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ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

Data Validation Report for CH2M Hill Plateau Remediation Company

VSR17-012
Project 200-EA-1

Chemical and Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder — Eyda Hergenreder — **Date:** 09-29-2017

Technical Review By: Ellen McEntee — *Ellen McEntee* — **Date:** 09-30-2017

Quality Review By: Mary A. Donivan — *Mary Donivan*, *Quality Assurance Manager* — **Date:** 10-04-2017

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Date: 29 September 2017
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200-EA-1
Subject: Volatile Organics - Sample Data Groups (SDGs) GEL426852, GEL427715, GEL428015, GEL428197 and GEL428482

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL426852, GEL427715, GEL428015, GEL428197 and GEL428482 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3BBC2	06/29/17	Soil	C	8260C
B3BBD0	07/11/17	Soil	C	8260C
B3BBC6	07/11/17	Soil	C	8260C
B3BBD4	07/11/17	Soil	C	8260C
B3BBD8	07/13/17	Soil	C	8260C
B3BBF2	07/13/17	Soil	C	8260C
B3BBF6	07/13/17	Soil	C	8260C
B3BBH0	07/17/17	Soil	C	8260C
B3BBH4	07/17/17	Soil	C	8260C
B3BBH8	07/19/17	Soil	C	8260C
B3BBJ2	07/19/17	Soil	C	8260C

Data validation was conducted in accordance with the CHPRC validation statement of work and the Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site, DOE/RL-2017-35, Rev. 0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for volatile organics are analysis within 14 days of sample collection. Sample preservation requires freezing to < -7 and >-20 degrees Celsius.

The samples were analyzed within the prescribed holding time and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exception. An MS/MSD pair was not included with SDG GEL427715. Data should not be qualified as a result.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS/LCSD recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤20%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

LCS/LCSD Samples

All reported LCS/LCSD RPD values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDGs GEL426852, GEL427715, GEL428015, GEL428197 and GEL428482 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

DOE/RL-2017-35, Rev. 0, *Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site*, June 2017.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Volatile Organics Data Qualification Summary			
SDGs: GEL426852, GEL427715, GEL428015, GEL428197, GEL428482	Reviewer: AQA	Project: 200-EA-1	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
VOCs	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200-EA-1			DATA PACKAGE: VSR17-012		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 09/29/17	
			SDG: GEL426852, GEL427715, GEL428015, GEL428197, GEL428482		
ANALYSES PERFORMED					
SW-846 8260 X		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
GEL426852: B3BBC2					
GEL427715: B3BBD0, B3BBC6, B3BBD4					
GEL428015: B3BBD8, B3BBF2, B3BBF6					
GEL428197: B3BBH0, B3BBH4					
GEL428482: B3BBH8, B3BBJ2					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes (No) N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No N/A
Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	Yes No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes No N/A
Surrogates traceable? (Levels D, E)	Yes No N/A
Surrogates expired? (Levels D, E)	Yes No N/A
MS/MSD samples analyzed?	Yes No N/A
MS/MSD results acceptable?	Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No N/A
MS/MSD standards? (Levels D, E)	Yes No N/A
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yes No N/A
Standards traceable? (Levels D, E)	Yes No N/A
Standards expired? (Levels D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No N/A

Comments:

MS/MSD samples were not included with SDG GEL427715

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	Yes (No) N/A
MS/MSD RPD values acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	(Yes) No N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

MS/MSD samples were not included with SDG GEL427715,

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No (N/A)
Internal standard areas acceptable?	Yes No (N/A)
Internal standard retention times acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No (N/A)
Compound quantitation acceptable? (Levels D, E)	Yes No (N/A)
Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

GEL LABORATORIES LLC

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QC Summary

Report Date: July 14, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **426852**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1681390											
QC1203828645 LCS											
1,1,1-Trichloroethane	50.0			47.4	ug/kg		95	(70%-130%)	VXY1	07/11/17	12:57
1,1,2,2-Tetrachloroethane	50.0			50.2	ug/kg		100	(70%-130%)			
1,1,2-Trichloroethane	50.0			47.0	ug/kg		94	(70%-130%)			
1,1-Dichloroethane	50.0			45.3	ug/kg		91	(70%-130%)			
1,1-Dichloroethylene	50.0			42.9	ug/kg		86	(70%-130%)			
1,2-Dichloroethane	50.0			44.7	ug/kg		89	(70%-130%)			
1,2-Dichloroethylene (total)	100			88.2	ug/kg		88	(70%-130%)			
1,2-Dichloropropane	50.0			42.8	ug/kg		86	(70%-130%)			
2-Butanone	250			208	ug/kg		83	(70%-130%)			
2-Hexanone	250			216	ug/kg		86	(70%-130%)			
4-Methyl-2-pentanone	250			198	ug/kg		79	(70%-130%)			
Acetone	250			232	ug/kg		93	(70%-130%)			
Benzene	50.0			44.0	ug/kg		88	(70%-130%)			

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1681390										
Bromodichloromethane	50.0			49.0	ug/kg		98	(70%-130%)	VXY1	07/11/17 12:57
Bromoform	50.0			48.0	ug/kg		96	(70%-130%)		
Bromomethane	50.0			51.1	ug/kg		102	(70%-130%)		
Carbon disulfide	250			198	ug/kg		79	(70%-130%)		
Carbon tetrachloride	50.0			45.7	ug/kg		91	(70%-130%)		
Chlorobenzene	50.0			44.3	ug/kg		89	(70%-130%)		
Chloroethane	50.0			47.7	ug/kg		95	(70%-130%)		
Chloroform	50.0			45.0	ug/kg		90	(70%-130%)		
Chloromethane	50.0			44.9	ug/kg		90	(70%-130%)		
Dibromochloromethane	50.0			51.3	ug/kg		103	(70%-130%)		
Ethylbenzene	50.0			43.2	ug/kg		86	(70%-130%)		
Methylene chloride	50.0			41.8	ug/kg		84	(70%-130%)		
Styrene	50.0			45.5	ug/kg		91	(70%-130%)		
Tetrachloroethylene	50.0			42.7	ug/kg		85	(70%-130%)		
Toluene	50.0			46.5	ug/kg		93	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1681390										
Trichloroethylene	50.0			45.8	ug/kg		92	(70%-130%)	VXY1	07/11/17 12:57
Vinyl chloride	50.0			48.5	ug/kg		97	(70%-130%)		
Xylenes (total)	150			132	ug/kg		88	(70%-130%)		
cis-1,3-Dichloropropylene	50.0			48.2	ug/kg		96	(70%-130%)		
n-Butyl alcohol	5000			3850	ug/kg		77	(70%-130%)		
trans-1,3-Dichloropropylene	50.0			49.1	ug/kg		98	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			45.3	ug/L		91	(70%-130%)		
**Bromofluorobenzene	50.0			54.2	ug/L		108	(70%-130%)		
**Toluene-d8	50.0			48.6	ug/L		97	(70%-130%)		
QC1203830996 LCS										
1,1,1-Trichloroethane	50.0			50.3	ug/kg		101	(70%-130%)		07/13/17 21:12
1,1,2,2-Tetrachloroethane	50.0			45.6	ug/kg		91	(70%-130%)		
1,1,2-Trichloroethane	50.0			45.0	ug/kg		90	(70%-130%)		
1,1-Dichloroethane	50.0			46.4	ug/kg		93	(70%-130%)		
1,1-Dichloroethylene	50.0			45.5	ug/kg		91	(70%-130%)		
1,2-Dichloroethane	50.0			45.1	ug/kg		90	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1681390										
1,2-Dichloroethylene (total)	100			93.2	ug/kg		93	(70%-130%)	VXY1	07/13/17 21:12
1,2-Dichloropropane	50.0			45.5	ug/kg		91	(70%-130%)		
2-Butanone	250			186	ug/kg		74	(70%-130%)		
2-Hexanone	250			190	ug/kg		76	(70%-130%)		
4-Methyl-2-pentanone	250			195	ug/kg		78	(70%-130%)		
Acetone	250			212	ug/kg		85	(70%-130%)		
Benzene	50.0			45.2	ug/kg		90	(70%-130%)		
Bromodichloromethane	50.0			49.0	ug/kg		98	(70%-130%)		
Bromoform	50.0			44.7	ug/kg		89	(70%-130%)		
Bromomethane	50.0			44.2	ug/kg		88	(70%-130%)		
Carbon disulfide	250			209	ug/kg		84	(70%-130%)		
Carbon tetrachloride	50.0			47.2	ug/kg		94	(70%-130%)		
Chlorobenzene	50.0			45.4	ug/kg		91	(70%-130%)		
Chloroethane	50.0			44.3	ug/kg		89	(70%-130%)		
Chloroform	50.0			47.3	ug/kg		95	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1681390										
Chloromethane	50.0			39.3	ug/kg		79	(70%-130%)	VXY1	07/13/17 21:12
Dibromochloromethane	50.0			50.0	ug/kg		100	(70%-130%)		
Ethylbenzene	50.0			44.2	ug/kg		88	(70%-130%)		
Methylene chloride	50.0			43.8	ug/kg		88	(70%-130%)		
Styrene	50.0			46.1	ug/kg		92	(70%-130%)		
Tetrachloroethylene	50.0			44.4	ug/kg		89	(70%-130%)		
Toluene	50.0			46.9	ug/kg		94	(70%-130%)		
Trichloroethylene	50.0			46.5	ug/kg		93	(70%-130%)		
Vinyl chloride	50.0			40.7	ug/kg		81	(70%-130%)		
Xylenes (total)	150			135	ug/kg		90	(70%-130%)		
cis-1,3-Dichloropropylene	50.0			47.0	ug/kg		94	(70%-130%)		
n-Butyl alcohol	5000			3870	ug/kg		77	(70%-130%)		
trans-1,3-Dichloropropylene	50.0			49.2	ug/kg		98	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			41.7	ug/L		83	(70%-130%)		
**Bromofluorobenzene	50.0			54.0	ug/L		108	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1681390										
**Toluene-d8	50.0			46.5	ug/L		93	(70%-130%)	VXY1	07/13/17 21:12
QC1203828644 MB										
1,1,1-Trichloroethane			U	0.300	ug/kg					07/11/17 15:00
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg					
1,1,2-Trichloroethane			U	0.300	ug/kg					
1,1-Dichloroethane			U	0.300	ug/kg					
1,1-Dichloroethylene			U	0.300	ug/kg					
1,2-Dichloroethane			U	0.300	ug/kg					
1,2-Dichloroethylene (total)			U	0.300	ug/kg					
1,2-Dichloropropane			U	0.300	ug/kg					
2-Butanone			U	3.00	ug/kg					
2-Hexanone			U	3.00	ug/kg					
4-Methyl-2-pentanone			U	3.00	ug/kg					
Acetone			U	3.00	ug/kg					
Benzene			U	0.300	ug/kg					
Bromodichloromethane			U	0.300	ug/kg					

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1681390										
Bromoform			U	0.300	ug/kg				VXY1	07/11/17 15:00
Bromomethane			U	0.300	ug/kg					
Carbon disulfide			U	1.60	ug/kg					
Carbon tetrachloride			U	0.300	ug/kg					
Chlorobenzene			U	0.300	ug/kg					
Chloroethane			U	0.300	ug/kg					
Chloroform			U	0.300	ug/kg					
Chloromethane			U	0.300	ug/kg					
Dibromochloromethane			U	0.300	ug/kg					
Ethylbenzene			U	0.300	ug/kg					
Methylene chloride			U	1.60	ug/kg					
Styrene			U	0.300	ug/kg					
Tetrachloroethylene			U	0.300	ug/kg					
Toluene			U	0.300	ug/kg					
Trichloroethylene			U	0.300	ug/kg					

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1681390										
Vinyl chloride			U	0.300	ug/kg				VXY1	07/11/17 15:00
Xylenes (total)			U	0.300	ug/kg					
cis-1,3-Dichloropropylene			U	0.300	ug/kg					
n-Butyl alcohol			U	83.3	ug/kg					
trans-1,3-Dichloropropylene			U	0.300	ug/kg					
**1,2-Dichloroethane-d4	50.0			50.1	ug/L		100	(70%-130%)		
**Bromofluorobenzene	50.0			51.1	ug/L		102	(70%-130%)		
**Toluene-d8	50.0			49.8	ug/L		100	(70%-130%)		
QC1203830995 MB										
1,1,1-Trichloroethane			U	0.300	ug/kg					07/13/17 23:15
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg					
1,1,2-Trichloroethane			U	0.300	ug/kg					
1,1-Dichloroethane			U	0.300	ug/kg					
1,1-Dichloroethylene			U	0.300	ug/kg					
1,2-Dichloroethane			U	0.300	ug/kg					
1,2-Dichloroethylene (total)			U	0.300	ug/kg					

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QC Summary

Workorder: **426852**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1681390										
1,2-Dichloropropane			U	0.300	ug/kg				VXY1	07/13/17 23:15
2-Butanone			U	3.00	ug/kg					
2-Hexanone			U	3.00	ug/kg					
4-Methyl-2-pentanone			U	3.00	ug/kg					
Acetone			U	3.00	ug/kg					
Benzene			U	0.300	ug/kg					
Bromodichloromethane			U	0.300	ug/kg					
Bromoform			U	0.300	ug/kg					
Bromomethane			U	0.300	ug/kg					
Carbon disulfide			U	1.60	ug/kg					
Carbon tetrachloride			U	0.300	ug/kg					
Chlorobenzene			U	0.300	ug/kg					
Chloroethane			U	0.300	ug/kg					
Chloroform			U	0.300	ug/kg					
Chloromethane			U	0.300	ug/kg					

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1681390										
Dibromochloromethane			U	0.300	ug/kg				VXY1	07/13/17 23:15
Ethylbenzene			U	0.300	ug/kg					
Methylene chloride			U	1.60	ug/kg					
Styrene			U	0.300	ug/kg					
Tetrachloroethylene			U	0.300	ug/kg					
Toluene			U	0.300	ug/kg					
Trichloroethylene			U	0.300	ug/kg					
Vinyl chloride			U	0.300	ug/kg					
Xylenes (total)			U	0.300	ug/kg					
cis-1,3-Dichloropropylene			U	0.300	ug/kg					
n-Butyl alcohol			U	83.3	ug/kg					
trans-1,3-Dichloropropylene			U	0.300	ug/kg					
**1,2-Dichloroethane-d4	50.0			44.8	ug/L		90	(70%-130%)		
**Bromofluorobenzene	50.0			49.2	ug/L		98	(70%-130%)		
**Toluene-d8	50.0			49.0	ug/L		98	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1681390											
QC1203830997 426852001 PS											
1,1,1-Trichloroethane	50.0	U	0.00	X	49.0	ug/L		98	(70%-130%)	VXY1	07/14/17 00:17
1,1,2,2-Tetrachloroethane	50.0	U	0.00	X	46.4	ug/L		93	(70%-130%)		
1,1,2-Trichloroethane	50.0	U	0.00	X	46.5	ug/L		93	(70%-130%)		
1,1-Dichloroethane	50.0	U	0.00	X	48.6	ug/L		97	(70%-130%)		
1,1-Dichloroethylene	50.0	U	0.00	X	44.2	ug/L		88	(70%-130%)		
1,2-Dichloroethane	50.0	U	0.00	X	46.0	ug/L		92	(70%-130%)		
1,2-Dichloroethylene (total)	100	U	0.00	X	90.1	ug/L		90	(70%-130%)		
1,2-Dichloropropane	50.0	U	0.00	X	45.3	ug/L		91	(70%-130%)		
2-Butanone	250	U	0.00	X	251	ug/L		101	(70%-130%)		
2-Hexanone	250	U	0.00	X	242	ug/L		97	(70%-130%)		
4-Methyl-2-pentanone	250	U	0.00	X	222	ug/L		89	(70%-130%)		
Acetone	250	U	0.00	X	282	ug/L		113	(70%-130%)		
Benzene	50.0	U	0.00	X	44.0	ug/L		88	(70%-130%)		
Bromodichloromethane	50.0	U	0.00	X	50.8	ug/L		102	(70%-130%)		
Bromoform	50.0	U	0.00	X	44.6	ug/L		89	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1681390											
Bromomethane	50.0	U	0.00	X	46.2	ug/L		92	(70%-130%)	VXY1	07/14/17 00:17
Carbon disulfide	250	U	0.00	X	208	ug/L		83	(70%-130%)		
Carbon tetrachloride	50.0	U	0.00	X	44.9	ug/L		90	(70%-130%)		
Chlorobenzene	50.0	U	0.00	X	42.6	ug/L		85	(70%-130%)		
Chloroethane	50.0	U	0.00	X	43.0	ug/L		86	(70%-130%)		
Chloroform	50.0	U	0.00	X	47.4	ug/L		95	(70%-130%)		
Chloromethane	50.0	U	0.00	X	41.9	ug/L		84	(70%-130%)		
Dibromochloromethane	50.0	U	0.00	X	50.4	ug/L		101	(70%-130%)		
Ethylbenzene	50.0	U	0.00	X	41.8	ug/L		84	(70%-130%)		
Methylene chloride	50.0	U	0.00	X	44.7	ug/L		89	(70%-130%)		
Styrene	50.0	U	0.00	X	42.0	ug/L		84	(70%-130%)		
Tetrachloroethylene	50.0	U	0.00	X	41.1	ug/L		82	(70%-130%)		
Toluene	50.0	U	0.00	X	44.6	ug/L		89	(70%-130%)		
Trichloroethylene	50.0	U	0.00	X	47.5	ug/L		95	(70%-130%)		
Vinyl chloride	50.0	U	0.00	X	41.5	ug/L		83	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1681390											
Xylenes (total)	150	U	0.00	X	122	ug/L		82	(70%-130%)	VXY1	07/14/17 00:17
cis-1,3-Dichloropropylene	50.0	U	0.00	X	47.9	ug/L		96	(70%-130%)		
n-Butyl alcohol	5000	U	0.00	X	4000	ug/L		80	(70%-130%)		
trans-1,3-Dichloropropylene	50.0	U	0.00	X	48.7	ug/L		97	(70%-130%)		
**1,2-Dichloroethane-d4	50.0		44.3		41.5	ug/L		83	(70%-130%)		
**Bromofluorobenzene	50.0		47.5		53.0	ug/L		106	(70%-130%)		
**Toluene-d8	50.0		48.8		45.6	ug/L		91	(70%-130%)		
QC1203830998 426852001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	X	48.8	ug/L	0	98	(0%-20%)		07/14/17 00:47
1,1,2,2-Tetrachloroethane	50.0	U	0.00	X	42.2	ug/L	10	84	(0%-20%)		
1,1,2-Trichloroethane	50.0	U	0.00	X	42.8	ug/L	8	86	(0%-20%)		
1,1-Dichloroethane	50.0	U	0.00	X	48.0	ug/L	1	96	(0%-20%)		
1,1-Dichloroethylene	50.0	U	0.00	X	43.0	ug/L	3	86	(0%-20%)		
1,2-Dichloroethane	50.0	U	0.00	X	43.4	ug/L	6	87	(0%-20%)		
1,2-Dichloroethylene (total)	100	U	0.00	X	87.9	ug/L	2	88	(0%-20%)		
1,2-Dichloropropane	50.0	U	0.00	X	42.1	ug/L	7	84	(0%-20%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1681390											
2-Butanone	250	U	0.00	X	215	ug/L	16	86	(0%-20%)	VXY1	07/14/17 00:47
2-Hexanone	250	U	0.00	X	205	ug/L	16	82	(0%-20%)		
4-Methyl-2-pentanone	250	U	0.00	X	197	ug/L	12	79	(0%-20%)		
Acetone	250	U	0.00	X	234	ug/L	19	94	(0%-20%)		
Benzene	50.0	U	0.00	X	43.6	ug/L	1	87	(0%-20%)		
Bromodichloromethane	50.0	U	0.00	X	46.4	ug/L	9	93	(0%-20%)		
Bromoform	50.0	U	0.00	X	41.2	ug/L	8	82	(0%-20%)		
Bromomethane	50.0	U	0.00	X	44.4	ug/L	4	89	(0%-20%)		
Carbon disulfide	250	U	0.00	X	207	ug/L	0	83	(0%-20%)		
Carbon tetrachloride	50.0	U	0.00	X	44.7	ug/L	0	89	(0%-20%)		
Chlorobenzene	50.0	U	0.00	X	38.9	ug/L	9	78	(0%-20%)		
Chloroethane	50.0	U	0.00	X	43.6	ug/L	1	87	(0%-20%)		
Chloroform	50.0	U	0.00	X	45.7	ug/L	4	91	(0%-20%)		
Chloromethane	50.0	U	0.00	X	40.2	ug/L	4	80	(0%-20%)		
Dibromochloromethane	50.0	U	0.00	X	46.2	ug/L	9	92	(0%-20%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anist	Date Time
Volatile-GC/MS											
Batch 1681390											
Ethylbenzene	50.0	U	0.00	X	37.5	ug/L	11	75	(0%-20%)	VXY1	07/14/17 00:47
Methylene chloride	50.0	U	0.00	X	42.4	ug/L	5	85	(0%-20%)		
Styrene	50.0	U	0.00	X	37.5	ug/L	12	75	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00	X	36.6	ug/L	12	73	(0%-20%)		
Toluene	50.0	U	0.00	X	40.6	ug/L	9	81	(0%-20%)		
Trichloroethylene	50.0	U	0.00	X	44.6	ug/L	6	89	(0%-20%)		
Vinyl chloride	50.0	U	0.00	X	40.5	ug/L	2	81	(0%-20%)		
Xylenes (total)	150	U	0.00	X	108	ug/L	12	72	(0%-20%)		
cis-1,3-Dichloropropylene	50.0	U	0.00	X	42.9	ug/L	11	86	(0%-20%)		
n-Butyl alcohol	5000	U	0.00	X	3810	ug/L	5	76	(0%-20%)		
trans-1,3-Dichloropropylene	50.0	U	0.00	X	45.1	ug/L	8	90	(0%-20%)		
**1,2-Dichloroethane-d4	50.0		44.3		38.7	ug/L		77	(70%-130%)		
**Bromofluorobenzene	50.0		47.5		52.0	ug/L		104	(70%-130%)		
**Toluene-d8	50.0		48.8		43.3	ug/L		87	(70%-130%)		

Notes:

The Qualifiers in this report are defined as follows:

Volatile

Surrogate Recovery Report

SDG Number: GEL426852

Matrix Type: SOLID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203828645	LCS for batch 1681389	91	97	108
1203828644	MB for batch 1681389	100	100	102
426852001	B3BBC2	89	98	95
1203830996	LCS for batch 1681389	83	93	108
1203830995	MB for batch 1681389	90	98	98
1203830997	B3BBC2PS	83	91	106
1203830998	B3BBC2PSD	77	87	104

Surrogate		Acceptance Limits
DCED4	= 1,2-Dichloroethane-d4	(70%-130%)
TOL	= Toluene-d8	(70%-130%)
BFB	= Bromofluorobenzene	(70%-130%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

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QC Summary

Report Date: July 25, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **427715**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
QC1203834294 LCS										
1,1,1-Trichloroethane	50.0			51.0	ug/kg		102	(70%-130%)	VXY1	07/19/17 10:32
1,1,2,2-Tetrachloroethane	50.0			44.8	ug/kg		90	(70%-130%)		
1,1,2-Trichloroethane	50.0			42.8	ug/kg		86	(70%-130%)		
1,1-Dichloroethane	50.0			45.9	ug/kg		92	(70%-130%)		
1,1-Dichloroethylene	50.0			43.9	ug/kg		88	(70%-130%)		
1,2-Dichloroethane	50.0			42.8	ug/kg		86	(70%-130%)		
1,2-Dichloroethylene (total)	100			91.1	ug/kg		91	(70%-130%)		
1,2-Dichloropropane	50.0			43.9	ug/kg		88	(70%-130%)		
2-Butanone	250			226	ug/kg		91	(70%-130%)		
2-Hexanone	250			224	ug/kg		90	(70%-130%)		
4-Methyl-2-pentanone	250			200	ug/kg		80	(70%-130%)		
Acetone	250			259	ug/kg		104	(70%-130%)		
Benzene	50.0			44.7	ug/kg		89	(70%-130%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Bromodichloromethane	50.0			48.5	ug/kg		97	(70%-130%)	VXY1	07/19/17 10:32
Bromoform	50.0			43.5	ug/kg		87	(70%-130%)		
Bromomethane	50.0			49.6	ug/kg		99	(70%-130%)		
Carbon disulfide	250			212	ug/kg		85	(70%-130%)		
Carbon tetrachloride	50.0			45.4	ug/kg		91	(70%-130%)		
Chlorobenzene	50.0			43.5	ug/kg		87	(70%-130%)		
Chloroethane	50.0			47.6	ug/kg		95	(70%-130%)		
Chloroform	50.0			45.5	ug/kg		91	(70%-130%)		
Chloromethane	50.0			43.2	ug/kg		86	(70%-130%)		
Dibromochloromethane	50.0			50.2	ug/kg		100	(70%-130%)		
Ethylbenzene	50.0			42.9	ug/kg		86	(70%-130%)		
Methylene chloride	50.0			41.9	ug/kg		84	(70%-130%)		
Styrene	50.0			44.2	ug/kg		88	(70%-130%)		
Tetrachloroethylene	50.0			43.5	ug/kg		87	(70%-130%)		
Toluene	50.0			45.3	ug/kg		91	(70%-130%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Trichloroethylene	50.0			47.7	ug/kg		95	(70%-130%)	VXY1	07/19/17 10:32
Vinyl chloride	50.0			46.5	ug/kg		93	(70%-130%)		
Xylenes (total)	150			126	ug/kg		84	(70%-130%)		
cis-1,3-Dichloropropylene	50.0			46.4	ug/kg		93	(70%-130%)		
n-Butyl alcohol	5000			3640	ug/kg		73	(70%-130%)		
trans-1,3-Dichloropropylene	50.0			47.5	ug/kg		95	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			41.5	ug/L		83	(70%-130%)		
**Bromofluorobenzene	50.0			53.3	ug/L		107	(70%-130%)		
**Toluene-d8	50.0			45.1	ug/L		90	(70%-130%)		
QC1203834295 LCSD										
1,1,1-Trichloroethane	50.0			49.5	ug/kg	3	99	(0%-20%)		07/19/17 11:03
1,1,2,2-Tetrachloroethane	50.0			48.5	ug/kg	8	97	(0%-20%)		
1,1,2-Trichloroethane	50.0			46.5	ug/kg	8	93	(0%-20%)		
1,1-Dichloroethane	50.0			45.6	ug/kg	1	91	(0%-20%)		
1,1-Dichloroethylene	50.0			43.6	ug/kg	1	87	(0%-20%)		
1,2-Dichloroethane	50.0			44.2	ug/kg	3	88	(0%-20%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
1,2-Dichloroethylene (total)	100			88.7	ug/kg	3	89	(0%-20%)	VXY1	07/19/17 11:03
1,2-Dichloropropane	50.0			44.6	ug/kg	2	89	(0%-20%)		
2-Butanone	250			231	ug/kg	2	93	(0%-20%)		
2-Hexanone	250			244	ug/kg	8	97	(0%-20%)		
4-Methyl-2-pentanone	250			214	ug/kg	7	86	(0%-20%)		
Acetone	250			262	ug/kg	1	105	(0%-20%)		
Benzene	50.0			43.8	ug/kg	2	88	(0%-20%)		
Bromodichloromethane	50.0			48.5	ug/kg	0	97	(0%-20%)		
Bromoform	50.0			45.7	ug/kg	5	91	(0%-20%)		
Bromomethane	50.0			41.3	ug/kg	18	83	(0%-20%)		
Carbon disulfide	250			201	ug/kg	5	80	(0%-20%)		
Carbon tetrachloride	50.0			46.0	ug/kg	1	92	(0%-20%)		
Chlorobenzene	50.0			47.0	ug/kg	8	94	(0%-20%)		
Chloroethane	50.0			41.0	ug/kg	15	82	(0%-20%)		
Chloroform	50.0			46.1	ug/kg	1	92	(0%-20%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Chloromethane	50.0			39.4	ug/kg	9	79	(0%-20%)	VXY1	07/19/17 11:03
Dibromochloromethane	50.0			52.4	ug/kg	4	105	(0%-20%)		
Ethylbenzene	50.0			46.0	ug/kg	7	92	(0%-20%)		
Methylene chloride	50.0			41.1	ug/kg	2	82	(0%-20%)		
Styrene	50.0			46.1	ug/kg	4	92	(0%-20%)		
Tetrachloroethylene	50.0			45.5	ug/kg	4	91	(0%-20%)		
Toluene	50.0			47.3	ug/kg	4	95	(0%-20%)		
Trichloroethylene	50.0			47.2	ug/kg	1	94	(0%-20%)		
Vinyl chloride	50.0			38.0	ug/kg	20	76	(0%-20%)		
Xylenes (total)	150			137	ug/kg	8	91	(0%-20%)		
cis-1,3-Dichloropropylene	50.0			48.1	ug/kg	4	96	(0%-20%)		
n-Butyl alcohol	5000			3760	ug/kg	3	75	(0%-20%)		
trans-1,3-Dichloropropylene	50.0			51.5	ug/kg	8	103	(0%-20%)		
**1,2-Dichloroethane-d4	50.0			42.7	ug/L		85	(70%-130%)		
**Bromofluorobenzene	50.0			52.4	ug/L		105	(70%-130%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
**Toluene-d8	50.0			46.4	ug/L		93	(70%-130%)	VXY1	07/19/17 11:03
QC1203834293 MB										
1,1,1-Trichloroethane			U	0.300	ug/kg					07/19/17 13:37
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg					
1,1,2-Trichloroethane			U	0.300	ug/kg					
1,1-Dichloroethane			U	0.300	ug/kg					
1,1-Dichloroethylene			U	0.300	ug/kg					
1,2-Dichloroethane			U	0.300	ug/kg					
1,2-Dichloroethylene (total)			U	0.300	ug/kg					
1,2-Dichloropropane			U	0.300	ug/kg					
2-Butanone			U	3.00	ug/kg					
2-Hexanone			U	3.00	ug/kg					
4-Methyl-2-pentanone			U	3.00	ug/kg					
Acetone			U	3.00	ug/kg					
Benzene			U	0.300	ug/kg					
Bromodichloromethane			U	0.300	ug/kg					

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Bromoform			U	0.300	ug/kg				VXY1	07/19/17 13:37
Bromomethane			U	0.300	ug/kg					
Carbon disulfide			U	1.60	ug/kg					
Carbon tetrachloride			U	0.300	ug/kg					
Chlorobenzene			U	0.300	ug/kg					
Chloroethane			U	0.300	ug/kg					
Chloroform			U	0.300	ug/kg					
Chloromethane			U	0.300	ug/kg					
Dibromochloromethane			U	0.300	ug/kg					
Ethylbenzene			U	0.300	ug/kg					
Methylene chloride			U	1.60	ug/kg					
Styrene			U	0.300	ug/kg					
Tetrachloroethylene			U	0.300	ug/kg					
Toluene			U	0.300	ug/kg					
Trichloroethylene			U	0.300	ug/kg					

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Vinyl chloride			U	0.300	ug/kg				VXY1	07/19/17 13:37
Xylenes (total)			U	0.300	ug/kg					
cis-1,3-Dichloropropylene			U	0.300	ug/kg					
n-Butyl alcohol			U	83.3	ug/kg					
trans-1,3-Dichloropropylene			U	0.300	ug/kg					
**1,2-Dichloroethane-d4	50.0			45.3	ug/L		91	(70%-130%)		
**Bromofluorobenzene	50.0			50.2	ug/L		100	(70%-130%)		
**Toluene-d8	50.0			47.6	ug/L		95	(70%-130%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

Volatile

Surrogate Recovery Report

SDG Number: GEL427715

Matrix Type: SOLID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203834294	LCS for batch 1683620	83	90	107
1203834295	LCSD for batch 1683620	85	93	105
1203834293	MB for batch 1683620	91	95	100
427715001	B3BBD0	106	104	114
427715002	B3BBC6	107	98	111
427715003	B3BBD4	101	96	103

Surrogate		Acceptance Limits
DCED4	= 1,2-Dichloroethane-d4	(70%-130%)
TOL	= Toluene-d8	(70%-130%)
BFB	= Bromofluorobenzene	(70%-130%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

GEL LABORATORIES LLC

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QC Summary

Report Date: July 25, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428015**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
QC1203834294 LCS										
1,1,1-Trichloroethane	50.0			51.0	ug/kg		102	(70%-130%)	VXY1	07/19/17 10:32
1,1,2,2-Tetrachloroethane	50.0			44.8	ug/kg		90	(70%-130%)		
1,1,2-Trichloroethane	50.0			42.8	ug/kg		86	(70%-130%)		
1,1-Dichloroethane	50.0			45.9	ug/kg		92	(70%-130%)		
1,1-Dichloroethylene	50.0			43.9	ug/kg		88	(70%-130%)		
1,2-Dichloroethane	50.0			42.8	ug/kg		86	(70%-130%)		
1,2-Dichloroethylene (total)	100			91.1	ug/kg		91	(70%-130%)		
1,2-Dichloropropane	50.0			43.9	ug/kg		88	(70%-130%)		
2-Butanone	250			226	ug/kg		91	(70%-130%)		
2-Hexanone	250			224	ug/kg		90	(70%-130%)		
4-Methyl-2-pentanone	250			200	ug/kg		80	(70%-130%)		
Acetone	250			259	ug/kg		104	(70%-130%)		
Benzene	50.0			44.7	ug/kg		89	(70%-130%)		

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1683628											
Bromodichloromethane	50.0			48.5	ug/kg		97	(70%-130%)	VXY1	07/19/17	10:32
Bromoform	50.0			43.5	ug/kg		87	(70%-130%)			
Bromomethane	50.0			49.6	ug/kg		99	(70%-130%)			
Carbon disulfide	250			212	ug/kg		85	(70%-130%)			
Carbon tetrachloride	50.0			45.4	ug/kg		91	(70%-130%)			
Chlorobenzene	50.0			43.5	ug/kg		87	(70%-130%)			
Chloroethane	50.0			47.6	ug/kg		95	(70%-130%)			
Chloroform	50.0			45.5	ug/kg		91	(70%-130%)			
Chloromethane	50.0			43.2	ug/kg		86	(70%-130%)			
Dibromochloromethane	50.0			50.2	ug/kg		100	(70%-130%)			
Ethylbenzene	50.0			42.9	ug/kg		86	(70%-130%)			
Methylene chloride	50.0			41.9	ug/kg		84	(70%-130%)			
Styrene	50.0			44.2	ug/kg		88	(70%-130%)			
Tetrachloroethylene	50.0			43.5	ug/kg		87	(70%-130%)			
Toluene	50.0			45.3	ug/kg		91	(70%-130%)			

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Trichloroethylene	50.0			47.7	ug/kg		95	(70%-130%)	VXY1	07/19/17 10:32
Vinyl chloride	50.0			46.5	ug/kg		93	(70%-130%)		
Xylenes (total)	150			126	ug/kg		84	(70%-130%)		
cis-1,3-Dichloropropylene	50.0			46.4	ug/kg		93	(70%-130%)		
n-Butyl alcohol	5000			3640	ug/kg		73	(70%-130%)		
trans-1,3-Dichloropropylene	50.0			47.5	ug/kg		95	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			41.5	ug/L		83	(70%-130%)		
**Bromofluorobenzene	50.0			53.3	ug/L		107	(70%-130%)		
**Toluene-d8	50.0			45.1	ug/L		90	(70%-130%)		
QC1203834293 MB										
1,1,1-Trichloroethane			U	0.300	ug/kg					07/19/17 13:37
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg					
1,1,2-Trichloroethane			U	0.300	ug/kg					
1,1-Dichloroethane			U	0.300	ug/kg					
1,1-Dichloroethylene			U	0.300	ug/kg					
1,2-Dichloroethane			U	0.300	ug/kg					

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QC Summary

Workorder: **428015**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
1,2-Dichloroethylene (total)			U	0.300	ug/kg				VXY1	07/19/17 13:37
1,2-Dichloropropane			U	0.300	ug/kg					
2-Butanone			U	3.00	ug/kg					
2-Hexanone			U	3.00	ug/kg					
4-Methyl-2-pentanone			U	3.00	ug/kg					
Acetone			U	3.00	ug/kg					
Benzene			U	0.300	ug/kg					
Bromodichloromethane			U	0.300	ug/kg					
Bromoform			U	0.300	ug/kg					
Bromomethane			U	0.300	ug/kg					
Carbon disulfide			U	1.60	ug/kg					
Carbon tetrachloride			U	0.300	ug/kg					
Chlorobenzene			U	0.300	ug/kg					
Chloroethane			U	0.300	ug/kg					
Chloroform			U	0.300	ug/kg					

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Chloromethane			U	0.300	ug/kg				VXY1	07/19/17 13:37
Dibromochloromethane			U	0.300	ug/kg					
Ethylbenzene			U	0.300	ug/kg					
Methylene chloride			U	1.60	ug/kg					
Styrene			U	0.300	ug/kg					
Tetrachloroethylene			U	0.300	ug/kg					
Toluene			U	0.300	ug/kg					
Trichloroethylene			U	0.300	ug/kg					
Vinyl chloride			U	0.300	ug/kg					
Xylenes (total)			U	0.300	ug/kg					
cis-1,3-Dichloropropylene			U	0.300	ug/kg					
n-Butyl alcohol			U	83.3	ug/kg					
trans-1,3-Dichloropropylene			U	0.300	ug/kg					
**1,2-Dichloroethane-d4	50.0			45.3	ug/L		91	(70%-130%)		
**Bromofluorobenzene	50.0			50.2	ug/L		100	(70%-130%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
**Toluene-d8	50.0				47.6	ug/L		95	(70%-130%)	VXY1	07/19/17 13:37
QC1203835488 428015001 PS											
1,1,1-Trichloroethane	50.0	U	0.00		47.2	ug/L		94	(70%-130%)		07/19/17 19:14
1,1,2,2-Tetrachloroethane	50.0	U	0.00		45.8	ug/L		92	(70%-130%)		
1,1,2-Trichloroethane	50.0	U	0.00		46.3	ug/L		93	(70%-130%)		
1,1-Dichloroethane	50.0	U	0.00		46.9	ug/L		94	(70%-130%)		
1,1-Dichloroethylene	50.0	U	0.00		41.1	ug/L		82	(70%-130%)		
1,2-Dichloroethane	50.0	U	0.00		43.9	ug/L		88	(70%-130%)		
1,2-Dichloroethylene (total)	100	U	0.00		89.9	ug/L		90	(70%-130%)		
1,2-Dichloropropane	50.0	U	0.00		46.4	ug/L		93	(70%-130%)		
2-Butanone	250	U	0.00		264	ug/L		106	(70%-130%)		
2-Hexanone	250	U	0.00		254	ug/L		102	(70%-130%)		
4-Methyl-2-pentanone	250	U	0.00		220	ug/L		88	(70%-130%)		
Acetone	250	U	0.00		295	ug/L		118	(70%-130%)		
Benzene	50.0	U	0.00		45.2	ug/L		90	(70%-130%)		
Bromodichloromethane	50.0	U	0.00		49.2	ug/L		98	(70%-130%)		

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QC Summary

Workorder: **428015**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
Bromoform	50.0	U	0.00		43.6	ug/L		87	(70%-130%)	VXY1	07/19/17 19:14
Bromomethane	50.0	U	0.00		46.9	ug/L		94	(70%-130%)		
Carbon disulfide	250	U	0.00		209	ug/L		84	(70%-130%)		
Carbon tetrachloride	50.0	U	0.00		44.3	ug/L		89	(70%-130%)		
Chlorobenzene	50.0	U	0.00		45.6	ug/L		91	(70%-130%)		
Chloroethane	50.0	U	0.00		42.7	ug/L		85	(70%-130%)		
Chloroform	50.0	U	0.00		46.4	ug/L		93	(70%-130%)		
Chloromethane	50.0	U	0.00		38.5	ug/L		77	(70%-130%)		
Dibromochloromethane	50.0	U	0.00		50.2	ug/L		100	(70%-130%)		
Ethylbenzene	50.0	U	0.00		44.3	ug/L		89	(70%-130%)		
Methylene chloride	50.0	U	0.00		42.1	ug/L		84	(70%-130%)		
Styrene	50.0	U	0.00		44.6	ug/L		89	(70%-130%)		
Tetrachloroethylene	50.0	U	0.00		41.8	ug/L		84	(70%-130%)		
Toluene	50.0	U	0.00		46.6	ug/L		93	(70%-130%)		
Trichloroethylene	50.0	U	0.00		48.6	ug/L		97	(70%-130%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
Vinyl chloride	50.0	U	0.00		39.4	ug/L		79	(70%-130%)	VXY1	07/19/17 19:14
Xylenes (total)	150	U	0.00		129	ug/L		86	(70%-130%)		
cis-1,3-Dichloropropylene	50.0	U	0.00		47.3	ug/L		95	(70%-130%)		
n-Butyl alcohol	5000	U	0.00		3910	ug/L		78	(70%-130%)		
trans-1,3-Dichloropropylene	50.0	U	0.00		47.7	ug/L		95	(70%-130%)		
**1,2-Dichloroethane-d4	50.0		45.6		40.2	ug/L		80	(70%-130%)		
**Bromofluorobenzene	50.0		49.6		52.5	ug/L		105	(70%-130%)		
**Toluene-d8	50.0		44.6		45.6	ug/L		91	(70%-130%)		
QC1203835489 428015001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00		49.2	ug/L	4	98	(0%-20%)		07/19/17 19:45
1,1,2,2-Tetrachloroethane	50.0	U	0.00		44.2	ug/L	4	88	(0%-20%)		
1,1,2-Trichloroethane	50.0	U	0.00		43.8	ug/L	5	88	(0%-20%)		
1,1-Dichloroethane	50.0	U	0.00		48.4	ug/L	3	97	(0%-20%)		
1,1-Dichloroethylene	50.0	U	0.00		43.2	ug/L	5	86	(0%-20%)		
1,2-Dichloroethane	50.0	U	0.00		44.2	ug/L	1	88	(0%-20%)		
1,2-Dichloroethylene (total)	100	U	0.00		89.1	ug/L	1	89	(0%-20%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
1,2-Dichloropropane	50.0	U	0.00		46.0	ug/L	1	92	(0%-20%)	VXY1	07/19/17 19:45
2-Butanone	250	U	0.00		251	ug/L	5	100	(0%-20%)		
2-Hexanone	250	U	0.00		238	ug/L	6	95	(0%-20%)		
4-Methyl-2-pentanone	250	U	0.00		202	ug/L	8	81	(0%-20%)		
Acetone	250	U	0.00		294	ug/L	0	118	(0%-20%)		
Benzene	50.0	U	0.00		45.0	ug/L	0	90	(0%-20%)		
Bromodichloromethane	50.0	U	0.00		48.9	ug/L	1	98	(0%-20%)		
Bromoform	50.0	U	0.00		43.0	ug/L	1	86	(0%-20%)		
Bromomethane	50.0	U	0.00		50.5	ug/L	7	101	(0%-20%)		
Carbon disulfide	250	U	0.00		214	ug/L	2	86	(0%-20%)		
Carbon tetrachloride	50.0	U	0.00		45.2	ug/L	2	90	(0%-20%)		
Chlorobenzene	50.0	U	0.00		42.9	ug/L	6	86	(0%-20%)		
Chloroethane	50.0	U	0.00		46.3	ug/L	8	93	(0%-20%)		
Chloroform	50.0	U	0.00		46.0	ug/L	1	92	(0%-20%)		
Chloromethane	50.0	U	0.00		40.1	ug/L	4	80	(0%-20%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
Dibromochloromethane	50.0	U	0.00		47.8	ug/L	5	96	(0%-20%)	VXY1	07/19/17 19:45
Ethylbenzene	50.0	U	0.00		43.2	ug/L	2	86	(0%-20%)		
Methylene chloride	50.0	U	0.00		45.1	ug/L	7	90	(0%-20%)		
Styrene	50.0	U	0.00		41.6	ug/L	7	83	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00		40.9	ug/L	2	82	(0%-20%)		
Toluene	50.0	U	0.00		46.3	ug/L	1	93	(0%-20%)		
Trichloroethylene	50.0	U	0.00		47.9	ug/L	1	96	(0%-20%)		
Vinyl chloride	50.0	U	0.00		42.3	ug/L	7	85	(0%-20%)		
Xylenes (total)	150	U	0.00		124	ug/L	4	83	(0%-20%)		
cis-1,3-Dichloropropylene	50.0	U	0.00		46.9	ug/L	1	94	(0%-20%)		
n-Butyl alcohol	5000	U	0.00		3840	ug/L	2	77	(0%-20%)		
trans-1,3-Dichloropropylene	50.0	U	0.00		47.7	ug/L	0	95	(0%-20%)		
**1,2-Dichloroethane-d4	50.0		45.6		41.4	ug/L		83	(70%-130%)		
**Bromofluorobenzene	50.0		49.6		52.3	ug/L		105	(70%-130%)		
**Toluene-d8	50.0		44.6		44.7	ug/L		89	(70%-130%)		

Notes:

Volatile

Surrogate Recovery Report

SDG Number: GEL428015

Matrix Type: SOLID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203834294	LCS for batch 1683620	83	90	107
1203834293	MB for batch 1683620	91	95	100
428015001	B3BBD8	91	89	99
428015002	B3BBF2	90	94	99
428015003	B3BBF6	87	93	101
1203835488	B3BBD8PS	80	91	105
1203835489	B3BBD8PSD	83	89	105

Surrogate		Acceptance Limits
DCED4	= 1,2-Dichloroethane-d4	(70%-130%)
TOL	= Toluene-d8	(70%-130%)
BFB	= Bromofluorobenzene	(70%-130%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 25, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1683628											
QC1203834294 LCS											
1,1,1-Trichloroethane	50.0			51.0	ug/kg		102	(70%-130%)	VXY1	07/19/17	10:32
1,1,2,2-Tetrachloroethane	50.0			44.8	ug/kg		90	(70%-130%)			
1,1,2-Trichloroethane	50.0			42.8	ug/kg		86	(70%-130%)			
1,1-Dichloroethane	50.0			45.9	ug/kg		92	(70%-130%)			
1,1-Dichloroethylene	50.0			43.9	ug/kg		88	(70%-130%)			
1,2-Dichloroethane	50.0			42.8	ug/kg		86	(70%-130%)			
1,2-Dichloroethylene (total)	100			91.1	ug/kg		91	(70%-130%)			
1,2-Dichloropropane	50.0			43.9	ug/kg		88	(70%-130%)			
2-Butanone	250			226	ug/kg		91	(70%-130%)			
2-Hexanone	250			224	ug/kg		90	(70%-130%)			
4-Methyl-2-pentanone	250			200	ug/kg		80	(70%-130%)			
Acetone	250			259	ug/kg		104	(70%-130%)			
Benzene	50.0			44.7	ug/kg		89	(70%-130%)			

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1683628											
Bromodichloromethane	50.0			48.5	ug/kg		97	(70%-130%)	VXY1	07/19/17	10:32
Bromoform	50.0			43.5	ug/kg		87	(70%-130%)			
Bromomethane	50.0			49.6	ug/kg		99	(70%-130%)			
Carbon disulfide	250			212	ug/kg		85	(70%-130%)			
Carbon tetrachloride	50.0			45.4	ug/kg		91	(70%-130%)			
Chlorobenzene	50.0			43.5	ug/kg		87	(70%-130%)			
Chloroethane	50.0			47.6	ug/kg		95	(70%-130%)			
Chloroform	50.0			45.5	ug/kg		91	(70%-130%)			
Chloromethane	50.0			43.2	ug/kg		86	(70%-130%)			
Dibromochloromethane	50.0			50.2	ug/kg		100	(70%-130%)			
Ethylbenzene	50.0			42.9	ug/kg		86	(70%-130%)			
Methylene chloride	50.0			41.9	ug/kg		84	(70%-130%)			
Styrene	50.0			44.2	ug/kg		88	(70%-130%)			
Tetrachloroethylene	50.0			43.5	ug/kg		87	(70%-130%)			
Toluene	50.0			45.3	ug/kg		91	(70%-130%)			

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Trichloroethylene	50.0			47.7	ug/kg		95	(70%-130%)	VXY1	07/19/17 10:32
Vinyl chloride	50.0			46.5	ug/kg		93	(70%-130%)		
Xylenes (total)	150			126	ug/kg		84	(70%-130%)		
cis-1,3-Dichloropropylene	50.0			46.4	ug/kg		93	(70%-130%)		
n-Butyl alcohol	5000			3640	ug/kg		73	(70%-130%)		
trans-1,3-Dichloropropylene	50.0			47.5	ug/kg		95	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			41.5	ug/L		83	(70%-130%)		
**Bromofluorobenzene	50.0			53.3	ug/L		107	(70%-130%)		
**Toluene-d8	50.0			45.1	ug/L		90	(70%-130%)		
QC1203836196 LCS										
1,1,1-Trichloroethane	50.0			55.9	ug/kg		112	(70%-130%)		07/21/17 10:34
1,1,2,2-Tetrachloroethane	50.0			50.2	ug/kg		100	(70%-130%)		
1,1,2-Trichloroethane	50.0			48.6	ug/kg		97	(70%-130%)		
1,1-Dichloroethane	50.0			48.6	ug/kg		97	(70%-130%)		
1,1-Dichloroethylene	50.0			47.4	ug/kg		95	(70%-130%)		
1,2-Dichloroethane	50.0			48.1	ug/kg		96	(70%-130%)		

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QC Summary

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
1,2-Dichloroethylene (total)	100			97.5	ug/kg		98	(70%-130%)	VXY1	07/21/17 10:34
1,2-Dichloropropane	50.0			48.9	ug/kg		98	(70%-130%)		
2-Butanone	250			271	ug/kg		108	(70%-130%)		
2-Hexanone	250			255	ug/kg		102	(70%-130%)		
4-Methyl-2-pentanone	250			221	ug/kg		89	(70%-130%)		
Acetone	250			315	ug/kg		126	(70%-130%)		
Benzene	50.0			48.5	ug/kg		97	(70%-130%)		
Bromodichloromethane	50.0			54.1	ug/kg		108	(70%-130%)		
Bromoform	50.0			47.3	ug/kg		95	(70%-130%)		
Bromomethane	50.0			50.4	ug/kg		101	(70%-130%)		
Carbon disulfide	250			230	ug/kg		92	(70%-130%)		
Carbon tetrachloride	50.0			50.3	ug/kg		101	(70%-130%)		
Chlorobenzene	50.0			47.2	ug/kg		94	(70%-130%)		
Chloroethane	50.0			48.3	ug/kg		97	(70%-130%)		
Chloroform	50.0			49.2	ug/kg		98	(70%-130%)		

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Chloromethane	50.0			40.9	ug/kg		82	(70%-130%)	VXY1	07/21/17 10:34
Dibromochloromethane	50.0			53.5	ug/kg		107	(70%-130%)		
Ethylbenzene	50.0			46.7	ug/kg		93	(70%-130%)		
Methylene chloride	50.0			48.1	ug/kg		96	(70%-130%)		
Styrene	50.0			47.1	ug/kg		94	(70%-130%)		
Tetrachloroethylene	50.0			44.9	ug/kg		90	(70%-130%)		
Toluene	50.0			46.3	ug/kg		93	(70%-130%)		
Trichloroethylene	50.0			51.5	ug/kg		103	(70%-130%)		
Vinyl chloride	50.0			42.5	ug/kg		85	(70%-130%)		
Xylenes (total)	150			134	ug/kg		90	(70%-130%)		
cis-1,3-Dichloropropylene	50.0			52.8	ug/kg		106	(70%-130%)		
n-Butyl alcohol	5000			4280	ug/kg		86	(70%-130%)		
trans-1,3-Dichloropropylene	50.0			50.7	ug/kg		101	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			44.8	ug/L		90	(70%-130%)		
**Bromofluorobenzene	50.0			53.9	ug/L		108	(70%-130%)		

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
**Toluene-d8	50.0			44.5	ug/L		89	(70%-130%)	VXY1	07/21/17 10:34
QC1203834293 MB										
1,1,1-Trichloroethane			U	0.300	ug/kg					07/19/17 13:37
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg					
1,1,2-Trichloroethane			U	0.300	ug/kg					
1,1-Dichloroethane			U	0.300	ug/kg					
1,1-Dichloroethylene			U	0.300	ug/kg					
1,2-Dichloroethane			U	0.300	ug/kg					
1,2-Dichloroethylene (total)			U	0.300	ug/kg					
1,2-Dichloropropane			U	0.300	ug/kg					
2-Butanone			U	3.00	ug/kg					
2-Hexanone			U	3.00	ug/kg					
4-Methyl-2-pentanone			U	3.00	ug/kg					
Acetone			U	3.00	ug/kg					
Benzene			U	0.300	ug/kg					
Bromodichloromethane			U	0.300	ug/kg					

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Bromoform			U	0.300	ug/kg				VXY1	07/19/17 13:37
Bromomethane			U	0.300	ug/kg					
Carbon disulfide			U	1.60	ug/kg					
Carbon tetrachloride			U	0.300	ug/kg					
Chlorobenzene			U	0.300	ug/kg					
Chloroethane			U	0.300	ug/kg					
Chloroform			U	0.300	ug/kg					
Chloromethane			U	0.300	ug/kg					
Dibromochloromethane			U	0.300	ug/kg					
Ethylbenzene			U	0.300	ug/kg					
Methylene chloride			U	1.60	ug/kg					
Styrene			U	0.300	ug/kg					
Tetrachloroethylene			U	0.300	ug/kg					
Toluene			U	0.300	ug/kg					
Trichloroethylene			U	0.300	ug/kg					

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QC Summary

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Vinyl chloride			U	0.300	ug/kg				VXY1	07/19/17 13:37
Xylenes (total)			U	0.300	ug/kg					
cis-1,3-Dichloropropylene			U	0.300	ug/kg					
n-Butyl alcohol			U	83.3	ug/kg					
trans-1,3-Dichloropropylene			U	0.300	ug/kg					
**1,2-Dichloroethane-d4	50.0			45.3	ug/L		91	(70%-130%)		
**Bromofluorobenzene	50.0			50.2	ug/L		100	(70%-130%)		
**Toluene-d8	50.0			47.6	ug/L		95	(70%-130%)		
QC1203836195 MB										
1,1,1-Trichloroethane			U	0.300	ug/kg					07/21/17 12:36
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg					
1,1,2-Trichloroethane			U	0.300	ug/kg					
1,1-Dichloroethane			U	0.300	ug/kg					
1,1-Dichloroethylene			U	0.300	ug/kg					
1,2-Dichloroethane			U	0.300	ug/kg					
1,2-Dichloroethylene (total)			U	0.300	ug/kg					

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QC Summary

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
1,2-Dichloropropane			U	0.300	ug/kg				VXY1	07/21/17 12:36
2-Butanone			U	3.00	ug/kg					
2-Hexanone			U	3.00	ug/kg					
4-Methyl-2-pentanone			U	3.00	ug/kg					
Acetone			U	3.00	ug/kg					
Benzene			U	0.300	ug/kg					
Bromodichloromethane			U	0.300	ug/kg					
Bromoform			U	0.300	ug/kg					
Bromomethane			U	0.300	ug/kg					
Carbon disulfide			U	1.60	ug/kg					
Carbon tetrachloride			U	0.300	ug/kg					
Chlorobenzene			U	0.300	ug/kg					
Chloroethane			U	0.300	ug/kg					
Chloroform			U	0.300	ug/kg					
Chloromethane			U	0.300	ug/kg					

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Dibromochloromethane			U	0.300	ug/kg				VXY1	07/21/17 12:36
Ethylbenzene			U	0.300	ug/kg					
Methylene chloride			U	1.60	ug/kg					
Styrene			U	0.300	ug/kg					
Tetrachloroethylene			U	0.300	ug/kg					
Toluene			U	0.300	ug/kg					
Trichloroethylene			U	0.300	ug/kg					
Vinyl chloride			U	0.300	ug/kg					
Xylenes (total)			U	0.300	ug/kg					
cis-1,3-Dichloropropylene			U	0.300	ug/kg					
n-Butyl alcohol			U	83.3	ug/kg					
trans-1,3-Dichloropropylene			U	0.300	ug/kg					
**1,2-Dichloroethane-d4	50.0			42.9	ug/L		86	(70%-130%)		
**Bromofluorobenzene	50.0			49.5	ug/L		99	(70%-130%)		
**Toluene-d8	50.0			45.1	ug/L		90	(70%-130%)		

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
QC1203835488 428015001 PS											
1,1,1-Trichloroethane	50.0	U	0.00		47.2	ug/L		94	(70%-130%)	VXY1	07/19/17 19:14
1,1,2,2-Tetrachloroethane	50.0	U	0.00		45.8	ug/L		92	(70%-130%)		
1,1,2-Trichloroethane	50.0	U	0.00		46.3	ug/L		93	(70%-130%)		
1,1-Dichloroethane	50.0	U	0.00		46.9	ug/L		94	(70%-130%)		
1,1-Dichloroethylene	50.0	U	0.00		41.1	ug/L		82	(70%-130%)		
1,2-Dichloroethane	50.0	U	0.00		43.9	ug/L		88	(70%-130%)		
1,2-Dichloroethylene (total)	100	U	0.00		89.9	ug/L		90	(70%-130%)		
1,2-Dichloropropane	50.0	U	0.00		46.4	ug/L		93	(70%-130%)		
2-Butanone	250	U	0.00		264	ug/L		106	(70%-130%)		
2-Hexanone	250	U	0.00		254	ug/L		102	(70%-130%)		
4-Methyl-2-pentanone	250	U	0.00		220	ug/L		88	(70%-130%)		
Acetone	250	U	0.00		295	ug/L		118	(70%-130%)		
Benzene	50.0	U	0.00		45.2	ug/L		90	(70%-130%)		
Bromodichloromethane	50.0	U	0.00		49.2	ug/L		98	(70%-130%)		
Bromoform	50.0	U	0.00		43.6	ug/L		87	(70%-130%)		

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QC Summary

Workorder: **428197**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
Bromomethane	50.0	U	0.00		46.9	ug/L		94	(70%-130%)	VXY1	07/19/17 19:14
Carbon disulfide	250	U	0.00		209	ug/L		84	(70%-130%)		
Carbon tetrachloride	50.0	U	0.00		44.3	ug/L		89	(70%-130%)		
Chlorobenzene	50.0	U	0.00		45.6	ug/L		91	(70%-130%)		
Chloroethane	50.0	U	0.00		42.7	ug/L		85	(70%-130%)		
Chloroform	50.0	U	0.00		46.4	ug/L		93	(70%-130%)		
Chloromethane	50.0	U	0.00		38.5	ug/L		77	(70%-130%)		
Dibromochloromethane	50.0	U	0.00		50.2	ug/L		100	(70%-130%)		
Ethylbenzene	50.0	U	0.00		44.3	ug/L		89	(70%-130%)		
Methylene chloride	50.0	U	0.00		42.1	ug/L		84	(70%-130%)		
Styrene	50.0	U	0.00		44.6	ug/L		89	(70%-130%)		
Tetrachloroethylene	50.0	U	0.00		41.8	ug/L		84	(70%-130%)		
Toluene	50.0	U	0.00		46.6	ug/L		93	(70%-130%)		
Trichloroethylene	50.0	U	0.00		48.6	ug/L		97	(70%-130%)		
Vinyl chloride	50.0	U	0.00		39.4	ug/L		79	(70%-130%)		

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
Xylenes (total)	150	U	0.00		129	ug/L		86	(70%-130%)	VXY1	07/19/17 19:14
cis-1,3-Dichloropropylene	50.0	U	0.00		47.3	ug/L		95	(70%-130%)		
n-Butyl alcohol	5000	U	0.00		3910	ug/L		78	(70%-130%)		
trans-1,3-Dichloropropylene	50.0	U	0.00		47.7	ug/L		95	(70%-130%)		
**1,2-Dichloroethane-d4	50.0		45.6		40.2	ug/L		80	(70%-130%)		
**Bromofluorobenzene	50.0		49.6		52.5	ug/L		105	(70%-130%)		
**Toluene-d8	50.0		44.6		45.6	ug/L		91	(70%-130%)		
QC1203835489 428015001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00		49.2	ug/L	4	98	(0%-20%)		07/19/17 19:45
1,1,2,2-Tetrachloroethane	50.0	U	0.00		44.2	ug/L	4	88	(0%-20%)		
1,1,2-Trichloroethane	50.0	U	0.00		43.8	ug/L	5	88	(0%-20%)		
1,1-Dichloroethane	50.0	U	0.00		48.4	ug/L	3	97	(0%-20%)		
1,1-Dichloroethylene	50.0	U	0.00		43.2	ug/L	5	86	(0%-20%)		
1,2-Dichloroethane	50.0	U	0.00		44.2	ug/L	1	88	(0%-20%)		
1,2-Dichloroethylene (total)	100	U	0.00		89.1	ug/L	1	89	(0%-20%)		
1,2-Dichloropropane	50.0	U	0.00		46.0	ug/L	1	92	(0%-20%)		

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
2-Butanone	250	U	0.00		251	ug/L	5	100	(0%-20%)	VXY1	07/19/17 19:45
2-Hexanone	250	U	0.00		238	ug/L	6	95	(0%-20%)		
4-Methyl-2-pentanone	250	U	0.00		202	ug/L	8	81	(0%-20%)		
Acetone	250	U	0.00		294	ug/L	0	118	(0%-20%)		
Benzene	50.0	U	0.00		45.0	ug/L	0	90	(0%-20%)		
Bromodichloromethane	50.0	U	0.00		48.9	ug/L	1	98	(0%-20%)		
Bromoform	50.0	U	0.00		43.0	ug/L	1	86	(0%-20%)		
Bromomethane	50.0	U	0.00		50.5	ug/L	7	101	(0%-20%)		
Carbon disulfide	250	U	0.00		214	ug/L	2	86	(0%-20%)		
Carbon tetrachloride	50.0	U	0.00		45.2	ug/L	2	90	(0%-20%)		
Chlorobenzene	50.0	U	0.00		42.9	ug/L	6	86	(0%-20%)		
Chloroethane	50.0	U	0.00		46.3	ug/L	8	93	(0%-20%)		
Chloroform	50.0	U	0.00		46.0	ug/L	1	92	(0%-20%)		
Chloromethane	50.0	U	0.00		40.1	ug/L	4	80	(0%-20%)		
Dibromochloromethane	50.0	U	0.00		47.8	ug/L	5	96	(0%-20%)		

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anist	Date Time
Volatile-GC/MS											
Batch 1683628											
Ethylbenzene	50.0	U	0.00		43.2	ug/L	2	86	(0%-20%)	VXY1	07/19/17 19:45
Methylene chloride	50.0	U	0.00		45.1	ug/L	7	90	(0%-20%)		
Styrene	50.0	U	0.00		41.6	ug/L	7	83	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00		40.9	ug/L	2	82	(0%-20%)		
Toluene	50.0	U	0.00		46.3	ug/L	1	93	(0%-20%)		
Trichloroethylene	50.0	U	0.00		47.9	ug/L	1	96	(0%-20%)		
Vinyl chloride	50.0	U	0.00		42.3	ug/L	7	85	(0%-20%)		
Xylenes (total)	150	U	0.00		124	ug/L	4	83	(0%-20%)		
cis-1,3-Dichloropropylene	50.0	U	0.00		46.9	ug/L	1	94	(0%-20%)		
n-Butyl alcohol	5000	U	0.00		3840	ug/L	2	77	(0%-20%)		
trans-1,3-Dichloropropylene	50.0	U	0.00		47.7	ug/L	0	95	(0%-20%)		
**1,2-Dichloroethane-d4	50.0		45.6		41.4	ug/L		83	(70%-130%)		
**Bromofluorobenzene	50.0		49.6		52.3	ug/L		105	(70%-130%)		
**Toluene-d8	50.0		44.6		44.7	ug/L		89	(70%-130%)		

Notes:

The Qualifiers in this report are defined as follows:

Volatile

Surrogate Recovery Report

SDG Number: GEL428197

Matrix Type: SOLID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203834294	LCS for batch 1683620	83	90	107
1203834293	MB for batch 1683620	91	95	100
1203835488	B3BBD8PS	80	91	105
1203835489	B3BBD8PSD	83	89	105
1203836196	LCS for batch 1683620	90	89	108
1203836195	MB for batch 1683620	86	90	99
428197001	B3BBH0	88	89	98
428197004	B3BBH4	86	88	100

Surrogate		Acceptance Limits
DCED4	= 1,2-Dichloroethane-d4	(70%-130%)
TOL	= Toluene-d8	(70%-130%)
BFB	= Bromofluorobenzene	(70%-130%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

GEL LABORATORIES LLC

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QC Summary

Report Date: July 25, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428482**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
QC1203834294 LCS										
1,1,1-Trichloroethane	50.0			51.0	ug/kg		102	(70%-130%)	VXY1	07/19/17 10:32
1,1,2,2-Tetrachloroethane	50.0			44.8	ug/kg		90	(70%-130%)		
1,1,2-Trichloroethane	50.0			42.8	ug/kg		86	(70%-130%)		
1,1-Dichloroethane	50.0			45.9	ug/kg		92	(70%-130%)		
1,1-Dichloroethylene	50.0			43.9	ug/kg		88	(70%-130%)		
1,2-Dichloroethane	50.0			42.8	ug/kg		86	(70%-130%)		
1,2-Dichloroethylene (total)	100			91.1	ug/kg		91	(70%-130%)		
1,2-Dichloropropane	50.0			43.9	ug/kg		88	(70%-130%)		
2-Butanone	250			226	ug/kg		91	(70%-130%)		
2-Hexanone	250			224	ug/kg		90	(70%-130%)		
4-Methyl-2-pentanone	250			200	ug/kg		80	(70%-130%)		
Acetone	250			259	ug/kg		104	(70%-130%)		
Benzene	50.0			44.7	ug/kg		89	(70%-130%)		

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QC Summary

Workorder: **428482**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Bromodichloromethane	50.0			48.5	ug/kg		97	(70%-130%)	VXY1	07/19/17 10:32
Bromoform	50.0			43.5	ug/kg		87	(70%-130%)		
Bromomethane	50.0			49.6	ug/kg		99	(70%-130%)		
Carbon disulfide	250			212	ug/kg		85	(70%-130%)		
Carbon tetrachloride	50.0			45.4	ug/kg		91	(70%-130%)		
Chlorobenzene	50.0			43.5	ug/kg		87	(70%-130%)		
Chloroethane	50.0			47.6	ug/kg		95	(70%-130%)		
Chloroform	50.0			45.5	ug/kg		91	(70%-130%)		
Chloromethane	50.0			43.2	ug/kg		86	(70%-130%)		
Dibromochloromethane	50.0			50.2	ug/kg		100	(70%-130%)		
Ethylbenzene	50.0			42.9	ug/kg		86	(70%-130%)		
Methylene chloride	50.0			41.9	ug/kg		84	(70%-130%)		
Styrene	50.0			44.2	ug/kg		88	(70%-130%)		
Tetrachloroethylene	50.0			43.5	ug/kg		87	(70%-130%)		
Toluene	50.0			45.3	ug/kg		91	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Trichloroethylene	50.0			47.7	ug/kg		95	(70%-130%)	VXY1	07/19/17 10:32
Vinyl chloride	50.0			46.5	ug/kg		93	(70%-130%)		
Xylenes (total)	150			126	ug/kg		84	(70%-130%)		
cis-1,3-Dichloropropylene	50.0			46.4	ug/kg		93	(70%-130%)		
n-Butyl alcohol	5000			3640	ug/kg		73	(70%-130%)		
trans-1,3-Dichloropropylene	50.0			47.5	ug/kg		95	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			41.5	ug/L		83	(70%-130%)		
**Bromofluorobenzene	50.0			53.3	ug/L		107	(70%-130%)		
**Toluene-d8	50.0			45.1	ug/L		90	(70%-130%)		
QC1203838373 LCS										
1,1,1-Trichloroethane	50.0			54.1	ug/kg		108	(70%-130%)		07/24/17 11:32
1,1,2,2-Tetrachloroethane	50.0			48.7	ug/kg		97	(70%-130%)		
1,1,2-Trichloroethane	50.0			48.8	ug/kg		98	(70%-130%)		
1,1-Dichloroethane	50.0			50.1	ug/kg		100	(70%-130%)		
1,1-Dichloroethylene	50.0			47.9	ug/kg		96	(70%-130%)		
1,2-Dichloroethane	50.0			48.3	ug/kg		97	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
1,2-Dichloroethylene (total)	100			97.2	ug/kg		97	(70%-130%)	VXY1	07/24/17 11:32
1,2-Dichloropropane	50.0			48.1	ug/kg		96	(70%-130%)		
2-Butanone	250			236	ug/kg		94	(70%-130%)		
2-Hexanone	250			231	ug/kg		92	(70%-130%)		
4-Methyl-2-pentanone	250			201	ug/kg		80	(70%-130%)		
Acetone	250			288	ug/kg		115	(70%-130%)		
Benzene	50.0			50.9	ug/kg		102	(70%-130%)		
Bromodichloromethane	50.0			54.6	ug/kg		109	(70%-130%)		
Bromoform	50.0			47.3	ug/kg		95	(70%-130%)		
Bromomethane	50.0			46.3	ug/kg		93	(70%-130%)		
Carbon disulfide	250			227	ug/kg		91	(70%-130%)		
Carbon tetrachloride	50.0			50.2	ug/kg		100	(70%-130%)		
Chlorobenzene	50.0			47.6	ug/kg		95	(70%-130%)		
Chloroethane	50.0			46.2	ug/kg		92	(70%-130%)		
Chloroform	50.0			49.9	ug/kg		100	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Chloromethane	50.0			38.6	ug/kg		77	(70%-130%)	VXY1	07/24/17 11:32
Dibromochloromethane	50.0			52.9	ug/kg		106	(70%-130%)		
Ethylbenzene	50.0			44.9	ug/kg		90	(70%-130%)		
Methylene chloride	50.0			47.4	ug/kg		95	(70%-130%)		
Styrene	50.0			47.9	ug/kg		96	(70%-130%)		
Tetrachloroethylene	50.0			45.4	ug/kg		91	(70%-130%)		
Toluene	50.0			48.7	ug/kg		97	(70%-130%)		
Trichloroethylene	50.0			53.0	ug/kg		106	(70%-130%)		
Vinyl chloride	50.0			41.2	ug/kg		82	(70%-130%)		
Xylenes (total)	150			138	ug/kg		92	(70%-130%)		
cis-1,3-Dichloropropylene	50.0			54.0	ug/kg		108	(70%-130%)		
n-Butyl alcohol	5000			3930	ug/kg		79	(70%-130%)		
trans-1,3-Dichloropropylene	50.0			51.6	ug/kg		103	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			40.9	ug/L		82	(70%-130%)		
**Bromofluorobenzene	50.0			55.7	ug/L		111	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
**Toluene-d8	50.0			43.4	ug/L		87	(70%-130%)	VXY1	07/24/17 11:32
QC1203834293 MB										
1,1,1-Trichloroethane			U	0.300	ug/kg					07/19/17 13:37
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg					
1,1,2-Trichloroethane			U	0.300	ug/kg					
1,1-Dichloroethane			U	0.300	ug/kg					
1,1-Dichloroethylene			U	0.300	ug/kg					
1,2-Dichloroethane			U	0.300	ug/kg					
1,2-Dichloroethylene (total)			U	0.300	ug/kg					
1,2-Dichloropropane			U	0.300	ug/kg					
2-Butanone			U	3.00	ug/kg					
2-Hexanone			U	3.00	ug/kg					
4-Methyl-2-pentanone			U	3.00	ug/kg					
Acetone			U	3.00	ug/kg					
Benzene			U	0.300	ug/kg					
Bromodichloromethane			U	0.300	ug/kg					

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Bromoform			U	0.300	ug/kg				VXY1	07/19/17 13:37
Bromomethane			U	0.300	ug/kg					
Carbon disulfide			U	1.60	ug/kg					
Carbon tetrachloride			U	0.300	ug/kg					
Chlorobenzene			U	0.300	ug/kg					
Chloroethane			U	0.300	ug/kg					
Chloroform			U	0.300	ug/kg					
Chloromethane			U	0.300	ug/kg					
Dibromochloromethane			U	0.300	ug/kg					
Ethylbenzene			U	0.300	ug/kg					
Methylene chloride			U	1.60	ug/kg					
Styrene			U	0.300	ug/kg					
Tetrachloroethylene			U	0.300	ug/kg					
Toluene			U	0.300	ug/kg					
Trichloroethylene			U	0.300	ug/kg					

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Vinyl chloride			U	0.300	ug/kg				VXY1	07/19/17 13:37
Xylenes (total)			U	0.300	ug/kg					
cis-1,3-Dichloropropylene			U	0.300	ug/kg					
n-Butyl alcohol			U	83.3	ug/kg					
trans-1,3-Dichloropropylene			U	0.300	ug/kg					
**1,2-Dichloroethane-d4	50.0			45.3	ug/L		91	(70%-130%)		
**Bromofluorobenzene	50.0			50.2	ug/L		100	(70%-130%)		
**Toluene-d8	50.0			47.6	ug/L		95	(70%-130%)		
QC1203838372 MB										
1,1,1-Trichloroethane			U	0.300	ug/kg					07/24/17 13:36
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg					
1,1,2-Trichloroethane			U	0.300	ug/kg					
1,1-Dichloroethane			U	0.300	ug/kg					
1,1-Dichloroethylene			U	0.300	ug/kg					
1,2-Dichloroethane			U	0.300	ug/kg					
1,2-Dichloroethylene (total)			U	0.300	ug/kg					

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
1,2-Dichloropropane			U	0.300	ug/kg				VXY1	07/24/17 13:36
2-Butanone			U	3.00	ug/kg					
2-Hexanone			U	3.00	ug/kg					
4-Methyl-2-pentanone			U	3.00	ug/kg					
Acetone			U	3.00	ug/kg					
Benzene			U	0.300	ug/kg					
Bromodichloromethane			U	0.300	ug/kg					
Bromoform			U	0.300	ug/kg					
Bromomethane			U	0.300	ug/kg					
Carbon disulfide			U	1.60	ug/kg					
Carbon tetrachloride			U	0.300	ug/kg					
Chlorobenzene			U	0.300	ug/kg					
Chloroethane			U	0.300	ug/kg					
Chloroform			U	0.300	ug/kg					
Chloromethane			U	0.300	ug/kg					

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
Dibromochloromethane			U	0.300	ug/kg				VXY1	07/24/17 13:36
Ethylbenzene			U	0.300	ug/kg					
Methylene chloride			U	1.60	ug/kg					
Styrene			U	0.300	ug/kg					
Tetrachloroethylene			U	0.300	ug/kg					
Toluene			U	0.300	ug/kg					
Trichloroethylene			U	0.300	ug/kg					
Vinyl chloride			U	0.300	ug/kg					
Xylenes (total)			U	0.300	ug/kg					
cis-1,3-Dichloropropylene			U	0.300	ug/kg					
n-Butyl alcohol			U	83.3	ug/kg					
trans-1,3-Dichloropropylene			U	0.300	ug/kg					
**1,2-Dichloroethane-d4	50.0			41.8	ug/L		84	(70%-130%)		
**Bromofluorobenzene	50.0			48.9	ug/L		98	(70%-130%)		
**Toluene-d8	50.0			43.4	ug/L		87	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
QC1203835488 428015001 PS											
1,1,1-Trichloroethane	50.0	U	0.00		47.2	ug/L		94	(70%-130%)	VXY1	07/19/17 19:14
1,1,2,2-Tetrachloroethane	50.0	U	0.00		45.8	ug/L		92	(70%-130%)		
1,1,2-Trichloroethane	50.0	U	0.00		46.3	ug/L		93	(70%-130%)		
1,1-Dichloroethane	50.0	U	0.00		46.9	ug/L		94	(70%-130%)		
1,1-Dichloroethylene	50.0	U	0.00		41.1	ug/L		82	(70%-130%)		
1,2-Dichloroethane	50.0	U	0.00		43.9	ug/L		88	(70%-130%)		
1,2-Dichloroethylene (total)	100	U	0.00		89.9	ug/L		90	(70%-130%)		
1,2-Dichloropropane	50.0	U	0.00		46.4	ug/L		93	(70%-130%)		
2-Butanone	250	U	0.00		264	ug/L		106	(70%-130%)		
2-Hexanone	250	U	0.00		254	ug/L		102	(70%-130%)		
4-Methyl-2-pentanone	250	U	0.00		220	ug/L		88	(70%-130%)		
Acetone	250	U	0.00		295	ug/L		118	(70%-130%)		
Benzene	50.0	U	0.00		45.2	ug/L		90	(70%-130%)		
Bromodichloromethane	50.0	U	0.00		49.2	ug/L		98	(70%-130%)		
Bromoform	50.0	U	0.00		43.6	ug/L		87	(70%-130%)		

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QC Summary

Workorder: **428482**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
Bromomethane	50.0	U	0.00		46.9	ug/L		94	(70%-130%)	VXY1	07/19/17 19:14
Carbon disulfide	250	U	0.00		209	ug/L		84	(70%-130%)		
Carbon tetrachloride	50.0	U	0.00		44.3	ug/L		89	(70%-130%)		
Chlorobenzene	50.0	U	0.00		45.6	ug/L		91	(70%-130%)		
Chloroethane	50.0	U	0.00		42.7	ug/L		85	(70%-130%)		
Chloroform	50.0	U	0.00		46.4	ug/L		93	(70%-130%)		
Chloromethane	50.0	U	0.00		38.5	ug/L		77	(70%-130%)		
Dibromochloromethane	50.0	U	0.00		50.2	ug/L		100	(70%-130%)		
Ethylbenzene	50.0	U	0.00		44.3	ug/L		89	(70%-130%)		
Methylene chloride	50.0	U	0.00		42.1	ug/L		84	(70%-130%)		
Styrene	50.0	U	0.00		44.6	ug/L		89	(70%-130%)		
Tetrachloroethylene	50.0	U	0.00		41.8	ug/L		84	(70%-130%)		
Toluene	50.0	U	0.00		46.6	ug/L		93	(70%-130%)		
Trichloroethylene	50.0	U	0.00		48.6	ug/L		97	(70%-130%)		
Vinyl chloride	50.0	U	0.00		39.4	ug/L		79	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
Xylenes (total)	150	U	0.00		129	ug/L		86	(70%-130%)	VXY1	07/19/17 19:14
cis-1,3-Dichloropropylene	50.0	U	0.00		47.3	ug/L		95	(70%-130%)		
n-Butyl alcohol	5000	U	0.00		3910	ug/L		78	(70%-130%)		
trans-1,3-Dichloropropylene	50.0	U	0.00		47.7	ug/L		95	(70%-130%)		
**1,2-Dichloroethane-d4	50.0		45.6		40.2	ug/L		80	(70%-130%)		
**Bromofluorobenzene	50.0		49.6		52.5	ug/L		105	(70%-130%)		
**Toluene-d8	50.0		44.6		45.6	ug/L		91	(70%-130%)		
QC1203835489 428015001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00		49.2	ug/L	4	98	(0%-20%)		07/19/17 19:45
1,1,2,2-Tetrachloroethane	50.0	U	0.00		44.2	ug/L	4	88	(0%-20%)		
1,1,2-Trichloroethane	50.0	U	0.00		43.8	ug/L	5	88	(0%-20%)		
1,1-Dichloroethane	50.0	U	0.00		48.4	ug/L	3	97	(0%-20%)		
1,1-Dichloroethylene	50.0	U	0.00		43.2	ug/L	5	86	(0%-20%)		
1,2-Dichloroethane	50.0	U	0.00		44.2	ug/L	1	88	(0%-20%)		
1,2-Dichloroethylene (total)	100	U	0.00		89.1	ug/L	1	89	(0%-20%)		
1,2-Dichloropropane	50.0	U	0.00		46.0	ug/L	1	92	(0%-20%)		

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QC Summary

Workorder: **428482**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1683628										
2-Butanone	250	U	0.00	251	ug/L	5	100	(0%-20%)	VXY1	07/19/17 19:45
2-Hexanone	250	U	0.00	238	ug/L	6	95	(0%-20%)		
4-Methyl-2-pentanone	250	U	0.00	202	ug/L	8	81	(0%-20%)		
Acetone	250	U	0.00	294	ug/L	0	118	(0%-20%)		
Benzene	50.0	U	0.00	45.0	ug/L	0	90	(0%-20%)		
Bromodichloromethane	50.0	U	0.00	48.9	ug/L	1	98	(0%-20%)		
Bromoform	50.0	U	0.00	43.0	ug/L	1	86	(0%-20%)		
Bromomethane	50.0	U	0.00	50.5	ug/L	7	101	(0%-20%)		
Carbon disulfide	250	U	0.00	214	ug/L	2	86	(0%-20%)		
Carbon tetrachloride	50.0	U	0.00	45.2	ug/L	2	90	(0%-20%)		
Chlorobenzene	50.0	U	0.00	42.9	ug/L	6	86	(0%-20%)		
Chloroethane	50.0	U	0.00	46.3	ug/L	8	93	(0%-20%)		
Chloroform	50.0	U	0.00	46.0	ug/L	1	92	(0%-20%)		
Chloromethane	50.0	U	0.00	40.1	ug/L	4	80	(0%-20%)		
Dibromochloromethane	50.0	U	0.00	47.8	ug/L	5	96	(0%-20%)		

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1683628											
Ethylbenzene	50.0	U	0.00		43.2	ug/L	2	86	(0%-20%)	VXY1	07/19/17 19:45
Methylene chloride	50.0	U	0.00		45.1	ug/L	7	90	(0%-20%)		
Styrene	50.0	U	0.00		41.6	ug/L	7	83	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00		40.9	ug/L	2	82	(0%-20%)		
Toluene	50.0	U	0.00		46.3	ug/L	1	93	(0%-20%)		
Trichloroethylene	50.0	U	0.00		47.9	ug/L	1	96	(0%-20%)		
Vinyl chloride	50.0	U	0.00		42.3	ug/L	7	85	(0%-20%)		
Xylenes (total)	150	U	0.00		124	ug/L	4	83	(0%-20%)		
cis-1,3-Dichloropropylene	50.0	U	0.00		46.9	ug/L	1	94	(0%-20%)		
n-Butyl alcohol	5000	U	0.00		3840	ug/L	2	77	(0%-20%)		
trans-1,3-Dichloropropylene	50.0	U	0.00		47.7	ug/L	0	95	(0%-20%)		
**1,2-Dichloroethane-d4	50.0		45.6		41.4	ug/L		83	(70%-130%)		
**Bromofluorobenzene	50.0		49.6		52.3	ug/L		105	(70%-130%)		
**Toluene-d8	50.0		44.6		44.7	ug/L		89	(70%-130%)		

Notes:

The Qualifiers in this report are defined as follows:

Volatile

Surrogate Recovery Report

SDG Number: GEL428482

Matrix Type: SOLID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203834294	LCS for batch 1683620	83	90	107
1203834293	MB for batch 1683620	91	95	100
1203835488	B3BBD8PS	80	91	105
1203835489	B3BBD8PSD	83	89	105
1203838373	LCS for batch 1683620	82	87	111
1203838372	MB for batch 1683620	84	87	98
428482001	B3BBH8	83	85	100
428482002	B3BBJ2	81	87	100

Surrogate		Acceptance Limits
DCED4	= 1,2-Dichloroethane-d4	(70%-130%)
TOL	= Toluene-d8	(70%-130%)
BFB	= Bromofluorobenzene	(70%-130%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

Date: 04 October 2017
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200-EA-1
Subject: Semivolatile Organics - Sample Data Groups (SDGs) GEL426852, GEL427715, GEL428015, GEL428197 and GEL428482

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL426852, GEL427715, GEL428015, GEL428197 and GEL428482 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3BBC2	06/29/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBD0	07/11/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBC6	07/11/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBD4	07/11/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBD8	07/13/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBF2	07/13/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBF6	07/13/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBH0	07/17/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBH4	07/17/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBH8	07/19/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBH8RE	07/19/17	Soil	C	WTPH-D
B3BBJ2	07/19/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBJ2RE	07/19/17	Soil	C	WTPH-D
B3BBK0	07/19/17	Soil	C	8270, 8270D PAH, WTPH-D
B3BBK0RE	07/19/17	Soil	C	WTPH-D

Data validation was conducted in accordance with the CHPRC validation statement of work and the Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site, DOE/RL-2017-35, Rev. 0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for semivolatile organics and WTPH-D in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to <-6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved with the following exception.

For SDG GEL428482, the WTPH-D samples were re-extracted and re-analyzed due to poor LCS and surrogate recoveries with the original analysis. The reanalysis results were reported with –RE sample designation. All results for samples B3BBH8RE, B3BBJ2RE and B3BBK0RE were detects and should be qualified as estimates and flagged "J."

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

For SDG GEL426852, the MB result for motor oil was a detect > the method detection limit (MDL). The motor oil result for sample B3BBC2 was a detect ≥ the MDL but ≤ the practical quantitation limit (PQL) and should be qualified as an estimate and flagged "J+."

For SDG GEL428015, the MB results for DRO, kerosene and motor oil were detects > the MDLs. The DRO, kerosene and motor oil results for samples B3BBD8, B3BBF2 and B3BBF6 were detects ≥ the MDLs but ≤ the PQLs and should be qualified as estimates and flagged "J+."

For SDG GEL428482, the MB results for DRO, kerosene and motor oil for both batches were detects > the MDLs. The DRO and kerosene results for samples B3BBH8 and B3BBK0 and the DRO, kerosene and motor oil results for sample B3BBJ2 were non-detects and should not be qualified. All other sample results were detects ≥ the MDLs but ≤ the PQLs and should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of all affected sample results.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the laboratory control sample accuracy limits for SVOCs are 70% to 130% and the matrix spike sample accuracy limits are the ones established by the analytical laboratory. The laboratory control sample and matrix spike sample accuracy limits for WTPH-D are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable with the following exceptions.

For SDG GEL426852, the o-terphenyl surrogate recoveries for the MS and MSD samples were < the lower acceptance limit. Since the MS and MSD samples were QC samples, data should not be qualified.

For SDG GEL427715, the o-terphenyl surrogate recoveries for samples B3BBD0, B3BBD4 and the MB were < the lower acceptance limit but ≥10%. The DRO, kerosene and motor oil results for samples B3BBD0 and B3BBD4 were non-detects and should be qualified as estimates and flagged "UJ." Since the MB was a QC sample, data should not be qualified as a result.

For SDG GEL428015, the o-terphenyl surrogate recoveries for sample B3BBF6 and the LCSD were < the lower acceptance limit but ≥10%. The DRO, kerosene and motor oil sample results were detects and should be qualified as estimates and flagged "J-." Since the LCSD was a QC sample, data should not be qualified as a result.

For SDG GEL428197, the o-terphenyl surrogate recoveries for sample B3BBH0 and MB were < the lower acceptance limit but ≥10%. The DRO and kerosene sample results were non-detects and should be qualified as estimates and flagged "UJ." The motor oil sample result was a detect and should be qualified as an estimate and flagged "J-." Since the MB was a QC sample data should not be qualified as a result.

For SDG GEL428482, the o-terphenyl surrogate recoveries for samples B3BBH8, B3BBJ2, B3BBK0 and the LCSD (both batches) were < the lower acceptance limit but ≥10%. The motor oil results for samples B3BBH8 and B3BBK0 were detects and should be qualified as estimates and flagged "J-." All other sample results were non-detects and should be qualified as estimates and flagged "UJ." Since the LCSD were QC samples data should not be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exception.

For SDGs GEL426852 and GEL428482, the MS/MSD analyses for the SVOC (long list) and/or SVOC-PAH were performed on samples from other SDGs. Data should not be qualified as a result.

For SDG GEL426852, the MS recoveries for DRO and motor oil were < the lower acceptance limit but ≥20%. The DRO and motor results for sample B3BBC2 were detects and should be qualified as estimates and flagged "J-."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For SDG GEL426852:
The LCS recoveries for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dimethylphenol, 2,4-dinitrophenol, 2-chloronaphthalene, 2-chlorophenol, 2-methyl-4,6-dinitrophenol, 4-chloroaniline, hexachlorocyclopentadiene, hexachloroethane, isophorone, n-nitrosodipropylamine, phenol, bis(2-chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, o-cresol and fluorene were < the lower acceptance limit but >40%. The fluorene result for sample B3BBC2 was a detect and should be qualified as an estimate and flagged "J-." All other sample results were non-detects and should be qualified as estimates and flagged "UJ."

For SDG GEL427715:
The LCS recoveries for acenaphthene, acenaphthylene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene and 2,4-dinitrophenol were < the lower acceptance limit but >40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected samples results.

The LCS recovery for DRO and LCSD recovery for kerosene were < the lower acceptance limit. All associated sample results should be qualified as estimates and flagged "UJ" for non-detect sample results and flagged "J-"for all detect sample results. See the table in Appendix 2 for a listing of all affected sample results.

For SDG GEL428015:
The LCS recovery for 2,4-dinitrophenol was <40%. All associated sample results were non-detects and should be qualified as unusable and flagged "UR." The LCS recoveries for 2-methyl-4,6-dinitrophenol, hexachlorocyclopentadiene, pentachlorophenol, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene were < the lower acceptance limit but >40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected sample results.

The LCSD recovery for kerosene was < the lower acceptance limit. The kerosene results for samples B3BBD8, B3BBF2 and B3BBF6 were detects and should be qualified as estimates and flagged "J-."

For SDG GEL428197:
The LCS recoveries for 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dimethylphenol, 2,4-dinitrophenol, 2-chloronaphthalene, 2-methyl-4,6-dinitrophenol, 4-chloroaniline, hexachlorocyclopentadiene, hexachloroethane, n-nitrosodipropylamine, phenol, bis(2-chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, o-nitroaniline, acenaphthene, acenaphthylene, benzo(ghi)perylene, fluorene and indeno(1,2,3-cd)pyrene were < the lower acceptance limit but >40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected sample results.

The LCS recovery for DRO and LCSD recovery for kerosene were < the lower acceptance limit. The DRO and kerosene results for samples B3BBH0 and B3BBH4 were non-detects and should be qualified as estimates and flagged "UJ."

For SDG GEL428482:
The LCS recoveries for 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dimethylphenol, 2,4-dinitrophenol, 2-chloronaphthalene, 2-methyl-4,6-dinitrophenol, 4-chloroaniline, hexachlorocyclopentadiene, hexachloroethane, n-nitrosodipropylamine, phenol, bis(2-chloro-1-methylethyl)ether, bis(2-chloroethyl)ether, o-nitroaniline, acenaphthene, acenaphthylene, benzo(ghi)perylene, fluorene and indeno(1,2,3-cd)pyrene were < the lower acceptance limit but >40%. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected sample results.

For batch 1685897, the LCS and LCSD recoveries for kerosene were < the lower acceptance limit. The kerosene results for samples B3BBH8, B3BBJ2 and B3BBK0 were non-detects and should be qualified as estimates and flagged "UJ."

For batch 1688122, the LCSD recovery for kerosene was < the lower acceptance limit. The kerosene results for samples B3BBH8RE, B3BBJ2RE and B3BBK0RE were detects and should be qualified as estimates and flagged "J-."

- **Precision**

Precision is evaluated by reviewing MS/MSD results, LCS/LCSD results, field duplicate sample results, field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are <30%.

<u>MS/MSD Samples</u>

All MS/MSD RPD values were acceptable with the following exceptions.

For SDG GEL426852, the RPDs for 2,4-dinitrophenol and 2-methyl-4,6-dinitrophenol were above the upper acceptance limits. The results for sample B3BBC2 were non-detects and should be qualified as estimates and flagged "UJ."

For SDG GEL428015, the RPDs for 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4,5-trichlorophenol, 2,4-dichlorophenol, 2,4-dimethylphenol, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-chloronaphthalene, 2-chlorophenol, 2-methyl-4,6-dinitrophenol, 2-methylnaphthalene, 2-nitrophenol, 4-bromophenylphenyether, 4-chloro-3-methylphenol, 4-chloroaniline, 4-chlorophenylphenyl, 4-nitrophenol, butylbenzylphthalate, carbazole, di-n-butylphthalate, di-n-octylphthalate, dibenzofuran, diethylphthalate, dimethylphthalate, hexachlorobenzene, hexachlorobutadiene, hexachlorocyclopentadiene, hexachloroethane, isophorone, n-nitrosodipropylamine, nitrobenzene, pentachlorphenol, phenol, tributylphosphate, bis(2-chloro-1-methylethyl)ether, bis(2chloroethyoxy)methane, bis(2-chloroethyl)ether, bis(2-ethylhexyl)phthalate, m-nitroaniline, o-cresol, o-nitroaniline and p-nitroaniline were above the upper acceptance limits. All associated sample results were non-detects and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of all affected sample results.

LCS/LCSD Samples

For SDG GEL428482, the RPD for kerosene was > the upper acceptance limit. The kerosene results for samples B3BBH3RE, B3BBJ2RE and B3BBK0RE were detects and should be qualified as estimates and flagged "J-."

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDGs GEL426852, GEL427715, GEL428015, GEL428197 and GEL428482 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage for 8270 methods was 99.6%. The completion percentage for WTPH-D was 100%

MAJOR DEFICIENCIES

A major deficiency leading to qualification of the 2,4-dinitrophenol results for samples B3BBD8, B3BBF2 and B3BBF6 as unusable were due to very low LCS recovery.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to multiple QC infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

DOE/RL-2017-35, Rev. 0, *Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site*, June 2017.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDGs: GEL426852, GEL427715, GEL428015, GEL428197, GEL428482	Reviewer: AQA	Project: 200-EA-1	Page 1 of 4
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Fluorene	J-	B3BBC2	Low LCS recovery
1.2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 2,4-Dimethylphenol, 2-Chloronaphthalene, 2-Chlorophenol, 4-Chloroaniline, Hexachlorocyclopentadiene, Hexachloroethane, Isophorone, n-Nitrosodipropylamine, Phenol, bis(2-Chloro-1-methylethyl)ether, bis(2-Chloroethyl)ether, o-Cresol	UJ	B3BBC2	Low LCS recoveries
2,4-Dinitrophenol, 2-Methyl-4,6-dinitrophenol	UJ	B3BBC2	Low LCS recoveries and poor MS/MSD precision
Motor oil	J	B3BBH8, B3BBK0	Blank contamination, low surrogate recovery
Motor oil	J	B3BBC2	Blank contamination, low matrix spike recovery
DRO	J-	B3BBC2	Low matrix spike recovery
Acenaphthene, Acenaphthylene, Benzo(ghi)perylene, Indeno(1,2,3-cd)pyrene, 2,4-Dinitrophenol	UJ	B3BBD0, B3BBC6, B3BBD4	Low LCS recoveries
Motor oil	UJ	B3BBD0, B3BBD4	Low surrogate recoveries
DRO Kerosene	UJ	B3BBD0, B3BBD4	Low surrogate recoveries and low LCS recoveries
DRO	J-	B3BBC6	Low LCS recoveries

Kerosene			
2,4-dinitrophenol	**UR**	B3BBD8, B3BBF2, B3BBF6	Very low LCS recovery.
Benzo(ghi)perylene, Indeno(1,2,3-cd)pyrene	UJ	B3BBD8, B3BBF2, B3BBF6	Low LCS recoveries
2-methyl-4,6-dinitrophenol, Hexachlorocyclopentadiene, Pentachlorophenol	UJ	B3BBD8, B3BBF2, B3BBF6	Low LCS recovery and poor MS/MSD precision
1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 2,4,5-Trichlorophenol, 2,4-Dichlorophenol, 2,4-Dimethylphenol, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Chloronaphthalene, 2-Chlorophenol, 2-Methylnaphthalene, 2-Nitrophenol, 4-Bromophenylphenylether, 4-Chloro-3-methylphenol, 4-Chloroaniline, 4-Chlorophenylphenyl, 4-Nitrophenol, Butylbenzylphthalate Carbazole, Di-n-butylphthalate, Di-n-octylphthalate, Dibenzofuran, Diethylphthalate, Dimethylphthalate, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Isophorone, n-Nitrosodipropylamine, Nitrobenzene, Phenol, Tributylphosphate, Bis(2-chloro-1-methylethyl)ether, Bis(2-chloroethoxy)methane, Bis(2-chloroethyl)ether Bis(2-ethylhexyl)phthalate, m-Nitroaniline,	UJ	B3BBD8, B3BBF2, B3BBF6	Poor MS/MSD precision

o-Cresol, o-Nitroaniline, p-Nitroaniline			
DRO, Motor oil	J+	B3BBD8, B3BBF2	Blank contamination
Kerosene	J	B3BBD8, B3BBF2	Blank contamination, low LCS recovery
DRO, Motor oil	J	B3BBF6	Low surrogate recovery and blank contamination
Kerosene	J	B3BBF6	Low surrogate recovery, blank contamination, low LCS recovery
1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 2,4-Dimethylphenol, 2,4-Dinitrophenol, 2-Chloronaphthalene, 2-Methyl-4,6-dintrophenol, 4-Chloroaniline, Hexachlorocyclopentadiene, Hexachloroethane, n-Nitrosodipropylamine, Phenol, Bis(2-chloro-1-methylethyl)ether, Bis(2-chloroethyl)ether, o-Nitroaniline, Acenaphthene, Acenaphthylene, Benzo(ghi)perylene, Fluorene, Indeno(1,2,3-cd)pyrene	UJ	B3BBH0, B3BBH4, B3BBH8, B3BBJ2, B3BBK0	Low LCS recoveries
DRO	UJ	B3BBH8, B3BBK0	Low surrogate recoveries
Motor oil	J-	B3BBH0	Low surrogate recovery
Kerosene	UJ	B3BBH8, B3BBJ2, B3BBK0	Low surrogate recoveries, low LCS recovery
DRO Kerosene	UJ	B3BBH0	Low surrogate recoveries and low LCS recoveries
DRO Kerosene	UJ	B3BBH4	Low LCS recoveries

DRO Motor oil	UJ	B3BBJ2	Low surrogate recovery
DRO, Motor oil	J+	B3BBH8RE, B3BBJ2RE, B3BBK0RE	Analysis beyond but within 2X the holding time and blank contamination
Kerosene	J	B3BBH8RE, B3BBJ2RE, B3BBK0RE	Analysis beyond but within 2X the holding time, blank contamination, low LCS recovery, poor LCS/LSD precision

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-EA-1			DATA PACKAGE: VSR17-012		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 09/29/17	
			SDG: GEL426852, GEL427715, GEL428015, GEL428197, GEL428482		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil					
GEL426852: B3BBC2					
GEL427715: B3BBD0, B3BBC6, B3BBD4					
GEL428015: B3BBD8, B3BBF2, B3BBF6					
GEL428197: B3BBH0, B3BBH4,					
GEL428482: B3BBH8, B3BBJ2, B3BBK0					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes No N/A
Initial calibrations acceptable?	Yes No N/A
Continuing calibrations acceptable?	Yes No N/A
Standards traceable?	Yes No N/A
Standards expired?	Yes No N/A
Calculation check acceptable?	Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes No N/A
Calibration blank results acceptable? (Levels D, E)	Yes No N/A
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	(Yes) No N/A
Surrogate/system monitoring compound recoveries acceptable?	(Yes) No N/A
Surrogates traceable? (Levels D, E)	Yes No (N/A)
Surrogates expired? (Levels D, E)	Yes No (N/A)
MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards? (Levels D, E)	Yes No (N/A)
LCS/BSS samples analyzed?	(Yes) No N/A
LCS/BSS results acceptable?	Yes (No) N/A
Standards traceable? (Levels D, E)	Yes No (N/A)
Standards expired? (Levels D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments: MS/MSD samples for SDGs GEL426852 and GEL428482 (SVOC &/or 8270PAH) were performed on samples from other SDGs.

SDG GEL426852: 1,2-dichlorobenzene 66%; 1,3-dichlorobenzene 64%, 1,4-dichlorobenzene 63%; 2,4-dimethylphenol 68%, 2,4-dinitrophenol 44%, 2-chloronaphthalene 64%, 2-chlorophenol 67%, 2-methyl-4,6-dinitrophenol 45%, 4-chloroaniline 64%, hexachlorocyclopentadiene 51%, hexachloroethane 68%, isophorone 69%, n-nitrosodipropylamine 65%, phenol 65%, bis(2-chloro-1-methylethyl)ether 64%, bis(2-chloroethyl)ether 65%, o-cresol 68%, fluorene 69%

SDG GEL427715: acenaphthene 69%, acenaphthylene 67%, benzo(ghi)perylene 63%, indeno(1,2,3-cd)pyrene 67%, 2,4-dinitrophenol 67%

SDG GEL428015: 2,4-dinitrophenol 33%; 2-methyl-4,6-dinitrophenol 41%; hexachlorocyclopentadiene 58%, pentachlorophenol 67%, benzo(ghi)perylene 62%, indeno(1,2,3-cd)pyrene 64%

SDG GEL428197: 1,3-dichlorobenzene 64%, 1,4-dichlorobenzene 65%, 2,4-dimethylphenol 63%, 2,4-dinitrophenol 44%, 2-chloronaphthalene 63%, 2-methyl-4,6-dinitrophenol 51%, 4-chloroaniline 69%, hexachlorocyclopentadiene 46%, hexachloroethane 67%, n-nitrosodipropylamine 68%, phenol 66%, bis(2-chloro-1-methylethyl)ether 64%, bis(2-chloroethyl)ether 69%, o-nitroaniline 69%, acenaphthene 68%, acenaphthylene 65%, benzo(ghi)perylene 65%, fluorene 68%, indeno(1,2,3-cd)pyrene 68%

Continue on last page

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD RPD values acceptable?	Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG GEL426852: 2,4-dinitrophenol 33%; 2-methyl-4,6-dinitrophenol 45%

SDG GEL428015: 1,2,4-trichlorobenzene 38%, 1,2-dichlorobenzene 39%, 1,3-dichlorobenzene 39%, 1,4-dichlorobenzene 39%, 2,4,5-trichlorophenol 45%, 2,4-dichlorophenol 41%, 2,4-dimethylphenol 36%, 2,4-dinitrotoluene 39%, 2,6-dinitrotoluene 41%, 2-chloronaphthalene 41%, 2-chlorophenol 41%, 2-methyl-4,6-dinitrophenol 35%, 2-methylnaphthalene 38% 2-nitrophenol 39%, 4-bromophenylphenylether 43%, 4-chloro-3-methylphenol 39%, 4-chloroaniline 33%, 4-chlorophenylphenyl 41%, 4-nitrophenol 31%, butylbenzylphthalate 37%, carbazole 33%, di-n-butylphthalate 33%

(Continue on last page)

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed?	Yes No (N/A)
Internal standard areas acceptable?	Yes No (N/A)
Internal standard retention times acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. HOLDING TIMES (all levels)

Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	Yes No N/A

Comments:

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes No N/A
Compound quantitation acceptable? (Levels D, E)	Yes No N/A
Results reported for all requested analyses?	Yes No N/A
Results supported in the raw data? (Levels D, E)	Yes No N/A
Samples properly prepared? (Levels D, E)	Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes No N/A
Detection limits meet RDL?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes No N/A
GPC check performed?	Yes No N/A
GPC check recoveries acceptable?	Yes No N/A
GPC calibration performed?	Yes No N/A
GPC calibration check performed?	Yes No N/A
GPC calibration check retention times acceptable?	Yes No N/A
Check/calibration materials traceable?	Yes No N/A
Check/calibration materials Expired?	Yes No N/A
Analytical batch QC given similar cleanup?	Yes No N/A
Transcription/Calculation Errors?	Yes No N/A

Comments (attach additional sheets as necessary):

LCS%R

SDG GEL428482: 1,3-dichlorobenzene 64%, 1,4-dichlorobenzene 65%, 2,4-dimethylphenol 63%, 2,4-dinitrophenol 44%, 2-chloronaphthalene 63%, 2-methyl-4,6-dinitrophenol 51%, 4-chloroaniline 69%, hexachlorocyclopentadiene 46%, hexachloroethane 67%, n-nitrosodipropylamine 68%, phenol 66%, bis(2-chloro-1-methylethyl)ether 64%, bis(2-chloroethyl)ether 69%, o-nitroaniline 69%, acenaphthene 68%, acenaphthylene 65%, benzo(ghi)perylene 65%, fluorene 68%, indeno(1,2,3-cd)pyrene 68%

MS/MSD RPDs

SDG GEL428015: di-n-octylphthalate 42%, dibenzofuran 41%, diethylphthalate 40%, dimethylphthalate 40%, hexachlorobenzene 41%, hexachlorobutadiene 38%, hexachlorocyclopentadiene 45%, hexachloroethane 39%, isophorone 38%, n-nitrosodipropylamine 41%, nitrobenzene 38%, pentachlorophenol 34%, phenol 41%, tributylphosphate 38% bis(2-chloro-1-methylethyl)ether 41%, bis(2-chloroethoxy)methane 39%, bis(2-chloroethyl)ether 40%, bis(2-ethylhexyl)phthalate 39%, m-nitroaniline 38%, o-cresol 39%, o-nitroaniline 40%, p-nitroaniline 39%

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200-EA-1			DATA PACKAGE: VSR17-012		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 09/29/17	
			SDG: GEL426852, GEL427715, GEL428015, GEL428197, GEL428482		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G	WTPH-D X	

SAMPLES/MATRIX: Soil
GEL426852: B3BBC2
GEL427715: B3BBD0, B3BBC6, B3BBD4
GEL428015: B3BBD8, B3BBF2, B3BBF6
GEL428197: B3BBH0, B3BBH4
GEL428482: B3BBH8, B3BBJ2, B3BBK0

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes (No) N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT TUNING AND CALIBRATION (Levels D and E)**

Initial calibrations acceptable?	Yes No (N/A)
Continuing calibrations acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

Calibration blanks analyzed? (Levels D, E)	Yes No (N/A)
Calibration blank results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

GEL426852: Motor oil 2590 ug/kg

GEL428015: DRO 3110 ug/kg; Kerosene 2990 ug/kg; motor oil 2260 ug/kg

GEL428482: DRO 2820 ug/kg; Kerosene 2810 ug/kg; motor oil 2610 ug/kg (batch 1685897)
DRO 3200 ug/kg; Kerosene 3140 ug/kg; motor oil 2940 ug/kg (batch 1688122 -RE)

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

Surrogates/system monitoring compounds analyzed?	(Yes) No N/A
Surrogate/system monitoring compound recoveries acceptable?	Yes (No) N/A
Surrogates traceable? (Levels D, E)	Yes No (N/A)
Surrogates expired? (Levels D, E)	Yes No (N/A)
MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD results acceptable?	Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/BSS samples analyzed?	(Yes) No N/A
LCS/BSS results acceptable?	Yes (No) N/A
Standards traceable? (Levels D, E)	Yes No (N/A)
Standards expired? (Levels D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

SDG GEL426852: MS/MSD (samples from another SDG) surrogates 51%/56%
MS%R DRO 64%, motor oil 64%

SDG GEL427715: surrogates B3BBD0 45%, B3BBD4 50%; MB 53%
LCS DRO 69%; LCSD Kerosene 66%

SDG GEL428015: surrogates B3BBF6 50%; LCSD 59%
LCSD kerosene 66%,

SDG GEL428197: surrogates B3BBH0 55%; MB 52%
LCS DRO 67%, LCSD kerosene 61%

SDG GEL428482: surrogates; B3BBH8 59%, B3BBJ2 49%, B3BBK0 58%; LCSD (batch 1685897) 59%
LCSD (batch 1688122) 53%

Batch 1685897: LCS kerosene 62%, LCSD kerosene 63%
Batch 1688122: LCSD kerosene 59%

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	(Yes) No N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

SDG GEL428482: Batch 1688122: Kerosene LCS/LCSD RPD 31%

6. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	Yes (No) N/A

Comments:

SDG GEL428482: Samples were re-extracted and reanalyzed past holding time, results reported are -RE designation.

Appendix A - (Cont.) Chemical Data Validation Checklist

7. **COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

8. **SAMPLE CLEANUP (Levels D and E)**

Fluorisil ® (or other absorbent) cleanup performed?	Yes No (N/A)
Lot check performed?	Yes No (N/A)
Check recoveries acceptable?	Yes No (N/A)
Check materials traceable?	Yes No (N/A)
Check materials Expired?	Yes No (N/A)
Analytical batch QC given similar cleanup?	Yes No (N/A)
Transcription/Calculation Errors?	Yes No (N/A)

Comments (attach additional sheets as necessary):

Appendix 4

Additional Documentation Requested By Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 10, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **426852**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680255										
QC1203825780 LCS										
1,2,4-Trichlorobenzene	1670			1190	ug/kg		71	(70%-130%)	JMB3	07/07/17 16:26
1,2-Dichlorobenzene	1670			1110	ug/kg		66*	(70%-130%)		
1,3-Dichlorobenzene	1670			1060	ug/kg		64*	(70%-130%)		
1,4-Dichlorobenzene	1670			1050	ug/kg		63*	(70%-130%)		
2,4,5-Trichlorophenol	1670			1300	ug/kg		78	(70%-130%)		
2,4-Dichlorophenol	1670			1210	ug/kg		73	(70%-130%)		
2,4-Dimethylphenol	1670			1130	ug/kg		68*	(70%-130%)		
2,4-Dinitrophenol	1670			734	ug/kg		44*	(70%-130%)		
2,4-Dinitrotoluene	1670			1290	ug/kg		77	(70%-130%)		
2,6-Dinitrotoluene	1670			1330	ug/kg		80	(70%-130%)		
2-Chloronaphthalene	1670			1070	ug/kg		64*	(70%-130%)		
2-Chlorophenol	1670			1120	ug/kg		67*	(70%-130%)		
2-Methyl-4,6-dinitrophenol	1670			745	ug/kg		45*	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680255										
2-Methylnaphthalene	1670			1190	ug/kg		71	(70%-130%)	JMB3	07/07/17 16:26
2-Nitrophenol	1670			1160	ug/kg		70	(70%-130%)		
3,3'-Dichlorobenzidine	1670			1390	ug/kg		84	(70%-130%)		
4-Bromophenylphenylether	1670			1310	ug/kg		79	(70%-130%)		
4-Chloro-3-methylphenol	1670			1270	ug/kg		76	(70%-130%)		
4-Chloroaniline	1670			1060	ug/kg		64 *	(70%-130%)		
4-Chlorophenylphenylether	1670			1290	ug/kg		78	(70%-130%)		
4-Nitrophenol	1670			1320	ug/kg		79	(70%-130%)		
Butylbenzylphthalate	1670			1350	ug/kg		81	(70%-130%)		
Carbazole	1670			1320	ug/kg		79	(70%-130%)		
Di-n-butylphthalate	1670			1330	ug/kg		80	(70%-130%)		
Di-n-octylphthalate	1670			1400	ug/kg		84	(70%-130%)		
Dibenzofuran	1670			1190	ug/kg		72	(70%-130%)		
Diethylphthalate	1670			1320	ug/kg		79	(70%-130%)		
Dimethylphthalate	1670			1250	ug/kg		75	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680255										
Hexachlorobenzene	1670			1350	ug/kg		81	(70%-130%)	JMB3	07/07/17 16:26
Hexachlorobutadiene	1670			1250	ug/kg		75	(70%-130%)		
Hexachlorocyclopentadiene	1670			848	ug/kg		51 *	(70%-130%)		
Hexachloroethane	1670			1130	ug/kg		68 *	(70%-130%)		
Isophorone	1670			1150	ug/kg		69 *	(70%-130%)		
N-Nitrosodipropylamine	1670			1080	ug/kg		65 *	(70%-130%)		
Nitrobenzene	1670			1210	ug/kg		73	(70%-130%)		
Pentachlorophenol	1670			1190	ug/kg		72	(70%-130%)		
Phenol	1670			1080	ug/kg		65 *	(70%-130%)		
Tributylphosphate	1670			1610	ug/kg		97	(70%-130%)		
bis(2-Chloro-1-methylethyl)ether	1670			1060	ug/kg		64 *	(70%-130%)		
bis(2-Chloroethoxy)methane	1670			1170	ug/kg		70	(70%-130%)		
bis(2-Chloroethyl) ether	1670			1090	ug/kg		65 *	(70%-130%)		
bis(2-Ethylhexyl)phthalate	1670			1420	ug/kg		85	(70%-130%)		
m-Nitroaniline	1670			1240	ug/kg		75	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680255										
o-Cresol	1670			1140	ug/kg		68*	(70%-130%)	JMB3	07/07/17 16:26
o-Nitroaniline	1670			1220	ug/kg		73	(70%-130%)		
p-Nitroaniline	1670			1280	ug/kg		77	(70%-130%)		
**2,4,6-Tribromophenol	3330			2760	ug/kg		83	(12%-129%)		
**2-Fluorobiphenyl	1670			1190	ug/kg		71	(15%-110%)		
**2-Fluorophenol	3330			2100	ug/kg		63	(10%-115%)		
**Nitrobenzene-d5	1670			1250	ug/kg		75	(13%-112%)		
**Phenol-d5	3330			2280	ug/kg		68	(15%-117%)		
**p-Terphenyl-d14	1670			1500	ug/kg		90	(24%-141%)		
QC1203825779 MB										
1,2,4-Trichlorobenzene			U	100	ug/kg					07/07/17 15:55
1,2-Dichlorobenzene			U	100	ug/kg					
1,3-Dichlorobenzene			U	100	ug/kg					
1,4-Dichlorobenzene			U	100	ug/kg					
2,4,5-Trichlorophenol			U	100	ug/kg					
2,4-Dichlorophenol			U	100	ug/kg					

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680255										
2,4-Dimethylphenol			U	100	ug/kg				JMB3	07/07/17 15:55
2,4-Dinitrophenol			U	100	ug/kg					
2,4-Dinitrotoluene			U	100	ug/kg					
2,6-Dinitrotoluene			U	100	ug/kg					
2-Chloronaphthalene			U	10.0	ug/kg					
2-Chlorophenol			U	100	ug/kg					
2-Methyl-4,6-dinitrophenol			U	100	ug/kg					
2-Methylnaphthalene			U	10.0	ug/kg					
2-Nitrophenol			U	100	ug/kg					
3,3'-Dichlorobenzidine			U	100	ug/kg					
4-Bromophenylphenylether			U	100	ug/kg					
4-Chloro-3-methylphenol			U	133	ug/kg					
4-Chloroaniline			U	100	ug/kg					
4-Chlorophenylphenylether			U	100	ug/kg					
4-Nitrophenol			U	100	ug/kg					

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680255										
Butylbenzylphthalate			U	100	ug/kg				JMB3	07/07/17 15:55
Carbazole			U	10.0	ug/kg					
Di-n-butylphthalate			U	100	ug/kg					
Di-n-octylphthalate			U	100	ug/kg					
Dibenzofuran			U	100	ug/kg					
Diethylphthalate			U	100	ug/kg					
Dimethylphthalate			U	100	ug/kg					
Hexachlorobenzene			U	100	ug/kg					
Hexachlorobutadiene			U	100	ug/kg					
Hexachlorocyclopentadiene			U	100	ug/kg					
Hexachloroethane			U	100	ug/kg					
Isophorone			U	100	ug/kg					
N-Nitrosodipropylamine			U	100	ug/kg					
Nitrobenzene			U	100	ug/kg					
Pentachlorophenol			U	100	ug/kg					

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680255										
Phenol			U	100	ug/kg				JMB3	07/07/17 15:55
Tributylphosphate			U	100	ug/kg					
bis(2-Chloro-1-methylethyl)ether			U	100	ug/kg					
bis(2-Chloroethoxy)methane			U	100	ug/kg					
bis(2-Chloroethyl) ether			U	100	ug/kg					
bis(2-Ethylhexyl)phthalate			U	100	ug/kg					
m-Nitroaniline			U	100	ug/kg					
o-Cresol			U	100	ug/kg					
o-Nitroaniline			U	110	ug/kg					
p-Nitroaniline			U	100	ug/kg					
**2,4,6-Tribromophenol	3330			2730	ug/kg		82	(12%-129%)		
**2-Fluorobiphenyl	1670			1320	ug/kg		79	(15%-110%)		
**2-Fluorophenol	3330			2180	ug/kg		65	(10%-115%)		
**Nitrobenzene-d5	1670			1380	ug/kg		83	(13%-112%)		
**Phenol-d5	3330			2280	ug/kg		69	(15%-117%)		

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QC Summary

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1680255											
**p-Terphenyl-d14	1670				1390	ug/kg		84	(24%-141%)	JMB3	07/07/17 15:55
QC1203825781 427197001 MS											
1,2,4-Trichlorobenzene	1690	U	101		1090	ug/kg		64	(26%-104%)		07/07/17 18:30
1,2-Dichlorobenzene	1690	U	101		1010	ug/kg		60	(26%-98%)		
1,3-Dichlorobenzene	1690	U	101		939	ug/kg		56	(27%-92%)		
1,4-Dichlorobenzene	1690	U	101		935	ug/kg		55	(27%-95%)		
2,4,5-Trichlorophenol	1690	U	101		1260	ug/kg		75	(26%-120%)		
2,4-Dichlorophenol	1690	U	101		1150	ug/kg		68	(21%-119%)		
2,4-Dimethylphenol	1690	U	101		1030	ug/kg		61	(27%-111%)		
2,4-Dinitrophenol	1690	U	101	J	542	ug/kg		32	(12%-112%)		
2,4-Dinitrotoluene	1690	U	101		1290	ug/kg		76	(32%-118%)		
2,6-Dinitrotoluene	1690	U	101		1280	ug/kg		76	(32%-114%)		
2-Chloronaphthalene	1690	U	10.1		1060	ug/kg		63	(25%-111%)		
2-Chlorophenol	1690	U	101		1060	ug/kg		63	(20%-114%)		
2-Methyl-4,6-dinitrophenol	1690	U	101		494	ug/kg		29	(17%-115%)		
2-Methylnaphthalene	1690	U	10.1		1140	ug/kg		67	(25%-112%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1680255											
2-Nitrophenol	1690	U	101		1080	ug/kg		64	(23%-115%)	JMB3	07/07/17 18:30
3,3'-Dichlorobenzidine	1690	U	101		1060	ug/kg		63	(21%-107%)		
4-Bromophenylphenylether	1690	U	101		1290	ug/kg		76	(29%-121%)		
4-Chloro-3-methylphenol	1690	U	135		1230	ug/kg		73	(29%-119%)		
4-Chloroaniline	1690	U	101		1060	ug/kg		63	(22%-120%)		
4-Chlorophenylphenylether	1690	U	101		1260	ug/kg		75	(29%-119%)		
4-Nitrophenol	1690	U	101		1190	ug/kg		71	(20%-120%)		
Butylbenzylphthalate	1690	U	101		1260	ug/kg		75	(26%-133%)		
Carbazole	1690	U	10.1		1190	ug/kg		71	(27%-123%)		
Di-n-butylphthalate	1690	U	101		1250	ug/kg		74	(26%-126%)		
Di-n-octylphthalate	1690	U	101		1240	ug/kg		74	(29%-130%)		
Dibenzofuran	1690	U	101		1170	ug/kg		69	(30%-119%)		
Diethylphthalate	1690	U	101		1280	ug/kg		75	(26%-124%)		
Dimethylphthalate	1690	U	101		1240	ug/kg		74	(27%-120%)		
Hexachlorobenzene	1690	U	101		1330	ug/kg		79	(30%-113%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1680255											
Hexachlorobutadiene	1690	U	101		1140	ug/kg		67	(25%-109%)	JMB3	07/07/17 18:30
Hexachlorocyclopentadiene	1690	U	101		776	ug/kg		46	(10%-100%)		
Hexachloroethane	1690	U	101		1040	ug/kg		62	(23%-98%)		
Isophorone	1690	U	101		1070	ug/kg		63	(29%-107%)		
N-Nitrosodipropylamine	1690	U	101		1050	ug/kg		62	(25%-113%)		
Nitrobenzene	1690	U	101		1120	ug/kg		66	(26%-109%)		
Pentachlorophenol	1690	U	101		1040	ug/kg		61	(17%-119%)		
Phenol	1690	U	101		1050	ug/kg		62	(28%-111%)		
Tributylphosphate	1690	U	101		1540	ug/kg		91	(25%-131%)		
bis(2-Chloro-1-methylethyl)ether	1690	U	101		988	ug/kg		59	(21%-116%)		
bis(2-Chloroethoxy)methane	1690	U	101		1090	ug/kg		65	(30%-111%)		
bis(2-Chloroethyl) ether	1690	U	101		1000	ug/kg		60	(27%-110%)		
bis(2-Ethylhexyl)phthalate	1690	U	101		1340	ug/kg		78	(27%-131%)		
m-Nitroaniline	1690	U	101		1290	ug/kg		76	(24%-137%)		
o-Cresol	1690	U	101		1090	ug/kg		65	(28%-114%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1680255											
o-Nitroaniline	1690	U	111		1200	ug/kg		71	(27%-120%)	JMB3	07/07/17 18:30
p-Nitroaniline	1690	U	101		1180	ug/kg		70	(19%-140%)		
**2,4,6-Tribromophenol	3370		2620		2490	ug/kg		74	(12%-129%)		
**2-Fluorobiphenyl	1690		1250		1060	ug/kg		63	(15%-110%)		
**2-Fluorophenol	3370		1850		1850	ug/kg		55	(10%-115%)		
**Nitrobenzene-d5	1690		1150		1050	ug/kg		62	(13%-112%)		
**Phenol-d5	3370		2000		2030	ug/kg		60	(15%-117%)		
**p-Terphenyl-d14	1690		1460		1430	ug/kg		85	(24%-141%)		
QC1203825782 427197001 MSD											
1,2,4-Trichlorobenzene	1690	U	101		1270	ug/kg	16	75	(0%-30%)		07/07/17 19:02
1,2-Dichlorobenzene	1690	U	101		1210	ug/kg	18	72	(0%-30%)		
1,3-Dichlorobenzene	1690	U	101		1140	ug/kg	20	68	(0%-30%)		
1,4-Dichlorobenzene	1690	U	101		1160	ug/kg	21	69	(0%-30%)		
2,4,5-Trichlorophenol	1690	U	101		1380	ug/kg	9	82	(0%-30%)		
2,4-Dichlorophenol	1690	U	101		1330	ug/kg	14	79	(0%-30%)		
2,4-Dimethylphenol	1690	U	101		1180	ug/kg	14	70	(0%-30%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1680255											
2,4-Dinitrophenol	1690	U	101		754	ug/kg	33*	45	(0%-30%)	JMB3	07/07/17 19:02
2,4-Dinitrotoluene	1690	U	101		1420	ug/kg	10	84	(0%-30%)		
2,6-Dinitrotoluene	1690	U	101		1430	ug/kg	11	85	(0%-30%)		
2-Chloronaphthalene	1690	U	10.1		1220	ug/kg	14	72	(0%-30%)		
2-Chlorophenol	1690	U	101		1290	ug/kg	19	77	(0%-30%)		
2-Methyl-4,6-dinitrophenol	1690	U	101		783	ug/kg	45*	46	(0%-30%)		
2-Methylnaphthalene	1690	U	10.1		1310	ug/kg	14	78	(0%-30%)		
2-Nitrophenol	1690	U	101		1250	ug/kg	14	74	(0%-30%)		
3,3'-Dichlorobenzidine	1690	U	101		1060	ug/kg	0	63	(0%-30%)		
4-Bromophenylphenylether	1690	U	101		1410	ug/kg	9	84	(0%-30%)		
4-Chloro-3-methylphenol	1690	U	135		1430	ug/kg	15	85	(0%-30%)		
4-Chloroaniline	1690	U	101		1150	ug/kg	8	68	(0%-30%)		
4-Chlorophenylphenylether	1690	U	101		1440	ug/kg	13	85	(0%-30%)		
4-Nitrophenol	1690	U	101		1370	ug/kg	14	82	(0%-30%)		
Butylbenzylphthalate	1690	U	101		1420	ug/kg	12	84	(0%-30%)		

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QC Summary

Workorder: **426852**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680255										
Carbazole	1690	U	10.1	1350	ug/kg	12	80	(0%-30%)	JMB3	07/07/17 19:02
Di-n-butylphthalate	1690	U	101	1370	ug/kg	9	81	(0%-30%)		
Di-n-octylphthalate	1690	U	101	1390	ug/kg	12	83	(0%-30%)		
Dibenzofuran	1690	U	101	1330	ug/kg	13	79	(0%-30%)		
Diethylphthalate	1690	U	101	1420	ug/kg	10	84	(0%-30%)		
Dimethylphthalate	1690	U	101	1410	ug/kg	12	83	(0%-30%)		
Hexachlorobenzene	1690	U	101	1440	ug/kg	7	85	(0%-30%)		
Hexachlorobutadiene	1690	U	101	1330	ug/kg	16	79	(0%-30%)		
Hexachlorocyclopentadiene	1690	U	101	883	ug/kg	13	52	(0%-30%)		
Hexachloroethane	1690	U	101	1220	ug/kg	16	72	(0%-30%)		
Isophorone	1690	U	101	1240	ug/kg	15	73	(0%-30%)		
N-Nitrosodipropylamine	1690	U	101	1240	ug/kg	16	73	(0%-30%)		
Nitrobenzene	1690	U	101	1270	ug/kg	13	75	(0%-30%)		
Pentachlorophenol	1690	U	101	1280	ug/kg	21	76	(0%-30%)		
Phenol	1690	U	101	1250	ug/kg	18	74	(0%-30%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680255										
Tributylphosphate	1690	U	101	1710	ug/kg	10	101	(0%-30%)	JMB3	07/07/17 19:02
bis(2-Chloro-1-methylethyl)ether	1690	U	101	1170	ug/kg	17	70	(0%-30%)		
bis(2-Chloroethoxy)methane	1690	U	101	1290	ug/kg	17	76	(0%-30%)		
bis(2-Chloroethyl) ether	1690	U	101	1200	ug/kg	17	71	(0%-30%)		
bis(2-Ethylhexyl)phthalate	1690	U	101	1590	ug/kg	17	93	(0%-30%)		
m-Nitroaniline	1690	U	101	1310	ug/kg	2	77	(0%-30%)		
o-Cresol	1690	U	101	1300	ug/kg	18	77	(0%-30%)		
o-Nitroaniline	1690	U	111	1390	ug/kg	15	83	(0%-30%)		
p-Nitroaniline	1690	U	101	1350	ug/kg	14	80	(0%-30%)		
**2,4,6-Tribromophenol	3370		2620	2680	ug/kg		79	(12%-129%)		
**2-Fluorobiphenyl	1690		1250	1220	ug/kg		73	(15%-110%)		
**2-Fluorophenol	3370		1850	2180	ug/kg		65	(10%-115%)		
**Nitrobenzene-d5	1690		1150	1210	ug/kg		72	(13%-112%)		
**Phenol-d5	3370		2000	2380	ug/kg		71	(15%-117%)		
**p-Terphenyl-d14	1690		1460	1610	ug/kg		96	(24%-141%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680293										
QC1203825860 LCS										
Acenaphthene	332			241	ug/kg		73	(70%-130%)	JLD1	07/07/17 17:18
Acenaphthylene	332			232	ug/kg		70	(70%-130%)		
Anthracene	332			262	ug/kg		79	(70%-130%)		
Benzo(a)anthracene	332			274	ug/kg		83	(70%-130%)		
Benzo(a)pyrene	332			262	ug/kg		79	(70%-130%)		
Benzo(b)fluoranthene	332			249	ug/kg		75	(70%-130%)		
Benzo(ghi)perylene	332			236	ug/kg		71	(70%-130%)		
Benzo(k)fluoranthene	332			262	ug/kg		79	(70%-130%)		
Chrysene	332			291	ug/kg		88	(70%-130%)		
Dibenzo(a,h)anthracene	332			269	ug/kg		81	(70%-130%)		
Fluoranthene	332			275	ug/kg		83	(70%-130%)		
Fluorene	332			230	ug/kg		69*	(70%-130%)		
Indeno(1,2,3-cd)pyrene	332			247	ug/kg		74	(70%-130%)		
Naphthalene	332			281	ug/kg		85	(70%-130%)		
Phenanthrene	332			266	ug/kg		80	(70%-130%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680293										
Pyrene	332			248	ug/kg		75	(70%-130%)	JLD1	07/07/17 17:18
**5-alpha-Androstane	166			131	ug/kg		79	(25%-129%)		
QC1203825859 MB										
Acenaphthene			U	1.66	ug/kg					07/07/17 16:46
Acenaphthylene			U	1.66	ug/kg					
Anthracene			U	1.66	ug/kg					
Benzo(a)anthracene			U	1.66	ug/kg					
Benzo(a)pyrene			U	1.66	ug/kg					
Benzo(b)fluoranthene			U	1.66	ug/kg					
Benzo(ghi)perylene			U	1.66	ug/kg					
Benzo(k)fluoranthene			U	1.66	ug/kg					
Chrysene			U	1.66	ug/kg					
Dibenzo(a,h)anthracene			U	1.66	ug/kg					
Fluoranthene			U	1.66	ug/kg					
Fluorene			U	1.66	ug/kg					
Indeno(1,2,3-cd)pyrene			U	1.66	ug/kg					

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1680293											
Naphthalene				U	0.995	ug/kg				JLD1	07/07/17 16:46
Phenanthrene				U	1.66	ug/kg					
Pyrene				U	1.66	ug/kg					
**5-alpha-Androstane	166				102	ug/kg		61	(25%-129%)		
QC1203825861 426852001 MS											
Acenaphthene	352	U	1.76		230	ug/kg		65	(18%-115%)		07/07/17 18:22
Acenaphthylene	352	U	1.76		222	ug/kg		63	(19%-116%)		
Anthracene	352	J	2.11		248	ug/kg		70	(23%-115%)		
Benzo(a)anthracene	352	J	2.81		259	ug/kg		73	(23%-124%)		
Benzo(a)pyrene	352	J	2.46		256	ug/kg		72	(20%-130%)		
Benzo(b)fluoranthene	352	J	2.81		267	ug/kg		75	(20%-134%)		
Benzo(ghi)perylene	352	J	2.11		198	ug/kg		56	(18%-118%)		
Benzo(k)fluoranthene	352	J	2.81		276	ug/kg		78	(23%-128%)		
Chrysene	352	J	2.46		270	ug/kg		76	(18%-121%)		
Dibenzo(a,h)anthracene	352	J	2.46		230	ug/kg		65	(12%-132%)		
Fluoranthene	352	J	3.16		266	ug/kg		75	(21%-124%)		

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QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1680293											
Fluorene	352	J	2.11		226	ug/kg		64	(21%-118%)	JLD1	07/07/17 18:22
Indeno(1,2,3-cd)pyrene	352	J	2.11		206	ug/kg		58	(11%-130%)		
Naphthalene	352	J	1.76		274	ug/kg		77	(14%-114%)		
Phenanthrene	352	J	2.81		254	ug/kg		72	(24%-106%)		
Pyrene	352	J	2.46		241	ug/kg		68	(16%-122%)		
**5-alpha-Androstane	176		141		126	ug/kg		72	(25%-129%)		
QC1203825862 426852001 MSD											
Acenaphthene	354	U	1.76		264	ug/kg	14	75	(0%-30%)		07/07/17 18:55
Acenaphthylene	354	U	1.76		252	ug/kg	13	71	(0%-30%)		
Anthracene	354	J	2.11		272	ug/kg	9	76	(0%-30%)		
Benzo(a)anthracene	354	J	2.81		287	ug/kg	10	80	(0%-30%)		
Benzo(a)pyrene	354	J	2.46		276	ug/kg	8	77	(0%-30%)		
Benzo(b)fluoranthene	354	J	2.81		297	ug/kg	11	83	(0%-30%)		
Benzo(ghi)perylene	354	J	2.11		249	ug/kg	23	70	(0%-30%)		
Benzo(k)fluoranthene	354	J	2.81		304	ug/kg	10	85	(0%-30%)		
Chrysene	354	J	2.46		301	ug/kg	11	85	(0%-30%)		

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QC Summary

Workorder: 426852

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1680293										
Dibenzo(a,h)anthracene	354	2.46	J	301	ug/kg	27	84	(0%-30%)	JLD1	07/07/17 18:55
Fluoranthene	354	3.16	J	288	ug/kg	8	80	(0%-30%)		
Fluorene	354	2.11	J	255	ug/kg	12	72	(0%-30%)		
Indeno(1,2,3-cd)pyrene	354	2.11	J	263	ug/kg	24	74	(0%-30%)		
Naphthalene	354	1.76	J	320	ug/kg	16	90	(0%-30%)		
Phenanthrene	354	2.81	J	274	ug/kg	7	77	(0%-30%)		
Pyrene	354	2.46	J	265	ug/kg	9	74	(0%-30%)		
**5-alpha-Androstane	177	141		138	ug/kg		78	(25%-129%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

Semi-Volatile

Surrogate Recovery Report

SDG Number: GEL426852

Matrix Type: SOLID

Sample ID	Client ID	5-alpha %REC
1203825859	MB for batch 1680291	61
1203825860	LCS for batch 1680291	79
426852001	B3BBC2	80
1203825861	B3BBC2MS	72
1203825862	B3BBC2MSD	78

Surrogate	Acceptance Limits
5-alpha- = 5-alpha-Androstane	(25%-129%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

Semi-Volatile

Surrogate Recovery Report

SDG Number: GEL426852

Matrix Type: SOLID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203825779	MB for batch 1680254	65	69	83	79	82	84
1203825780	LCS for batch 1680254	63	68	75	71	83	90
426852001	B3BBC2	44	50	58	61	68	80
1203825781	B3B7N8MS	55	60	62	63	74	85
1203825782	B3B7N8MSD	65	71	72	73	79	96

Surrogate		Acceptance Limits
2FP	= 2-Fluorophenol	(10%-115%)
PHL	= Phenol-d5	(15%-117%)
NBZ	= Nitrobenzene-d5	(13%-112%)
FBP	= 2-Fluorobiphenyl	(15%-110%)
TBP	= 2,4,6-Tribromophenol	(12%-129%)
TPH	= p-Terphenyl-d14	(24%-141%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

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QC Summary

Report Date: July 18, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **427715**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682100										
QC1203830332 LCS										
Acenaphthene	333			231	ug/kg		69*	(70%-130%)	JLD1	07/14/17 16:31
Acenaphthylene	333			223	ug/kg		67*	(70%-130%)		
Anthracene	333			270	ug/kg		81	(70%-130%)		
Benzo(a)anthracene	333			292	ug/kg		87	(70%-130%)		
Benzo(a)pyrene	333			283	ug/kg		85	(70%-130%)		
Benzo(b)fluoranthene	333			300	ug/kg		90	(70%-130%)		
Benzo(ghi)perylene	333			208	ug/kg		63*	(70%-130%)		
Benzo(k)fluoranthene	333			313	ug/kg		94	(70%-130%)		
Chrysene	333			304	ug/kg		91	(70%-130%)		
Dibenzo(a,h)anthracene	333			260	ug/kg		78	(70%-130%)		
Fluoranthene	333			286	ug/kg		86	(70%-130%)		
Fluorene	333			238	ug/kg		71	(70%-130%)		
Indeno(1,2,3-cd)pyrene	333			224	ug/kg		67*	(70%-130%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682100										
Naphthalene	333			250	ug/kg		75	(70%-130%)	JLD1	07/14/17 16:31
Phenanthrene	333			272	ug/kg		82	(70%-130%)		
Pyrene	333			282	ug/kg		85	(70%-130%)		
**5-alpha-Androstane	167			137	ug/kg		82	(25%-129%)		
QC1203830331 MB										
Acenaphthene			U	1.67	ug/kg					07/14/17 15:59
Acenaphthylene			U	1.67	ug/kg					
Anthracene			U	1.67	ug/kg					
Benzo(a)anthracene			U	1.67	ug/kg					
Benzo(a)pyrene			U	1.67	ug/kg					
Benzo(b)fluoranthene			U	1.67	ug/kg					
Benzo(ghi)perylene			U	1.67	ug/kg					
Benzo(k)fluoranthene			U	1.67	ug/kg					
Chrysene			U	1.67	ug/kg					
Dibenzo(a,h)anthracene			U	1.67	ug/kg					
Fluoranthene			U	1.67	ug/kg					

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QC Summary

Workorder: 427715

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682100											
Fluorene				U	1.67	ug/kg				JLD1	07/14/17 15:59
Indeno(1,2,3-cd)pyrene				U	1.67	ug/kg					
Naphthalene				U	1.00	ug/kg					
Phenanthrene				U	1.67	ug/kg					
Pyrene				U	1.67	ug/kg					
**5-alpha-Androstane	167				152	ug/kg		91	(25%-129%)		
QC1203830333 427715001 MS											
Acenaphthene	371	U	1.85		252	ug/kg		68	(18%-115%)		07/14/17 17:36
Acenaphthylene	371	U	1.85		243	ug/kg		66	(19%-116%)		
Anthracene	371	U	1.85		287	ug/kg		78	(23%-115%)		
Benzo(a)anthracene	371	U	1.85		320	ug/kg		86	(23%-124%)		
Benzo(a)pyrene	371	U	1.85		306	ug/kg		83	(20%-130%)		
Benzo(b)fluoranthene	371	U	1.85		340	ug/kg		92	(20%-134%)		
Benzo(ghi)perylene	371	U	1.85		231	ug/kg		62	(18%-118%)		
Benzo(k)fluoranthene	371	U	1.85		348	ug/kg		94	(23%-128%)		
Chrysene	371	U	1.85		331	ug/kg		89	(18%-121%)		

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QC Summary

Workorder: 427715

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682100											
Dibenzo(a,h)anthracene	371	U	1.85		284	ug/kg		77	(12%-132%)	JLD1	07/14/17 17:36
Fluoranthene	371	U	1.85		310	ug/kg		84	(21%-124%)		
Fluorene	371	U	1.85		253	ug/kg		68	(21%-118%)		
Indeno(1,2,3-cd)pyrene	371	U	1.85		246	ug/kg		66	(11%-130%)		
Naphthalene	371	U	1.11		269	ug/kg		73	(14%-114%)		
Phenanthrene	371	U	1.85		291	ug/kg		78	(24%-106%)		
Pyrene	371	U	1.85		310	ug/kg		84	(16%-122%)		
**5-alpha-Androstane	185		138		130	ug/kg		70	(25%-129%)		
QC1203830334 427715001 MSD											
Acenaphthene	370	U	1.85		226	ug/kg	11	61	(0%-30%)		07/14/17 18:08
Acenaphthylene	370	U	1.85		223	ug/kg	8	60	(0%-30%)		
Anthracene	370	U	1.85		263	ug/kg	9	71	(0%-30%)		
Benzo(a)anthracene	370	U	1.85		286	ug/kg	11	77	(0%-30%)		
Benzo(a)pyrene	370	U	1.85		277	ug/kg	10	75	(0%-30%)		
Benzo(b)fluoranthene	370	U	1.85		295	ug/kg	14	80	(0%-30%)		
Benzo(ghi)perylene	370	U	1.85		229	ug/kg	1	62	(0%-30%)		

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QC Summary

Workorder: 427715

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682100											
Benzo(k)fluoranthene	370	U	1.85		307	ug/kg	12	83	(0%-30%)	JLD1	07/14/17 18:08
Chrysene	370	U	1.85		294	ug/kg	12	79	(0%-30%)		
Dibenzo(a,h)anthracene	370	U	1.85		276	ug/kg	3	75	(0%-30%)		
Fluoranthene	370	U	1.85		277	ug/kg	11	75	(0%-30%)		
Fluorene	370	U	1.85		231	ug/kg	9	62	(0%-30%)		
Indeno(1,2,3-cd)pyrene	370	U	1.85		238	ug/kg	4	64	(0%-30%)		
Naphthalene	370	U	1.11		260	ug/kg	3	70	(0%-30%)		
Phenanthrene	370	U	1.85		270	ug/kg	7	73	(0%-30%)		
Pyrene	370	U	1.85		287	ug/kg	8	78	(0%-30%)		
**5-alpha-Androstane	185		138		135	ug/kg		73	(25%-129%)		
Batch 1682715											
QC1203831890 LCS											
1,2,4-Trichlorobenzene	1670				1600	ug/kg		96	(70%-130%)	JLD1	07/17/17 18:00
1,2-Dichlorobenzene	1670				1450	ug/kg		87	(70%-130%)		
1,3-Dichlorobenzene	1670				1390	ug/kg		83	(70%-130%)		
1,4-Dichlorobenzene	1670				1430	ug/kg		86	(70%-130%)		
2,4,5-Trichlorophenol	1670				1610	ug/kg		96	(70%-130%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682715										
2,4-Dichlorophenol	1670			1700	ug/kg		102	(70%-130%)	JLD1	07/17/17 18:00
2,4-Dimethylphenol	1670			1510	ug/kg		90	(70%-130%)		
2,4-Dinitrophenol	1670			1120	ug/kg		67 *	(70%-130%)		
2,4-Dinitrotoluene	1670			1900	ug/kg		114	(70%-130%)		
2,6-Dinitrotoluene	1670			1720	ug/kg		103	(70%-130%)		
2-Chloronaphthalene	1670			1520	ug/kg		91	(70%-130%)		
2-Chlorophenol	1670			1620	ug/kg		97	(70%-130%)		
2-Methyl-4,6-dinitrophenol	1670			1280	ug/kg		77	(70%-130%)		
2-Methylnaphthalene	1670			1630	ug/kg		98	(70%-130%)		
2-Nitrophenol	1670			1690	ug/kg		101	(70%-130%)		
3,3'-Dichlorobenzidine	1670			1930	ug/kg		116	(70%-130%)		
4-Bromophenylphenylether	1670			1560	ug/kg		94	(70%-130%)		
4-Chloro-3-methylphenol	1670			1780	ug/kg		107	(70%-130%)		
4-Chloroaniline	1670			1650	ug/kg		99	(70%-130%)		
4-Chlorophenylphenylether	1670			1730	ug/kg		104	(70%-130%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682715										
4-Nitrophenol	1670			1700	ug/kg		102	(70%-130%)	JLD1	07/17/17 18:00
Butylbenzylphthalate	1670			1600	ug/kg		96	(70%-130%)		
Carbazole	1670			1820	ug/kg		109	(70%-130%)		
Di-n-butylphthalate	1670			1790	ug/kg		107	(70%-130%)		
Di-n-octylphthalate	1670			2140	ug/kg		128	(70%-130%)		
Dibenzofuran	1670			1610	ug/kg		97	(70%-130%)		
Diethylphthalate	1670			1740	ug/kg		104	(70%-130%)		
Dimethylphthalate	1670			1650	ug/kg		99	(70%-130%)		
Hexachlorobenzene	1670			1560	ug/kg		94	(70%-130%)		
Hexachlorobutadiene	1670			1590	ug/kg		95	(70%-130%)		
Hexachlorocyclopentadiene	1670			1180	ug/kg		71	(70%-130%)		
Hexachloroethane	1670			1400	ug/kg		84	(70%-130%)		
Isophorone	1670			1630	ug/kg		98	(70%-130%)		
N-Nitrosodipropylamine	1670			1600	ug/kg		96	(70%-130%)		
Nitrobenzene	1670			1630	ug/kg		97	(70%-130%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682715										
Pentachlorophenol	1670			1630	ug/kg		98	(70%-130%)	JLD1	07/17/17 18:00
Phenol	1670			1600	ug/kg		96	(70%-130%)		
Tributylphosphate	1670			1930	ug/kg		116	(70%-130%)		
bis(2-Chloro-1-methylethyl)ether	1670			1510	ug/kg		91	(70%-130%)		
bis(2-Chloroethoxy)methane	1670			1640	ug/kg		98	(70%-130%)		
bis(2-Chloroethyl) ether	1670			1570	ug/kg		94	(70%-130%)		
bis(2-Ethylhexyl)phthalate	1670			1720	ug/kg		103	(70%-130%)		
m-Nitroaniline	1670			1770	ug/kg		106	(70%-130%)		
o-Cresol	1670			1570	ug/kg		94	(70%-130%)		
o-Nitroaniline	1670			1660	ug/kg		100	(70%-130%)		
p-Nitroaniline	1670			2070	ug/kg		124	(70%-130%)		
**2,4,6-Tribromophenol	3330			3170	ug/kg		95	(12%-129%)		
**2-Fluorobiphenyl	1670			1250	ug/kg		75	(15%-110%)		
**2-Fluorophenol	3330			2620	ug/kg		79	(10%-115%)		
**Nitrobenzene-d5	1670			1290	ug/kg		77	(13%-112%)		

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682715										
**Phenol-d5	3330			2710	ug/kg		81	(15%-117%)	JLD1	07/17/17 18:00
**p-Terphenyl-d14	1670			1240	ug/kg		74	(24%-141%)		
QC1203831889 MB										
1,2,4-Trichlorobenzene			U	100	ug/kg					07/17/17 17:31
1,2-Dichlorobenzene			U	100	ug/kg					
1,3-Dichlorobenzene			U	100	ug/kg					
1,4-Dichlorobenzene			U	100	ug/kg					
2,4,5-Trichlorophenol			U	100	ug/kg					
2,4-Dichlorophenol			U	100	ug/kg					
2,4-Dimethylphenol			U	100	ug/kg					
2,4-Dinitrophenol			U	100	ug/kg					
2,4-Dinitrotoluene			U	100	ug/kg					
2,6-Dinitrotoluene			U	100	ug/kg					
2-Chloronaphthalene			U	10.0	ug/kg					
2-Chlorophenol			U	100	ug/kg					
2-Methyl-4,6-dinitrophenol			U	100	ug/kg					

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682715										
2-Methylnaphthalene			U	10.0	ug/kg				JLD1	07/17/17 17:31
2-Nitrophenol			U	100	ug/kg					
3,3'-Dichlorobenzidine			U	100	ug/kg					
4-Bromophenylphenylether			U	100	ug/kg					
4-Chloro-3-methylphenol			U	133	ug/kg					
4-Chloroaniline			U	100	ug/kg					
4-Chlorophenylphenylether			U	100	ug/kg					
4-Nitrophenol			U	100	ug/kg					
Butylbenzylphthalate			U	100	ug/kg					
Carbazole			U	10.0	ug/kg					
Di-n-butylphthalate			U	100	ug/kg					
Di-n-octylphthalate			U	100	ug/kg					
Dibenzofuran			U	100	ug/kg					
Diethylphthalate			U	100	ug/kg					
Dimethylphthalate			U	100	ug/kg					

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682715										
Hexachlorobenzene			U	100	ug/kg				JLD1	07/17/17 17:31
Hexachlorobutadiene			U	100	ug/kg					
Hexachlorocyclopentadiene			U	100	ug/kg					
Hexachloroethane			U	100	ug/kg					
Isophorone			U	100	ug/kg					
N-Nitrosodipropylamine			U	100	ug/kg					
Nitrobenzene			U	100	ug/kg					
Pentachlorophenol			U	100	ug/kg					
Phenol			U	100	ug/kg					
Tributylphosphate			U	100	ug/kg					
bis(2-Chloro-1-methylethyl)ether			U	100	ug/kg					
bis(2-Chloroethoxy)methane			U	100	ug/kg					
bis(2-Chloroethyl) ether			U	100	ug/kg					
bis(2-Ethylhexyl)phthalate			U	100	ug/kg					
m-Nitroaniline			U	100	ug/kg					

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682715										
o-Cresol			U	100	ug/kg				JLD1	07/17/17 17:31
o-Nitroaniline			U	110	ug/kg					
p-Nitroaniline			U	100	ug/kg					
**2,4,6-Tribromophenol	3330			3050	ug/kg		92	(12%-129%)		
**2-Fluorobiphenyl	1670			1350	ug/kg		81	(15%-110%)		
**2-Fluorophenol	3330			2740	ug/kg		82	(10%-115%)		
**Nitrobenzene-d5	1670			1440	ug/kg		86	(13%-112%)		
**Phenol-d5	3330			2790	ug/kg		84	(15%-117%)		
**p-Terphenyl-d14	1670			1380	ug/kg		83	(24%-141%)		
QC1203831891 427715002 MS										
1,2,4-Trichlorobenzene	1740	U	105	1290	ug/kg		74	(26%-104%)		07/17/17 20:28
1,2-Dichlorobenzene	1740	U	105	1200	ug/kg		69	(26%-98%)		
1,3-Dichlorobenzene	1740	U	105	1130	ug/kg		65	(27%-92%)		
1,4-Dichlorobenzene	1740	U	105	1160	ug/kg		67	(27%-95%)		
2,4,5-Trichlorophenol	1740	U	105	1280	ug/kg		73	(26%-120%)		
2,4-Dichlorophenol	1740	U	105	1360	ug/kg		78	(21%-119%)		

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QC Summary

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682715											
2,4-Dimethylphenol	1740	U	105		1190	ug/kg		68	(27%-111%)	JLD1	07/17/17 20:28
2,4-Dinitrophenol	1740	U	105	J	685	ug/kg		39	(12%-112%)		
2,4-Dinitrotoluene	1740	U	105		1540	ug/kg		89	(32%-118%)		
2,6-Dinitrotoluene	1740	U	105		1380	ug/kg		79	(32%-114%)		
2-Chloronaphthalene	1740	U	10.5		1220	ug/kg		70	(25%-111%)		
2-Chlorophenol	1740	U	105		1370	ug/kg		79	(20%-114%)		
2-Methyl-4,6-dinitrophenol	1740	U	105		822	ug/kg		47	(17%-115%)		
2-Methylnaphthalene	1740	U	10.5		1320	ug/kg		76	(25%-112%)		
2-Nitrophenol	1740	U	105		1360	ug/kg		78	(23%-115%)		
3,3'-Dichlorobenzidine	1740	U	105		1510	ug/kg		87	(21%-107%)		
4-Bromophenylphenylether	1740	U	105		1250	ug/kg		72	(29%-121%)		
4-Chloro-3-methylphenol	1740	U	139		1460	ug/kg		84	(29%-119%)		
4-Chloroaniline	1740	U	105		1470	ug/kg		85	(22%-120%)		
4-Chlorophenylphenylether	1740	U	105		1410	ug/kg		81	(29%-119%)		
4-Nitrophenol	1740	U	105		1410	ug/kg		81	(20%-120%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682715										
Butylbenzylphthalate	1740	U	105	1280	ug/kg		73	(26%-133%)	JLD1	07/17/17 20:28
Carbazole	1740	U	10.5	1450	ug/kg		84	(27%-123%)		
Di-n-butylphthalate	1740	U	105	1460	ug/kg		84	(26%-126%)		
Di-n-octylphthalate	1740	U	105	1660	ug/kg		95	(29%-130%)		
Dibenzofuran	1740	U	105	1310	ug/kg		75	(30%-119%)		
Diethylphthalate	1740	U	105	1440	ug/kg		83	(26%-124%)		
Dimethylphthalate	1740	U	105	1330	ug/kg		77	(27%-120%)		
Hexachlorobenzene	1740	U	105	1250	ug/kg		72	(30%-113%)		
Hexachlorobutadiene	1740	U	105	1280	ug/kg		73	(25%-109%)		
Hexachlorocyclopentadiene	1740	U	105	862	ug/kg		50	(10%-100%)		
Hexachloroethane	1740	U	105	1140	ug/kg		65	(23%-98%)		
Isophorone	1740	U	105	1310	ug/kg		75	(29%-107%)		
N-Nitrosodipropylamine	1740	U	105	1350	ug/kg		78	(25%-113%)		
Nitrobenzene	1740	U	105	1320	ug/kg		76	(26%-109%)		
Pentachlorophenol	1740	U	105	1040	ug/kg		60	(17%-119%)		

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QC Summary

Workorder: 427715

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682715											
Phenol	1740	U	105		1370	ug/kg		79	(28%-111%)	JLD1	07/17/17 20:28
Tributylphosphate	1740	U	105		1640	ug/kg		94	(25%-131%)		
bis(2-Chloro-1-methylethyl)ether	1740	U	105		1260	ug/kg		72	(21%-116%)		
bis(2-Chloroethoxy)methane	1740	U	105		1330	ug/kg		77	(30%-111%)		
bis(2-Chloroethyl) ether	1740	U	105		1310	ug/kg		75	(27%-110%)		
bis(2-Ethylhexyl)phthalate	1740	U	105		1400	ug/kg		80	(27%-131%)		
m-Nitroaniline	1740	U	105		1580	ug/kg		91	(24%-137%)		
o-Cresol	1740	U	105		1360	ug/kg		78	(28%-114%)		
o-Nitroaniline	1740	U	115		1320	ug/kg		76	(27%-120%)		
p-Nitroaniline	1740	U	105		1680	ug/kg		96	(19%-140%)		
**2,4,6-Tribromophenol	3480		2500		2560	ug/kg		74	(12%-129%)		
**2-Fluorobiphenyl	1740		1100		999	ug/kg		57	(15%-110%)		
**2-Fluorophenol	3480		2520		2250	ug/kg		65	(10%-115%)		
**Nitrobenzene-d5	1740		1260		1070	ug/kg		62	(13%-112%)		
**Phenol-d5	3480		2620		2300	ug/kg		66	(15%-117%)		

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QC Summary

Workorder: 427715

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682715											
**p-Terphenyl-d14	1740		1220		1010	ug/kg		58	(24%-141%)	JLD1	07/17/17 20:28
QC1203831892 427715002 MSD											
1,2,4-Trichlorobenzene	1740	U	105		1210	ug/kg	6	70	(0%-30%)		07/17/17 20:58
1,2-Dichlorobenzene	1740	U	105		1220	ug/kg	2	70	(0%-30%)		
1,3-Dichlorobenzene	1740	U	105		1160	ug/kg	3	67	(0%-30%)		
1,4-Dichlorobenzene	1740	U	105		1190	ug/kg	3	69	(0%-30%)		
2,4,5-Trichlorophenol	1740	U	105		1230	ug/kg	4	71	(0%-30%)		
2,4-Dichlorophenol	1740	U	105		1260	ug/kg	8	73	(0%-30%)		
2,4-Dimethylphenol	1740	U	105		979	ug/kg	19	56	(0%-30%)		
2,4-Dinitrophenol	1740	U	105	J	658	ug/kg	4	38	(0%-30%)		
2,4-Dinitrotoluene	1740	U	105		1520	ug/kg	2	87	(0%-30%)		
2,6-Dinitrotoluene	1740	U	105		1340	ug/kg	3	77	(0%-30%)		
2-Chloronaphthalene	1740	U	10.5		1170	ug/kg	4	67	(0%-30%)		
2-Chlorophenol	1740	U	105		1370	ug/kg	0	78	(0%-30%)		
2-Methyl-4,6-dinitrophenol	1740	U	105		777	ug/kg	6	45	(0%-30%)		
2-Methylnaphthalene	1740	U	10.5		1240	ug/kg	6	71	(0%-30%)		

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QC Summary

Workorder: 427715

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682715											
2-Nitrophenol	1740	U	105		1250	ug/kg	8	72	(0%-30%)	JLD1	07/17/17 20:58
3,3'-Dichlorobenzidine	1740	U	105		1370	ug/kg	9	79	(0%-30%)		
4-Bromophenylphenylether	1740	U	105		1190	ug/kg	5	68	(0%-30%)		
4-Chloro-3-methylphenol	1740	U	139		1370	ug/kg	7	78	(0%-30%)		
4-Chloroaniline	1740	U	105		1300	ug/kg	12	75	(0%-30%)		
4-Chlorophenylphenylether	1740	U	105		1370	ug/kg	3	79	(0%-30%)		
4-Nitrophenol	1740	U	105		1390	ug/kg	1	80	(0%-30%)		
Butylbenzylphthalate	1740	U	105		1230	ug/kg	4	71	(0%-30%)		
Carbazole	1740	U	10.5		1380	ug/kg	5	80	(0%-30%)		
Di-n-butylphthalate	1740	U	105		1420	ug/kg	3	81	(0%-30%)		
Di-n-octylphthalate	1740	U	105		1610	ug/kg	3	93	(0%-30%)		
Dibenzofuran	1740	U	105		1250	ug/kg	5	72	(0%-30%)		
Diethylphthalate	1740	U	105		1400	ug/kg	3	80	(0%-30%)		
Dimethylphthalate	1740	U	105		1280	ug/kg	4	74	(0%-30%)		
Hexachlorobenzene	1740	U	105		1220	ug/kg	3	70	(0%-30%)		

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QC Summary

Workorder: 427715

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682715											
Hexachlorobutadiene	1740	U	105		1210	ug/kg	6	69	(0%-30%)	JLD1	07/17/17 20:58
Hexachlorocyclopentadiene	1740	U	105		844	ug/kg	2	49	(0%-30%)		
Hexachloroethane	1740	U	105		1180	ug/kg	3	68	(0%-30%)		
Isophorone	1740	U	105		1220	ug/kg	7	70	(0%-30%)		
N-Nitrosodipropylamine	1740	U	105		1360	ug/kg	1	78	(0%-30%)		
Nitrobenzene	1740	U	105		1240	ug/kg	7	71	(0%-30%)		
Pentachlorophenol	1740	U	105		992	ug/kg	5	57	(0%-30%)		
Phenol	1740	U	105		1350	ug/kg	2	77	(0%-30%)		
Tributylphosphate	1740	U	105		1630	ug/kg	1	93	(0%-30%)		
bis(2-Chloro-1-methylethyl)ether	1740	U	105		1280	ug/kg	1	73	(0%-30%)		
bis(2-Chloroethoxy)methane	1740	U	105		1230	ug/kg	8	71	(0%-30%)		
bis(2-Chloroethyl) ether	1740	U	105		1300	ug/kg	0	75	(0%-30%)		
bis(2-Ethylhexyl)phthalate	1740	U	105		1360	ug/kg	3	78	(0%-30%)		
m-Nitroaniline	1740	U	105		1510	ug/kg	5	87	(0%-30%)		
o-Cresol	1740	U	105		1340	ug/kg	2	77	(0%-30%)		

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682715										
o-Nitroaniline	1740	115	U	1260	ug/kg	4	73	(0%-30%)	JLD1	07/17/17 20:58
p-Nitroaniline	1740	105	U	1590	ug/kg	5	91	(0%-30%)		
**2,4,6-Tribromophenol	3480	2500		2400	ug/kg		69	(12%-129%)		
**2-Fluorobiphenyl	1740	1100		943	ug/kg		54	(15%-110%)		
**2-Fluorophenol	3480	2520		2200	ug/kg		63	(10%-115%)		
**Nitrobenzene-d5	1740	1260		971	ug/kg		56	(13%-112%)		
**Phenol-d5	3480	2620		2240	ug/kg		64	(15%-117%)		
**p-Terphenyl-d14	1740	1220		935	ug/kg		54	(24%-141%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

Semi-Volatile
Surrogate Recovery Report

SDG Number: GEL427715

Matrix Type: SOLID

Sample ID	Client ID	5-alpha %REC
1203830331	MB for batch 1682098	91
1203830332	LCS for batch 1682098	82
427715001	B3BBD0	74
1203830333	B3BBD0MS	70
1203830334	B3BBD0MSD	73
427715002	B3BBC6	63
427715003	B3BBD4	79

Surrogate	Acceptance Limits
5-alpha- = 5-alpha-Androstane	(25%-129%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

Semi-Volatile

Surrogate Recovery Report

SDG Number: GEL427715

Matrix Type: SOLID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203831889	MB for batch 1682714	82	84	86	81	92	83
1203831890	LCS for batch 1682714	79	81	77	75	95	74
427715001	B3BBD0	75	77	73	65	78	71
427715002	B3BBC6	72	75	72	63	72	70
1203831891	B3BBC6MS	65	66	62	57	74	58
1203831892	B3BBC6MSD	63	64	56	54	69	54
427715003	B3BBD4	54	54	56	50	48	59

Surrogate		Acceptance Limits
2FP	= 2-Fluorophenol	(10%-115%)
PHL	= Phenol-d5	(15%-117%)
NBZ	= Nitrobenzene-d5	(13%-112%)
FBP	= 2-Fluorobiphenyl	(15%-110%)
TBP	= 2,4,6-Tribromophenol	(12%-129%)
TPH	= p-Terphenyl-d14	(24%-141%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

GEL LABORATORIES LLC

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QC Summary

Report Date: July 19, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428015**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
QC1203832415 LCS										
1,2,4-Trichlorobenzene	1670			1460	ug/kg		88	(70%-130%)	JLD1	07/18/17 18:16
1,2-Dichlorobenzene	1670			1380	ug/kg		83	(70%-130%)		
1,3-Dichlorobenzene	1670			1310	ug/kg		79	(70%-130%)		
1,4-Dichlorobenzene	1670			1320	ug/kg		79	(70%-130%)		
2,4,5-Trichlorophenol	1670			1340	ug/kg		81	(70%-130%)		
2,4-Dichlorophenol	1670			1500	ug/kg		90	(70%-130%)		
2,4-Dimethylphenol	1670			1180	ug/kg		71	(70%-130%)		
2,4-Dinitrophenol	1670		J	548	ug/kg		33 *	(70%-130%)		
2,4-Dinitrotoluene	1670			1590	ug/kg		96	(70%-130%)		
2,6-Dinitrotoluene	1670			1450	ug/kg		87	(70%-130%)		
2-Chloronaphthalene	1670			1310	ug/kg		78	(70%-130%)		
2-Chlorophenol	1670			1520	ug/kg		91	(70%-130%)		
2-Methyl-4,6-dinitrophenol	1670			681	ug/kg		41 *	(70%-130%)		

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
2-Methylnaphthalene	1670			1470	ug/kg		88	(70%-130%)	JLD1	07/18/17 18:16
2-Nitrophenol	1670			1520	ug/kg		91	(70%-130%)		
3,3'-Dichlorobenzidine	1670			1620	ug/kg		97	(70%-130%)		
4-Bromophenylphenylether	1670			1280	ug/kg		77	(70%-130%)		
4-Chloro-3-methylphenol	1670			1560	ug/kg		93	(70%-130%)		
4-Chloroaniline	1670			1530	ug/kg		92	(70%-130%)		
4-Chlorophenylphenylether	1670			1470	ug/kg		88	(70%-130%)		
4-Nitrophenol	1670			1430	ug/kg		86	(70%-130%)		
Butylbenzylphthalate	1670			1310	ug/kg		78	(70%-130%)		
Carbazole	1670			1510	ug/kg		91	(70%-130%)		
Di-n-butylphthalate	1670			1520	ug/kg		92	(70%-130%)		
Di-n-octylphthalate	1670			1700	ug/kg		102	(70%-130%)		
Dibenzofuran	1670			1380	ug/kg		83	(70%-130%)		
Diethylphthalate	1670			1480	ug/kg		89	(70%-130%)		
Dimethylphthalate	1670			1390	ug/kg		83	(70%-130%)		

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
Hexachlorobenzene	1670			1310	ug/kg		79	(70%-130%)	JLD1	07/18/17 18:16
Hexachlorobutadiene	1670			1460	ug/kg		87	(70%-130%)		
Hexachlorocyclopentadiene	1670			964	ug/kg		58 *	(70%-130%)		
Hexachloroethane	1670			1320	ug/kg		79	(70%-130%)		
Isophorone	1670			1460	ug/kg		88	(70%-130%)		
N-Nitrosodipropylamine	1670			1500	ug/kg		90	(70%-130%)		
Nitrobenzene	1670			1490	ug/kg		89	(70%-130%)		
Pentachlorophenol	1670			1120	ug/kg		67 *	(70%-130%)		
Phenol	1670			1500	ug/kg		90	(70%-130%)		
Tributylphosphate	1670			1680	ug/kg		101	(70%-130%)		
bis(2-Chloro-1-methylethyl)ether	1670			1400	ug/kg		84	(70%-130%)		
bis(2-Chloroethoxy)methane	1670			1490	ug/kg		89	(70%-130%)		
bis(2-Chloroethyl) ether	1670			1470	ug/kg		88	(70%-130%)		
bis(2-Ethylhexyl)phthalate	1670			1440	ug/kg		86	(70%-130%)		
m-Nitroaniline	1670			1580	ug/kg		95	(70%-130%)		

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
o-Cresol	1670			1480	ug/kg		89	(70%-130%)	JLD1	07/18/17 18:16
o-Nitroaniline	1670			1370	ug/kg		82	(70%-130%)		
p-Nitroaniline	1670			1750	ug/kg		105	(70%-130%)		
**2,4,6-Tribromophenol	3330			3030	ug/kg		91	(12%-129%)		
**2-Fluorobiphenyl	1670			1110	ug/kg		67	(15%-110%)		
**2-Fluorophenol	3330			2830	ug/kg		85	(10%-115%)		
**Nitrobenzene-d5	1670			1250	ug/kg		75	(13%-112%)		
**Phenol-d5	3330			2890	ug/kg		87	(15%-117%)		
**p-Terphenyl-d14	1670			1190	ug/kg		71	(24%-141%)		
QC1203832414 MB										
1,2,4-Trichlorobenzene			U	100	ug/kg					07/18/17 17:46
1,2-Dichlorobenzene			U	100	ug/kg					
1,3-Dichlorobenzene			U	100	ug/kg					
1,4-Dichlorobenzene			U	100	ug/kg					
2,4,5-Trichlorophenol			U	100	ug/kg					
2,4-Dichlorophenol			U	100	ug/kg					

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
2,4-Dimethylphenol			U	100	ug/kg				JLD1	07/18/17 17:46
2,4-Dinitrophenol			U	100	ug/kg					
2,4-Dinitrotoluene			U	100	ug/kg					
2,6-Dinitrotoluene			U	100	ug/kg					
2-Chloronaphthalene			U	10.0	ug/kg					
2-Chlorophenol			U	100	ug/kg					
2-Methyl-4,6-dinitrophenol			U	100	ug/kg					
2-Methylnaphthalene			U	10.0	ug/kg					
2-Nitrophenol			U	100	ug/kg					
3,3'-Dichlorobenzidine			U	100	ug/kg					
4-Bromophenylphenylether			U	100	ug/kg					
4-Chloro-3-methylphenol			U	133	ug/kg					
4-Chloroaniline			U	100	ug/kg					
4-Chlorophenylphenylether			U	100	ug/kg					
4-Nitrophenol			U	100	ug/kg					

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
Butylbenzylphthalate			U	100	ug/kg				JLD1	07/18/17 17:46
Carbazole			U	10.0	ug/kg					
Di-n-butylphthalate			U	100	ug/kg					
Di-n-octylphthalate			U	100	ug/kg					
Dibenzofuran			U	100	ug/kg					
Diethylphthalate			U	100	ug/kg					
Dimethylphthalate			U	100	ug/kg					
Hexachlorobenzene			U	100	ug/kg					
Hexachlorobutadiene			U	100	ug/kg					
Hexachlorocyclopentadiene			U	100	ug/kg					
Hexachloroethane			U	100	ug/kg					
Isophorone			U	100	ug/kg					
N-Nitrosodipropylamine			U	100	ug/kg					
Nitrobenzene			U	100	ug/kg					
Pentachlorophenol			U	100	ug/kg					

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
Phenol			U	100	ug/kg				JLD1	07/18/17 17:46
Tributylphosphate			U	100	ug/kg					
bis(2-Chloro-1-methylethyl)ether			U	100	ug/kg					
bis(2-Chloroethoxy)methane			U	100	ug/kg					
bis(2-Chloroethyl) ether			U	100	ug/kg					
bis(2-Ethylhexyl)phthalate			U	100	ug/kg					
m-Nitroaniline			U	100	ug/kg					
o-Cresol			U	100	ug/kg					
o-Nitroaniline			U	110	ug/kg					
p-Nitroaniline			U	100	ug/kg					
**2,4,6-Tribromophenol	3330			2900	ug/kg		87	(12%-129%)		
**2-Fluorobiphenyl	1670			1220	ug/kg		73	(15%-110%)		
**2-Fluorophenol	3330			2900	ug/kg		87	(10%-115%)		
**Nitrobenzene-d5	1670			1330	ug/kg		80	(13%-112%)		
**Phenol-d5	3330			2970	ug/kg		89	(15%-117%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682943											
**p-Terphenyl-d14	1670				1510	ug/kg		91	(24%-141%)	JLD1	07/18/17 17:46
QC1203832416 428015003 MS											
1,2,4-Trichlorobenzene	1690	U	101		1100	ug/kg		65	(26%-104%)		07/18/17 20:14
1,2-Dichlorobenzene	1690	U	101		1050	ug/kg		62	(26%-98%)		
1,3-Dichlorobenzene	1690	U	101		989	ug/kg		59	(27%-92%)		
1,4-Dichlorobenzene	1690	U	101		1010	ug/kg		60	(27%-95%)		
2,4,5-Trichlorophenol	1690	U	101		1140	ug/kg		68	(26%-120%)		
2,4-Dichlorophenol	1690	U	101		1140	ug/kg		68	(21%-119%)		
2,4-Dimethylphenol	1690	U	101		896	ug/kg		53	(27%-111%)		
2,4-Dinitrophenol	1690	U	101		713	ug/kg		42	(12%-112%)		
2,4-Dinitrotoluene	1690	U	101		1340	ug/kg		79	(32%-118%)		
2,6-Dinitrotoluene	1690	U	101		1200	ug/kg		71	(32%-114%)		
2-Chloronaphthalene	1690	U	10.1		1090	ug/kg		65	(25%-111%)		
2-Chlorophenol	1690	U	101		1190	ug/kg		71	(20%-114%)		
2-Methyl-4,6-dinitrophenol	1690	U	101		921	ug/kg		55	(17%-115%)		
2-Methylnaphthalene	1690	U	10.1		1100	ug/kg		65	(25%-112%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682943											
2-Nitrophenol	1690	U	101		1160	ug/kg		69	(23%-115%)	JLD1	07/18/17 20:14
3,3'-Dichlorobenzidine	1690	U	101		1130	ug/kg		67	(21%-107%)		
4-Bromophenylphenylether	1690	U	101		1140	ug/kg		67	(29%-121%)		
4-Chloro-3-methylphenol	1690	U	135		1160	ug/kg		69	(29%-119%)		
4-Chloroaniline	1690	U	101		1140	ug/kg		67	(22%-120%)		
4-Chlorophenylphenylether	1690	U	101		1220	ug/kg		72	(29%-119%)		
4-Nitrophenol	1690	U	101		1160	ug/kg		69	(20%-120%)		
Butylbenzylphthalate	1690	U	101		1370	ug/kg		81	(26%-133%)		
Carbazole	1690	U	10.1		1260	ug/kg		74	(27%-123%)		
Di-n-butylphthalate	1690	U	101		1340	ug/kg		79	(26%-126%)		
Di-n-octylphthalate	1690	U	101		1550	ug/kg		92	(29%-130%)		
Dibenzofuran	1690	U	101		1140	ug/kg		67	(30%-119%)		
Diethylphthalate	1690	U	101		1260	ug/kg		74	(26%-124%)		
Dimethylphthalate	1690	U	101		1160	ug/kg		69	(27%-120%)		
Hexachlorobenzene	1690	U	101		1150	ug/kg		68	(30%-113%)		

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
Hexachlorobutadiene	1690	U	101	1100	ug/kg		65	(25%-109%)	JLD1	07/18/17 20:14
Hexachlorocyclopentadiene	1690	U	101	873	ug/kg		52	(10%-100%)		
Hexachloroethane	1690	U	101	995	ug/kg		59	(23%-98%)		
Isophorone	1690	U	101	1110	ug/kg		65	(29%-107%)		
N-Nitrosodipropylamine	1690	U	101	1170	ug/kg		69	(25%-113%)		
Nitrobenzene	1690	U	101	1130	ug/kg		67	(26%-109%)		
Pentachlorophenol	1690	U	101	1120	ug/kg		66	(17%-119%)		
Phenol	1690	U	101	1180	ug/kg		70	(28%-111%)		
Tributylphosphate	1690	U	101	1480	ug/kg		88	(25%-131%)		
bis(2-Chloro-1-methylethyl)ether	1690	U	101	1100	ug/kg		65	(21%-116%)		
bis(2-Chloroethoxy)methane	1690	U	101	1130	ug/kg		67	(30%-111%)		
bis(2-Chloroethyl) ether	1690	U	101	1150	ug/kg		68	(27%-110%)		
bis(2-Ethylhexyl)phthalate	1690	U	101	1510	ug/kg		89	(27%-131%)		
m-Nitroaniline	1690	U	101	1280	ug/kg		76	(24%-137%)		
o-Cresol	1690	U	101	1150	ug/kg		68	(28%-114%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682943											
o-Nitroaniline	1690	U	111		1120	ug/kg		66	(27%-120%)	JLD1	07/18/17 20:14
p-Nitroaniline	1690	U	101		1390	ug/kg		83	(19%-140%)		
**2,4,6-Tribromophenol	3380		2650		2800	ug/kg		83	(12%-129%)		
**2-Fluorobiphenyl	1690		1060		1010	ug/kg		60	(15%-110%)		
**2-Fluorophenol	3380		2850		2420	ug/kg		72	(10%-115%)		
**Nitrobenzene-d5	1690		1270		1020	ug/kg		60	(13%-112%)		
**Phenol-d5	3380		2880		2440	ug/kg		72	(15%-117%)		
**p-Terphenyl-d14	1690		1220		1470	ug/kg		87	(24%-141%)		
QC1203832417 428015001 MSD											
1,2,4-Trichlorobenzene	1680	U	100		751	ug/kg	38*	45	(0%-30%)		07/18/17 20:43
1,2-Dichlorobenzene	1680	U	100		710	ug/kg	39*	42	(0%-30%)		
1,3-Dichlorobenzene	1680	U	100		669	ug/kg	39*	40	(0%-30%)		
1,4-Dichlorobenzene	1680	U	100		684	ug/kg	39*	41	(0%-30%)		
2,4,5-Trichlorophenol	1680	U	100		726	ug/kg	45*	43	(0%-30%)		
2,4-Dichlorophenol	1680	U	100		756	ug/kg	41*	45	(0%-30%)		
2,4-Dimethylphenol	1680	U	100		620	ug/kg	36*	37	(0%-30%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682943											
2,4-Dinitrophenol	1680	U	100	J	570	ug/kg	22	34	(0%-30%)	JLD1	07/18/17 20:43
2,4-Dinitrotoluene	1680	U	100		901	ug/kg	39*	54	(0%-30%)		
2,6-Dinitrotoluene	1680	U	100		787	ug/kg	41*	47	(0%-30%)		
2-Chloronaphthalene	1680	U	10.0		719	ug/kg	41*	43	(0%-30%)		
2-Chlorophenol	1680	U	100		783	ug/kg	41*	47	(0%-30%)		
2-Methyl-4,6-dinitrophenol	1680	U	100		649	ug/kg	35*	39	(0%-30%)		
2-Methylnaphthalene	1680	U	10.0		747	ug/kg	38*	45	(0%-30%)		
2-Nitrophenol	1680	U	100		785	ug/kg	39*	47	(0%-30%)		
3,3'-Dichlorobenzidine	1680	U	100		846	ug/kg	29	50	(0%-30%)		
4-Bromophenylphenylether	1680	U	100		731	ug/kg	43*	44	(0%-30%)		
4-Chloro-3-methylphenol	1680	U	134		786	ug/kg	39*	47	(0%-30%)		
4-Chloroaniline	1680	U	100		814	ug/kg	33*	48	(0%-30%)		
4-Chlorophenylphenylether	1680	U	100		806	ug/kg	41*	48	(0%-30%)		
4-Nitrophenol	1680	U	100		851	ug/kg	31*	51	(0%-30%)		
Butylbenzylphthalate	1680	U	100		943	ug/kg	37*	56	(0%-30%)		

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
Carbazole	1680	U	10.0	901	ug/kg	33*	54	(0%-30%)	JLD1	07/18/17 20:43
Di-n-butylphthalate	1680	U	100	957	ug/kg	33*	57	(0%-30%)		
Di-n-octylphthalate	1680	U	100	1010	ug/kg	42*	60	(0%-30%)		
Dibenzofuran	1680	U	100	753	ug/kg	41*	45	(0%-30%)		
Diethylphthalate	1680	U	100	838	ug/kg	40*	50	(0%-30%)		
Dimethylphthalate	1680	U	100	773	ug/kg	40*	46	(0%-30%)		
Hexachlorobenzene	1680	U	100	761	ug/kg	41*	45	(0%-30%)		
Hexachlorobutadiene	1680	U	100	754	ug/kg	38*	45	(0%-30%)		
Hexachlorocyclopentadiene	1680	U	100	551	ug/kg	45*	33	(0%-30%)		
Hexachloroethane	1680	U	100	672	ug/kg	39*	40	(0%-30%)		
Isophorone	1680	U	100	753	ug/kg	38*	45	(0%-30%)		
N-Nitrosodipropylamine	1680	U	100	773	ug/kg	41*	46	(0%-30%)		
Nitrobenzene	1680	U	100	768	ug/kg	38*	46	(0%-30%)		
Pentachlorophenol	1680	U	100	795	ug/kg	34*	47	(0%-30%)		
Phenol	1680	U	100	772	ug/kg	41*	46	(0%-30%)		

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682943										
Tributylphosphate	1680	U	100	1010	ug/kg	38*	60	(0%-30%)	JLD1	07/18/17 20:43
bis(2-Chloro-1-methylethyl)ether	1680	U	100	727	ug/kg	41*	43	(0%-30%)		
bis(2-Chloroethoxy)methane	1680	U	100	760	ug/kg	39*	45	(0%-30%)		
bis(2-Chloroethyl) ether	1680	U	100	766	ug/kg	40*	46	(0%-30%)		
bis(2-Ethylhexyl)phthalate	1680	U	100	1010	ug/kg	39*	60	(0%-30%)		
m-Nitroaniline	1680	U	100	874	ug/kg	38*	52	(0%-30%)		
o-Cresol	1680	U	100	774	ug/kg	39*	46	(0%-30%)		
o-Nitroaniline	1680	U	110	744	ug/kg	40*	44	(0%-30%)		
p-Nitroaniline	1680	U	100	935	ug/kg	39*	56	(0%-30%)		
**2,4,6-Tribromophenol	3360		2380	1840	ug/kg		55	(12%-129%)		
**2-Fluorobiphenyl	1680		1080	686	ug/kg		41	(15%-110%)		
**2-Fluorophenol	3360		2510	1590	ug/kg		47	(10%-115%)		
**Nitrobenzene-d5	1680		1180	710	ug/kg		42	(13%-112%)		
**Phenol-d5	3360		2560	1610	ug/kg		48	(15%-117%)		
**p-Terphenyl-d14	1680		1320	997	ug/kg		59	(24%-141%)		

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682945										
QC1203832422 LCS										
Acenaphthene	333			240	ug/kg		72	(70%-130%)	JLD1	07/18/17 19:58
Acenaphthylene	333			234	ug/kg		70	(70%-130%)		
Anthracene	333			261	ug/kg		78	(70%-130%)		
Benzo(a)anthracene	333			279	ug/kg		84	(70%-130%)		
Benzo(a)pyrene	333			266	ug/kg		80	(70%-130%)		
Benzo(b)fluoranthene	333			274	ug/kg		82	(70%-130%)		
Benzo(ghi)perylene	333			206	ug/kg		62*	(70%-130%)		
Benzo(k)fluoranthene	333			286	ug/kg		86	(70%-130%)		
Chrysene	333			288	ug/kg		86	(70%-130%)		
Dibenzo(a,h)anthracene	333			253	ug/kg		76	(70%-130%)		
Fluoranthene	333			270	ug/kg		81	(70%-130%)		
Fluorene	333			243	ug/kg		73	(70%-130%)		
Indeno(1,2,3-cd)pyrene	333			215	ug/kg		64*	(70%-130%)		
Naphthalene	333			296	ug/kg		89	(70%-130%)		
Phenanthrene	333			266	ug/kg		80	(70%-130%)		

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QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1682945										
Pyrene	333			274	ug/kg		82	(70%-130%)	JLD1	07/18/17 19:58
**5-alpha-Androstane	167			133	ug/kg		80	(25%-129%)		
QC1203832421 MB										
Acenaphthene			U	1.67	ug/kg					07/18/17 19:26
Acenaphthylene			U	1.67	ug/kg					
Anthracene			U	1.67	ug/kg					
Benzo(a)anthracene			U	1.67	ug/kg					
Benzo(a)pyrene			U	1.67	ug/kg					
Benzo(b)fluoranthene			U	1.67	ug/kg					
Benzo(ghi)perylene			U	1.67	ug/kg					
Benzo(k)fluoranthene			U	1.67	ug/kg					
Chrysene			U	1.67	ug/kg					
Dibenzo(a,h)anthracene			U	1.67	ug/kg					
Fluoranthene			U	1.67	ug/kg					
Fluorene			U	1.67	ug/kg					
Indeno(1,2,3-cd)pyrene			U	1.67	ug/kg					

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682945											
Naphthalene				U	1.00	ug/kg				JLD1	07/18/17 19:26
Phenanthrene				U	1.67	ug/kg					
Pyrene				U	1.67	ug/kg					
**5-alpha-Androstane	167				137	ug/kg		82	(25%-129%)		
QC1203832423 428015003 MS											
Acenaphthene	335	U	1.69		198	ug/kg		59	(18%-115%)		07/18/17 22:07
Acenaphthylene	335	U	1.69		191	ug/kg		57	(19%-116%)		
Anthracene	335	U	1.69		249	ug/kg		74	(23%-115%)		
Benzo(a)anthracene	335	U	1.69		283	ug/kg		84	(23%-124%)		
Benzo(a)pyrene	335	U	1.69		279	ug/kg		83	(20%-130%)		
Benzo(b)fluoranthene	335	U	1.69		283	ug/kg		85	(20%-134%)		
Benzo(ghi)perylene	335	U	1.69		240	ug/kg		72	(18%-118%)		
Benzo(k)fluoranthene	335	U	1.69		294	ug/kg		88	(23%-128%)		
Chrysene	335	U	1.69		289	ug/kg		86	(18%-121%)		
Dibenzo(a,h)anthracene	335	U	1.69		290	ug/kg		87	(12%-132%)		
Fluoranthene	335	U	1.69		261	ug/kg		78	(21%-124%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682945											
Fluorene	335	U	1.69		204	ug/kg		61	(21%-118%)	JLD1	07/18/17 22:07
Indeno(1,2,3-cd)pyrene	335	U	1.69		248	ug/kg		74	(11%-130%)		
Naphthalene	335	U	1.01		244	ug/kg		73	(14%-114%)		
Phenanthrene	335	U	1.69		249	ug/kg		75	(24%-106%)		
Pyrene	335	U	1.69		321	ug/kg		96	(16%-122%)		
**5-alpha-Androstane	167		121		131	ug/kg		78	(25%-129%)		
QC1203832424 428015003 MSD											
Acenaphthene	336	U	1.69		183	ug/kg	8	55	(0%-30%)		07/18/17 22:39
Acenaphthylene	336	U	1.69		177	ug/kg	7	53	(0%-30%)		
Anthracene	336	U	1.69		195	ug/kg	24	58	(0%-30%)		
Benzo(a)anthracene	336	U	1.69		254	ug/kg	11	76	(0%-30%)		
Benzo(a)pyrene	336	U	1.69		245	ug/kg	13	73	(0%-30%)		
Benzo(b)fluoranthene	336	U	1.69		249	ug/kg	13	74	(0%-30%)		
Benzo(ghi)perylene	336	U	1.69		233	ug/kg	3	69	(0%-30%)		
Benzo(k)fluoranthene	336	U	1.69		258	ug/kg	13	77	(0%-30%)		
Chrysene	336	U	1.69		260	ug/kg	11	77	(0%-30%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1682945											
Dibenzo(a,h)anthracene	336	U	1.69		269	ug/kg	8	80	(0%-30%)	JLD1	07/18/17 22:39
Fluoranthene	336	U	1.69		218	ug/kg	18	65	(0%-30%)		
Fluorene	336	U	1.69		186	ug/kg	9	55	(0%-30%)		
Indeno(1,2,3-cd)pyrene	336	U	1.69		236	ug/kg	5	70	(0%-30%)		
Naphthalene	336	U	1.01		243	ug/kg	0	72	(0%-30%)		
Phenanthrene	336	U	1.69		192	ug/kg	26	57	(0%-30%)		
Pyrene	336	U	1.69		329	ug/kg	2	98	(0%-30%)		
**5-alpha-Androstane	168		121		102	ug/kg		61	(25%-129%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

Semi-Volatile

Surrogate Recovery Report

SDG Number: GEL428015

Matrix Type: SOLID

Sample ID	Client ID	5-alpha %REC
1203832421	MB for batch 1682944	82
1203832422	LCS for batch 1682944	80
428015001	B3BBD8	75
428015002	B3BBF2	63
428015003	B3BBF6	72
1203832423	B3BBF6MS	78
1203832424	B3BBF6MSD	61

Surrogate	Acceptance Limits
5-alpha- = 5-alpha-Androstane	(25%-129%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

Semi-Volatile

Surrogate Recovery Report

SDG Number: GEL428015

Matrix Type: SOLID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203832414	MB for batch 1682942	87	89	80	73	87	91
1203832415	LCS for batch 1682942	85	87	75	67	91	71
428015001	B3BBD8	75	76	70	64	71	79
428015002	B3BBF2	57	58	53	49	59	72
428015003	B3BBF6	84	85	76	63	79	73
1203832416	B3BBF6MS	72	72	60	60	83	87
1203832417	B3BBD8MSD	47	48	42	41	55	59

Surrogate		Acceptance Limits
2FP	= 2-Fluorophenol	(10%-115%)
PHL	= Phenol-d5	(15%-117%)
NBZ	= Nitrobenzene-d5	(13%-112%)
FBP	= 2-Fluorobiphenyl	(15%-110%)
TBP	= 2,4,6-Tribromophenol	(12%-129%)
TPH	= p-Terphenyl-d14	(24%-141%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

GEL LABORATORIES LLC

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QC Summary

Report Date: July 27, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
QC1203835338 LCS										
1,2,4-Trichlorobenzene	1670			1220	ug/kg		74	(70%-130%)	JLD1	07/25/17 18:22
1,2-Dichlorobenzene	1670			1170	ug/kg		70	(70%-130%)		
1,3-Dichlorobenzene	1670			1070	ug/kg		64*	(70%-130%)		
1,4-Dichlorobenzene	1670			1080	ug/kg		65*	(70%-130%)		
2,4,5-Trichlorophenol	1670			1200	ug/kg		72	(70%-130%)		
2,4-Dichlorophenol	1670			1240	ug/kg		74	(70%-130%)		
2,4-Dimethylphenol	1670			1050	ug/kg		63*	(70%-130%)		
2,4-Dinitrophenol	1670			730	ug/kg		44*	(70%-130%)		
2,4-Dinitrotoluene	1670			1370	ug/kg		82	(70%-130%)		
2,6-Dinitrotoluene	1670			1310	ug/kg		79	(70%-130%)		
2-Chloronaphthalene	1670			1040	ug/kg		63*	(70%-130%)		
2-Chlorophenol	1670			1190	ug/kg		71	(70%-130%)		
2-Methyl-4,6-dinitrophenol	1670			847	ug/kg		51*	(70%-130%)		

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QC Summary

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
2-Methylnaphthalene	1670			1180	ug/kg		71	(70%-130%)	JLD1	07/25/17 18:22
2-Nitrophenol	1670			1160	ug/kg		70	(70%-130%)		
3,3'-Dichlorobenzidine	1670			1210	ug/kg		73	(70%-130%)		
4-Bromophenylphenylether	1670			1290	ug/kg		78	(70%-130%)		
4-Chloro-3-methylphenol	1670			1240	ug/kg		75	(70%-130%)		
4-Chloroaniline	1670			1150	ug/kg		69*	(70%-130%)		
4-Chlorophenylphenylether	1670			1250	ug/kg		75	(70%-130%)		
4-Nitrophenol	1670			1250	ug/kg		75	(70%-130%)		
Butylbenzylphthalate	1670			1360	ug/kg		82	(70%-130%)		
Carbazole	1670			1240	ug/kg		74	(70%-130%)		
Di-n-butylphthalate	1670			1330	ug/kg		80	(70%-130%)		
Di-n-octylphthalate	1670			1290	ug/kg		77	(70%-130%)		
Dibenzofuran	1670			1170	ug/kg		70	(70%-130%)		
Diethylphthalate	1670			1280	ug/kg		77	(70%-130%)		
Dimethylphthalate	1670			1200	ug/kg		72	(70%-130%)		

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Hexachlorobenzene	1670			1310	ug/kg		79	(70%-130%)	JLD1	07/25/17 18:22
Hexachlorobutadiene	1670			1230	ug/kg		74	(70%-130%)		
Hexachlorocyclopentadiene	1670			768	ug/kg		46*	(70%-130%)		
Hexachloroethane	1670			1120	ug/kg		67*	(70%-130%)		
Isophorone	1670			1180	ug/kg		71	(70%-130%)		
N-Nitrosodipropylamine	1670			1130	ug/kg		68*	(70%-130%)		
Nitrobenzene	1670			1230	ug/kg		74	(70%-130%)		
Pentachlorophenol	1670			1260	ug/kg		76	(70%-130%)		
Phenol	1670			1100	ug/kg		66*	(70%-130%)		
Tributylphosphate	1670			1610	ug/kg		97	(70%-130%)		
bis(2-Chloro-1-methylethyl)ether	1670			1060	ug/kg		64*	(70%-130%)		
bis(2-Chloroethoxy)methane	1670			1170	ug/kg		70	(70%-130%)		
bis(2-Chloroethyl) ether	1670			1150	ug/kg		69*	(70%-130%)		
bis(2-Ethylhexyl)phthalate	1670			1320	ug/kg		79	(70%-130%)		
m-Nitroaniline	1670			1290	ug/kg		78	(70%-130%)		

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
o-Cresol	1670			1180	ug/kg		71	(70%-130%)	JLD1	07/25/17 18:22
o-Nitroaniline	1670			1150	ug/kg		69*	(70%-130%)		
p-Nitroaniline	1670			1190	ug/kg		71	(70%-130%)		
**2,4,6-Tribromophenol	3330			2810	ug/kg		84	(12%-129%)		
**2-Fluorobiphenyl	1670			1200	ug/kg		72	(15%-110%)		
**2-Fluorophenol	3330			2360	ug/kg		71	(10%-115%)		
**Nitrobenzene-d5	1670			1240	ug/kg		74	(13%-112%)		
**Phenol-d5	3330			2410	ug/kg		72	(15%-117%)		
**p-Terphenyl-d14	1670			1710	ug/kg		103	(24%-141%)		
QC1203835337 MB										
1,2,4-Trichlorobenzene			U	100	ug/kg					07/25/17 17:51
1,2-Dichlorobenzene			U	100	ug/kg					
1,3-Dichlorobenzene			U	100	ug/kg					
1,4-Dichlorobenzene			U	100	ug/kg					
2,4,5-Trichlorophenol			U	100	ug/kg					
2,4-Dichlorophenol			U	100	ug/kg					

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
2,4-Dimethylphenol			U	100	ug/kg				JLD1	07/25/17 17:51
2,4-Dinitrophenol			U	100	ug/kg					
2,4-Dinitrotoluene			U	100	ug/kg					
2,6-Dinitrotoluene			U	100	ug/kg					
2-Chloronaphthalene			U	10.0	ug/kg					
2-Chlorophenol			U	100	ug/kg					
2-Methyl-4,6-dinitrophenol			U	100	ug/kg					
2-Methylnaphthalene			U	10.0	ug/kg					
2-Nitrophenol			U	100	ug/kg					
3,3'-Dichlorobenzidine			U	100	ug/kg					
4-Bromophenylphenylether			U	100	ug/kg					
4-Chloro-3-methylphenol			U	133	ug/kg					
4-Chloroaniline			U	100	ug/kg					
4-Chlorophenylphenylether			U	100	ug/kg					
4-Nitrophenol			U	100	ug/kg					

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Butylbenzylphthalate			U	100	ug/kg				JLD1	07/25/17 17:51
Carbazole			U	10.0	ug/kg					
Di-n-butylphthalate			U	100	ug/kg					
Di-n-octylphthalate			U	100	ug/kg					
Dibenzofuran			U	100	ug/kg					
Diethylphthalate			U	100	ug/kg					
Dimethylphthalate			U	100	ug/kg					
Hexachlorobenzene			U	100	ug/kg					
Hexachlorobutadiene			U	100	ug/kg					
Hexachlorocyclopentadiene			U	100	ug/kg					
Hexachloroethane			U	100	ug/kg					
Isophorone			U	100	ug/kg					
N-Nitrosodipropylamine			U	100	ug/kg					
Nitrobenzene			U	100	ug/kg					
Pentachlorophenol			U	100	ug/kg					

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Phenol			U	100	ug/kg				JLD1	07/25/17 17:51
Tributylphosphate			U	100	ug/kg					
bis(2-Chloro-1-methylethyl)ether			U	100	ug/kg					
bis(2-Chloroethoxy)methane			U	100	ug/kg					
bis(2-Chloroethyl) ether			U	100	ug/kg					
bis(2-Ethylhexyl)phthalate			U	100	ug/kg					
m-Nitroaniline			U	100	ug/kg					
o-Cresol			U	100	ug/kg					
o-Nitroaniline			U	110	ug/kg					
p-Nitroaniline			U	100	ug/kg					
**2,4,6-Tribromophenol	3330			2630	ug/kg		79	(12%-129%)		
**2-Fluorobiphenyl	1670			1270	ug/kg		76	(15%-110%)		
**2-Fluorophenol	3330			2190	ug/kg		66	(10%-115%)		
**Nitrobenzene-d5	1670			1320	ug/kg		79	(13%-112%)		
**Phenol-d5	3330			2310	ug/kg		69	(15%-117%)		

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
**p-Terphenyl-d14	1670			1620	ug/kg		97	(24%-141%)	JLD1	07/25/17 17:51
QC1203835339 428197001 MS										
1,2,4-Trichlorobenzene	1710	U	103	1180	ug/kg		69	(26%-104%)		07/25/17 19:26
1,2-Dichlorobenzene	1710	U	103	1120	ug/kg		65	(26%-98%)		
1,3-Dichlorobenzene	1710	U	103	1070	ug/kg		62	(27%-92%)		
1,4-Dichlorobenzene	1710	U	103	1090	ug/kg		64	(27%-95%)		
2,4,5-Trichlorophenol	1710	U	103	1210	ug/kg		71	(26%-120%)		
2,4-Dichlorophenol	1710	U	103	1250	ug/kg		73	(21%-119%)		
2,4-Dimethylphenol	1710	U	103	1030	ug/kg		60	(27%-111%)		
2,4-Dinitrophenol	1710	U	103	745	ug/kg		44	(12%-112%)		
2,4-Dinitrotoluene	1710	U	103	1360	ug/kg		79	(32%-118%)		
2,6-Dinitrotoluene	1710	U	103	1300	ug/kg		76	(32%-114%)		
2-Chloronaphthalene	1710	U	10.3	1100	ug/kg		64	(25%-111%)		
2-Chlorophenol	1710	U	103	1210	ug/kg		71	(20%-114%)		
2-Methyl-4,6-dinitrophenol	1710	U	103	946	ug/kg		55	(17%-115%)		
2-Methylnaphthalene	1710	U	10.3	1210	ug/kg		71	(25%-112%)		

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QC Summary

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1684057											
2-Nitrophenol	1710	U	103		1230	ug/kg		72	(23%-115%)	JLD1	07/25/17 19:26
3,3'-Dichlorobenzidine	1710	U	103		1060	ug/kg		62	(21%-107%)		
4-Bromophenylphenylether	1710	U	103		1280	ug/kg		75	(29%-121%)		
4-Chloro-3-methylphenol	1710	U	137		1330	ug/kg		78	(29%-119%)		
4-Chloroaniline	1710	U	103		1150	ug/kg		67	(22%-120%)		
4-Chlorophenylphenylether	1710	U	103		1330	ug/kg		77	(29%-119%)		
4-Nitrophenol	1710	U	103		1310	ug/kg		76	(20%-120%)		
Butylbenzylphthalate	1710	U	103		1190	ug/kg		69	(26%-133%)		
Carbazole	1710	U	10.3		1180	ug/kg		69	(27%-123%)		
Di-n-butylphthalate	1710	U	103		1270	ug/kg		74	(26%-126%)		
Di-n-octylphthalate	1710	U	103		1180	ug/kg		69	(29%-130%)		
Dibenzofuran	1710	U	103		1230	ug/kg		72	(30%-119%)		
Diethylphthalate	1710	U	103		1330	ug/kg		77	(26%-124%)		
Dimethylphthalate	1710	U	103		1290	ug/kg		75	(27%-120%)		
Hexachlorobenzene	1710	U	103		1310	ug/kg		77	(30%-113%)		

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Hexachlorobutadiene	1710	U	103	1210	ug/kg		70	(25%-109%)	JLD1	07/25/17 19:26
Hexachlorocyclopentadiene	1710	U	103	832	ug/kg		49	(10%-100%)		
Hexachloroethane	1710	U	103	1110	ug/kg		65	(23%-98%)		
Isophorone	1710	U	103	1190	ug/kg		69	(29%-107%)		
N-Nitrosodipropylamine	1710	U	103	1090	ug/kg		64	(25%-113%)		
Nitrobenzene	1710	U	103	1220	ug/kg		71	(26%-109%)		
Pentachlorophenol	1710	U	103	1180	ug/kg		69	(17%-119%)		
Phenol	1710	U	103	1130	ug/kg		66	(28%-111%)		
Tributylphosphate	1710	U	103	1610	ug/kg		94	(25%-131%)		
bis(2-Chloro-1-methylethyl)ether	1710	U	103	1050	ug/kg		62	(21%-116%)		
bis(2-Chloroethoxy)methane	1710	U	103	1210	ug/kg		71	(30%-111%)		
bis(2-Chloroethyl) ether	1710	U	103	1150	ug/kg		67	(27%-110%)		
bis(2-Ethylhexyl)phthalate	1710	U	103	1210	ug/kg		65	(27%-131%)		
m-Nitroaniline	1710	U	103	1270	ug/kg		74	(24%-137%)		
o-Cresol	1710	U	103	1200	ug/kg		70	(28%-114%)		

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
o-Nitroaniline	1710	113	U	1200	ug/kg		70	(27%-120%)	JLD1	07/25/17 19:26
p-Nitroaniline	1710	103	U	1210	ug/kg		71	(19%-140%)		
**2,4,6-Tribromophenol	3420	2500		2730	ug/kg		80	(12%-129%)		
**2-Fluorobiphenyl	1710	1220		1170	ug/kg		68	(15%-110%)		
**2-Fluorophenol	3420	2040		2260	ug/kg		66	(10%-115%)		
**Nitrobenzene-d5	1710	1230		1170	ug/kg		68	(13%-112%)		
**Phenol-d5	3420	2160		2360	ug/kg		69	(15%-117%)		
**p-Terphenyl-d14	1710	1350		1380	ug/kg		81	(24%-141%)		
QC1203835340 428197001 MSD										
1,2,4-Trichlorobenzene	1720	103	U	1110	ug/kg	6	65	(0%-30%)		07/25/17 19:57
1,2-Dichlorobenzene	1720	103	U	1050	ug/kg	6	61	(0%-30%)		
1,3-Dichlorobenzene	1720	103	U	963	ug/kg	10	56	(0%-30%)		
1,4-Dichlorobenzene	1720	103	U	1030	ug/kg	5	60	(0%-30%)		
2,4,5-Trichlorophenol	1720	103	U	1110	ug/kg	9	64	(0%-30%)		
2,4-Dichlorophenol	1720	103	U	1190	ug/kg	5	69	(0%-30%)		
2,4-Dimethylphenol	1720	103	U	973	ug/kg	6	57	(0%-30%)		

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
2,4-Dinitrophenol	1720	U	103	962	ug/kg	25	56	(0%-30%)	JLD1	07/25/17 19:57
2,4-Dinitrotoluene	1720	U	103	1240	ug/kg	9	72	(0%-30%)		
2,6-Dinitrotoluene	1720	U	103	1160	ug/kg	11	67	(0%-30%)		
2-Chloronaphthalene	1720	U	10.3	968	ug/kg	13	56	(0%-30%)		
2-Chlorophenol	1720	U	103	1140	ug/kg	6	66	(0%-30%)		
2-Methyl-4,6-dinitrophenol	1720	U	103	1140	ug/kg	18	66	(0%-30%)		
2-Methylnaphthalene	1720	U	10.3	1120	ug/kg	7	65	(0%-30%)		
2-Nitrophenol	1720	U	103	1120	ug/kg	9	65	(0%-30%)		
3,3'-Dichlorobenzidine	1720	U	103	1100	ug/kg	3	64	(0%-30%)		
4-Bromophenylphenylether	1720	U	103	1130	ug/kg	12	66	(0%-30%)		
4-Chloro-3-methylphenol	1720	U	137	1230	ug/kg	7	72	(0%-30%)		
4-Chloroaniline	1720	U	103	1120	ug/kg	2	65	(0%-30%)		
4-Chlorophenylphenylether	1720	U	103	1210	ug/kg	9	70	(0%-30%)		
4-Nitrophenol	1720	U	103	1170	ug/kg	11	68	(0%-30%)		
Butylbenzylphthalate	1720	U	103	1140	ug/kg	4	67	(0%-30%)		

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Carbazole	1720	U	10.3	1140	ug/kg	3	66	(0%-30%)	JLD1	07/25/17 19:57
Di-n-butylphthalate	1720	U	103	1200	ug/kg	6	70	(0%-30%)		
Di-n-octylphthalate	1720	U	103	1090	ug/kg	7	64	(0%-30%)		
Dibenzofuran	1720	U	103	1110	ug/kg	10	64	(0%-30%)		
Diethylphthalate	1720	U	103	1180	ug/kg	12	68	(0%-30%)		
Dimethylphthalate	1720	U	103	1110	ug/kg	15	65	(0%-30%)		
Hexachlorobenzene	1720	U	103	1190	ug/kg	10	69	(0%-30%)		
Hexachlorobutadiene	1720	U	103	1130	ug/kg	6	66	(0%-30%)		
Hexachlorocyclopentadiene	1720	U	103	767	ug/kg	8	45	(0%-30%)		
Hexachloroethane	1720	U	103	1020	ug/kg	9	59	(0%-30%)		
Isophorone	1720	U	103	1140	ug/kg	4	66	(0%-30%)		
N-Nitrosodipropylamine	1720	U	103	1020	ug/kg	6	59	(0%-30%)		
Nitrobenzene	1720	U	103	1170	ug/kg	4	68	(0%-30%)		
Pentachlorophenol	1720	U	103	1250	ug/kg	6	73	(0%-30%)		
Phenol	1720	U	103	1060	ug/kg	6	62	(0%-30%)		

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1684057											
Tributylphosphate	1720	U	103		1440	ug/kg	11	84	(0%-30%)	JLD1	07/25/17 19:57
bis(2-Chloro-1-methylethyl)ether	1720	U	103		996	ug/kg	6	58	(0%-30%)		
bis(2-Chloroethoxy)methane	1720	U	103		1130	ug/kg	7	65	(0%-30%)		
bis(2-Chloroethyl) ether	1720	U	103		1070	ug/kg	8	62	(0%-30%)		
bis(2-Ethylhexyl)phthalate	1720	U	103		1100	ug/kg	9	59	(0%-30%)		
m-Nitroaniline	1720	U	103		1160	ug/kg	9	67	(0%-30%)		
o-Cresol	1720	U	103		1120	ug/kg	7	65	(0%-30%)		
o-Nitroaniline	1720	U	113		1080	ug/kg	11	63	(0%-30%)		
p-Nitroaniline	1720	U	103		1090	ug/kg	10	64	(0%-30%)		
**2,4,6-Tribromophenol	3440		2500		2470	ug/kg		72	(12%-129%)		
**2-Fluorobiphenyl	1720		1220		1030	ug/kg		60	(15%-110%)		
**2-Fluorophenol	3440		2040		2130	ug/kg		62	(10%-115%)		
**Nitrobenzene-d5	1720		1230		1120	ug/kg		65	(13%-112%)		
**Phenol-d5	3440		2160		2230	ug/kg		65	(15%-117%)		
**p-Terphenyl-d14	1720		1350		1310	ug/kg		76	(24%-141%)		

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684064										
QC1203835357 LCS										
Acenaphthene	333			226	ug/kg		68*	(70%-130%)	JLD1	07/25/17 19:40
Acenaphthylene	333			218	ug/kg		65*	(70%-130%)		
Anthracene	333			254	ug/kg		76	(70%-130%)		
Benzo(a)anthracene	333			280	ug/kg		84	(70%-130%)		
Benzo(a)pyrene	333			274	ug/kg		82	(70%-130%)		
Benzo(b)fluoranthene	333			288	ug/kg		86	(70%-130%)		
Benzo(ghi)perylene	333			215	ug/kg		65*	(70%-130%)		
Benzo(k)fluoranthene	333			300	ug/kg		90	(70%-130%)		
Chrysene	333			290	ug/kg		87	(70%-130%)		
Dibenzo(a,h)anthracene	333			263	ug/kg		79	(70%-130%)		
Fluoranthene	333			265	ug/kg		80	(70%-130%)		
Fluorene	333			228	ug/kg		68*	(70%-130%)		
Indeno(1,2,3-cd)pyrene	333			226	ug/kg		68*	(70%-130%)		
Naphthalene	333			264	ug/kg		79	(70%-130%)		
Phenanthrene	333			252	ug/kg		76	(70%-130%)		

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684064										
Pyrene	333			283	ug/kg		85	(70%-130%)	JLD1	07/25/17 19:40
**5-alpha-Androstane	167			132	ug/kg		79	(25%-129%)		
QC1203835356 MB										
Acenaphthene			U	1.67	ug/kg					07/26/17 09:19
Acenaphthylene			U	1.67	ug/kg					
Anthracene			U	1.67	ug/kg					
Benzo(a)anthracene			U	1.67	ug/kg					
Benzo(a)pyrene			U	1.67	ug/kg					
Benzo(b)fluoranthene			U	1.67	ug/kg					
Benzo(ghi)perylene			U	1.67	ug/kg					
Benzo(k)fluoranthene			U	1.67	ug/kg					
Chrysene			U	1.67	ug/kg					
Dibenzo(a,h)anthracene			U	1.67	ug/kg					
Fluoranthene			U	1.67	ug/kg					
Fluorene			U	1.67	ug/kg					
Indeno(1,2,3-cd)pyrene			U	1.67	ug/kg					

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1684064											
Naphthalene				U	1.00	ug/kg				JLD1	07/26/17 09:19
Phenanthrene				U	1.67	ug/kg					
Pyrene				U	1.67	ug/kg					
**5-alpha-Androstane	167				127	ug/kg		76	(25%-129%)		
QC1203835358 428197001 MS											
Acenaphthene	344	U	1.72		109	ug/kg		32	(18%-115%)		07/26/17 10:24
Acenaphthylene	344	U	1.72		109	ug/kg		32	(19%-116%)		
Anthracene	344	U	1.72		159	ug/kg		46	(23%-115%)		
Benzo(a)anthracene	344	U	1.72		202	ug/kg		59	(23%-124%)		
Benzo(a)pyrene	344	U	1.72		200	ug/kg		58	(20%-130%)		
Benzo(b)fluoranthene	344	U	1.72		211	ug/kg		62	(20%-134%)		
Benzo(ghi)perylene	344	U	1.72		155	ug/kg		45	(18%-118%)		
Benzo(k)fluoranthene	344	U	1.72		216	ug/kg		63	(23%-128%)		
Chrysene	344	U	1.72		203	ug/kg		59	(18%-121%)		
Dibenzo(a,h)anthracene	344	U	1.72		177	ug/kg		52	(12%-132%)		
Fluoranthene	344	U	1.72		182	ug/kg		53	(21%-124%)		

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QC Summary

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1684064											
Fluorene	344	U	1.72		126	ug/kg		37	(21%-118%)	JLD1	07/26/17 10:24
Indeno(1,2,3-cd)pyrene	344	U	1.72		162	ug/kg		47	(11%-130%)		
Naphthalene	344	U	1.03		121	ug/kg		35	(14%-114%)		
Phenanthrene	344	U	1.72		157	ug/kg		46	(24%-106%)		
Pyrene	344	U	1.72		245	ug/kg		71	(16%-122%)		
**5-alpha-Androstane	172		119		81.8	ug/kg		48	(25%-129%)		
QC1203835359 428197001 MSD											
Acenaphthene	344	U	1.72		131	ug/kg	18	38	(0%-30%)		07/26/17 10:56
Acenaphthylene	344	U	1.72		128	ug/kg	16	37	(0%-30%)		
Anthracene	344	U	1.72		182	ug/kg	13	53	(0%-30%)		
Benzo(a)anthracene	344	U	1.72		235	ug/kg	15	68	(0%-30%)		
Benzo(a)pyrene	344	U	1.72		235	ug/kg	16	68	(0%-30%)		
Benzo(b)fluoranthene	344	U	1.72		253	ug/kg	18	73	(0%-30%)		
Benzo(ghi)perylene	344	U	1.72		191	ug/kg	21	56	(0%-30%)		
Benzo(k)fluoranthene	344	U	1.72		253	ug/kg	16	74	(0%-30%)		
Chrysene	344	U	1.72		250	ug/kg	21	73	(0%-30%)		

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1684064											
Dibenzo(a,h)anthracene	344	U	1.72		217	ug/kg	21	63	(0%-30%)	JLD1	07/26/17 10:56
Fluoranthene	344	U	1.72		205	ug/kg	12	59	(0%-30%)		
Fluorene	344	U	1.72		142	ug/kg	12	41	(0%-30%)		
Indeno(1,2,3-cd)pyrene	344	U	1.72		197	ug/kg	19	57	(0%-30%)		
Naphthalene	344	U	1.03		139	ug/kg	14	41	(0%-30%)		
Phenanthrene	344	U	1.72		179	ug/kg	13	52	(0%-30%)		
Pyrene	344	U	1.72		314	ug/kg	24	91	(0%-30%)		
**5-alpha-Androstane	172		119		95.7	ug/kg		56	(25%-129%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

Semi-Volatile

Surrogate Recovery Report

SDG Number: GEL428197

Matrix Type: SOLID

Sample ID	Client ID	5-alpha %REC
1203835357	LCS for batch 1684062	79
1203835356	MB for batch 1684062	76
428197001	B3BBH0	69
1203835358	B3BBH0MS	48
1203835359	B3BBH0MSD	56
428197004	B3BBH4	69

Surrogate	Acceptance Limits
5-alpha- = 5-alpha-Androstane	(25%-129%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Semi-Volatile

Surrogate Recovery Report

SDG Number: GEL428197

Matrix Type: SOLID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203835337	MB for batch 1684056	66	69	79	76	79	97
1203835338	LCS for batch 1684056	71	72	74	72	84	103
428197001	B3BBH0	59	63	72	71	73	78
1203835339	B3BBH0MS	66	69	68	68	80	81
1203835340	B3BBH0MSD	62	65	65	60	72	76
428197004	B3BBH4	57	60	69	70	71	83

Surrogate		Acceptance Limits
2FP	= 2-Fluorophenol	(10%-115%)
PHL	= Phenol-d5	(15%-117%)
NBZ	= Nitrobenzene-d5	(13%-112%)
FBP	= 2-Fluorobiphenyl	(15%-110%)
TBP	= 2,4,6-Tribromophenol	(12%-129%)
TPH	= p-Terphenyl-d14	(24%-141%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

GEL LABORATORIES LLC

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QC Summary

Report Date: July 27, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428482**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
QC1203835338 LCS										
1,2,4-Trichlorobenzene	1670			1220	ug/kg		74	(70%-130%)	JLD1	07/25/17 18:22
1,2-Dichlorobenzene	1670			1170	ug/kg		70	(70%-130%)		
1,3-Dichlorobenzene	1670			1070	ug/kg		64*	(70%-130%)		
1,4-Dichlorobenzene	1670			1080	ug/kg		65*	(70%-130%)		
2,4,5-Trichlorophenol	1670			1200	ug/kg		72	(70%-130%)		
2,4-Dichlorophenol	1670			1240	ug/kg		74	(70%-130%)		
2,4-Dimethylphenol	1670			1050	ug/kg		63*	(70%-130%)		
2,4-Dinitrophenol	1670			730	ug/kg		44*	(70%-130%)		
2,4-Dinitrotoluene	1670			1370	ug/kg		82	(70%-130%)		
2,6-Dinitrotoluene	1670			1310	ug/kg		79	(70%-130%)		
2-Chloronaphthalene	1670			1040	ug/kg		63*	(70%-130%)		
2-Chlorophenol	1670			1190	ug/kg		71	(70%-130%)		
2-Methyl-4,6-dinitrophenol	1670			847	ug/kg		51*	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
2-Methylnaphthalene	1670			1180	ug/kg		71	(70%-130%)	JLD1	07/25/17 18:22
2-Nitrophenol	1670			1160	ug/kg		70	(70%-130%)		
3,3'-Dichlorobenzidine	1670			1210	ug/kg		73	(70%-130%)		
4-Bromophenylphenylether	1670			1290	ug/kg		78	(70%-130%)		
4-Chloro-3-methylphenol	1670			1240	ug/kg		75	(70%-130%)		
4-Chloroaniline	1670			1150	ug/kg		69*	(70%-130%)		
4-Chlorophenylphenylether	1670			1250	ug/kg		75	(70%-130%)		
4-Nitrophenol	1670			1250	ug/kg		75	(70%-130%)		
Butylbenzylphthalate	1670			1360	ug/kg		82	(70%-130%)		
Carbazole	1670			1240	ug/kg		74	(70%-130%)		
Di-n-butylphthalate	1670			1330	ug/kg		80	(70%-130%)		
Di-n-octylphthalate	1670			1290	ug/kg		77	(70%-130%)		
Dibenzofuran	1670			1170	ug/kg		70	(70%-130%)		
Diethylphthalate	1670			1280	ug/kg		77	(70%-130%)		
Dimethylphthalate	1670			1200	ug/kg		72	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Hexachlorobenzene	1670			1310	ug/kg		79	(70%-130%)	JLD1	07/25/17 18:22
Hexachlorobutadiene	1670			1230	ug/kg		74	(70%-130%)		
Hexachlorocyclopentadiene	1670			768	ug/kg		46*	(70%-130%)		
Hexachloroethane	1670			1120	ug/kg		67*	(70%-130%)		
Isophorone	1670			1180	ug/kg		71	(70%-130%)		
N-Nitrosodipropylamine	1670			1130	ug/kg		68*	(70%-130%)		
Nitrobenzene	1670			1230	ug/kg		74	(70%-130%)		
Pentachlorophenol	1670			1260	ug/kg		76	(70%-130%)		
Phenol	1670			1100	ug/kg		66*	(70%-130%)		
Tributylphosphate	1670			1610	ug/kg		97	(70%-130%)		
bis(2-Chloro-1-methylethyl)ether	1670			1060	ug/kg		64*	(70%-130%)		
bis(2-Chloroethoxy)methane	1670			1170	ug/kg		70	(70%-130%)		
bis(2-Chloroethyl) ether	1670			1150	ug/kg		69*	(70%-130%)		
bis(2-Ethylhexyl)phthalate	1670			1320	ug/kg		79	(70%-130%)		
m-Nitroaniline	1670			1290	ug/kg		78	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
o-Cresol	1670			1180	ug/kg		71	(70%-130%)	JLD1	07/25/17 18:22
o-Nitroaniline	1670			1150	ug/kg		69*	(70%-130%)		
p-Nitroaniline	1670			1190	ug/kg		71	(70%-130%)		
**2,4,6-Tribromophenol	3330			2810	ug/kg		84	(12%-129%)		
**2-Fluorobiphenyl	1670			1200	ug/kg		72	(15%-110%)		
**2-Fluorophenol	3330			2360	ug/kg		71	(10%-115%)		
**Nitrobenzene-d5	1670			1240	ug/kg		74	(13%-112%)		
**Phenol-d5	3330			2410	ug/kg		72	(15%-117%)		
**p-Terphenyl-d14	1670			1710	ug/kg		103	(24%-141%)		
QC1203835337 MB										
1,2,4-Trichlorobenzene			U	100	ug/kg					07/25/17 17:51
1,2-Dichlorobenzene			U	100	ug/kg					
1,3-Dichlorobenzene			U	100	ug/kg					
1,4-Dichlorobenzene			U	100	ug/kg					
2,4,5-Trichlorophenol			U	100	ug/kg					
2,4-Dichlorophenol			U	100	ug/kg					

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QC Summary

Workorder: **428482**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1684057											
2,4-Dimethylphenol			U	100	ug/kg				JLD1	07/25/17	17:51
2,4-Dinitrophenol			U	100	ug/kg						
2,4-Dinitrotoluene			U	100	ug/kg						
2,6-Dinitrotoluene			U	100	ug/kg						
2-Chloronaphthalene			U	10.0	ug/kg						
2-Chlorophenol			U	100	ug/kg						
2-Methyl-4,6-dinitrophenol			U	100	ug/kg						
2-Methylnaphthalene			U	10.0	ug/kg						
2-Nitrophenol			U	100	ug/kg						
3,3'-Dichlorobenzidine			U	100	ug/kg						
4-Bromophenylphenylether			U	100	ug/kg						
4-Chloro-3-methylphenol			U	133	ug/kg						
4-Chloroaniline			U	100	ug/kg						
4-Chlorophenylphenylether			U	100	ug/kg						
4-Nitrophenol			U	100	ug/kg						

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Butylbenzylphthalate			U	100	ug/kg				JLD1	07/25/17 17:51
Carbazole			U	10.0	ug/kg					
Di-n-butylphthalate			U	100	ug/kg					
Di-n-octylphthalate			U	100	ug/kg					
Dibenzofuran			U	100	ug/kg					
Diethylphthalate			U	100	ug/kg					
Dimethylphthalate			U	100	ug/kg					
Hexachlorobenzene			U	100	ug/kg					
Hexachlorobutadiene			U	100	ug/kg					
Hexachlorocyclopentadiene			U	100	ug/kg					
Hexachloroethane			U	100	ug/kg					
Isophorone			U	100	ug/kg					
N-Nitrosodipropylamine			U	100	ug/kg					
Nitrobenzene			U	100	ug/kg					
Pentachlorophenol			U	100	ug/kg					

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Phenol			U	100	ug/kg				JLD1	07/25/17 17:51
Tributylphosphate			U	100	ug/kg					
bis(2-Chloro-1-methylethyl)ether			U	100	ug/kg					
bis(2-Chloroethoxy)methane			U	100	ug/kg					
bis(2-Chloroethyl) ether			U	100	ug/kg					
bis(2-Ethylhexyl)phthalate			U	100	ug/kg					
m-Nitroaniline			U	100	ug/kg					
o-Cresol			U	100	ug/kg					
o-Nitroaniline			U	110	ug/kg					
p-Nitroaniline			U	100	ug/kg					
**2,4,6-Tribromophenol	3330			2630	ug/kg		79	(12%-129%)		
**2-Fluorobiphenyl	1670			1270	ug/kg		76	(15%-110%)		
**2-Fluorophenol	3330			2190	ug/kg		66	(10%-115%)		
**Nitrobenzene-d5	1670			1320	ug/kg		79	(13%-112%)		
**Phenol-d5	3330			2310	ug/kg		69	(15%-117%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
**p-Terphenyl-d14	1670			1620	ug/kg		97	(24%-141%)	JLD1	07/25/17 17:51
QC1203835339 428197001 MS										
1,2,4-Trichlorobenzene	1710	U	103	1180	ug/kg		69	(26%-104%)		07/25/17 19:26
1,2-Dichlorobenzene	1710	U	103	1120	ug/kg		65	(26%-98%)		
1,3-Dichlorobenzene	1710	U	103	1070	ug/kg		62	(27%-92%)		
1,4-Dichlorobenzene	1710	U	103	1090	ug/kg		64	(27%-95%)		
2,4,5-Trichlorophenol	1710	U	103	1210	ug/kg		71	(26%-120%)		
2,4-Dichlorophenol	1710	U	103	1250	ug/kg		73	(21%-119%)		
2,4-Dimethylphenol	1710	U	103	1030	ug/kg		60	(27%-111%)		
2,4-Dinitrophenol	1710	U	103	745	ug/kg		44	(12%-112%)		
2,4-Dinitrotoluene	1710	U	103	1360	ug/kg		79	(32%-118%)		
2,6-Dinitrotoluene	1710	U	103	1300	ug/kg		76	(32%-114%)		
2-Chloronaphthalene	1710	U	10.3	1100	ug/kg		64	(25%-111%)		
2-Chlorophenol	1710	U	103	1210	ug/kg		71	(20%-114%)		
2-Methyl-4,6-dinitrophenol	1710	U	103	946	ug/kg		55	(17%-115%)		
2-Methylnaphthalene	1710	U	10.3	1210	ug/kg		71	(25%-112%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
2-Nitrophenol	1710	U	103	1230	ug/kg		72	(23%-115%)	JLD1	07/25/17 19:26
3,3'-Dichlorobenzidine	1710	U	103	1060	ug/kg		62	(21%-107%)		
4-Bromophenylphenylether	1710	U	103	1280	ug/kg		75	(29%-121%)		
4-Chloro-3-methylphenol	1710	U	137	1330	ug/kg		78	(29%-119%)		
4-Chloroaniline	1710	U	103	1150	ug/kg		67	(22%-120%)		
4-Chlorophenylphenylether	1710	U	103	1330	ug/kg		77	(29%-119%)		
4-Nitrophenol	1710	U	103	1310	ug/kg		76	(20%-120%)		
Butylbenzylphthalate	1710	U	103	1190	ug/kg		69	(26%-133%)		
Carbazole	1710	U	10.3	1180	ug/kg		69	(27%-123%)		
Di-n-butylphthalate	1710	U	103	1270	ug/kg		74	(26%-126%)		
Di-n-octylphthalate	1710	U	103	1180	ug/kg		69	(29%-130%)		
Dibenzofuran	1710	U	103	1230	ug/kg		72	(30%-119%)		
Diethylphthalate	1710	U	103	1330	ug/kg		77	(26%-124%)		
Dimethylphthalate	1710	U	103	1290	ug/kg		75	(27%-120%)		
Hexachlorobenzene	1710	U	103	1310	ug/kg		77	(30%-113%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Hexachlorobutadiene	1710	U	103	1210	ug/kg		70	(25%-109%)	JLD1	07/25/17 19:26
Hexachlorocyclopentadiene	1710	U	103	832	ug/kg		49	(10%-100%)		
Hexachloroethane	1710	U	103	1110	ug/kg		65	(23%-98%)		
Isophorone	1710	U	103	1190	ug/kg		69	(29%-107%)		
N-Nitrosodipropylamine	1710	U	103	1090	ug/kg		64	(25%-113%)		
Nitrobenzene	1710	U	103	1220	ug/kg		71	(26%-109%)		
Pentachlorophenol	1710	U	103	1180	ug/kg		69	(17%-119%)		
Phenol	1710	U	103	1130	ug/kg		66	(28%-111%)		
Tributylphosphate	1710	U	103	1610	ug/kg		94	(25%-131%)		
bis(2-Chloro-1-methylethyl)ether	1710	U	103	1050	ug/kg		62	(21%-116%)		
bis(2-Chloroethoxy)methane	1710	U	103	1210	ug/kg		71	(30%-111%)		
bis(2-Chloroethyl) ether	1710	U	103	1150	ug/kg		67	(27%-110%)		
bis(2-Ethylhexyl)phthalate	1710	U	103	1210	ug/kg		65	(27%-131%)		
m-Nitroaniline	1710	U	103	1270	ug/kg		74	(24%-137%)		
o-Cresol	1710	U	103	1200	ug/kg		70	(28%-114%)		

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1684057											
o-Nitroaniline	1710	U	113		1200	ug/kg		70	(27%-120%)	JLD1	07/25/17 19:26
p-Nitroaniline	1710	U	103		1210	ug/kg		71	(19%-140%)		
**2,4,6-Tribromophenol	3420		2500		2730	ug/kg		80	(12%-129%)		
**2-Fluorobiphenyl	1710		1220		1170	ug/kg		68	(15%-110%)		
**2-Fluorophenol	3420		2040		2260	ug/kg		66	(10%-115%)		
**Nitrobenzene-d5	1710		1230		1170	ug/kg		68	(13%-112%)		
**Phenol-d5	3420		2160		2360	ug/kg		69	(15%-117%)		
**p-Terphenyl-d14	1710		1350		1380	ug/kg		81	(24%-141%)		
QC1203835340 428197001 MSD											
1,2,4-Trichlorobenzene	1720	U	103		1110	ug/kg	6	65	(0%-30%)		07/25/17 19:57
1,2-Dichlorobenzene	1720	U	103		1050	ug/kg	6	61	(0%-30%)		
1,3-Dichlorobenzene	1720	U	103		963	ug/kg	10	56	(0%-30%)		
1,4-Dichlorobenzene	1720	U	103		1030	ug/kg	5	60	(0%-30%)		
2,4,5-Trichlorophenol	1720	U	103		1110	ug/kg	9	64	(0%-30%)		
2,4-Dichlorophenol	1720	U	103		1190	ug/kg	5	69	(0%-30%)		
2,4-Dimethylphenol	1720	U	103		973	ug/kg	6	57	(0%-30%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
2,4-Dinitrophenol	1720	U	103	962	ug/kg	25	56	(0%-30%)	JLD1	07/25/17 19:57
2,4-Dinitrotoluene	1720	U	103	1240	ug/kg	9	72	(0%-30%)		
2,6-Dinitrotoluene	1720	U	103	1160	ug/kg	11	67	(0%-30%)		
2-Chloronaphthalene	1720	U	10.3	968	ug/kg	13	56	(0%-30%)		
2-Chlorophenol	1720	U	103	1140	ug/kg	6	66	(0%-30%)		
2-Methyl-4,6-dinitrophenol	1720	U	103	1140	ug/kg	18	66	(0%-30%)		
2-Methylnaphthalene	1720	U	10.3	1120	ug/kg	7	65	(0%-30%)		
2-Nitrophenol	1720	U	103	1120	ug/kg	9	65	(0%-30%)		
3,3'-Dichlorobenzidine	1720	U	103	1100	ug/kg	3	64	(0%-30%)		
4-Bromophenylphenylether	1720	U	103	1130	ug/kg	12	66	(0%-30%)		
4-Chloro-3-methylphenol	1720	U	137	1230	ug/kg	7	72	(0%-30%)		
4-Chloroaniline	1720	U	103	1120	ug/kg	2	65	(0%-30%)		
4-Chlorophenylphenylether	1720	U	103	1210	ug/kg	9	70	(0%-30%)		
4-Nitrophenol	1720	U	103	1170	ug/kg	11	68	(0%-30%)		
Butylbenzylphthalate	1720	U	103	1140	ug/kg	4	67	(0%-30%)		

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1684057											
Carbazole	1720	U	10.3		1140	ug/kg	3	66	(0%-30%)	JLD1	07/25/17 19:57
Di-n-butylphthalate	1720	U	103		1200	ug/kg	6	70	(0%-30%)		
Di-n-octylphthalate	1720	U	103		1090	ug/kg	7	64	(0%-30%)		
Dibenzofuran	1720	U	103		1110	ug/kg	10	64	(0%-30%)		
Diethylphthalate	1720	U	103		1180	ug/kg	12	68	(0%-30%)		
Dimethylphthalate	1720	U	103		1110	ug/kg	15	65	(0%-30%)		
Hexachlorobenzene	1720	U	103		1190	ug/kg	10	69	(0%-30%)		
Hexachlorobutadiene	1720	U	103		1130	ug/kg	6	66	(0%-30%)		
Hexachlorocyclopentadiene	1720	U	103		767	ug/kg	8	45	(0%-30%)		
Hexachloroethane	1720	U	103		1020	ug/kg	9	59	(0%-30%)		
Isophorone	1720	U	103		1140	ug/kg	4	66	(0%-30%)		
N-Nitrosodipropylamine	1720	U	103		1020	ug/kg	6	59	(0%-30%)		
Nitrobenzene	1720	U	103		1170	ug/kg	4	68	(0%-30%)		
Pentachlorophenol	1720	U	103		1250	ug/kg	6	73	(0%-30%)		
Phenol	1720	U	103		1060	ug/kg	6	62	(0%-30%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684057										
Tributylphosphate	1720	103	U	1440	ug/kg	11	84	(0%-30%)	JLD1	07/25/17 19:57
bis(2-Chloro-1-methylethyl)ether	1720	103	U	996	ug/kg	6	58	(0%-30%)		
bis(2-Chloroethoxy)methane	1720	103	U	1130	ug/kg	7	65	(0%-30%)		
bis(2-Chloroethyl) ether	1720	103	U	1070	ug/kg	8	62	(0%-30%)		
bis(2-Ethylhexyl)phthalate	1720	103	U	1100	ug/kg	9	59	(0%-30%)		
m-Nitroaniline	1720	103	U	1160	ug/kg	9	67	(0%-30%)		
o-Cresol	1720	103	U	1120	ug/kg	7	65	(0%-30%)		
o-Nitroaniline	1720	113	U	1080	ug/kg	11	63	(0%-30%)		
p-Nitroaniline	1720	103	U	1090	ug/kg	10	64	(0%-30%)		
**2,4,6-Tribromophenol	3440	2500		2470	ug/kg		72	(12%-129%)		
**2-Fluorobiphenyl	1720	1220		1030	ug/kg		60	(15%-110%)		
**2-Fluorophenol	3440	2040		2130	ug/kg		62	(10%-115%)		
**Nitrobenzene-d5	1720	1230		1120	ug/kg		65	(13%-112%)		
**Phenol-d5	3440	2160		2230	ug/kg		65	(15%-117%)		
**p-Terphenyl-d14	1720	1350		1310	ug/kg		76	(24%-141%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684064										
QC1203835357 LCS										
Acenaphthene	333			226	ug/kg		68*	(70%-130%)	JLD1	07/25/17 19:40
Acenaphthylene	333			218	ug/kg		65*	(70%-130%)		
Anthracene	333			254	ug/kg		76	(70%-130%)		
Benzo(a)anthracene	333			280	ug/kg		84	(70%-130%)		
Benzo(a)pyrene	333			274	ug/kg		82	(70%-130%)		
Benzo(b)fluoranthene	333			288	ug/kg		86	(70%-130%)		
Benzo(ghi)perylene	333			215	ug/kg		65*	(70%-130%)		
Benzo(k)fluoranthene	333			300	ug/kg		90	(70%-130%)		
Chrysene	333			290	ug/kg		87	(70%-130%)		
Dibenzo(a,h)anthracene	333			263	ug/kg		79	(70%-130%)		
Fluoranthene	333			265	ug/kg		80	(70%-130%)		
Fluorene	333			228	ug/kg		68*	(70%-130%)		
Indeno(1,2,3-cd)pyrene	333			226	ug/kg		68*	(70%-130%)		
Naphthalene	333			264	ug/kg		79	(70%-130%)		
Phenanthrene	333			252	ug/kg		76	(70%-130%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684064										
Pyrene	333			283	ug/kg		85	(70%-130%)	JLD1	07/25/17 19:40
**5-alpha-Androstane	167			132	ug/kg		79	(25%-129%)		
QC1203835356 MB										
Acenaphthene			U	1.67	ug/kg					07/26/17 09:19
Acenaphthylene			U	1.67	ug/kg					
Anthracene			U	1.67	ug/kg					
Benzo(a)anthracene			U	1.67	ug/kg					
Benzo(a)pyrene			U	1.67	ug/kg					
Benzo(b)fluoranthene			U	1.67	ug/kg					
Benzo(ghi)perylene			U	1.67	ug/kg					
Benzo(k)fluoranthene			U	1.67	ug/kg					
Chrysene			U	1.67	ug/kg					
Dibenzo(a,h)anthracene			U	1.67	ug/kg					
Fluoranthene			U	1.67	ug/kg					
Fluorene			U	1.67	ug/kg					
Indeno(1,2,3-cd)pyrene			U	1.67	ug/kg					

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1684064											
Naphthalene				U	1.00	ug/kg				JLD1	07/26/17 09:19
Phenanthrene				U	1.67	ug/kg					
Pyrene				U	1.67	ug/kg					
**5-alpha-Androstane	167				127	ug/kg		76	(25%-129%)		
QC1203835358 428197001 MS											
Acenaphthene	344	U	1.72		109	ug/kg		32	(18%-115%)		07/26/17 10:24
Acenaphthylene	344	U	1.72		109	ug/kg		32	(19%-116%)		
Anthracene	344	U	1.72		159	ug/kg		46	(23%-115%)		
Benzo(a)anthracene	344	U	1.72		202	ug/kg		59	(23%-124%)		
Benzo(a)pyrene	344	U	1.72		200	ug/kg		58	(20%-130%)		
Benzo(b)fluoranthene	344	U	1.72		211	ug/kg		62	(20%-134%)		
Benzo(ghi)perylene	344	U	1.72		155	ug/kg		45	(18%-118%)		
Benzo(k)fluoranthene	344	U	1.72		216	ug/kg		63	(23%-128%)		
Chrysene	344	U	1.72		203	ug/kg		59	(18%-121%)		
Dibenzo(a,h)anthracene	344	U	1.72		177	ug/kg		52	(12%-132%)		
Fluoranthene	344	U	1.72		182	ug/kg		53	(21%-124%)		

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 1684064											
Fluorene	344	U	1.72		126	ug/kg		37	(21%-118%)	JLD1	07/26/17 10:24
Indeno(1,2,3-cd)pyrene	344	U	1.72		162	ug/kg		47	(11%-130%)		
Naphthalene	344	U	1.03		121	ug/kg		35	(14%-114%)		
Phenanthrene	344	U	1.72		157	ug/kg		46	(24%-106%)		
Pyrene	344	U	1.72		245	ug/kg		71	(16%-122%)		
**5-alpha-Androstane	172		119		81.8	ug/kg		48	(25%-129%)		
QC1203835359 428197001 MSD											
Acenaphthene	344	U	1.72		131	ug/kg	18	38	(0%-30%)		07/26/17 10:56
Acenaphthylene	344	U	1.72		128	ug/kg	16	37	(0%-30%)		
Anthracene	344	U	1.72		182	ug/kg	13	53	(0%-30%)		
Benzo(a)anthracene	344	U	1.72		235	ug/kg	15	68	(0%-30%)		
Benzo(a)pyrene	344	U	1.72		235	ug/kg	16	68	(0%-30%)		
Benzo(b)fluoranthene	344	U	1.72		253	ug/kg	18	73	(0%-30%)		
Benzo(ghi)perylene	344	U	1.72		191	ug/kg	21	56	(0%-30%)		
Benzo(k)fluoranthene	344	U	1.72		253	ug/kg	16	74	(0%-30%)		
Chrysene	344	U	1.72		250	ug/kg	21	73	(0%-30%)		

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1684064										
Dibenzo(a,h)anthracene	344	1.72	U	217	ug/kg	21	63	(0%-30%)	JLD1	07/26/17 10:56
Fluoranthene	344	1.72	U	205	ug/kg	12	59	(0%-30%)		
Fluorene	344	1.72	U	142	ug/kg	12	41	(0%-30%)		
Indeno(1,2,3-cd)pyrene	344	1.72	U	197	ug/kg	19	57	(0%-30%)		
Naphthalene	344	1.03	U	139	ug/kg	14	41	(0%-30%)		
Phenanthrene	344	1.72	U	179	ug/kg	13	52	(0%-30%)		
Pyrene	344	1.72	U	314	ug/kg	24	91	(0%-30%)		
**5-alpha-Androstane	172	119		95.7	ug/kg		56	(25%-129%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

Semi-Volatiles

Surrogate Recovery Report

SDG Number: GEL428482

Matrix Type: SOLID

Sample ID	Client ID	5-alpha %REC
1203835357	LCS for batch 1684062	79
1203835356	MB for batch 1684062	76
1203835358	B3BBH0MS	48
1203835359	B3BBH0MSD	56
428482001	B3BBH8	61
428482002	B3BBJ2	60
428482003	B3BBK0	70

Surrogate	Acceptance Limits
5-alpha- = 5-alpha-Androstane	(25%-129%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

Semi-Volatile

Surrogate Recovery Report

SDG Number: GEL428482

Matrix Type: SOLID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203835337	MB for batch 1684056	66	69	79	76	79	97
1203835338	LCS for batch 1684056	71	72	74	72	84	103
1203835339	B3BBH0MS	66	69	68	68	80	81
1203835340	B3BBH0MSD	62	65	65	60	72	76
428482001	B3BBH8	51	54	63	63	73	79
428482002	B3BBJ2	52	55	64	62	69	73
428482003	B3BBK0	60	65	74	75	73	83

Surrogate		Acceptance Limits
2FP	= 2-Fluorophenol	(10%-115%)
PHL	= Phenol-d5	(15%-117%)
NBZ	= Nitrobenzene-d5	(13%-112%)
FBP	= 2-Fluorobiphenyl	(15%-110%)
TBP	= 2,4,6-Tribromophenol	(12%-129%)
TPH	= p-Terphenyl-d14	(24%-141%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

GEL LABORATORIES LLC

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QC Summary

Report Date: July 12, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **426852**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1680275											
QC1203825820 LCS											
Diesel Range Organics	66600				46900	UG/KG		70	(70%-130%)	LXA1	07/11/17 16:20
Motor Oil	66600			B	52600	UG/KG		79	(70%-130%)		
**o-Terphenyl	666				476	UG/KG		71	(60%-140%)		
QC1203825823 LCS											
Kerosene	33300				24600	UG/KG		74	(70%-130%)		07/11/17 16:59
**o-Terphenyl	666				457	UG/KG		69	(60%-140%)		
QC1203825824 LCSD											
Kerosene	33300				26600	UG/KG	8	80	(0%-30%)		07/11/17 17:38
**o-Terphenyl	666				492	UG/KG		74	(60%-140%)		
QC1203825819 MB											
Diesel Range Organics				U	2160	UG/KG					07/11/17 15:41
Kerosene				U	1110	UG/KG					
Motor Oil				J	2590	UG/KG					
**o-Terphenyl	666				432	UG/KG		65	(60%-140%)		
QC1203825821 427197002 MS											
Diesel Range Organics	68200	JT	2670	T	46400	UG/KG		64*	(70%-130%)		07/11/17 20:54

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 426852

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1680275											
Motor Oil	68200	BT	20700	BT	64300	UG/KG		64*	(70%-130%)	LXA1	07/11/17 20:54
**o-Terphenyl	682		343		351	UG/KG		51*	(60%-140%)		
QC1203825822 427197002 MSD											
Diesel Range Organics	68000	JT	2670		51700	UG/KG	11	72	(0%-30%)		07/11/17 21:34
Motor Oil	68000	BT	20700	B	69300	UG/KG	8	71	(0%-30%)		
**o-Terphenyl	680		343		378	UG/KG		56*	(60%-140%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Surrogate Recovery Report

SDG Number: GEL426852

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1203825819	MB for batch 1680274	65
1203825820	LCS for batch 1680274	71
1203825823	LCS for batch 1680274	69
1203825824	LCSD for batch 1680274	74
426852001	B3BBC2	73
1203825821	B3B7P0MS	51 *
1203825822	B3B7P0MSD	56 *

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(60%-140%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

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QC Summary

Report Date: July 20, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **427715**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics										
Batch 1682135										
QC1203830420 LCS										
Diesel Range Organics	66600			46000	UG/KG		69*	(70%-130%)	LXA1	07/16/17 00:26
Motor Oil	66600			46800	UG/KG		70	(70%-130%)		
**o-Terphenyl	666			415	UG/KG		62	(60%-140%)		
QC1203830423 LCS										
Kerosene	33300			23200	UG/KG		70	(70%-130%)		07/16/17 01:06
**o-Terphenyl	666			427	UG/KG		64	(60%-140%)		
QC1203830424 LCSD										
Kerosene	33300			22000	UG/KG	5	66*	(0%-30%)		07/16/17 01:45
**o-Terphenyl	667			410	UG/KG		61	(60%-140%)		
QC1203830419 MB										
Diesel Range Organics			U	2170	UG/KG					07/15/17 23:47
Kerosene			U	1110	UG/KG					
Motor Oil			U	2170	UG/KG					
**o-Terphenyl	666			351	UG/KG		53*	(60%-140%)		
QC1203830421 427715003 MS										
Diesel Range Organics	70900	U	2310	57000	UG/KG		80	(70%-130%)		07/16/17 04:22

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QC Summary

Workorder: 427715

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics										
Batch 1682135										
Motor Oil	70900	2310	U	60100	UG/KG		85	(70%-130%)	LXA1	07/16/17 04:22
**o-Terphenyl	709	355		515	UG/KG		73	(60%-140%)		
QC1203830422 427715003 MSD										
Diesel Range Organics	71200	2310	U	56000	UG/KG	2	79	(0%-30%)		07/16/17 05:01
Motor Oil	71200	2310	U	58500	UG/KG	3	82	(0%-30%)		
**o-Terphenyl	712	355		509	UG/KG		71	(60%-140%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

FID Diesel Range Organics
Surrogate Recovery Report

SDG Number: GEL427715
Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1203830419	MB for batch 1682134	53 *
1203830420	LCS for batch 1682134	62
1203830423	LCS for batch 1682134	64
1203830424	LCSD for batch 1682134	61
427715001	B3BBD0	45 *
427715002	B3BBC6	60
427715003	B3BBD4	50 *
1203830421	B3BBD4MS	73
1203830422	B3BBD4MSD	71

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(60%-140%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 24, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428015**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1682869											
QC1203832260 LCS											
Diesel Range Organics	66600			B	64200	UG/KG		96	(70%-130%)	LXA1	07/22/17 00:42
Motor Oil	66600			B	73700	UG/KG		111	(70%-130%)		
**o-Terphenyl	666				599	UG/KG		90	(60%-140%)		
QC1203832263 LCS											
Kerosene	33300			B	24300	UG/KG		73	(70%-130%)		07/22/17 01:21
**o-Terphenyl	667				550	UG/KG		82	(60%-140%)		
QC1203832264 LCSD											
Kerosene	33300			B	22000	UG/KG	10	66*	(0%-30%)		07/22/17 02:00
**o-Terphenyl	666				396	UG/KG		59*	(60%-140%)		
QC1203832259 MB											
Diesel Range Organics				J	3110	UG/KG					07/22/17 00:03
Kerosene				J	2990	UG/KG					
Motor Oil				J	2260	UG/KG					
**o-Terphenyl	666				463	UG/KG		70	(60%-140%)		
QC1203832261 428015001 MS											
Diesel Range Organics	67300	BJ	3460	B	52900	UG/KG		74	(70%-130%)		07/22/17 03:18

GEL LABORATORIES LLC

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QC Summary

Workorder: **428015**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1682869											
Motor Oil	67300	BJ	3240	B	57800	UG/KG		81	(70%-130%)	LXA1	07/22/17 03:18
**o-Terphenyl	673		499		466	UG/KG		69	(60%-140%)		
QC1203832262 428015001 MSD											
Diesel Range Organics	67200	BJ	3460	B	58000	UG/KG	9	81	(0%-30%)		07/22/17 03:57
Motor Oil	67200	BJ	3240	B	63600	UG/KG	10	90	(0%-30%)		
**o-Terphenyl	672		499		449	UG/KG		67	(60%-140%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL428015

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1203832259	MB for batch 1682866	70
1203832260	LCS for batch 1682866	90
1203832263	LCS for batch 1682866	82
1203832264	LCSD for batch 1682866	59 *
428015001	B3BBD8	74
1203832261	B3BBD8MS	69
1203832262	B3BBD8MSD	67
428015002	B3BBF2	60
428015003	B3BBF6	50 *

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(60%-140%)

* Recovery outside Acceptance Limits

\# Column to be used to flag recovery values

D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 24, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics										
Batch 1683556										
QC1203834117 LCS										
Diesel Range Organics	66600			44500	UG/KG		67*	(70%-130%)	LXA1	07/21/17 14:51
Motor Oil	66600			49000	UG/KG		73	(70%-130%)		
**o-Terphenyl	666			422	UG/KG		63	(60%-140%)		
QC1203834120 LCS										
Kerosene	33300			24000	UG/KG		72	(70%-130%)		07/21/17 15:31
**o-Terphenyl	667			481	UG/KG		72	(60%-140%)		
QC1203834121 LCSD										
Kerosene	33300			20500	UG/KG	16	61*	(0%-30%)		07/21/17 16:10
**o-Terphenyl	666			433	UG/KG		65	(60%-140%)		
QC1203834116 MB										
Diesel Range Organics			U	2170	UG/KG					07/21/17 14:12
Kerosene			U	1110	UG/KG					
Motor Oil			U	2170	UG/KG					
**o-Terphenyl	666			347	UG/KG		52*	(60%-140%)		
QC1203834118 428197001 MS										
Diesel Range Organics	68800	U	2240	52300	UG/KG		76	(70%-130%)		07/21/17 17:29

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics										
Batch 1683556										
Motor Oil	68800	3300	J	60500	UG/KG		83	(70%-130%)	LXA1	07/21/17 17:29
**o-Terphenyl	688	379		496	UG/KG		72	(60%-140%)		
QC1203834119 428197001 MSD										
Diesel Range Organics	68800	2240	U	54500	UG/KG	4	79	(0%-30%)		07/21/17 18:09
Motor Oil	68800	3300	J	64700	UG/KG	7	89	(0%-30%)		
**o-Terphenyl	688	379		457	UG/KG		66	(60%-140%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (0rganics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL428197

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1203834116	MB for batch 1683555	52 *
1203834117	LCS for batch 1683555	63
1203834120	LCS for batch 1683555	72
1203834121	LCSD for batch 1683555	65
428197001	B3BBH0	55 *
1203834118	B3BBH0MS	72
1203834119	B3BBH0MSD	66
428197004	B3BBH4	67

Surrogate		Acceptance Limits
OTP	= o-Terphenyl	(60%-140%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: August 4, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428482**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics										
Batch 1685897										
QC1203839792 LCS										
Diesel Range Organics	66600		B	46500	UG/KG		70	(70%-130%)	LXA1	07/28/17 13:54
Motor Oil	66600		B	52300	UG/KG		79	(70%-130%)		
**o-Terphenyl	666			456	UG/KG		69	(60%-140%)		
QC1203839795 LCS										
Kerosene	33300		B	20700	UG/KG		62*	(70%-130%)		07/28/17 14:33
**o-Terphenyl	667			415	UG/KG		62	(60%-140%)		
QC1203839796 LCSD										
Kerosene	33300		B	21100	UG/KG	2	63*	(0%-30%)		07/28/17 15:13
**o-Terphenyl	666			393	UG/KG		59*	(60%-140%)		
QC1203839791 MB										
Diesel Range Organics			J	2820	UG/KG					07/28/17 13:15
Kerosene			J	2810	UG/KG					
Motor Oil			J	2610	UG/KG					
**o-Terphenyl	667			470	UG/KG		71	(60%-140%)		
QC1203839793 428482003 MS										
Diesel Range Organics	69400 U	2260	B	50000	UG/KG		72	(70%-130%)		07/28/17 17:49

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1685897											
Motor Oil	69400	BJ	4560	B	55300	UG/KG		73	(70%-130%)	LXA1	07/28/17 17:49
**o-Terphenyl	694		404		451	UG/KG		65	(60%-140%)		
QC1203839794 428482003 MSD											
Diesel Range Organics	69400	U	2260	B	53000	UG/KG	6	76	(0%-30%)		07/28/17 18:29
Motor Oil	69400	BJ	4560	B	62700	UG/KG	12	84	(0%-30%)		
**o-Terphenyl	694		404		469	UG/KG		68	(60%-140%)		
Batch 1688122											
QC1203845333 LCS											
Diesel Range Organics	66600			B	46400	UG/KG		70	(70%-130%)	LXA1	08/04/17 10:30
Motor Oil	66600			B	54500	UG/KG		82	(70%-130%)		
**o-Terphenyl	666				462	UG/KG		69	(60%-140%)		
QC1203845336 LCS											
Kerosene	33300			B	27000	UG/KG		81	(70%-130%)		08/04/17 11:09
**o-Terphenyl	666				440	UG/KG		66	(60%-140%)		
QC1203845337 LCSD											
Kerosene	33300			B	19700	UG/KG	31*	59*	(0%-30%)		08/04/17 11:48
**o-Terphenyl	666				355	UG/KG		53*	(60%-140%)		
QC1203845332 MB											
Diesel Range Organics				J	3200	UG/KG					08/04/17 09:50
Kerosene				J	3140	UG/KG					

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Diesel Range Organics											
Batch 1688122											
Motor Oil				J	2940	UG/KG				LXA1	08/04/17 09:50
**o-Terphenyl	667				472	UG/KG		71	(60%-140%)		
QC1203845334 428482003 MS											
Diesel Range Organics	69400	BJX	4110	BX	53500	UG/KG		71	(70%-130%)		08/04/17 14:26
Motor Oil	69400	BX	7280	BX	64600	UG/KG		83	(70%-130%)		
**o-Terphenyl	694		478		492	UG/KG		71	(60%-140%)		
QC1203845335 428482003 MSD											
Diesel Range Organics	69500	BJX	4110	BX	58300	UG/KG	9	78	(0%-30%)		08/04/17 15:05
Motor Oil	69500	BX	7280	BX	72300	UG/KG	11	94	(0%-30%)		
**o-Terphenyl	695		478		528	UG/KG		76	(60%-140%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

FID Diesel Range Organics

Surrogate Recovery Report

SDG Number: GEL428482

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1203839791	MB for batch 1685896	71
1203839792	LCS for batch 1685896	69
1203839795	LCS for batch 1685896	62
1203839796	LCSD for batch 1685896	59 *
428482001	B3BBH8	59 *
428482002	B3BBJ2	49 *
428482003	B3BBK0	58 *
1203839793	B3BBK0MS	65
1203839794	B3BBK0MSD	68
1203845332	MB for batch 1688121	71
1203845333	LCS for batch 1688121	69
1203845336	LCS for batch 1688121	66
1203845337	LCSD for batch 1688121	53 *
428482001	B3BBH8RE	66
428482002	B3BBJ2RE	70
428482003	B3BBK0RE	69
1203845334	B3BBK0REMS	71
1203845335	B3BBK0REMSD	76

Surrogate	Acceptance Limits
OTP = o-Terphenyl	(60%-140%)

* Recovery outside Acceptance Limits
\# Column to be used to flag recovery values
D Sample Diluted

Date: 29 September 2017
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200-EA-I
Subject: Inorganics - Sample Data Groups (SDGs) GEL426775, GEL427585, GEL428015, GEL428197, GEL428313 and GEL428482

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL426775, GEL427585, GEL428015, GEL428197, GEL428313 and GEL428482 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3BBC4	06/29/17	Soil	C	6010D, 6020B, 7471B
B3BBC8	07/11/17	Soil	C	6010D, 6020B, 7471B
B3BBD2	07/11/17	Soil	C	6010D, 6020B, 7471B
B3BBD6	07/11/04	Soil	C	6010D, 6020B, 7471B
B3BBF0	07/13/17	Soil	C	6010D, 6020B, 7471B
B3BBF4	07/13/17	Soil	C	6010D, 6020B, 7471B
B3BBF8	07/13/17	Soil	C	6010D, 6020B, 7471B
B3BBH2	07/17/17	Soil	C	6010D, 6020B, 7471B
B3BBH6	07/17/17	Soil	C	6010D, 6020B, 7471B
B3BBJ0	07/19/17	Soil	C	6010D, 6020B, 7471B
B3BBK2	07/19/17	Soil	C	6010D, 6020B, 7471B
B3BBJ4	07/19/17	Soil	C	6010D, 6020B, 7471B

Data validation was conducted in accordance with the CHPRC validation statement of work and the Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site, DOE/RL-2017-35, Rev. 0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP metals are analysis within 180 days of sample collection, and the holding time requirement for mercury is analysis within 28 days of sample collection. There were no specific preservation requirements for the metals soil sample analysis.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

For SDG GEL426775, the K laboratory blank result was ≥ the method detection limit (MDL) but ≤ the practical quantitation limit (PQL). The K result for sample B3BBC4 was ≥20X the blank value and should not be qualified.

For SDG GEL427585, the Ca and Na laboratory blank results were ≥ MDLs but ≤ the PQLs. The Ca and Na results for samples B3BBC8, B3BBD2 and B3BBD6 were detects ≥20X the blank values and should not be qualified.

For SDG GEL428015, the Na laboratory blank result was ≥ MDL but ≤ the PQL. The Na result for sample B3BBF8 was a detect <20X the blank value and should be qualified as an estimate and flagged "J+." The Na results for samples B3BBF0 and B3BBF4 were detects ≥20X the blank value and should not be qualified.

For SDG GEL428197, the Ca and Zn laboratory blank results were ≥ the MDLs but ≤ the PQLs. The Ca and Zn results for samples B3BBH2 and B3BBH6 were detects >20X the blank values and should not be qualified.

For SDG GEL428313, the Ca and Na laboratory blank results were ≥ the MDLs but ≤ the PQLs. The Ca and Na results for sample B3BBJ0 were detects > 20X the blank values and should not be qualified.

For SDG GEL428482, the Sb laboratory blank result was ≥ the MDL but ≤ the PQL. The Sb result for sample B3BBJ4 was a detect ≥ the MDL but ≤ the PQL and <20X the blank value and should be qualified as an estimate and flagged "J+." The Sb result for sample B3BBK2 as a non-detect and should not be qualified.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample and ICP-AES interference check sample results. According to the SAP, the laboratory control sample accuracy limits are 80% to 120% and the matrix spike sample accuracy limits are 75% to 120%. The interference check sample limits are ones specified by the DV procedure.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG GEL426775, the MS recovery for Se was < the lower acceptance limit but ≥30%. The Se result for sample B3BBC4 was a detect and should be qualified as an estimate and flagged "J-."

For SDG GEL427585, the MS recovery for Se was < the lower acceptance limit ≥ 30%. The Se results for samples B3BBC8, B3BBD2 and B3BBD6 were detects and should be qualified as estimates and flagged "J-."

For SDG GEL420815, the MS recovery for K was < lower acceptance limit but ≥30%. The K results for samples B3BBF0 and B3BBF4 were detects and should be qualified as estimates and flagged "J-." The K result for sample B3BBF8 was a non-detect and should be qualified as an estimate and flagged "UJ."

For SDG GEL428313, the MS recoveries for Ba, Mn and K were > the upper acceptance limit. The Ba, Mn and K results for sample B3BBJ0 were detects and should be qualified as estimates and flagged "J+."

For SDG GEL428482, the MS recovery for Ba was > the upper acceptance limit. The Ba results for samples B3BBK2 and B3BBJ4 were detects and should be qualified as estimates and flagged "J+."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate sample results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable with the following exceptions.

For SDG GEL428197, the RPD for Ca was above the upper limit. The Ca results for samples B3BBH2 and B3BBH6 were detects and should be qualified as estimates and flagged "J."

For SDG GEL428313, the RPDs for Cr, K and Na were above the upper limit. The Cr, K and Na results for sample B3BBJ0 were detects and should be qualified as estimates and flagged "J."

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDGs GEL426775, GEL427585, GEL428015, GEL428197, GEL428313 and GEL428482 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to laboratory blanks, matrix spike and duplicate precision infractions. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

DOE/RL-2017-35, Rev. 0, *Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site*, June 2017.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Inorganic Data Qualification Summary			
SDG: GEL426775, GEL427585, GEL428015, GEL428197, GEL428313, GEL428482	Reviewer: AQA	Project: 200-EA-1	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Na	J+	B3BBF8	Laboratory blank contamination
Sb	J+	B3BBJ4	Laboratory blank contamination
Se	J-	B3BBC4, B3BBC8, B3BBD2, B3BBD6	Low matrix spike recovery
K	J-	B3BBF0, B3BBF4	Low matrix spike recovery
K	UJ	B3BBF8	Low matrix spike recovery
Ba, Mn	J+	B3BBJ0	High matrix spike recovery
Ba	J+	B3BBK2, B3BBJ4	High matrix spike recovery
Ca	J	B3BBH2, B3BBH6	Poor duplicate precision
Cr, Na	J	B3BBJ0	Poor duplicate precision
K	J+	B3BBJ0	High matrix spike recovery, poor duplicate precision

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200-EA-1			DATA PACKAGE: VSR17-012		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 09/29/17	
			SDG: GEL426775, GEL427585, GEL428015, GEL428197, GEL428313, GEL428482		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X	SW-846 Cyanide	SW-846/ICPMS X	
SAMPLES/MATRIX Soil					
GEL426775: B3BBC4					
GEL427585: B3BBC8, B3BBD2, B3BBD6					
GEL428015: B3BBF0, B3BBF4, B3BBF8					
GEL428197: B3BBH2, B3BBH6					
GEL428313: B3BBJ0			GEL 428482: B3BBK2, B3BBJ4		

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes (No) N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. **INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)**

Initial calibrations performed on all instruments?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
ICP interference checks acceptable?	Yes No (N/A)
ICV and CCV checks performed on all instruments?	Yes No (N/A)
ICV and CCV checks acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. **BLANKS (Levels B, C, D, and E)**

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

GEL426775: K 6060 ug/kg

GEL427585: Ca 8540 ug/kg, Na 8400 ug/kg

Continue on last page

Appendix A - (Cont.) Chemical Data Validation Checklist

4. **ACCURACY (Levels C, D, and E)**

MS/MSD samples analyzed?	(Yes) No N/A
MS/MSD results acceptable?	Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/BSS samples analyzed?	(Yes) No N/A
LCS/BSS results acceptable?	(Yes) No N/A
Standards traceable? (Levels D, E)	Yes No (N/A)
Standards expired? (Levels D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

GEL426775: MS Se 74%; Ca, Fe, Mg, Mn results >4X spike concentration

GEL427585: MS Se 70%; Ca, Fe, Mg, Mn results >4X spike concentration

GEL428015: MS K 52%; Ca, Fe, Mg, Mn results >4X spike concentration

GEL428197: Ca, Fe, Mg, Mn results >4X spike concentration

GEL428313: MS Ba 138%, Mn 180%, K 134%; Ca, Fe, Mg results >4X spike concentration

GEL428482: MS Ba 128%; Ca, Fe, Mg, Mn results >4X spike concentration

Appendix A - (Cont.) Chemical Data Validation Checklist

5. **PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable?	Yes (No) N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

GEL428197: RPD Ca 38%

GEL428313: RPDs Cr 38%, K 55%, Na 57%

Appendix A - (Cont.) Chemical Data Validation Checklist

6. **ICP QUALITY CONTROL (Levels D and E)**

ICP serial dilution samples analyzed?	Yes No (N/A)
ICP serial dilution %D values acceptable?	Yes No (N/A)
ICP post digestion spike required?	Yes No (N/A)
ICP post digestion spike values acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Transcription/calculation errors?	Yes No (N/A)

Comments:

7. **HOLDING TIMES (all levels)**

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

8. **RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	(Yes) No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments (attach additional sheets as necessary):

Blanks

GEL428015: Na 10300 ug/kg

GEL428197: Ca 15200 ug/kg, Zn 478 ug/kg

GEL428313: Ca 10900 ug/kg, Na 10000 ug/kg

GEL428482: Sb 373 ug/kg

Appendix 4

Additional Documentation Requested By Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 13, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **426775**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1678808											
QC1203822716 426775002 DUP											
Arsenic		D	2350	D	2350	ug/kg	0.139 ^		(+/-994)	PRB	07/08/17 00:34
Molybdenum		D	455	D	394	ug/kg	14.3 ^		(+/-199)		
Selenium		DN	1100	D	1080	ug/kg	1.87 ^		(+/-994)		
QC1203822715 LCS											
Arsenic	4890			D	4850	ug/kg		99.1	(80%-120%)		07/08/17 00:25
Molybdenum	4890			D	5280	ug/kg		108	(80%-120%)		
Selenium	4890			D	4110	ug/kg		84	(80%-120%)		
QC1203822714 MB											
Arsenic				DU	315	ug/kg					07/08/17 00:22
Molybdenum				DU	74.5	ug/kg					
Selenium				DU	335	ug/kg					
QC1203822717 426775002 MS											
Arsenic	5090	D	2350	D	6500	ug/kg		81.5	(75%-125%)		07/08/17 00:37
Molybdenum	5090	D	455	D	5210	ug/kg		93.4	(75%-125%)		
Selenium	5090	DN	1100	DN	4860	ug/kg		73.8 *	(75%-125%)		

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QC Summary

Workorder: 426775

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1678808											
QC1203825551 426775002 PS											
Selenium	25.0	DN	5.25	D	25.8	ug/L		82.3	(75%-125%)	PRB	07/08/17 00:40
QC1203822718 426775002 SDILT											
Arsenic		D	11.2	BD	2.79	ug/L	24.5		(0%-10%)		07/08/17 00:44
Molybdenum		D	2.17	BD	0.419	ug/L	3.32		(0%-10%)		
Selenium		DN	5.25	DU	1890	ug/L	N/A		(0%-10%)		
Metals Analysis-ICP											
Batch 1678798											
QC1203822691 426775002 DUP											
Antimony		DU	1730	DU	1640	ug/kg	N/A			HSC	07/10/17 14:29
Barium			97000		108000	ug/kg	10.6		(0%-35%)		07/06/17 14:55
Beryllium			1380		1350	ug/kg	2.27 ^		(+/-497)		
Cadmium		DU	525	DU	497	ug/kg	N/A				07/10/17 14:29
Calcium			10600000		10400000	ug/kg	2.68		(0%-35%)		07/06/17 14:55
Chromium			5940		5320	ug/kg	11		(0%-35%)		
Cobalt		D	9410	D	9100	ug/kg	3.29 ^		(+/-2480)		07/10/17 14:29
Copper			14600		15200	ug/kg	4.2		(0%-35%)		07/06/17 14:55
Iron			31300000		31600000	ug/kg	1.01		(0%-35%)		
Lead		BD	-2730	BD	-3420	ug/kg	22.7 ^		(+/-4970)		07/10/17 14:29

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QC Summary

Workorder: 426775

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1678798											
Magnesium			4570000		4380000	ug/kg	4.24		(0%-35%)	HSC	07/06/17 14:55
Manganese			397000		381000	ug/kg	4.08		(0%-35%)		
Nickel			5670		5610	ug/kg	1.02		(0%-35%)		
Potassium			908000		801000	ug/kg	12.6		(0%-35%)		
Silver		B	-370	B	-404	ug/kg	8.7 ^		(+/-497)		
Vanadium		D	119000	D	113000	ug/kg	5.06		(0%-35%)		07/10/17 14:29
Zinc		D	66800	D	56200	ug/kg	17.2		(0%-35%)		
QC1203822690 LCS											
Antimony	48900				48700	ug/kg		99.5	(80%-120%)		07/06/17 14:48
Barium	48900				49500	ug/kg		101	(80%-120%)		
Beryllium	48900				50100	ug/kg		103	(80%-120%)		
Cadmium	48900				50200	ug/kg		103	(80%-120%)		
Calcium	489000				516000	ug/kg		105	(80%-120%)		
Chromium	48900				50000	ug/kg		102	(80%-120%)		
Cobalt	48900				50300	ug/kg		103	(80%-120%)		
Copper	48900				49100	ug/kg		100	(80%-120%)		

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QC Summary

Workorder: 426775

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1678798										
Iron	489000			486000	ug/kg		99.4	(80%-120%)	HSC	07/06/17 14:48
Lead	48900			49600	ug/kg		101	(80%-120%)		
Magnesium	489000			515000	ug/kg		105	(80%-120%)		
Manganese	48900			49300	ug/kg		101	(80%-120%)		
Nickel	48900			50900	ug/kg		104	(80%-120%)		
Potassium	489000			511000	ug/kg		105	(80%-120%)		
Silver	48900			48200	ug/kg		98.6	(80%-120%)		
Vanadium	48900			48700	ug/kg		99.6	(80%-120%)		
Zinc	48900			48000	ug/kg		98.2	(80%-120%)		
QC1203822689 MB										
Antimony			U	307	ug/kg					07/06/17 14:45
Barium			U	93.1	ug/kg					
Beryllium			U	93.1	ug/kg					
Cadmium			U	93.1	ug/kg					
Calcium			U	7450	ug/kg					
Chromium			U	140	ug/kg					

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QC Summary

Workorder: 426775

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1678798											
Cobalt				U	140	ug/kg				HSC	07/06/17 14:45
Copper				U	279	ug/kg					
Iron				U	7450	ug/kg					
Lead				U	307	ug/kg					
Magnesium				U	7910	ug/kg					
Manganese				U	186	ug/kg					
Nickel				U	140	ug/kg					
Potassium				B	6060	ug/kg					
Silver				U	93.1	ug/kg					
Vanadium				U	93.1	ug/kg					
Zinc				U	372	ug/kg					
QC1203822692 426775002 MS											
Antimony	50900	DU	1730	D	45800	ug/kg		89	(75%-125%)		07/10/17 14:32
Barium	50900		97000		140000	ug/kg		83.5	(75%-125%)		07/06/17 14:58
Beryllium	50900		1380		50900	ug/kg		97.2	(75%-125%)		
Cadmium	50900	DU	525	D	52200	ug/kg		103	(75%-125%)		07/10/17 14:32

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QC Summary

Workorder: 426775

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1678798											
Calcium	509000		10600000		13900000	ug/kg		N/A	(75%-125%)	HSC	07/06/17 14:58
Chromium	50900		5940		53700	ug/kg		93.7	(75%-125%)		
Cobalt	50900	D	9410	D	63300	ug/kg		106	(75%-125%)		07/10/17 14:32
Copper	50900		14600		66100	ug/kg		101	(75%-125%)		07/06/17 14:58
Iron	509000		31300000		32000000	ug/kg		N/A	(75%-125%)		
Lead	50900	BD	-2730	D	49800	ug/kg		97.8	(75%-125%)		07/10/17 14:32
Magnesium	509000		4570000		5070000	ug/kg		N/A	(75%-125%)		07/06/17 14:58
Manganese	50900		397000		478000	ug/kg		N/A	(75%-125%)		
Nickel	50900		5670		53500	ug/kg		93.8	(75%-125%)		
Potassium	509000		908000		1350000	ug/kg		86.6	(75%-125%)		
Silver	50900	B	-370		52600	ug/kg		103	(75%-125%)		
Vanadium	50900	D	119000	D	173000	ug/kg		105	(75%-125%)		07/10/17 14:32
Zinc	50900	D	66800	D	114000	ug/kg		92	(75%-125%)		
QC1203822693 426775002 SDILT											
Antimony		DU	0.865	BD	-4.58	ug/L	N/A		(0%-10%)		07/10/17 14:35
Barium			925	D	192	ug/L	4.03		(0%-10%)		07/06/17 15:05

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QC Summary

Workorder: 426775

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1678798										
Beryllium		13.1	BD	2.65	ug/L	1.16		(0%-10%)	HSC	07/06/17 15:05
Cadmium	DU	-0.389	DU	2620	ug/L	N/A		(0%-10%)		07/10/17 14:35
Calcium		101000	D	21100	ug/L	3.96		(0%-10%)		07/06/17 15:05
Chromium		56.6	D	11.7	ug/L	3.53		(0%-10%)		
Cobalt	D	17.9	BD	3.72	ug/L	3.73		(0%-10%)		07/10/17 14:35
Copper		139	D	27.7	ug/L	.328		(0%-10%)		07/06/17 15:05
Iron		298000	D	63800	ug/L	6.99		(0%-10%)		
Lead	BD	-5.2	DU	8650	ug/L	N/A		(0%-10%)		07/10/17 14:35
Magnesium		43600	D	9110	ug/L	4.59		(0%-10%)		07/06/17 15:05
Manganese		3780	D	807	ug/L	6.67		(0%-10%)		
Nickel		54.1	D	11.5	ug/L	6.01		(0%-10%)		
Potassium		8660	D	1780	ug/L	2.7		(0%-10%)		
Silver	B	-3.53	DU	525	ug/L	N/A		(0%-10%)		
Vanadium	D	227	D	45.5	ug/L	.0769		(0%-10%)		07/10/17 14:35
Zinc	D	127	D	28.4	ug/L	11.5		(0%-10%)		

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QC Summary

Workorder: 426775

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1681846											
QC1203822691 426775002 DUP											
Sodium			243000		237000	ug/kg	2.68		(0%-35%)	HSC	07/13/17 09:08
QC1203829763 LCS											
Sodium	457000				482000	ug/kg		106	(80%-120%)		07/13/17 09:01
QC1203829762 MB											
Sodium				U	6900	ug/kg					07/13/17 08:58
QC1203822692 426775002 MS											
Sodium	512000		243000		758000	ug/kg		100	(75%-125%)		07/13/17 09:11
QC1203822693 426775002 SDILT											
Sodium			2410	D	677	ug/L	40.4		(0%-10%)		07/13/17 09:14
Metals Analysis-Mercury											
Batch 1679480											
QC1203824105 426775002 DUP											
Mercury		B	5.99	B	4.18	ug/kg	35.5 ^		(+/-11.6)	MTM1	07/05/17 11:25
QC1203824101 LCS											
Mercury	103				103	ug/kg		99.1	(80%-120%)		07/05/17 11:05
QC1203824100 MB											
Mercury				U	3.96	ug/kg					07/05/17 11:03
QC1203824106 426775002 MS											
Mercury	124	B	5.99		132	ug/kg		101	(75%-125%)		07/05/17 11:27
QC1203824107 426775002 SDILT											
Mercury		B	0.108	DU	18.6	ug/L	N/A		(0%-10%)		07/05/17 11:28

Notes:

The Qualifiers in this report are defined as follows:

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 26, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **427585**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1681620											
QC1203829246 427585002 DUP											
Arsenic		D	1700	D	1670	ug/kg	2.1 ^		(+/-1010)	BAJ	07/19/17 20:07
Molybdenum		D	351	D	342	ug/kg	2.6 ^		(+/-202)		
Selenium		BDN	766	BD	777	ug/kg	1.51 ^		(+/-1010)		
QC1203829245 LCS											
Arsenic	4750			D	4360	ug/kg		91.8	(80%-120%)		07/19/17 20:00
Molybdenum	4750			D	4680	ug/kg		98.5	(80%-120%)		
Selenium	4750			D	4150	ug/kg		87.2	(80%-120%)		
QC1203829244 MB											
Arsenic				DU	337	ug/kg					07/19/17 19:57
Molybdenum				DU	79.7	ug/kg					
Selenium				DU	359	ug/kg					
QC1203829247 427585002 MS											
Arsenic	4820	D	1700	D	7110	ug/kg		112	(75%-125%)		07/19/17 20:10
Molybdenum	4820	D	351	D	4750	ug/kg		91.4	(75%-125%)		
Selenium	4820	BDN	766	DN	4130	ug/kg		69.8 *	(75%-125%)		

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QC Summary

Workorder: 427585

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1681620											
QC1203834556 427585002 PS											
Selenium	25.0	BDN	3.72	D	26.4	ug/L		90.6	(75%-125%)	BAJ	07/19/17 20:14
QC1203829248 427585002 SDILT											
Arsenic		D	8.26	BD	1.69	ug/L	2.43		(0%-10%)		07/19/17 20:17
Molybdenum		D	1.70	DU	412	ug/L	N/A		(0%-10%)		
Selenium		BDN	3.72	DU	1850	ug/L	N/A		(0%-10%)		
Metals Analysis-ICP											
Batch 1681607											
QC1203829205 427585002 DUP											
Antimony		DU	1590	BD	1790	ug/kg	251 ^		(+/-4910)	HSC	07/20/17 18:42
Barium			72100		86600	ug/kg	18.2		(0%-35%)		07/17/17 14:10
Beryllium			1380		1420	ug/kg	2.46 ^		(+/-491)		
Cadmium		DU	482	DU	491	ug/kg	N/A				07/20/17 18:42
Calcium			10500000		11300000	ug/kg	6.98		(0%-35%)	TXT1	07/20/17 12:38
Chromium			5340		4920	ug/kg	8.11		(0%-35%)	HSC	07/17/17 14:10
Cobalt		D	11600	D	11800	ug/kg	1.33 ^		(+/-2450)		07/20/17 18:42
Copper			14400		14500	ug/kg	0.833		(0%-35%)		07/17/17 14:10
Iron			32700000		33100000	ug/kg	1.05		(0%-35%)		
Lead		BD	-4620	BD	-4860	ug/kg	5.06 ^		(+/-4910)		07/20/17 18:42

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2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 427585

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1681607											
Magnesium			4120000		3780000	ug/kg	8.64		(0%-35%)	HSC	07/17/17 14:10
Manganese		*	413000	*	546000	ug/kg	27.7		(0%-35%)		
Nickel			6640		6960	ug/kg	4.7		(0%-35%)		
Potassium			719000		682000	ug/kg	5.34		(0%-35%)		
Silver			634		632	ug/kg	0.374 ^		(+/-491)		
Sodium			390000		355000	ug/kg	9.53		(0%-35%)	TXT1	07/20/17 12:38
Vanadium		D	109000	D	111000	ug/kg	1.59		(0%-35%)	HSC	07/20/17 18:42
Zinc		D	51000	D	48700	ug/kg	4.63		(0%-35%)		
QC1203829204 LCS											
Antimony	48900				50200	ug/kg		103	(80%-120%)		07/17/17 14:03
Barium	48900				50300	ug/kg		103	(80%-120%)		
Beryllium	48900				50800	ug/kg		104	(80%-120%)		
Cadmium	48900				46200	ug/kg		94.5	(80%-120%)		07/20/17 18:35
Calcium	489000				505000	ug/kg		103	(80%-120%)	TXT1	07/20/17 12:34
Chromium	48900				50100	ug/kg		102	(80%-120%)	HSC	07/17/17 14:03
Cobalt	48900				50700	ug/kg		104	(80%-120%)		

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QC Summary

Workorder: 427585

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1681607										
Iron	489000			506000	ug/kg		103	(80%-120%)	HSC	07/17/17 14:03
Lead	48900			46100	ug/kg		94.3	(80%-120%)		07/20/17 18:35
Magnesium	489000			521000	ug/kg		107	(80%-120%)		07/17/17 14:03
Manganese	48900			50500	ug/kg		103	(80%-120%)		
Nickel	48900			51100	ug/kg		104	(80%-120%)		
Potassium	489000			515000	ug/kg		105	(80%-120%)		
Silver	48900			49000	ug/kg		100	(80%-120%)		
Sodium	489000			498000	ug/kg		102	(80%-120%)	TXT1	07/20/17 12:34
Vanadium	48900			47000	ug/kg		96.2	(80%-120%)	HSC	07/20/17 18:35
Zinc	48900			46100	ug/kg		94.3	(80%-120%)		
QC1203829203 MB										
Antimony			U	310	ug/kg					07/20/17 18:32
Barium			U	94.0	ug/kg					07/17/17 14:00
Beryllium			U	94.0	ug/kg					
Cadmium			U	94.0	ug/kg					07/20/17 18:32
Calcium			B	8540	ug/kg				TXT1	07/20/17 12:31

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QC Summary

Workorder: 427585

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1681607											
Chromium				U	141	ug/kg				HSC	07/17/17 14:00
Cobalt				U	141	ug/kg					07/20/17 18:32
Copper				U	282	ug/kg					07/17/17 14:00
Iron				U	7520	ug/kg					
Lead				U	310	ug/kg					07/20/17 18:32
Magnesium				U	7990	ug/kg					07/17/17 14:00
Manganese				U	188	ug/kg					
Nickel				U	141	ug/kg					
Potassium				U	6020	ug/kg					
Silver				U	94.0	ug/kg					
Sodium				B	8400	ug/kg				TXT1	07/20/17 12:31
Vanadium				U	94.0	ug/kg				HSC	07/20/17 18:32
Zinc				U	376	ug/kg					
QC1203829206 427585002 MS											
Antimony	50400	DU	1590	D	42700	ug/kg		84.7	(75%-125%)		07/20/17 18:45
Barium	50400		72100		126000	ug/kg		107	(75%-125%)		07/17/17 14:13

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QC Summary

Workorder: **427585**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1681607											
Beryllium	50400		1380		51000	ug/kg		98.4	(75%-125%)	HSC	07/17/17 14:13
Cadmium	50400	DU	482	D	46600	ug/kg		91.5	(75%-125%)		07/20/17 18:45
Calcium	504000		10500000		11400000	ug/kg		N/A	(75%-125%)	TXT1	07/20/17 12:40
Chromium	50400		5340		52200	ug/kg		93	(75%-125%)	HSC	07/17/17 14:13
Cobalt	50400	D	11600	D	60700	ug/kg		97.4	(75%-125%)		07/20/17 18:45
Copper	50400		14400		66500	ug/kg		103	(75%-125%)		07/17/17 14:13
Iron	504000		32700000		33600000	ug/kg		N/A	(75%-125%)		
Lead	50400	BD	-4620	D	43700	ug/kg		86.8	(75%-125%)		07/20/17 18:45
Magnesium	504000		4120000		4470000	ug/kg		N/A	(75%-125%)		07/17/17 14:13
Manganese	50400	*	413000		443000	ug/kg		N/A	(75%-125%)		
Nickel	50400		6640		54000	ug/kg		93.9	(75%-125%)		
Potassium	504000		719000		1270000	ug/kg		109	(75%-125%)		
Silver	50400		634		49700	ug/kg		97.3	(75%-125%)		
Sodium	504000		390000		1020000	ug/kg		124	(75%-125%)	TXT1	07/20/17 12:40
Vanadium	50400	D	109000	D	161000	ug/kg		104	(75%-125%)	HSC	07/20/17 18:45

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QC Summary

Workorder: **427585**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1681607											
Zinc	50400	D	51000	D	100000	ug/kg		97.3	(75%-125%)	HSC	07/20/17 18:45
QC1203829207 427585002 SDILT											
Antimony		DU	-0.42	DU	7950	ug/L	N/A		(0%-10%)		07/20/17 18:52
Barium			748	D	160	ug/L	6.64		(0%-10%)		07/17/17 14:20
Beryllium			14.3	BD	3.17	ug/L	10.6		(0%-10%)		
Cadmium		DU	0.867	DU	2410	ug/L	N/A		(0%-10%)		07/20/17 18:52
Calcium			109000	D	23000	ug/L	5.37		(0%-10%)	TXT1	07/20/17 12:43
Chromium			55.4	D	11.4	ug/L	2.76		(0%-10%)	HSC	07/17/17 14:20
Cobalt		D	24.2	BD	4.94	ug/L	2.21		(0%-10%)		07/20/17 18:52
Copper			149	D	30.3	ug/L	1.34		(0%-10%)		07/17/17 14:20
Iron			340000	D	73400	ug/L	8.09		(0%-10%)		
Lead		BD	-9.59	DU	7950	ug/L	N/A		(0%-10%)		07/20/17 18:52
Magnesium			42800	D	9180	ug/L	7.29		(0%-10%)		07/17/17 14:20
Manganese		*	4290	D	943	ug/L	10		(0%-10%)		
Nickel			68.9	D	15.3	ug/L	10.9		(0%-10%)		
Potassium			7460	D	1570	ug/L	5.41		(0%-10%)		

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QC Summary

Workorder: 427585

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1681607											
Silver			6.58	BD	2.03	ug/L	54.3		(0%-10%)	HSC	07/17/17 14:20
Sodium			4050	D	631	ug/L	22		(0%-10%)	TXT1	07/20/17 12:43
Vanadium		D	226	D	44.9	ug/L	.775		(0%-10%)	HSC	07/20/17 18:52
Zinc		D	106	D	25.9	ug/L	22.2		(0%-10%)		
Metals Analysis-Mercury											
Batch 1681565											
QC1203829073 427585002 DUP											
Mercury		B	3.63	U	3.91	ug/kg	2.02 ^		(+/-11.7)	MTM1	07/13/17 10:56
QC1203829068 LCS											
Mercury	111				115	ug/kg		103	(80%-120%)		07/13/17 10:28
QC1203829067 MB											
Mercury				U	3.51	ug/kg					07/13/17 10:26
QC1203829074 427585002 MS											
Mercury	112	B	3.63		115	ug/kg		99.1	(75%-125%)		07/13/17 10:58
QC1203829075 427585002 SDILT											
Mercury		B	0.067	DU	18.2	ug/L	N/A		(0%-10%)		07/13/17 10:59

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.

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QC Summary

Report Date: July 28, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428015**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1682660											
QC1203831762 428015007 DUP											
Arsenic		D	2220	D	2080	ug/kg	6.58 ^		(+/-966)	BAJ	07/19/17 20:43
Molybdenum		D	235	D	224	ug/kg	4.97 ^		(+/-193)		
Selenium		BD	476	BD	438	ug/kg	8.3 ^		(+/-966)		
QC1203831761 LCS											
Arsenic	4840			D	4450	ug/kg		92	(80%-120%)		07/19/17 20:36
Molybdenum	4840			D	4990	ug/kg		103	(80%-120%)		
Selenium	4840			D	4160	ug/kg		86	(80%-120%)		
QC1203831760 MB											
Arsenic				DU	316	ug/kg					07/19/17 20:33
Molybdenum				DU	74.8	ug/kg					
Selenium				DU	336	ug/kg					
QC1203831763 428015007 MS											
Arsenic	4770	D	2220	D	6320	ug/kg		86	(75%-125%)		07/19/17 20:46
Molybdenum	4770	D	235	D	4940	ug/kg		98.6	(75%-125%)		
Selenium	4770	BD	476	D	4450	ug/kg		83.4	(75%-125%)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1682660											
QC1203831764 428015007 SDILT											
Arsenic		D	11.8	BD	2.68	ug/L	13.9		(0%-10%)	BAJ	07/19/17 20:53
Molybdenum		D	1.25	DU	377	ug/L	N/A		(0%-10%)		
Selenium		BD	2.52	DU	1700	ug/L	N/A		(0%-10%)		
Batch 1683968											
QC1203835093 428015009 DUP											
Arsenic		D	1950	D	2060	ug/kg	5.45 ^		(+/-959)	BAJ	07/26/17 20:19
Molybdenum		D	216	D	220	ug/kg	1.93 ^		(+/-192)		
Selenium		BD	441	BD	532	ug/kg	18.6 ^		(+/-959)		07/27/17 09:42
QC1203835092 LCS											
Arsenic	4890			D	4270	ug/kg		87.3	(80%-120%)		07/26/17 20:12
Molybdenum	4890			D	4560	ug/kg		93.2	(80%-120%)		
Selenium	4890			D	3920	ug/kg		80.2	(80%-120%)		07/27/17 09:39
QC1203835091 MB											
Arsenic				DU	328	ug/kg					07/26/17 20:09
Molybdenum				DU	77.5	ug/kg					
Selenium				DU	349	ug/kg					07/27/17 09:37
QC1203835094 428015009 MS											
Arsenic	4870	D	1950	D	6560	ug/kg		94.8	(75%-125%)		07/26/17 20:22
Molybdenum	4870	D	216	D	4490	ug/kg		87.8	(75%-125%)		

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QC Summary

Workorder: **428015**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1683968											
Selenium	4870	BD	441	D	4310	ug/kg		79.5	(75%-125%)	BAJ	07/27/17 09:44
QC1203835095 428015009 SDILT											
Arsenic		D	10.0	BD	2.12	ug/L	5.63		(0%-10%)		07/26/17 20:28
Molybdenum		D	1.11	DU	390	ug/L	N/A		(0%-10%)		
Selenium		BD	2.26	DU	1760	ug/L	N/A		(0%-10%)		07/27/17 09:47
Metals Analysis-ICP											
Batch 1682648											
QC1203831732 428015007 DUP											
Antimony		BD	2740	BD	1840	ug/kg	38.9 ^		(+/-4660)	HSC	07/24/17 11:18
Barium			71300		68600	ug/kg	3.8		(0%-35%)		07/21/17 13:39
Beryllium			693		645	ug/kg	7.21 ^		(+/-466)		
Cadmium		DU	496	DU	466	ug/kg	N/A				07/24/17 11:18
Calcium		*	7190000	*	9240000	ug/kg	24.9		(0%-35%)		07/27/17 07:47
Chromium			7870		6490	ug/kg	19.2		(0%-35%)		07/21/17 13:39
Cobalt		D	6010	D	5540	ug/kg	8.07 ^		(+/-2330)		07/24/17 11:18
Copper			9560		10700	ug/kg	11.4		(0%-35%)		07/21/17 13:39
Iron			18300000		16300000	ug/kg	11.7		(0%-35%)		
Lead		B	-723	B	-937	ug/kg	25.9 ^		(+/-933)		

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1682648											
Magnesium			4120000		3950000	ug/kg	4.23		(0%-35%)	HSC	07/27/17 07:47
Manganese			255000		243000	ug/kg	4.84		(0%-35%)		07/21/17 13:39
Nickel			7010		6010	ug/kg	15.5		(0%-35%)		
Potassium		N	1170000		1030000	ug/kg	12.5		(0%-35%)		
Silver		B	-231	B	-264	ug/kg	13.1 ^		(+/-466)		
Sodium			318000		261000	ug/kg	19.7		(0%-35%)		07/27/17 07:47
Vanadium		D	49900	D	42400	ug/kg	16.3		(0%-35%)		07/24/17 11:18
Zinc		D	31600	D	27800	ug/kg	12.7		(0%-35%)		
QC1203831731 LCS											
Antimony	48600				44700	ug/kg		91.9	(80%-120%)		07/24/17 11:12
Barium	48600				48300	ug/kg		99.4	(80%-120%)		07/21/17 13:32
Beryllium	48600				48500	ug/kg		99.8	(80%-120%)		
Cadmium	48600				45800	ug/kg		94.1	(80%-120%)		07/24/17 11:12
Calcium	486000				507000	ug/kg		104	(80%-120%)		07/27/17 07:41
Chromium	48600				48400	ug/kg		99.4	(80%-120%)		07/21/17 13:32
Cobalt	48600				45800	ug/kg		94.1	(80%-120%)		07/24/17 11:12

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QC Summary

Workorder: **428015**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1682648										
Copper	48600			48800	ug/kg		100	(80%-120%)	HSC	07/21/17 13:32
Iron	486000			489000	ug/kg		100	(80%-120%)		
Lead	48600			47400	ug/kg		97.5	(80%-120%)		
Magnesium	486000			510000	ug/kg		105	(80%-120%)		07/27/17 07:41
Manganese	48600			48000	ug/kg		98.7	(80%-120%)		07/21/17 13:32
Nickel	48600			48400	ug/kg		99.6	(80%-120%)		
Potassium	486000			498000	ug/kg		102	(80%-120%)		
Silver	48600			50600	ug/kg		104	(80%-120%)		
Sodium	486000			476000	ug/kg		97.9	(80%-120%)		07/27/17 07:41
Vanadium	48600			44900	ug/kg		92.3	(80%-120%)		07/24/17 11:12
Zinc	48600			44100	ug/kg		90.6	(80%-120%)		
QC1203831730 MB										
Antimony			U	307	ug/kg					07/24/17 11:08
Barium			U	93.1	ug/kg					07/21/17 13:29
Beryllium			U	93.1	ug/kg					
Cadmium			U	93.1	ug/kg					07/24/17 11:08

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1682648											
Calcium				U	7450	ug/kg				HSC	07/27/17 07:37
Chromium				U	140	ug/kg					07/21/17 13:29
Cobalt				U	140	ug/kg					07/24/17 11:08
Copper				U	279	ug/kg					07/21/17 13:29
Iron				U	7450	ug/kg					
Lead				U	307	ug/kg					
Magnesium				U	7910	ug/kg					07/27/17 07:37
Manganese				U	186	ug/kg					07/21/17 13:29
Nickel				U	140	ug/kg					
Potassium				U	5960	ug/kg					
Silver				U	93.1	ug/kg					
Sodium				B	10300	ug/kg					07/27/17 07:37
Vanadium				U	93.1	ug/kg					07/24/17 11:08
Zinc				U	372	ug/kg					
QC1203831733 428015007 MS											
Antimony	49100	BD	2740	D	46300	ug/kg		88.8	(75%-125%)		07/24/17 11:21

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QC Summary

Workorder: **428015**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1682648											
Barium	49100		71300		132000	ug/kg		124	(75%-125%)	HSC	07/21/17 13:42
Beryllium	49100		693		47900	ug/kg		96.3	(75%-125%)		
Cadmium	49100	DU	496	D	45900	ug/kg		93.3	(75%-125%)		07/24/17 11:21
Calcium	491000	*	7190000		7850000	ug/kg		N/A	(75%-125%)		07/27/17 07:51
Chromium	49100		7870		52600	ug/kg		91.1	(75%-125%)		07/21/17 13:42
Cobalt	49100	D	6010	D	52900	ug/kg		95.6	(75%-125%)		07/24/17 11:21
Copper	49100		9560		60200	ug/kg		103	(75%-125%)		07/21/17 13:42
Iron	491000		18300000		17300000	ug/kg		N/A	(75%-125%)		
Lead	49100	B	-723		45900	ug/kg		93.5	(75%-125%)		
Magnesium	491000		4120000		3870000	ug/kg		N/A	(75%-125%)		07/27/17 07:51
Manganese	49100		255000		303000	ug/kg		N/A	(75%-125%)		07/21/17 13:42
Nickel	49100		7010		52200	ug/kg		92	(75%-125%)		
Potassium	491000	N	1170000	N	1430000	ug/kg		52.3 *	(75%-125%)		
Silver	49100	B	-231		47400	ug/kg		96.6	(75%-125%)		
Sodium	491000		318000		855000	ug/kg		110	(75%-125%)		07/27/17 07:51

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1682648											
Vanadium	49100	D	49900	D	90800	ug/kg		83.3	(75%-125%)	HSC	07/24/17 11:21
Zinc	49100	D	31600	D	71700	ug/kg		81.8	(75%-125%)		
QC1203835835 428015007 PS											
Potassium	5000	N	11800		16500	ug/L		94	(75%-125%)		07/21/17 13:45
QC1203831734 428015007 SDILT											
Antimony		BD	5.51	DU	8190	ug/L	N/A		(0%-10%)		07/24/17 11:28
Barium			718	D	153	ug/L	6.87		(0%-10%)		07/21/17 13:49
Beryllium			6.98	BD	1.46	ug/L	4.63		(0%-10%)		
Cadmium		DU	0.305	DU	2480	ug/L	N/A		(0%-10%)		07/24/17 11:28
Calcium		*	72400	D	14700	ug/L	1.79		(0%-10%)		07/27/17 07:57
Chromium			79.3	D	16.4	ug/L	3.18		(0%-10%)		07/21/17 13:49
Cobalt		D	12.1	BD	2.52	ug/L	4.08		(0%-10%)		07/24/17 11:28
Copper			96.3	D	19.5	ug/L	1.23		(0%-10%)		07/21/17 13:49
Iron			184000	D	38300	ug/L	3.95		(0%-10%)		
Lead		B	-7.28	DU	1640	ug/L	N/A		(0%-10%)		
Magnesium			41500	D	8410	ug/L	1.3		(0%-10%)		07/27/17 07:57
Manganese			2570	D	556	ug/L	8.25		(0%-10%)		07/21/17 13:49

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1682648											
Nickel			70.7	D	15.4	ug/L	8.86		(0%-10%)	HSC	07/21/17 13:49
Potassium		N	11800	D	2480	ug/L	5.03		(0%-10%)		
Silver		B	-2.33	BD	-1.77	ug/L	-280		(0%-10%)		
Sodium			3200	D	680	ug/L	6.32		(0%-10%)		07/27/17 07:57
Vanadium		D	101	D	19.8	ug/L	1.65		(0%-10%)		07/24/17 11:28
Zinc		D	63.6	D	13.1	ug/L	2.92		(0%-10%)		
Metals Analysis-Mercury											
Batch 1682743											
QC1203831946 428015007 DUP											
Mercury		U	3.65	U	3.95	ug/kg	N/A			MTM1	07/18/17 11:07
QC1203831945 LCS											
Mercury	104				104	ug/kg		100	(80%-120%)		07/18/17 11:00
QC1203831944 MB											
Mercury				U	3.42	ug/kg					07/18/17 10:59
QC1203831947 428015007 MS											
Mercury	103	U	3.65		105	ug/kg		100	(75%-125%)		07/18/17 11:09
QC1203831948 428015007 SDILT											
Mercury		U	0.026	DU	18.2	ug/L	N/A		(0%-10%)		07/18/17 11:11

Notes:

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

\+ Correlation coefficient for Method of Standard Additions (MSA) is < 0.995

GEL LABORATORIES LLC

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QC Summary

Report Date: July 31, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428197**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1683609											
QC1203834231 428201001 DUP											
Arsenic		D	1730	D	1830	ug/kg	5.83 ^		(+/-975)	PRB	07/25/17 11:45
Molybdenum		D	513	D	336	ug/kg	41.7 ^		(+/-195)		07/25/17 00:21
Selenium		BD	672	BD	718	ug/kg	6.68 ^		(+/-975)	BAJ	07/25/17 15:29
QC1203834230 LCS											
Arsenic	4600			D	4230	ug/kg		92.1	(80%-120%)	PRB	07/25/17 11:53
Molybdenum	4600			D	4430	ug/kg		96.4	(80%-120%)		07/25/17 00:09
Selenium	4600			D	4280	ug/kg		93.2	(80%-120%)	BAJ	07/25/17 15:18
QC1203834229 MB											
Arsenic				DU	318	ug/kg				PRB	07/25/17 11:28
Molybdenum				DU	75.2	ug/kg					07/25/17 00:06
Selenium				DU	338	ug/kg				BAJ	07/25/17 15:17
QC1203834232 428201001 MS											
Arsenic	4870	D	1730	D	5890	ug/kg		85.3	(75%-125%)	PRB	07/25/17 11:47
Molybdenum	4870	D	513	D	4980	ug/kg		91.6	(75%-125%)		07/25/17 00:24
Selenium	4870	BD	672	D	4600	ug/kg		80.6	(75%-125%)	BAJ	07/25/17 15:30

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1683609										
QC1203834233 428201001 SDILT										
Arsenic	D	9.00	BD	1.99	ug/L	10.7		(0%-10%)	PRB	07/25/17 11:51
Molybdenum	D	2.67	BD	0.582	ug/L	8.87		(0%-10%)		07/25/17 00:31
Selenium	BD	3.50	DU	1730	ug/L	N/A		(0%-10%)	BAJ	07/25/17 15:34
Metals Analysis-ICP										
Batch 1683638										
QC1203834323 428197003 DUP										
Antimony	DU	1580	DU	1590	ug/kg	N/A			HSC	07/21/17 12:49
Barium		44000		46000	ug/kg	4.47		(0%-35%)		07/21/17 12:00
Beryllium		565		557	ug/kg	1.58 ^		(+/-483)		
Cadmium	DU	480	DU	483	ug/kg	N/A				07/21/17 12:49
Calcium	*C	7720000	*	5270000	ug/kg	37.7*		(0%-35%)		07/21/17 12:00
Chromium		7790		7460	ug/kg	4.29		(0%-35%)		
Cobalt	D	5720	D	5840	ug/kg	2.08 ^		(+/-2410)		07/21/17 12:49
Copper		11100		9840	ug/kg	12.1		(0%-35%)		07/21/17 12:00
Iron		16300000		16100000	ug/kg	0.722		(0%-35%)		
Lead	DU	1580	DU	1590	ug/kg	N/A				07/21/17 12:49
Magnesium		3820000		3360000	ug/kg	12.7		(0%-35%)		07/21/17 12:00

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QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1683638										
Manganese		218000		265000	ug/kg	19.8		(0%-35%)	HSC	07/21/17 12:00
Nickel	*	10100	*	7280	ug/kg	32.6		(0%-35%)		
Potassium		714000		811000	ug/kg	12.8		(0%-35%)		
Silver	U	96.0	U	96.6	ug/kg	N/A				
Sodium		160000		167000	ug/kg	4.09		(0%-35%)		
Vanadium	D	39800	D	40700	ug/kg	2.18		(0%-35%)		07/21/17 12:49
Zinc	D	34900	D	34500	ug/kg	1.08		(0%-35%)		
QC1203834322 LCS										
Antimony	48000			44300	ug/kg		92.4	(80%-120%)		07/21/17 11:54
Barium	48000			45300	ug/kg		94.4	(80%-120%)		
Beryllium	48000			45400	ug/kg		94.6	(80%-120%)		
Cadmium	48000			44800	ug/kg		93.5	(80%-120%)		
Calcium	480000			470000	ug/kg		97.9	(80%-120%)		
Chromium	48000			45400	ug/kg		94.7	(80%-120%)		
Cobalt	48000			45500	ug/kg		94.7	(80%-120%)		
Copper	48000			45300	ug/kg		94.5	(80%-120%)		

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QC Summary

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1683638										
Iron	480000			468000	ug/kg		97.5	(80%-120%)	HSC	07/21/17 11:54
Lead	48000			44000	ug/kg		91.7	(80%-120%)		
Magnesium	480000			474000	ug/kg		98.8	(80%-120%)		
Manganese	48000			44800	ug/kg		93.3	(80%-120%)		
Nickel	48000			45200	ug/kg		94.2	(80%-120%)		
Potassium	480000			459000	ug/kg		95.7	(80%-120%)		
Silver	48000			44600	ug/kg		92.9	(80%-120%)		
Sodium	480000			515000	ug/kg		107	(80%-120%)		
Vanadium	48000			44600	ug/kg		92.9	(80%-120%)		
Zinc	48000			43700	ug/kg		91.1	(80%-120%)		
QC1203834321 MB										
Antimony			U	325	ug/kg					07/21/17 11:50
Barium			U	98.4	ug/kg					
Beryllium			U	98.4	ug/kg					
Cadmium			U	98.4	ug/kg					
Calcium				15200	ug/kg					07/21/17 12:39

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1683638											
Chromium				U	148	ug/kg				HSC	07/21/17 11:50
Cobalt				U	148	ug/kg					
Copper				U	295	ug/kg					
Iron				U	7870	ug/kg					
Lead				U	325	ug/kg					
Magnesium				U	8370	ug/kg					
Manganese				U	197	ug/kg					
Nickel				U	148	ug/kg					
Potassium				U	6300	ug/kg					
Silver				U	98.4	ug/kg					
Sodium				U	6890	ug/kg					
Vanadium				U	98.4	ug/kg					
Zinc				B	478	ug/kg					
QC1203834324 428197003 MS											
Antimony	50500	DU	1580	D	44900	ug/kg		86.3	(75%-125%)		07/21/17 12:52
Barium	50500		44000		91800	ug/kg		94.7	(75%-125%)		07/21/17 12:03

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1683638											
Beryllium	50500		565		48800	ug/kg		95.6	(75%-125%)	HSC	07/21/17 12:03
Cadmium	50500	DU	480	D	49100	ug/kg		96.7	(75%-125%)		07/21/17 12:52
Calcium	505000	*C	7720000		7040000	ug/kg		N/A	(75%-125%)		07/21/17 12:03
Chromium	50500		7790		56000	ug/kg		95.6	(75%-125%)		
Cobalt	50500	D	5720	D	56800	ug/kg		101	(75%-125%)		07/21/17 12:52
Copper	50500		11100		60800	ug/kg		98.5	(75%-125%)		07/21/17 12:03
Iron	505000		16300000		16000000	ug/kg		N/A	(75%-125%)		
Lead	50500	DU	1580	D	50400	ug/kg		100	(75%-125%)		07/21/17 12:52
Magnesium	505000		3820000		4430000	ug/kg		N/A	(75%-125%)		07/21/17 12:03
Manganese	50500		218000		280000	ug/kg		N/A	(75%-125%)		
Nickel	50500	*	10100		54400	ug/kg		87.8	(75%-125%)		
Potassium	505000		714000		1320000	ug/kg		121	(75%-125%)		
Silver	50500	U	96.0		47300	ug/kg		93.6	(75%-125%)		
Sodium	505000		160000		704000	ug/kg		108	(75%-125%)		
Vanadium	50500	D	39800	D	87900	ug/kg		95.3	(75%-125%)		07/21/17 12:52

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1683638											
Zinc	50500	D	34900	D	82600	ug/kg		94.5	(75%-125%)	HSC	07/21/17 12:52
QC1203834325 428197003 SDILT											
Antimony		DU	2.88	DU	7920	ug/L	N/A		(0%-10%)		07/21/17 12:55
Barium			458	D	93.4	ug/L	1.85		(0%-10%)		07/21/17 12:07
Beryllium			5.89	BD	1.49	ug/L	26.5		(0%-10%)		
Cadmium		DU	0.708	DU	2400	ug/L	N/A		(0%-10%)		07/21/17 12:55
Calcium		*C	80400	D	16600	ug/L	3.39		(0%-10%)		07/21/17 12:07
Chromium			81.1	D	17.2	ug/L	5.85		(0%-10%)		
Cobalt		D	11.9	BD	2.85	ug/L	19.4		(0%-10%)		07/21/17 12:55
Copper			116	D	22.4	ug/L	3.33		(0%-10%)		07/21/17 12:07
Iron			169000	D	34100	ug/L	.762		(0%-10%)		
Lead		DU	-2.52	DU	7920	ug/L	N/A		(0%-10%)		07/21/17 12:55
Magnesium			39800	D	8270	ug/L	3.88		(0%-10%)		07/21/17 12:07
Manganese			2270	D	485	ug/L	6.96		(0%-10%)		
Nickel		*	105	D	23.5	ug/L	11.5		(0%-10%)		
Potassium			7430	D	1550	ug/L	4.35		(0%-10%)		

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1683638											
Silver		U	0.068	DU	480	ug/L	N/A		(0%-10%)	HSC	07/21/17 12:07
Sodium			1670	D	418	ug/L	25.3		(0%-10%)		
Vanadium		D	82.9	D	15.7	ug/L	5.24		(0%-10%)		07/21/17 12:55
Zinc		D	72.6	D	19.1	ug/L	31.2		(0%-10%)		
Metals Analysis-Mercury											
Batch 1684344											
QC1203836046 428197003 DUP											
Mercury		B	5.01	B	4.30	ug/kg	15.4 ^		(+/-12.3)	MTM1	07/24/17 10:23
QC1203836045 LCS											
Mercury	118				128	ug/kg		109	(80%-120%)		07/24/17 10:20
QC1203836044 MB											
Mercury				U	3.98	ug/kg					07/24/17 10:18
QC1203836047 428197003 MS											
Mercury	111	B	5.01		123	ug/kg		106	(75%-125%)		07/24/17 10:25
QC1203836048 428197003 SDILT											
Mercury		B	0.088	DU	19.1	ug/L	N/A		(0%-10%)		07/24/17 10:26

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: August 3, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428313**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1683875											
QC1203834889 428313002 DUP											
Arsenic		*BD	679	*D	3230	ug/kg	131*^		(+/-1030)	BAJ	07/26/17 19:17
Molybdenum		D	351	BD	194	ug/kg	57.7 ^		(+/-206)		
Selenium		DU	348	DU	371	ug/kg	N/A				07/27/17 09:11
QC1203834888 LCS											
Arsenic	4690			D	4130	ug/kg		88	(80%-120%)		07/26/17 19:10
Molybdenum	4690			D	4460	ug/kg		95.1	(80%-120%)		
Selenium	4690			D	4110	ug/kg		87.6	(80%-120%)		07/27/17 09:06
QC1203834887 MB											
Arsenic				DU	310	ug/kg					07/26/17 19:07
Molybdenum				DU	73.4	ug/kg					
Selenium				DU	330	ug/kg					07/27/17 09:04
QC1203834890 428313002 MS											
Arsenic	4880	*BD	679	D	4780	ug/kg		83.9	(75%-125%)		07/26/17 19:20
Molybdenum	4880	D	351	D	5010	ug/kg		95.5	(75%-125%)		
Selenium	4880	DU	348	D	4330	ug/kg		88.6	(75%-125%)		07/27/17 09:12

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QC Summary

Workorder: 428313

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1683875										
QC1203834891 428313002 SDILT										
Arsenic	*BD	3.51	DU	1630	ug/L	N/A		(0%-10%)	BAJ	07/26/17 19:27
Molybdenum	D	1.81	DU	387	ug/L	N/A		(0%-10%)		
Selenium	DU	-0.515	DU	1740	ug/L	N/A		(0%-10%)		07/27/17 09:15
Metals Analysis-ICP										
Batch 1683869										
QC1203834866 428313002 DUP										
Antimony	B	482	U	325	ug/kg	169 ^		(+/-984)	HSC	07/21/17 17:14
Barium	N	39600		46000	ug/kg	15.1		(0%-35%)		
Beryllium	B	344	B	276	ug/kg	21.7 ^		(+/-492)		
Cadmium	B	149	U	98.4	ug/kg	47.6 ^		(+/-492)		
Calcium		4320000		4050000	ug/kg	6.38		(0%-35%)		07/25/17 13:32
Chromium	*	6150	*	4180	ug/kg	38.1 *		(0%-35%)		07/21/17 17:14
Cobalt	*	3630	*	2910	ug/kg	22		(0%-35%)		
Copper	*	8020	*	6350	ug/kg	23.1		(0%-35%)		
Iron		9420000		9440000	ug/kg	0.158		(0%-35%)		
Lead	U	334	B	-604	ug/kg	193 ^		(+/-984)		
Magnesium	*	2580000	*	2090000	ug/kg	21.1		(0%-35%)		07/25/17 13:32

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QC Summary

Workorder: 428313

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1683869											
Manganese		N	133000		142000	ug/kg	6.88		(0%-35%)	HSC	07/21/17 17:14
Nickel			4610		5090	ug/kg	9.92		(0%-35%)		
Potassium		*N	469000	*	829000	ug/kg	55.4*		(0%-35%)		07/25/17 13:32
Silver		B	-215	B	-238	ug/kg	10.2 ^		(+/-492)		07/21/17 17:14
Sodium		*	467000	*	261000	ug/kg	56.7*		(0%-35%)		07/25/17 13:32
Vanadium			21800		22100	ug/kg	1.26		(0%-35%)		07/21/17 17:14
Zinc			16500		16500	ug/kg	0.0271		(0%-35%)		
QC1203834865 LCS											
Antimony	48100				46200	ug/kg		96.1	(80%-120%)		07/21/17 17:07
Barium	48100				46500	ug/kg		96.8	(80%-120%)		
Beryllium	48100				46700	ug/kg		97.2	(80%-120%)		
Cadmium	48100				46300	ug/kg		96.4	(80%-120%)		
Calcium	481000				482000	ug/kg		100	(80%-120%)		07/25/17 13:25
Chromium	48100				46800	ug/kg		97.3	(80%-120%)		07/21/17 17:07
Cobalt	48100				46800	ug/kg		97.4	(80%-120%)		
Copper	48100				46800	ug/kg		97.3	(80%-120%)		

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QC Summary

Workorder: **428313**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1683869										
Iron	481000			474000	ug/kg		98.6	(80%-120%)	HSC	07/21/17 17:07
Lead	48100			45900	ug/kg		95.5	(80%-120%)		
Magnesium	481000			489000	ug/kg		102	(80%-120%)		07/25/17 13:25
Manganese	48100			46400	ug/kg		96.5	(80%-120%)		07/21/17 17:07
Nickel	48100			46800	ug/kg		97.4	(80%-120%)		
Potassium	481000			472000	ug/kg		98.3	(80%-120%)		07/25/17 13:25
Silver	48100			45200	ug/kg		94	(80%-120%)		07/21/17 17:07
Sodium	481000			505000	ug/kg		105	(80%-120%)		07/25/17 13:25
Vanadium	48100			46200	ug/kg		96	(80%-120%)		07/21/17 17:07
Zinc	48100			45400	ug/kg		94.5	(80%-120%)		
QC1203834864 MB										
Antimony			U	328	ug/kg					07/21/17 17:04
Barium			U	99.4	ug/kg					
Beryllium			U	99.4	ug/kg					
Cadmium			U	99.4	ug/kg					
Calcium			B	10900	ug/kg					07/25/17 13:22

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QC Summary

Workorder: 428313

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1683869											
Chromium				U	149	ug/kg				HSC	07/21/17 17:04
Cobalt				U	149	ug/kg					
Copper				U	298	ug/kg					
Iron				U	7950	ug/kg					
Lead				U	328	ug/kg					
Magnesium				U	8450	ug/kg					07/25/17 13:22
Manganese				U	199	ug/kg					07/21/17 17:04
Nickel				U	149	ug/kg					
Potassium				U	6360	ug/kg					07/25/17 13:22
Silver				U	99.4	ug/kg					07/21/17 17:04
Sodium				B	10000	ug/kg					07/25/17 13:22
Vanadium				U	99.4	ug/kg					07/21/17 17:04
Zinc				U	398	ug/kg					
QC1203834867 428313002 MS											
Antimony	48400	B	482		43000	ug/kg		87.9	(75%-125%)		07/21/17 17:17
Barium	48400	N	39600	N	106000	ug/kg		138*	(75%-125%)		

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QC Summary

Workorder: **428313**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1683869											
Beryllium	48400	B	344		46100	ug/kg		94.7	(75%-125%)	HSC	07/21/17 17:17
Cadmium	48400	B	149		45000	ug/kg		92.8	(75%-125%)		
Calcium	484000		4320000		4430000	ug/kg		N/A	(75%-125%)		07/25/17 13:35
Chromium	48400	*	6150		51100	ug/kg		92.8	(75%-125%)		07/21/17 17:17
Cobalt	48400	*	3630		49300	ug/kg		94.4	(75%-125%)		
Copper	48400	*	8020		56100	ug/kg		99.4	(75%-125%)		
Iron	484000		9420000		12400000	ug/kg		N/A	(75%-125%)		
Lead	48400	U	334		45200	ug/kg		93.5	(75%-125%)		
Magnesium	484000	*	2580000		2990000	ug/kg		N/A	(75%-125%)		07/25/17 13:35
Manganese	48400	N	133000	N	220000	ug/kg		180*	(75%-125%)		07/21/17 17:17
Nickel	48400		4610		49700	ug/kg		93.2	(75%-125%)		
Potassium	484000	*N	469000	N	1120000	ug/kg		134*	(75%-125%)		07/25/17 13:35
Silver	48400	B	-215		44000	ug/kg		90.9	(75%-125%)		07/21/17 17:17
Sodium	484000	*	467000		866000	ug/kg		82.5	(75%-125%)		07/25/17 13:35
Vanadium	48400		21800		79900	ug/kg		120	(75%-125%)		07/21/17 17:17

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QC Summary

Workorder: 428313

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1683869											
Zinc	48400		16500		65800	ug/kg		102	(75%-125%)	HSC	07/21/17 17:17
QC1203835796 428313002 PS											
Barium	500	N	391		876	ug/L		96.9	(75%-125%)		07/21/17 17:20
Manganese	500	N	1310		1790	ug/L		96.5	(75%-125%)		
Potassium	5000	*N	4640		9040	ug/L		88	(75%-125%)		
QC1203834868 428313002 SDILT											
Antimony		B	4.76	DU	1670	ug/L	N/A		(0%-10%)		07/21/17 17:23
Barium		N	391	D	80.1	ug/L	2.42		(0%-10%)		
Beryllium		B	3.40	DU	506	ug/L	N/A		(0%-10%)		
Cadmium		B	1.47	DU	506	ug/L	N/A		(0%-10%)		
Calcium			42700	D	8470	ug/L	.758		(0%-10%)		07/25/17 13:39
Chromium		*	60.8	D	13.0	ug/L	6.89		(0%-10%)		07/21/17 17:23
Cobalt		*	35.9	D	7.65	ug/L	6.49		(0%-10%)		
Copper		*	79.2	D	15.1	ug/L	4.48		(0%-10%)		
Iron			93100	D	19600	ug/L	5.18		(0%-10%)		
Lead		U	-0.11	DU	1670	ug/L	N/A		(0%-10%)		

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QC Summary

Workorder: 428313

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1683869											
Magnesium		*	25500	D	5050	ug/L	1.21		(0%-10%)	HSC	07/25/17 13:39
Manganese		N	1310	D	274	ug/L	4.39		(0%-10%)		07/21/17 17:23
Nickel			45.6	D	9.42	ug/L	3.33		(0%-10%)		
Potassium		*N	4640	D	963	ug/L	3.82		(0%-10%)		07/25/17 13:39
Silver		B	-2.13	DU	506	ug/L	N/A		(0%-10%)		07/21/17 17:23
Sodium		*	4620	D	960	ug/L	3.98		(0%-10%)		07/25/17 13:39
Vanadium			215	D	43.2	ug/L	.307		(0%-10%)		07/21/17 17:23
Zinc			163	D	37.7	ug/L	15.5		(0%-10%)		
Metals Analysis-Mercury											
Batch 1684344											
QC1203836046 428197003 DUP											
Mercury		B	5.01	B	4.30	ug/kg	15.4 ^		(+/-12.3)	MTM1	07/24/17 10:23
QC1203836045 LCS											
Mercury	118				128	ug/kg		109	(80%-120%)		07/24/17 10:20
QC1203836044 MB											
Mercury				U	3.98	ug/kg					07/24/17 10:18
QC1203836047 428197003 MS											
Mercury	111	B	5.01		123	ug/kg		106	(75%-125%)		07/24/17 10:25
QC1203836048 428197003 SDILT											
Mercury		B	0.088	DU	19.1	ug/L	N/A		(0%-10%)		07/24/17 10:26

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QC Summary

Report Date: August 3, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428482**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1684554											
QC1203836569 428482005 DUP											
Arsenic		D	1410	D	1190	ug/kg	17 ^		(+/-997)	BAJ	07/26/17 19:46
Molybdenum		*D	632	*D	266	ug/kg	81.6*^		(+/-199)		
Selenium		BD	538	BD	449	ug/kg	18.1 ^		(+/-997)		07/27/17 09:26
QC1203836568 LCS											
Arsenic	4600			D	3950	ug/kg		85.9	(80%-120%)		07/26/17 19:40
Molybdenum	4600			D	4270	ug/kg		93	(80%-120%)		
Selenium	4600			D	3790	ug/kg		82.5	(80%-120%)		07/27/17 09:23
QC1203836567 MB											
Arsenic				DU	317	ug/kg					07/26/17 19:36
Molybdenum				DU	75.0	ug/kg					
Selenium				DU	338	ug/kg					07/27/17 09:22
QC1203836570 428482005 MS											
Arsenic	4880	D	1410	D	5990	ug/kg		93.8	(75%-125%)		07/26/17 19:49
Molybdenum	4880	*D	632	D	5040	ug/kg		90.4	(75%-125%)		
Selenium	4880	BD	538	D	4580	ug/kg		82.8	(75%-125%)		07/27/17 09:28

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 1684554										
QC1203836571 428482005 SDILT										
Arsenic	D	7.16	DU	1660	ug/L	N/A		(0%-10%)	BAJ	07/26/17 19:56
Molybdenum	*D	3.21	BD	0.618	ug/L	3.74		(0%-10%)		
Selenium	BD	2.74	DU	1770	ug/L	N/A		(0%-10%)		07/27/17 09:31
Metals Analysis-ICP										
Batch 1684502										
QC1203836410 428482005 DUP										
Antimony	DU	1570	BD	1910	ug/kg	19.9 ^		(+/-4800)	HSC	07/28/17 13:42
Barium	N	55800		64900	ug/kg	15		(0%-35%)		07/25/17 17:02
Beryllium		877		755	ug/kg	15 ^		(+/-480)		
Cadmium	DU	476	DU	480	ug/kg	N/A				07/28/17 13:42
Calcium		4290000		4770000	ug/kg	10.7		(0%-35%)		07/27/17 09:49
Chromium		6350		7040	ug/kg	10.2		(0%-35%)		07/25/17 17:02
Cobalt	D	7430	D	6860	ug/kg	8 ^		(+/-2400)		07/28/17 13:42
Copper		17200		16700	ug/kg	2.93		(0%-35%)		07/25/17 17:02
Iron		18000000		17800000	ug/kg	1.08		(0%-35%)		
Lead	U	314	U	317	ug/kg	N/A				
Magnesium		3230000		3290000	ug/kg	1.97		(0%-35%)		

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1684502											
Manganese			224000		243000	ug/kg	8.33		(0%-35%)	HSC	07/25/17 17:02
Nickel			7820		8030	ug/kg	2.72		(0%-35%)		
Potassium			678000		689000	ug/kg	1.52		(0%-35%)		
Silver		U	95.3	U	96.0	ug/kg	N/A				
Sodium			230000		241000	ug/kg	4.64		(0%-35%)		07/27/17 09:49
Vanadium		D	59900	D	51000	ug/kg	16		(0%-35%)		07/28/17 13:42
Zinc		D	28000	D	28600	ug/kg	2.29		(0%-35%)		
QC1203836409 LCS											
Antimony	45600				41700	ug/kg		91.5	(80%-120%)		07/28/17 13:29
Barium	45600				46200	ug/kg		101	(80%-120%)		07/25/17 16:56
Beryllium	45600				46900	ug/kg		103	(80%-120%)		
Cadmium	45600				41800	ug/kg		91.7	(80%-120%)		07/28/17 13:29
Calcium	456000				467000	ug/kg		102	(80%-120%)		07/27/17 09:43
Chromium	45600				45400	ug/kg		99.6	(80%-120%)		07/25/17 16:56
Cobalt	45600				42700	ug/kg		93.6	(80%-120%)		07/28/17 13:29
Copper	45600				47300	ug/kg		104	(80%-120%)		07/25/17 16:56

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QC Summary

Workorder: **428482**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1684502										
Iron	456000			477000	ug/kg		105	(80%-120%)	HSC	07/25/17 16:56
Lead	45600			45200	ug/kg		99.1	(80%-120%)		
Magnesium	456000			480000	ug/kg		105	(80%-120%)		
Manganese	45600			46000	ug/kg		101	(80%-120%)		
Nickel	45600			46200	ug/kg		101	(80%-120%)		
Potassium	456000			461000	ug/kg		101	(80%-120%)		
Silver	45600			47600	ug/kg		104	(80%-120%)		
Sodium	456000			445000	ug/kg		97.6	(80%-120%)		07/27/17 09:43
Vanadium	45600			42400	ug/kg		93	(80%-120%)		07/28/17 13:29
Zinc	45600			39800	ug/kg		87.3	(80%-120%)		
QC1203836408 MB										
Antimony			B	373	ug/kg					07/28/17 13:26
Barium			U	97.8	ug/kg					07/25/17 16:53
Beryllium			U	97.8	ug/kg					
Cadmium			U	97.8	ug/kg					07/28/17 13:26
Calcium			U	7830	ug/kg					07/27/17 09:40

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1684502											
Chromium				U	147	ug/kg				HSC	07/25/17 16:53
Cobalt				U	147	ug/kg					07/28/17 13:26
Copper				U	294	ug/kg					07/25/17 16:53
Iron				U	7830	ug/kg					
Lead				U	323	ug/kg					
Magnesium				U	8320	ug/kg					
Manganese				U	196	ug/kg					
Nickel				U	147	ug/kg					
Potassium				U	6260	ug/kg					
Silver				U	97.8	ug/kg					
Sodium				U	6850	ug/kg					07/27/17 09:40
Vanadium				U	97.8	ug/kg					07/28/17 13:26
Zinc				U	391	ug/kg					
QC1203836411 428482005 MS											
Antimony	47400	DU	1570	D	43600	ug/kg		88.7	(75%-125%)		07/28/17 13:46
Barium	47400	N	55800	N	117000	ug/kg		128*	(75%-125%)		07/25/17 17:06

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QC Summary

Workorder: **428482**

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1684502											
Beryllium	47400		877		48300	ug/kg		100	(75%-125%)	HSC	07/25/17 17:06
Cadmium	47400	DU	476	D	43100	ug/kg		90.8	(75%-125%)		07/28/17 13:46
Calcium	474000		4290000		5170000	ug/kg		N/A	(75%-125%)		07/27/17 09:53
Chromium	47400		6350		52800	ug/kg		98	(75%-125%)		07/25/17 17:06
Cobalt	47400	D	7430	D	51200	ug/kg		92.3	(75%-125%)		07/28/17 13:46
Copper	47400		17200		67400	ug/kg		106	(75%-125%)		07/25/17 17:06
Iron	474000		18000000		19500000	ug/kg		N/A	(75%-125%)		
Lead	47400	U	314		45800	ug/kg		96.7	(75%-125%)		
Magnesium	474000		3230000		3870000	ug/kg		N/A	(75%-125%)		
Manganese	47400		224000		301000	ug/kg		N/A	(75%-125%)		
Nickel	47400		7820		54600	ug/kg		98.7	(75%-125%)		
Potassium	474000		678000		1220000	ug/kg		115	(75%-125%)		
Silver	47400	U	95.3		48400	ug/kg		102	(75%-125%)		
Sodium	474000		230000		735000	ug/kg		107	(75%-125%)		07/27/17 09:53
Vanadium	47400	D	59900	D	109000	ug/kg		104	(75%-125%)		07/28/17 13:46

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1684502											
Zinc	47400	D	28000	D	77900	ug/kg		105	(75%-125%)	HSC	07/28/17 13:46
QC1203841053 428482005 PS											
Barium	500	N	586		1170	ug/L		116	(75%-125%)		07/28/17 13:32
QC1203836412 428482005 SDILT											
Antimony		DU	3.28	DU	7860	ug/L	N/A		(0%-10%)		07/28/17 13:52
Barium		N	586	D	124	ug/L	5.98		(0%-10%)		07/25/17 17:09
Beryllium			9.20	BD	1.99	ug/L	8.38		(0%-10%)		
Cadmium		DU	0.117	DU	2380	ug/L	N/A		(0%-10%)		07/28/17 13:52
Calcium			45000	D	9320	ug/L	3.55		(0%-10%)		07/27/17 09:56
Chromium			66.7	D	14.3	ug/L	7.52		(0%-10%)		07/25/17 17:09
Cobalt		D	15.6	BD	2.75	ug/L	11.9		(0%-10%)		07/28/17 13:52
Copper			180	D	36.7	ug/L	1.93		(0%-10%)		07/25/17 17:09
Iron			189000	D	39800	ug/L	5.42		(0%-10%)		
Lead		U	-1.86	DU	1570	ug/L	N/A		(0%-10%)		
Magnesium			33900	D	7180	ug/L	5.85		(0%-10%)		
Manganese			2350	D	508	ug/L	8.13		(0%-10%)		

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1684502											
Nickel			82.0	D	17.7	ug/L	7.96		(0%-10%)	HSC	07/25/17 17:09
Potassium			7120	D	1480	ug/L	3.8		(0%-10%)		
Silver		U	-0.01	DU	476	ug/L	N/A		(0%-10%)		
Sodium			2420	D	719	ug/L	48.7		(0%-10%)		07/27/17 09:56
Vanadium		D	126	D	25.2	ug/L	.0318		(0%-10%)		07/28/17 13:52
Zinc		D	58.7	D	13.0	ug/L	11.1		(0%-10%)		
Metals Analysis-Mercury											
Batch 1684344											
QC1203836046 428197003 DUP											
Mercury		B	5.01	B	4.30	ug/kg	15.4 ^		(+/-12.3)	MTM1	07/24/17 10:23
QC1203836045 LCS											
Mercury	118				128	ug/kg		109	(80%-120%)		07/24/17 10:20
QC1203836044 MB											
Mercury				U	3.98	ug/kg					07/24/17 10:18
QC1203836047 428197003 MS											
Mercury	111	B	5.01		123	ug/kg		106	(75%-125%)		07/24/17 10:25
QC1203836048 428197003 SDILT											
Mercury		B	0.088	DU	19.1	ug/L	N/A		(0%-10%)		07/24/17 10:26

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- \+ Correlation coefficient for Method of Standard Additions (MSA) is < 0.995

Date: 29 September 2017
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200-EA-1
Subject: General Chemistry - Sample Data Groups (SDGs) GEL426775, GEL427585, GEL428015, GEL428197, GEL428313 and GEL428482

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL426775, GEL427585, GEL428015, GEL428197, GEL428313, GEL428482 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3BBC3	06/29/17	Soil	C	7196A
B3BBC4	06/29/17	Soil	C	9012, 300.0, 350.1
B3BBC7	07/11/17	Soil	C	7196A
B3BBC8	07/11/17	Soil	C	9012, 300.0, 350.1
B3BBD1	07/11/17	Soil	C	7196A
B3BBD2	07/11/17	Soil	C	9012, 300.0, 350.1
B3BBD5	07/11/17	Soil	C	7196A
B3BBD6	07/11/17	Soil	C	9012, 300.0, 350.1
B3BBD9	07/13/17	Soil	C	7196A
B3BBF3	07/13/17	Soil	C	7196A
B3BBF7	07/13/17	Soil	C	7196A
B3BBF0	07/13/17	Soil	C	9012, 300.0, 350.1
B3BBF4	07/13/17	Soil	C	9012, 300.0, 350.1
B3BBF8	07/13/17	Soil	C	9012, 300.0, 350.1
B3BBH1	07/17/17	Soil	C	7196A
B3BBH2	07/17/17	Soil	C	9012, 300.0, 350.1
B3BBH5	07/17/17	Soil	C	7196A
B3BBH6	07/17/17	Soil	C	9012, 300.0, 350.1
B3BBH9	07/19/17	Soil	C	7196A
B3BBJ0	07/19/17	Soil	C	9012, 300.0, 350.1
B3BBK1	07/19/17	Soil	C	7196A
B3BBK2	07/19/17	Soil	C	9012, 300.0, 350.1
B3BBJ3	07/19/17	Soil	C	7196A
B3BBJ4	07/19/17	Soil	C	9012, 300.0, 350.1

Data validation was conducted in accordance with the CHPRC validation statement of work and the Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site, DOE/RL-2017-35, Rev. 0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification

Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements are as follows:

- All anions except nitrate, nitrite, and phosphate – analysis within 28 days of sample collection
- Nitrate, nitrite, and phosphate – extraction within 28 days of sample collection and analysis within 48 hours of sample extraction
- Ammonia – analysis within 28 days of sample collection
- Hexavalent chromium – extraction within 30 days of sample collection and analysis within 7 days of sample extraction
- Total cyanide – analysis within 14 days of sample collection

Sample preservation for the above analyses requires chilling to <6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

For SDG GEL428015, the ammonia laboratory blank result was > the method detection limit (MDL) but < the practical quantitation limit (PQL). The ammonia results for samples B3BBF0, B3BBF4 and B3BBF8 were detects > the PQL but <20X the blank value and should be qualified as estimates and flagged "J+."

For SDG GEL428197, the ammonia laboratory blank result was > the MDL but < the PQL. The ammonia results for samples B3BBH2 and B3BBH6 were detects > the PQL but <20X the blank value and should be qualified as estimates and flagged "J+."

For SDG GEL428313, the ammonia laboratory blank result was > the MDL but < the PQL. The ammonia result for sample B3BBJ0 was a detect > the PQL but <20X the blank value and should be qualified as an estimate and flagged "J+."

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results and laboratory control sample results. According to the SAP, the matrix spike sample accuracy limits are 75% to 125% and the laboratory control sample accuracy limits are 80% to 120%.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable.

Laboratory Control Samples (LCSs)

The LCS recovery was acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, laboratory duplicate sample results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤35%.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

Reported sample MDLs for ammonia were > the CRDL.

- **Completeness**

SDGs GEL426775, GEL427585, GEL428015, GEL428197, GEL428313 and GEL428482 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of many ammonia sample results as estimates were due to blank contamination. See the table in Appendix 2 for a listing of all affected sample results.

REFERENCES

GRP-GD-003, Rev. 2, Change 0, *Data Validation for Chemical Analyses*, October 2016.

DOE/RL-2017-35, Rev. 0, *Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site*, June 2017.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

General Chemistry Data Qualification Summary			
SDGs: GEL426775, GEL427585, GEL428015, GEL428197, GEL428313, GEL428482	Reviewer: AQA	Project: 200-EA-1	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Ammonia	J+	B3BBF0, B3BBF4, B3BBF8, B3BBH2, B3BBH6, B3BBJ0	Laboratory blank contamination

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix A - (Cont.) Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200-EA-1			DATA PACKAGE: VSR17-012		
VALIDATOR: Eyda Hergenreder		LAB: GEL		DATE: 09/29/17	
			SDG: GEL426775, GEL427585, GEL428015, GEL428197, GEL428313, GEL428482		
ANALYSES PERFORMED					
Anions/IC X	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia X	BOD/COD	Chloride	Chromium-VI X	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate	Cyanide X	
SAMPLES/MATRIX Soil					
GEL426775: B3BBC3, B3BBC4					
GEL427585: B3BBC7, B3BBC8, B3BBD1, B3BBD2, B3BBD5, B3BBD6					
GEL428015: B3BBD9, B3BBF3, B3BBF7, B3BBF0, B3BBF4, B3BBF8					
GEL428197: B3BBH1, B3BBH2, B3BBH5, B3BBH6					
GEL428313: B3BBH9, B3BBJ0			GEL428482: B3BBK1, B3BBK2, B3BBJ3, B3BBJ4		

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?	Yes (No) N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments?	Yes No (N/A)
Initial calibrations acceptable?	Yes No (N/A)
ICV and CCV checks performed on all instruments?	Yes No (N/A)
ICV and CCV checks acceptable?	Yes No (N/A)
Standards traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	(Yes) No N/A
Laboratory blank results acceptable?	Yes (No) N/A
Field blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field blank results acceptable? (Levels C, D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

GEL428015: MB ammonia 1290 ug/kg

GEL428197: MB ammonia 1370 ug/kg

GEL428313: MB ammonia 1370 ug/kg

Appendix A - (Cont.) Chemical Data Validation Checklist

4. ACCURACY (Levels C, D, and E)

Spike samples analyzed?	(Yes) No N/A
Spike recoveries acceptable?	(Yes) No N/A
Spike standards NIST traceable? (Levels D, E)	Yes No (N/A)
Spike standards expired? (Levels D, E)	Yes No (N/A)
LCS/BSS samples analyzed?	(Yes) No N/A
LCS/BSS results acceptable?	(Yes) No N/A
Standards traceable? (Levels D, E)	Yes No (N/A)
Standards expired? (Levels D, E)	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	(Yes) No N/A
Duplicate results acceptable?	(Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No (N/A)
MS/MSD standards expired? (Levels D, E)	Yes No (N/A)
LCS/LCSD duplicates run due to insufficient sample material?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split RPD values acceptable?	Yes No (N/A)
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

6. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes) No N/A
Sample holding times acceptable?	(Yes) No N/A

Comments:

Appendix A - (Cont.) Chemical Data Validation Checklist

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses?	(Yes) No N/A
Results supported in the raw data? (Levels D, E)	Yes No (N/A)
Samples properly prepared? (Levels D, E)	Yes No (N/A)
Detection limits meet RDL?	Yes (No) N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/A)

Comments (attach additional sheets as necessary):

MDLs for ammonia >CRDL limit

Appendix A - (Cont.) Chemical Data Validation Checklist

Appendix 4

Additional Documentation Requested By Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 11, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **426775**

Parmname	NOM		Sample	Qual	QC	Units	RPD%		REC%	Range	Anlst	Date Time
Flow Injection Analysis												
Batch 1678717												
QC1203822468 426633003 DUP												
Cyanide, Total			583		650	ug/kg	10.8	^		(+/-208)	AXH3	07/03/17 08:23
QC1203823137 426775002 DUP												
Cyanide, Total		U	80.3	U	81.8	ug/kg	N/A					07/03/17 08:27
QC1203822466 LCS												
Cyanide, Total	108000			D	97000	ug/kg			89.8	(80%-120%)		07/03/17 08:19
QC1203822467 LCSD												
Cyanide, Total	108000			D	97700	ug/kg	0.719		90.5	(0%-35%)		07/03/17 08:20
QC1203822465 MB												
Cyanide, Total				U	83.5	ug/kg						07/03/17 08:18
QC1203822469 426633003 MS												
Cyanide, Total	4240		583		4230	ug/kg			86	(75%-125%)		07/03/17 08:24
QC1203823138 426775002 MS												
Cyanide, Total	4720	U	80.3		4860	ug/kg			103	(75%-125%)		07/03/17 08:32
Ion Chromatography												
Batch 1679119												
QC1203823415 426775002 DUP												
Bromide		U	707	U	705	ug/kg	N/A				MAR1	07/06/17 22:43
Chloride			2130	B	2090	ug/kg	2.25	^		(+/-2100)		
Fluoride		B	426	B	431	ug/kg	1.23	^		(+/-1050)		

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2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 426775

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography										
Batch 1679119										
Nitrate-N	B	502	B	492	ug/kg	1.94 ^		(+/-1050)	MAR1	07/06/17 22:43
Nitrite-N	U	348	U	347	ug/kg	N/A				
Phosphorus in phosphate	U	707	U	705	ug/kg	N/A				
Sulfate	B	3910	B	3440	ug/kg	12.5 ^		(+/-4210)		
QC1203823414 LCS										
Bromide	12500			12400	ug/kg		99.4	(80%-120%)		07/06/17 21:45
Chloride	50000			46800	ug/kg		93.6	(80%-120%)		
Fluoride	25000			23700	ug/kg		94.7	(80%-120%)		
Nitrate-N	25000			23400	ug/kg		93.7	(80%-120%)		
Nitrite-N	25000			23700	ug/kg		94.9	(80%-120%)		
Phosphorus in phosphate	12500			12500	ug/kg		99.7	(80%-120%)		
Sulfate	100000			96000	ug/kg		96	(80%-120%)		
QC1203823413 MB										
Bromide			U	670	ug/kg					07/06/17 21:17
Chloride			U	720	ug/kg					
Fluoride			U	340	ug/kg					
Nitrate-N			U	330	ug/kg					

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QC Summary

Workorder: 426775

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1679119											
Nitrite-N				U	330	ug/kg				MAR1	07/06/17 21:17
Phosphorus in phosphate				U	670	ug/kg					
Sulfate				U	1330	ug/kg					
QC1203823416 426775002 MS											
Bromide	13200	U	707		12800	ug/kg		97	(75%-125%)		07/06/17 23:12
Chloride	52700		2130		51100	ug/kg		92.9	(75%-125%)		
Fluoride	26400	B	426		24500	ug/kg		91.3	(75%-125%)		
Nitrate-N	26400	B	502		24700	ug/kg		91.9	(75%-125%)		
Nitrite-N	26400	U	348		25200	ug/kg		94.2	(75%-125%)		
Phosphorus in phosphate	13200	U	707		12100	ug/kg		89.6	(75%-125%)		
Sulfate	105000	B	3910		105000	ug/kg		96.2	(75%-125%)		
Nutrient Analysis											
Batch 1678854											
QC1203822805 426775002 DUP											
Nitrogen in Ammonia			3300		6590	ug/Kg	66.4*^		(+/-2320)	KLP1	07/06/17 11:30
QC1203822804 LCS											
Nitrogen in Ammonia	50000				53500	ug/Kg		107	(80%-120%)		07/06/17 11:24
QC1203822803 MB											
Nitrogen in Ammonia				U	900	ug/Kg					07/06/17 11:23

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QC Summary

Workorder: 426775

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Nutrient Analysis											
Batch 1678854											
QC1203822806 426775002 MS											
Nitrogen in Ammonia	41300		3300		48300	ug/Kg		109	(75%-125%)	KLP1	07/06/17 11:31
Spectrometric Analysis											
Batch 1678669											
QC1203823008 426736001 DUP											
Hexavalent Chromium		U	194	U	194	ug/Kg	N/A			VH1	07/06/17 15:23
QC1203823009 426775001 DUP											
Hexavalent Chromium		U	164	U	155	ug/Kg	N/A				07/06/17 15:24
QC1203822322 ILCS											
Hexavalent Chromium	6850				6310	ug/Kg		92.2	(80%-120%)		07/06/17 15:11
QC1203822320 LCS											
Hexavalent Chromium	3610				3490	ug/Kg		96.9	(80%-120%)		07/06/17 15:10
QC1203822319 MB											
Hexavalent Chromium				U	144	ug/Kg					07/06/17 15:10
QC1203823010 426736001 MS											
Hexavalent Chromium	5040	U	194		4790	ug/Kg		95	(75%-125%)		07/06/17 15:23
QC1203823011 426775001 MS											
Hexavalent Chromium	4220	U	164		3770	ug/Kg		89.4	(75%-125%)		07/06/17 15:24
QC1203823014 426736001 MSD											
Hexavalent Chromium	5040	U	194		4840	ug/Kg	0.985	94.1	(0%-35%)		07/06/17 15:23
QC1203823015 426775001 MSD											
Hexavalent Chromium	4220	U	164		3850	ug/Kg	2.07	91.3	(0%-35%)		07/06/17 15:24

Notes:

The Qualifiers in this report are defined as follows:

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 24, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **427585**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Flow Injection Analysis											
Batch 1681303											
QC1203829117 427585002 DUP											
Cyanide, Total		U	82.3	U	80.7	ug/kg	N/A			AXH3	07/17/17 14:12
QC1203828403 LCS											
Cyanide, Total	108000			D	103000	ug/kg		95.4	(80%-120%)		07/17/17 13:50
QC1203832026 LCSD											
Cyanide, Total	108000			D	106000	ug/kg	2.87	98.1	(0%-35%)		07/17/17 13:51
QC1203828402 MB											
Cyanide, Total				U	83.5	ug/kg					07/17/17 13:49
QC1203829118 427585002 MS											
Cyanide, Total	7250	U	82.3		8200	ug/kg		113	(75%-125%)		07/17/17 14:13
Ion Chromatography											
Batch 1682800											
QC1203832121 427585002 DUP											
Bromide		U	662	U	665	ug/kg	N/A			MXL2	07/17/17 20:56
Chloride			2060		2020	ug/kg	1.86 ^		(+/-1980)		
Fluoride		B	603	B	602	ug/kg	0.183 ^		(+/-992)		
Nitrate-N		B	484	B	452	ug/kg	6.71 ^		(+/-992)		
Nitrite-N		U	326	U	327	ug/kg	N/A				
Phosphorus in phosphate		U	662	U	665	ug/kg	N/A				

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: **427585**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography										
Batch 1682800										
Sulfate	B	3920	B	3580	ug/kg	9.14 ^		(+/-3970)	MXL2	07/17/17 20:56
QC1203832120 LCS										
Bromide	12500			12000	ug/kg		95.8	(80%-120%)		07/17/17 19:57
Chloride	50000			45100	ug/kg		90.1	(80%-120%)		
Fluoride	25000			23500	ug/kg		94.1	(80%-120%)		
Nitrate-N	25000			23000	ug/kg		92	(80%-120%)		
Nitrite-N	25000			23400	ug/kg		93.5	(80%-120%)		
Phosphorus in phosphate	12500			11800	ug/kg		94.4	(80%-120%)		
Sulfate	100000			93500	ug/kg		93.5	(80%-120%)		
QC1203832119 MB										
Bromide			U	665	ug/kg					07/17/17 19:28
Chloride			U	715	ug/kg					
Fluoride			U	337	ug/kg					
Nitrate-N			U	328	ug/kg					
Nitrite-N			U	328	ug/kg					
Phosphorus in phosphate			U	665	ug/kg					

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 427585

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1682800											
Sulfate				U	1320	ug/kg				MXL2	07/17/17 19:28
QC1203832122 427585002 MS											
Bromide	12200	U	662		11800	ug/kg		96.9	(75%-125%)		07/17/17 21:25
Chloride	48700		2060		46200	ug/kg		90.7	(75%-125%)		
Fluoride	24300	B	603		22400	ug/kg		89.4	(75%-125%)		
Nitrate-N	24300	B	484		22600	ug/kg		90.7	(75%-125%)		
Nitrite-N	24300	U	326		23000	ug/kg		94.6	(75%-125%)		
Phosphorus in phosphate	12200	U	662		10700	ug/kg		84.2	(75%-125%)		
Sulfate	97400	B	3920		98200	ug/kg		96.9	(75%-125%)		
Nutrient Analysis											
Batch 1681793											
QC1203829642 427585002 DUP											
Nitrogen in Ammonia			3980		14700	ug/Kg	115*^		(+/-2370)	KLP1	07/14/17 12:11
QC1203829641 LCS											
Nitrogen in Ammonia	50000				49900	ug/Kg		99.8	(80%-120%)		07/14/17 12:04
QC1203829640 MB											
Nitrogen in Ammonia				U	900	ug/Kg					07/14/17 12:03
QC1203829643 427585002 MS											
Nitrogen in Ammonia	42800		3980		45400	ug/Kg		96.7	(75%-125%)		07/14/17 12:12

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QC Summary

Workorder: 427585

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis											
Batch 1683182											
QC1203833180 428015006 DUP											
Hexavalent Chromium		U	112	U	112	ug/Kg	N/A			VH1	07/24/17 10:58
QC1203833178 ILCS											
Hexavalent Chromium	7520				6460	ug/Kg		85.9	(80%-120%)		07/24/17 10:53
QC1203833177 LCS											
Hexavalent Chromium	3650				3480	ug/Kg		95.4	(80%-120%)		07/24/17 10:53
QC1203833176 MB											
Hexavalent Chromium				U	152	ug/Kg					07/24/17 10:53
QC1203833182 428015006 MS											
Hexavalent Chromium	3190	U	112		3170	ug/Kg		96.2	(75%-125%)		07/24/17 10:59
QC1203833186 428015006 MSD											
Hexavalent Chromium	3190	U	112		3210	ug/Kg	1.03	97.2	(0%-35%)		07/24/17 10:59

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 24, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428015**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Flow Injection Analysis											
Batch 1681303											
QC1203829117 427585002 DUP											
Cyanide, Total		U	82.3	U	80.7	ug/kg	N/A			AXH3	07/17/17 14:12
QC1203828403 LCS											
Cyanide, Total	108000			D	103000	ug/kg		95.4	(80%-120%)		07/17/17 13:50
QC1203832026 LCSD											
Cyanide, Total	108000			D	106000	ug/kg	2.87	98.1	(0%-35%)		07/17/17 13:51
QC1203828402 MB											
Cyanide, Total				U	83.5	ug/kg					07/17/17 13:49
QC1203829118 427585002 MS											
Cyanide, Total	7250	U	82.3		8200	ug/kg		113	(75%-125%)		07/17/17 14:13
Ion Chromatography											
Batch 1682800											
QC1203832121 427585002 DUP											
Bromide		U	662	U	665	ug/kg	N/A			MXL2	07/17/17 20:56
Chloride			2060		2020	ug/kg	1.86 ^		(+/-1980)		
Fluoride		B	603	B	602	ug/kg	0.183 ^		(+/-992)		
Nitrate-N		B	484	B	452	ug/kg	6.71 ^		(+/-992)		
Nitrite-N		U	326	U	327	ug/kg	N/A				
Phosphorus in phosphate		U	662	U	665	ug/kg	N/A				

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QC Summary

Workorder: **428015**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1682800											
Sulfate		B	3920	B	3580	ug/kg	9.14 ^		(+/-3970)	MXL2	07/17/17 20:56
QC1203832120 LCS											
Bromide	12500				12000	ug/kg		95.8	(80%-120%)		07/17/17 19:57
Chloride	50000				45100	ug/kg		90.1	(80%-120%)		
Fluoride	25000				23500	ug/kg		94.1	(80%-120%)		
Nitrate-N	25000				23000	ug/kg		92	(80%-120%)		
Nitrite-N	25000				23400	ug/kg		93.5	(80%-120%)		
Phosphorus in phosphate	12500				11800	ug/kg		94.4	(80%-120%)		
Sulfate	100000				93500	ug/kg		93.5	(80%-120%)		
QC1203832119 MB											
Bromide				U	665	ug/kg					07/17/17 19:28
Chloride				U	715	ug/kg					
Fluoride				U	337	ug/kg					
Nitrate-N				U	328	ug/kg					
Nitrite-N				U	328	ug/kg					
Phosphorus in phosphate				U	665	ug/kg					

GEL LABORATORIES LLC

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QC Summary

Workorder: 428015

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1682800											
Sulfate				U	1320	ug/kg				MXL2	07/17/17 19:28
QC1203832122 427585002 MS											
Bromide	12200	U	662		11800	ug/kg		96.9	(75%-125%)		07/17/17 21:25
Chloride	48700		2060		46200	ug/kg		90.7	(75%-125%)		
Fluoride	24300	B	603		22400	ug/kg		89.4	(75%-125%)		
Nitrate-N	24300	B	484		22600	ug/kg		90.7	(75%-125%)		
Nitrite-N	24300	U	326		23000	ug/kg		94.6	(75%-125%)		
Phosphorus in phosphate	12200	U	662		10700	ug/kg		84.2	(75%-125%)		
Sulfate	97400	B	3920		98200	ug/kg		96.9	(75%-125%)		
Nutrient Analysis											
Batch 1682717											
QC1203831895 428015007 DUP											
Nitrogen in Ammonia		C	3910		4320	ug/Kg	9.98 ^		(+/-1850)	KLP1	07/19/17 15:22
QC1203831894 LCS											
Nitrogen in Ammonia	50000				52000	ug/Kg		104	(80%-120%)		07/19/17 15:20
QC1203831893 MB											
Nitrogen in Ammonia				B	1290	ug/Kg					07/19/17 15:15
QC1203831896 428015007 MS											
Nitrogen in Ammonia	52000	C	3910		59200	ug/Kg		106	(75%-125%)		07/19/17 15:23

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QC Summary

Workorder: **428015**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis										
Batch 1683182										
QC1203833180 428015006 DUP										
Hexavalent Chromium	U	112	U	112	ug/Kg	N/A			VH1	07/24/17 10:58
QC1203833178 ILCS										
Hexavalent Chromium	7520			6460	ug/Kg		85.9	(80%-120%)		07/24/17 10:53
QC1203833177 LCS										
Hexavalent Chromium	3650			3480	ug/Kg		95.4	(80%-120%)		07/24/17 10:53
QC1203833176 MB										
Hexavalent Chromium			U	152	ug/Kg					07/24/17 10:53
QC1203833182 428015006 MS										
Hexavalent Chromium	3190 U	112		3170	ug/Kg		96.2	(75%-125%)		07/24/17 10:59
QC1203833186 428015006 MSD										
Hexavalent Chromium	3190 U	112		3210	ug/Kg	1.03	97.2	(0%-35%)		07/24/17 10:59

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

GEL LABORATORIES LLC

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QC Summary

Report Date: July 26, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428197**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Flow Injection Analysis										
Batch 1683519										
QC1203834034 428197003 DUP										
Cyanide, Total	U	71.6	U	64.1	ug/kg	N/A			AXH3	07/21/17 14:33
QC1203835189 428313002 DUP										
Cyanide, Total	U	72.4	U	76.2	ug/kg	N/A				07/21/17 14:36
QC1203834033 LCS										
Cyanide, Total	108000		D	94300	ug/kg		87.3	(80%-120%)		07/21/17 14:27
QC1203834032 MB										
Cyanide, Total			U	83.5	ug/kg					07/21/17 14:26
QC1203834035 428197003 MS										
Cyanide, Total	4600 U	71.6		5280	ug/kg		115	(75%-125%)		07/21/17 14:33
QC1203835190 428313002 MS										
Cyanide, Total	5190 U	72.4		5710	ug/kg		110	(75%-125%)		07/21/17 14:37
Ion Chromatography										
Batch 1683810										
QC1203834739 428197003 DUP										
Bromide	U	690	U	690	ug/kg	N/A			MAR1	07/25/17 12:00
Chloride	B	1270	B	1160	ug/kg	9.04 ^		(+/-2060)		
Fluoride	U	350	U	350	ug/kg	N/A				
Nitrate-N	U	340	U	340	ug/kg	N/A				
Nitrite-N	U	340	U	340	ug/kg	N/A				

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1683810											
Phosphorus in phosphate		U	690	U	690	ug/kg	N/A			MAR1	07/25/17 12:00
Sulfate			4970		4810	ug/kg	3.22 ^		(+/-4120)		
QC1203834738 LCS											
Bromide	12500				12300	ug/kg		98.4	(80%-120%)		07/25/17 11:02
Chloride	50000				45200	ug/kg		90.4	(80%-120%)		
Fluoride	25000				23100	ug/kg		92.5	(80%-120%)		
Nitrate-N	25000				22700	ug/kg		90.9	(80%-120%)		
Nitrite-N	25000				23100	ug/kg		92.5	(80%-120%)		
Phosphorus in phosphate	12500				12600	ug/kg		100	(80%-120%)		
Sulfate	100000				92600	ug/kg		92.6	(80%-120%)		
QC1203834737 MB											
Bromide				U	670	ug/kg					07/25/17 10:33
Chloride				U	720	ug/kg					
Fluoride				U	340	ug/kg					
Nitrate-N				U	330	ug/kg					
Nitrite-N				U	330	ug/kg					
Phosphorus in phosphate				U	670	ug/kg					

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1683810											
Sulfate				U	1330	ug/kg				MAR1	07/25/17 10:33
QC1203834740 428197003 MS											
Bromide	12800	U	690		12500	ug/kg		97.6	(75%-125%)		07/25/17 12:28
Chloride	51300	B	1270		47000	ug/kg		89.1	(75%-125%)		
Fluoride	25700	U	350		23700	ug/kg		92.5	(75%-125%)		
Nitrate-N	25700	U	340		23400	ug/kg		91.1	(75%-125%)		
Nitrite-N	25700	U	340		24000	ug/kg		93.4	(75%-125%)		
Phosphorus in phosphate	12800	U	690		11300	ug/kg		88.2	(75%-125%)		
Sulfate	103000		4970		101000	ug/kg		93.7	(75%-125%)		
Nutrient Analysis											
Batch 1683503											
QC1203834004 428197003 DUP											
Nitrogen in Ammonia		C	6600		4340	ug/Kg	41.4 ^		(+/-2380)	KLP1	07/21/17 13:23
QC1203834003 LCS											
Nitrogen in Ammonia	50000				54500	ug/Kg		109	(80%-120%)		07/21/17 13:28
QC1203834002 MB											
Nitrogen in Ammonia				B	1370	ug/Kg					07/21/17 13:27
QC1203834005 428197003 MS											
Nitrogen in Ammonia	50500	C	6600		60000	ug/Kg		106	(75%-125%)		07/21/17 13:29

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QC Summary

Workorder: 428197

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis											
Batch 1683182											
QC1203833180 428015006 DUP											
Hexavalent Chromium		U	112	U	112	ug/Kg	N/A			VH1	07/24/17 10:58
QC1203833178 ILCS											
Hexavalent Chromium	7520				6460	ug/Kg		85.9	(80%-120%)		07/24/17 10:53
QC1203833177 LCS											
Hexavalent Chromium	3650				3480	ug/Kg		95.4	(80%-120%)		07/24/17 10:53
QC1203833176 MB											
Hexavalent Chromium				U	152	ug/Kg					07/24/17 10:53
QC1203833182 428015006 MS											
Hexavalent Chromium	3190	U	112		3170	ug/Kg		96.2	(75%-125%)		07/24/17 10:59
QC1203833186 428015006 MSD											
Hexavalent Chromium	3190	U	112		3210	ug/Kg	1.03	97.2	(0%-35%)		07/24/17 10:59

Notes:

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- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
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- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: August 1, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428313**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Flow Injection Analysis											
Batch 1683519											
QC1203834034 428197003 DUP											
Cyanide, Total		U	71.6	U	64.1	ug/kg	N/A			AXH3	07/21/17 14:33
QC1203835189 428313002 DUP											
Cyanide, Total		U	72.4	U	76.2	ug/kg	N/A				07/21/17 14:36
QC1203834033 LCS											
Cyanide, Total	108000			D	94300	ug/kg		87.3	(80%-120%)		07/21/17 14:27
QC1203834032 MB											
Cyanide, Total				U	83.5	ug/kg					07/21/17 14:26
QC1203834035 428197003 MS											
Cyanide, Total	4600	U	71.6		5280	ug/kg		115	(75%-125%)		07/21/17 14:33
QC1203835190 428313002 MS											
Cyanide, Total	5190	U	72.4		5710	ug/kg		110	(75%-125%)		07/21/17 14:37
Ion Chromatography											
Batch 1685540											
QC1203838989 428482007 DUP											
Bromide		U	757	U	756	ug/kg	N/A			MAR1	07/27/17 15:10
Chloride		B	1350	B	1290	ug/kg	4.26 ^		(+/-2260)		
Fluoride			1460		1320	ug/kg	9.84 ^		(+/-1130)		
Nitrate-N		U	373	U	372	ug/kg	N/A				
Nitrite-N		U	373	U	372	ug/kg	N/A				

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QC Summary

Workorder: 428313

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography										
Batch 1685540										
Phosphorus in phosphate	U	757	U	756	ug/kg	N/A			MAR1	07/27/17 15:10
Sulfate		10600		10100	ug/kg	4.34 ^		(+/-4510)		
QC1203838988 LCS										
Bromide	12500			12400	ug/kg		99.2	(80%-120%)		07/27/17 13:14
Chloride	50000			46100	ug/kg		92.2	(80%-120%)		
Fluoride	25000			23700	ug/kg		94.7	(80%-120%)		
Nitrate-N	25000			23000	ug/kg		92	(80%-120%)		
Nitrite-N	25000			23500	ug/kg		93.9	(80%-120%)		
Phosphorus in phosphate	12500			12000	ug/kg		96.2	(80%-120%)		
Sulfate	100000			95500	ug/kg		95.5	(80%-120%)		
QC1203838987 MB										
Bromide			U	670	ug/kg					07/27/17 12:45
Chloride			U	720	ug/kg					
Fluoride			U	340	ug/kg					
Nitrate-N			U	330	ug/kg					
Nitrite-N			U	330	ug/kg					
Phosphorus in phosphate			U	670	ug/kg					

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QC Summary

Workorder: 428313

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1685540											
Sulfate				U	1330	ug/kg				MAR1	07/27/17 12:45
QC1203838990 428482007 MS											
Bromide	14100	U	757		13200	ug/kg		93.6	(75%-125%)		07/27/17 15:39
Chloride	56500	B	1350		51800	ug/kg		89.3	(75%-125%)		
Fluoride	28300		1460		24200	ug/kg		80.5	(75%-125%)		
Nitrate-N	28300	U	373		25600	ug/kg		90.7	(75%-125%)		
Nitrite-N	28300	U	373		26200	ug/kg		92.8	(75%-125%)		
Phosphorus in phosphate	14100	U	757		11200	ug/kg		79.6	(75%-125%)		
Sulfate	113000		10600		118000	ug/kg		95	(75%-125%)		
Nutrient Analysis											
Batch 1683503											
QC1203834004 428197003 DUP											
Nitrogen in Ammonia		C	6600		4340	ug/Kg	41.4 ^		(+/-2380)	KLP1	07/21/17 13:23
QC1203834003 LCS											
Nitrogen in Ammonia	50000				54500	ug/Kg		109	(80%-120%)		07/21/17 13:28
QC1203834002 MB											
Nitrogen in Ammonia				B	1370	ug/Kg					07/21/17 13:27
QC1203834005 428197003 MS											
Nitrogen in Ammonia	50500	C	6600		60000	ug/Kg		106	(75%-125%)		07/21/17 13:29

GEL LABORATORIES LLC
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QC Summary

Workorder: **428313**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis											
Batch 1683182											
QC1203833180 428015006 DUP											
Hexavalent Chromium		U	112	U	112	ug/Kg	N/A			VH1	07/24/17 10:58
QC1203833178 ILCS											
Hexavalent Chromium	7520				6460	ug/Kg		85.9	(80%-120%)		07/24/17 10:53
QC1203833177 LCS											
Hexavalent Chromium	3650				3480	ug/Kg		95.4	(80%-120%)		07/24/17 10:53
QC1203833176 MB											
Hexavalent Chromium				U	152	ug/Kg					07/24/17 10:53
QC1203833182 428015006 MS											
Hexavalent Chromium	3190	U	112		3170	ug/Kg		96.2	(75%-125%)		07/24/17 10:59
QC1203833186 428015006 MSD											
Hexavalent Chromium	3190	U	112		3210	ug/Kg	1.03	97.2	(0%-35%)		07/24/17 10:59

Notes:

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- D Results are reported from a diluted aliquot of sample.
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- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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QC Summary

Report Date: August 3, 2017

CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: **Mr. Scot Fitzgerald**

Workorder: **428482**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Flow Injection Analysis											
Batch 1684460											
QC1203836330 428482005 DUP											
Cyanide, Total		U	83.1	B	81.0	ug/kg	544 ^		(+/-209)	AXH3	07/26/17 09:30
QC1203836329 LCS											
Cyanide, Total	108000			D	95100	ug/kg		88.1	(80%-120%)		07/26/17 09:21
QC1203837659 LCSD											
Cyanide, Total	108000			D	95500	ug/kg	0.42	88.4	(0%-35%)		07/26/17 09:22
QC1203836328 MB											
Cyanide, Total				U	83.5	ug/kg					07/26/17 09:20
QC1203836331 428482005 MS											
Cyanide, Total	4390	U	83.1		4910	ug/kg		112	(75%-125%)		07/26/17 09:31
Ion Chromatography											
Batch 1685540											
QC1203838989 428482007 DUP											
Bromide		U	757	U	756	ug/kg	N/A			MAR1	07/27/17 15:10
Chloride		B	1350	B	1290	ug/kg	4.26 ^		(+/-2260)		
Fluoride			1460		1320	ug/kg	9.84 ^		(+/-1130)		
Nitrate-N		U	373	U	372	ug/kg	N/A				
Nitrite-N		U	373	U	372	ug/kg	N/A				
Phosphorus in phosphate		U	757	U	756	ug/kg	N/A				

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QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography										
Batch 1685540										
Sulfate		10600		10100	ug/kg	4.34 ^		(+/-4510)	MAR1	07/27/17 15:10
QC1203838988 LCS										
Bromide	12500			12400	ug/kg		99.2	(80%-120%)		07/27/17 13:14
Chloride	50000			46100	ug/kg		92.2	(80%-120%)		
Fluoride	25000			23700	ug/kg		94.7	(80%-120%)		
Nitrate-N	25000			23000	ug/kg		92	(80%-120%)		
Nitrite-N	25000			23500	ug/kg		93.9	(80%-120%)		
Phosphorus in phosphate	12500			12000	ug/kg		96.2	(80%-120%)		
Sulfate	100000			95500	ug/kg		95.5	(80%-120%)		
QC1203838987 MB										
Bromide			U	670	ug/kg					07/27/17 12:45
Chloride			U	720	ug/kg					
Fluoride			U	340	ug/kg					
Nitrate-N			U	330	ug/kg					
Nitrite-N			U	330	ug/kg					
Phosphorus in phosphate			U	670	ug/kg					

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QC Summary

Workorder: 428482

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1685540											
Sulfate				U	1330	ug/kg				MAR1	07/27/17 12:45
QC1203838990 428482007 MS											
Bromide	14100	U	757		13200	ug/kg		93.6	(75%-125%)		07/27/17 15:39
Chloride	56500	B	1350		51800	ug/kg		89.3	(75%-125%)		
Fluoride	28300		1460		24200	ug/kg		80.5	(75%-125%)		
Nitrate-N	28300	U	373		25600	ug/kg		90.7	(75%-125%)		
Nitrite-N	28300	U	373		26200	ug/kg		92.8	(75%-125%)		
Phosphorus in phosphate	14100	U	757		11200	ug/kg		79.6	(75%-125%)		
Sulfate	113000		10600		118000	ug/kg		95	(75%-125%)		
Nutrient Analysis											
Batch 1684751											
QC1203837013 428482005 DUP											
Nitrogen in Ammonia			2750		2650	ug/Kg	3.55 ^		(+/-2440)	KLP1	08/02/17 13:20
QC1203837012 LCS											
Nitrogen in Ammonia	50000				50500	ug/Kg		101	(80%-120%)		08/02/17 13:18
QC1203837011 MB											
Nitrogen in Ammonia				U	900	ug/Kg					08/02/17 13:17
QC1203837014 428482005 MS											
Nitrogen in Ammonia	55000		2750		57800	ug/Kg		100	(75%-125%)		08/02/17 13:20

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QC Summary

Workorder: **428482**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis										
Batch 1684680										
QC1203836852 428482004 DUP										
Hexavalent Chromium	U	160	U	160	ug/Kg	N/A			VH1	08/01/17 10:21
QC1203836851 ILCS										
Hexavalent Chromium	6910			6030	ug/Kg		87.3	(80%-120%)		08/01/17 10:20
QC1203836850 LCS										
Hexavalent Chromium	3260			3250	ug/Kg		99.7	(80%-120%)		08/01/17 10:20
QC1203836849 MB										
Hexavalent Chromium			U	130	ug/Kg					08/01/17 10:20
QC1203836854 428482004 MS										
Hexavalent Chromium	3900	U	160	3000	ug/Kg		75.9	(75%-125%)		08/01/17 10:21
QC1203836858 428482004 MSD										
Hexavalent Chromium	3900	U	160	3080	ug/Kg	2.72	78	(0%-35%)		08/01/17 10:21

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Date: 29 September 2017
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 200-EA-1
Subject: Radiochemical - Sample Data Groups (SDGs) GEL426775, GEL427585, GEL428015, GEL428197, GEL428313 and GEL428482

INTRODUCTION

This memorandum presents the results of data validation for SDGs GEL426775, GEL427585, GEL428015, GEL428197, GEL428313 and GEL428482 prepared by GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3BBC3	06/29/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBC7	07/11/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBD1	07/11/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBD5	07/11/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBD9	07/13/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBF3	07/13/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBF7	07/13/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBH1	07/17/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBH5	07/17/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBH9	07/19/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium
B3BBK1	07/19/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma,

				Ni-63, Tc-99, Tritium
B3BBJ3	07/19/17	Soil	C	Iso-U, Am-241, Np-237, Iso-Pu, Total Sr, Gamma, Ni-63, Tc-99, Tritium

Data validation was conducted in accordance with the CHPRC validation statement of work and the Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site, DOE/RL-2017-35, Rev. 0 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days. There are no specific preservation requirements for radiochemical soil/solid analysis.

The samples were analyzed within the prescribed holding times.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the laboratory control sample accuracy limits are 80% to 120% and the matrix spike sample accuracy limits are 75% to 125%.

Matrix Spike (MS) Samples

All MS recoveries for tritium were acceptable.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%. When duplicate RPDs exceed the limits and have associated results <5X the MDCs the precision limits are ones specified by the DV procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDCs were below the CRDLs with the following exceptions. The Eu-152, Eu-154 and Eu-155 MDCs for samples B3BBC3, B3BBD1, B3BBH5, B3BBH9, B3BBK1 and B3BBJ3, the Eu-152 and Eu-154 MDCs for samples B3BBD5 and B3BBF7, the Pu-238 MDC for sample B3BBD9, the Eu-154 and Eu-155 MDCs for samples B3BBD9, B3BBF3 and B3BBH1, the Eu-154 MDC for sample B3BBC7 and the Am-241 MDCs for samples B3BBK1 and B3BBJ3 were > the CRDLs.

- **Completeness**

SDGs GEL426775, GEL427585, GEL428015, GEL428197, GEL428313 and GEL428482 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-002, Rev. 2, Change 0, *Data Validation for Radiochemical Analyses*, September 2016.

DOE/RL-2017-35, Rev. 0, *Characterization Sampling and Analysis Plan for the C9617 Borehole at the 216-A-29 Waste Site*, June 2017.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: GEL426775, GEL427585, GEL428015, GEL428197, GEL428313, GEL428482	Reviewer: AQA	Project: 200-EA-1	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Radiochemical	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

Validation Level:	A	B	(C)	D	E

Project: 200-EA-1	Data Package: VSR17-012
Validator: Eyda Hergenreder	Lab: GEL / Date: 09/29/17
	SDG: GEL426775, GEL427585, GEL428015, GEL428197, GEL428313, GEL428482

Analyses Performed

☐ Gross Alpha/Beta	X Strontium-90	X Technetium-99	X Alpha Spectroscopy	X Gamma Spectroscopy	X Tritium
X Total Uranium	☐ Radium-22	X Ni-63			

Samples/Matrix Soil

GEL426775: B3BBC3	GEL428197: B3BBH1, B3BBH5
GEL427585: B3BBC7, B3BBD1, B3BBD5	GEL428313: B3BBH9
GEL428015: B3BBD9, B3BBF3, B3BBF7	GEL428482: B3BBK1, B3BBJ3

1. Completeness and Case Narrative	☐ N/A
Technical verification forms present?	Yes (No) N/A

Comments:

2. Initial Calibration (Levels D, E)	☒ N/A
Instruments/detectors calibrated?	Yes No (N/A)
Initial calibration acceptable?	Yes No (N/A)
Standards NIST traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

3. Continuing Calibration (Levels D, E)	☒ N/A
Calibration checked within required frequency?	Yes No (N/A)
Calibration check acceptable?	Yes No (N/A)
Calibration check standards traceable?	Yes No (N/A)
Calibration check standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

4. Background Counts (Levels D, E)	☒ N/A
Background counts checked within required frequency?	Yes No (N/A)
Background counts acceptable?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E)	☐ N/A
Method blank analyzed within required frequency?	(Yes) No N/A
Method blank results acceptable?	(Yes) No N/A
Analytes detected in method blank?	Yes (No) N/A
Field blank(s) analyzed?	Yes (No) N/A
Field blank results acceptable?	Yes No (N/A)
Analytes detected in field blank(s)?	Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E)	Yes No (N/A)

Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	☐ N/A
LCS /BSS analyzed within required frequency?	(Yes) No N/A
LCS/BSS recoveries acceptable?	(Yes) No N/A
LCS/BSS traceable? (Levels D,E)	Yes No (N/A)
LCS/BSS expired? (Levels D,E)	Yes No (N/A)
LCS/BSS levels correct? (Levels D,E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

7. Chemical Carrier Recovery (Levels C, D, E)	☐ N/A
Chemical carrier added?	(Yes) No N/A
Chemical recovery acceptable?	(Yes) No N/A
Chemical carrier traceable? (Levels D, E)	Yes No (N/A)
Chemical carrier expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

8. Tracer Recovery (Levels C, D, E)	☐ N/A
Tracer added?	(Yes) No N/A
Tracer recovery acceptable?	(Yes) No N/A
Tracer traceable? (Levels D, E)	Yes No (N/A)
Tracer expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

9. Matrix Spikes (Levels C, D, E)	☐ N/A
Matrix spike analyzed?	(Yes) No N/A
Spike recoveries acceptable?	(Yes) No N/A
Spike source traceable? (Levels D, E)	Yes No (N/A)
Spike source expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

10. Duplicates (Levels C, D, E)	☐ N/A
Duplicates analyzed at required frequency?	(Yes) No N/A
RPD values acceptable?	(Yes) No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Appendix B - (Cont.) Radiochemical Data Validation Checklist

11. Field QC Samples (Levels C, D, E)	☐ N/A
Field duplicate sample(s) analyzed?	Yes (No) N/A
Field duplicate RPD values acceptable?	Yes No (N/A)
Field split sample(s) analyzed?	Yes (No) N/A
Field split RPD values acceptable?	Yes No (N/A)
Performance audit sample(s) analyzed?	Yes No (N/A)
Performance audit sample results acceptable?	Yes No (N/A)

Comments:

12. Holding Times (All levels)	☐ N/A
Are sample holding times acceptable?	(Yes) No N/A

Comments:

13. Results and MDCs (All Levels)	☐ N/A
Results reported for all required sample analyses?	(Yes) No N/A
Results supported in raw data?(Levels D, E)	Yes No (N/A)
Results acceptable? (Levels D, E)	Yes No (N/A)
MDC's meet required reporting limits?	Yes (No) N/A
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments: MDCs > CRDLs

Samples B3BBC3; B3BBD1, B3BBH5, B3BBH9, B3BBK1, B3BBJ3 Eu-152, Eu-154, Eu-155

Samples B3BBC7 Eu-154

Samples B3BBD5, B3BBF7 Eu-152, Eu-154

Sample B3BBD9 Pu-238,
Samples B3BBD9, B3BBF3, B3BBH1 Eu-154, Eu-155
Samples B3BBK1, B3BBJ3 Am-241

Appendix 4

Additional Documentation Requested By Client

QC Summary

Report Date: July 12, 2017
Page 1 of 6

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 426775

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1679643									
QC1203824495 MB									
Uranium-233/234			U	0.0531	pCi/g			BXA4	07/10/1711:15
Uncert:				+/-0.199					
TPU:				+/-0.199					
Uranium-235/236			U	0.111	pCi/g				
Uncert:				+/-0.304					
TPU:				+/-0.305					
Uranium-238			U	0.176	pCi/g				
Uncert:				+/-0.280					
TPU:				+/-0.281					
**Uranium-232 Tracer	19.7			17.5	pCi/g	REC: 89	(30%-105%)		
Uncert:				+/-2.30					
TPU:				+/-3.57					
QC1203824496 426775001 DUP									
Uranium-233/234		0.446	U	0.421	pCi/g				07/08/1711:01
Uncert:		+/-0.405		+/-0.479		RPD: 45	(0% - 100%)		
TPU:		+/-0.410		+/-0.483		RER: 0.0775	(0-2)		
Uranium-235/236	U	0.00	U	-0.0466	pCi/g				
Uncert:		+/-0.193		+/-0.206		RPD: 0	N/A		
TPU:		+/-0.193		+/-0.207		RER: 0.323	(0-2)		
Uranium-238		0.387		0.393	pCi/g				
Uncert:		+/-0.374		+/-0.379		RPD: 1	(0% - 100%)		
TPU:		+/-0.378		+/-0.383		RER: 0.0201	(0-2)		
**Uranium-232 Tracer	19.7	19.3		17.6	pCi/g	REC: 89	(30%-105%)		
Uncert:		+/-2.47		+/-2.46					
TPU:		+/-3.81		+/-3.77					
QC1203824497 LCS									
Uranium-233/234				26.7	pCi/g				07/08/1711:01
Uncert:				+/-2.78					
TPU:				+/-4.72					
Uranium-235/236				1.58	pCi/g				
Uncert:				+/-0.775					
TPU:				+/-0.807					
Uranium-238	25.5			26.0	pCi/g	REC: 102	(80%-120%)		
Uncert:				+/-2.75					
TPU:				+/-4.62					
**Uranium-232 Tracer	19.7			17.8	pCi/g	REC: 91	(30%-105%)		
Uncert:				+/-2.40					
TPU:				+/-3.70					
Batch 1679649									
QC1203824510 MB									
Americium-241			U	0.161	pCi/g			BXA4	07/10/1713:54
Uncert:				+/-0.232					
TPU:				+/-0.233					
						REC:			

QC Summary

Workorder: 426775

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1679649									
**Americium-243 Tracer	19.8			18.0	pCi/g	91	(30%-105%)		
Uncert:				+/-2.10					
TPU:				+/-3.25					
QC1203824511 426775001 DUP									
Americium-241	U	0.103	U	-0.0223	pCi/g				07/08/1711:47
Uncert:		+/-0.284		+/-0.192		RPD: 0	N/A		
TPU:		+/-0.284		+/-0.193		RER: 0.716	(0-2)		
**Americium-243 Tracer	19.8	14.5		15.9	pCi/g	REC: 81	(30%-105%)		
Uncert:		+/-2.50		+/-2.65					
TPU:		+/-3.80		+/-3.98					
QC1203824512 LCS									
Americium-241	18.6			17.7	pCi/g	REC: 95	(80%-120%)		07/10/1713:54
Uncert:				+/-3.48					
TPU:				+/-4.92					
**Americium-243 Tracer	19.8			6.24	pCi/g	REC: 32	(30%-105%)		
Uncert:				+/-3.65					
TPU:				+/-5.33					
Batch 1679650									
QC1203824513 MB									
Neptunium-237			U	-0.0333	pCi/g			BXA4	07/07/1708:28
Uncert:				+/-0.147					
TPU:				+/-0.148					
**Americium-243 Tracer	1960			1820	pCi/g	REC: 93	(30%-105%)		
QC1203824514 426775001 DUP									
Neptunium-237	U	0.0811	U	0.126	pCi/g				07/07/1708:28
Uncert:		+/-0.223		+/-0.248		RPD: 0	N/A		
TPU:		+/-0.223		+/-0.248		RER: 0.264	(0-2)		
**Americium-243 Tracer	2100	1990		2050	pCi/g	REC: 98	(30%-105%)		
QC1203824515 LCS									
Neptunium-237	41.0			41.5	pCi/g	REC: 101	(80%-120%)		07/07/1708:28
Uncert:				+/-3.66					
TPU:				+/-5.83					
**Americium-243 Tracer	1960			1570	pCi/g	REC: 80	(30%-105%)		
Batch 1679651									
QC1203824516 MB									
Plutonium-238			U	-0.055	pCi/g			BXA4	07/08/1711:46
Uncert:				+/-0.166					
TPU:				+/-0.166					
Plutonium-239/240			U	0.0427	pCi/g				
Uncert:				+/-0.276					
TPU:				+/-0.276					
**Plutonium-242 Tracer	18.6			18.1	pCi/g	REC: 98	(30%-105%)		
Uncert:				+/-2.35					
TPU:				+/-3.49					
QC1203824517 426775001 DUP									
Plutonium-238	U	-0.0383	U	0.00	pCi/g				07/08/1711:46
Uncert:		+/-0.170		+/-0.268		RPD: 0	N/A		
TPU:		+/-0.170		+/-0.269		RER: 0.236	(0-2)		
Plutonium-239/240	U	-0.0767	U	0.202	pCi/g				
Uncert:		+/-0.178		+/-0.463		RPD: 0	N/A		

QC Summary

Workorder: 426775

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Alpha Spec										
Batch 1679651										
	TPU:	+/-0.178		+/-0.465						
						RER:	1.1	(0-2)		
**Plutonium-242 Tracer	18.6	13.8		9.95	pCi/g	REC:	54	(30%-105%)		
	Uncert:	+/-2.43		+/-3.10						
	TPU:	+/-3.61		+/-4.51						
QC1203824518 LCS										
Plutonium-238				0.444	pCi/g					07/08/1711:46
	Uncert:			+/-0.428						
	TPU:			+/-0.433						
Plutonium-239/240	18.6			22.3	pCi/g	REC:	120	(80%-120%)		
	Uncert:			+/-2.77						
	TPU:			+/-4.31						
**Plutonium-242 Tracer	18.6			14.3	pCi/g	REC:	77	(30%-105%)		
	Uncert:			+/-2.53						
	TPU:			+/-3.73						
Rad Gamma Spec										
Batch 1678945										
QC1203823036 MB										
Cesium-137			U	0.0112	pCi/g				MJH1	07/05/1716:54
	Uncert:			+/-0.0274						
	TPU:			+/-0.0279						
Cobalt-60			U	0.032	pCi/g					
	Uncert:			+/-0.0276						
	TPU:			+/-0.0313						
Europium-152			U	-0.0327	pCi/g					
	Uncert:			+/-0.0617						
	TPU:			+/-0.0635						
Europium-154			U	-0.0101	pCi/g					
	Uncert:			+/-0.0696						
	TPU:			+/-0.0698						
Europium-155			U	-0.00865	pCi/g					
	Uncert:			+/-0.0538						
	TPU:			+/-0.0539						
QC1203823037 426775001 DUP										
Cesium-137	U	-0.0194	UX	0.00	pCi/g					07/06/1708:19
	Uncert:	+/-0.0443		+/-0.057		RPD:	0	N/A		
	TPU:	+/-0.0452		+/-0.0575		RER:	2.27	(0-2)		
Cobalt-60	U	0.0117	U	0.0193	pCi/g					
	Uncert:	+/-0.0469		+/-0.032		RPD:	0	N/A		
	TPU:	+/-0.0472		+/-0.0332		RER:	0.259	(0-2)		
Europium-152	U	-0.0342	U	-0.0145	pCi/g					
	Uncert:	+/-0.110		+/-0.0758		RPD:	0	N/A		
	TPU:	+/-0.111		+/-0.0761		RER:	0.286	(0-2)		
Europium-154	U	0.0854	U	-0.031	pCi/g					
	Uncert:	+/-0.145		+/-0.123		RPD:	0	N/A		
	TPU:	+/-0.150		+/-0.124		RER:	1.17	(0-2)		
Europium-155	U	0.0377	U	0.0208	pCi/g					
	Uncert:	+/-0.0976		+/-0.0732		RPD:	0	N/A		
	TPU:	+/-0.0991		+/-0.0738		RER:	0.269	(0-2)		

QC Summary

Workorder: 426775

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Gamma Spec										
Batch 1678945										
QC1203823038 LCS										
Americium-241	683			621	pCi/g	REC:	91	(80%-120%)		07/06/1708:21
Uncert:				+/-8.77						
TPU:				+/-61.9						
Cesium-137	219			198	pCi/g	REC:	90	(80%-120%)		
Uncert:				+/-3.02						
TPU:				+/-19.0						
Cobalt-60	126			118	pCi/g	REC:	94	(80%-120%)		
Uncert:				+/-3.04						
TPU:				+/-12.3						
Europium-152			U	0.365	pCi/g					
Uncert:				+/-1.19						
TPU:				+/-1.20						
Europium-154			U	-0.0991	pCi/g					
Uncert:				+/-0.922						
TPU:				+/-0.924						
Europium-155			U	0.335	pCi/g					
Uncert:				+/-0.939						
TPU:				+/-0.952						
Rad Gas Flow										
Batch 1678784										
QC1203822661 MB										
Total Strontium			U	0.00763	pCi/g				KSD1	07/06/1716:03
Uncert:				+/-0.449						
TPU:				+/-0.449						
**Strontium Carrier	7.75			6.70	mg	REC:	87	(40%-110%)		
QC1203822662 426736001 DUP										
Total Strontium	U	0.235	U	-0.122	pCi/g					07/06/1716:04
Uncert:		+/-0.845		+/-0.604		RPD:	0	N/A		
TPU:		+/-0.847		+/-0.604		RER:	0.671	(0-2)		
**Strontium Carrier	7.75	6.20		6.80	mg	REC:	88	(40%-110%)		
QC1203822663 LCS										
Total Strontium	39.7			39.8	pCi/g	REC:	100	(80%-120%)		07/06/1716:04
Uncert:				+/-2.31						
TPU:				+/-10.3						
**Strontium Carrier	7.75			6.70	mg	REC:	87	(40%-110%)		
Rad Liquid Scintillation										
Batch 1678884										
QC1203822860 MB										
Nickel-63			U	0.683	pCi/g				TXJ1	07/07/1708:12
Uncert:				+/-4.22						
TPU:				+/-4.22						
**Nickel Carrier	25.2			19.4	mg	REC:	77	(40%-110%)		
QC1203822861 426633001 DUP										
Nickel-63	U	2.22	U	1.72	pCi/g					07/06/1721:14
Uncert:		+/-6.87		+/-6.33		RPD:	0	N/A		
TPU:		+/-6.88		+/-6.33		RER:	0.104	(0-2)		
**Nickel Carrier	25.2	20.1		21.3	mg	REC:	85	(40%-110%)		
QC1203822862 LCS										
						REC:				

QC Summary

Workorder: 426775

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch 1678884									
Nickel-63	479			482	pCi/g	101	(80%-120%)		
	Uncert:			+/-18.7					
	TPU:			+/-91.4					
**Nickel Carrier	25.2			21.1	mg	REC: 84	(40%-110%)		
Batch 1678899									
QC1203822903 MB									
Technetium-99			U	0.136	pCi/g			GXR1	07/10/1707:24
	Uncert:			+/-1.51					
	TPU:			+/-1.51					
**Technetium-99m Tracer	25800			24900	CPM	REC: 97	(30%-105%)		
QC1203822904 426736001 DUP									
Technetium-99	U	0.575	U	-0.15	pCi/g				07/10/1707:51
	Uncert:	+/-1.58		+/-1.57		RPD: 0	N/A		
	TPU:	+/-1.59		+/-1.57		RER: 0.637	(0-2)		
**Technetium-99m Tracer	25800	25700		25300	CPM	REC: 98	(30%-105%)		
QC1203822906 LCS									
Technetium-99	68.2			58.5	pCi/g	REC: 86	(80%-120%)		07/10/1708:17
	Uncert:			+/-2.79					
	TPU:			+/-7.28					
**Technetium-99m Tracer	25800			25800	CPM	REC: 100	(30%-105%)		
Batch 1680886									
QC1203827282 MB									
Tritium			U	1.63	pCi/g			BXM4	07/11/1719:47
	Uncert:			+/-12.9					
	TPU:			+/-12.9					
QC1203827283 426775001 DUP									
Tritium	U	-1.22	U	-5.05	pCi/g				07/11/1720:08
	Uncert:	+/-12.6		+/-12.4		RPD: 0	N/A		
	TPU:	+/-12.6		+/-12.4		RER: 0.423	(0-2)		
QC1203827285 426775001 MS									
Tritium	148 U	-1.22		147	pCi/g	REC: 100	(75%-125%)		07/11/1720:30
	Uncert:	+/-12.6		+/-31.6					
	TPU:	+/-12.6		+/-46.0					
QC1203827287 LCS									
Tritium	88.9			80.0	pCi/g	REC: 90	(80%-120%)		07/11/1720:51
	Uncert:			+/-18.2					
	TPU:			+/-25.7					

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 25, 2017
Page 1 of 6

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 427585

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Alpha Spec										
Batch 1681761										
QC1203829534 MB										
Americium-241			U	0.0368	pCi/g				HAKB	07/15/1710:41
Uncert:				+/-0.237						
TPU:				+/-0.238						
**Americium-243 Tracer	19.1			17.0	pCi/g	REC:	89	(30%-105%)		
Uncert:				+/-2.19						
TPU:				+/-3.36						
QC1203829535 427585001 DUP										
Americium-241	U	0.134	U	0.0719	pCi/g					
Uncert:		+/-0.263		+/-0.270		RPD:	0	N/A		
TPU:		+/-0.264		+/-0.270		RER:	0.322	(0-2)		
**Americium-243 Tracer	20.4	13.2		11.7	pCi/g	REC:	58	(30%-105%)		
Uncert:		+/-2.36		+/-2.71						
TPU:		+/-3.58		+/-4.08						
QC1203829536 LCS										
Americium-241	17.9			16.4	pCi/g	REC:	92	(80%-120%)		07/15/1710:41
Uncert:				+/-2.07						
TPU:				+/-3.03						
**Americium-243 Tracer	19.1			15.9	pCi/g	REC:	83	(30%-105%)		
Uncert:				+/-2.22						
TPU:				+/-3.39						
Batch 1681762										
QC1203829537 MB										
Neptunium-237			U	0.240	pCi/g				HAKB	07/17/1715:28
Uncert:				+/-0.328						
TPU:				+/-0.329						
**Americium-243 Tracer	2000			1850	pCi/g	REC:	92	(30%-105%)		
QC1203829538 427585001 DUP										
Neptunium-237	U	0.0186	U	0.0576	pCi/g					07/15/1710:20
Uncert:		+/-0.194		+/-0.405		RPD:	0	N/A		
TPU:		+/-0.194		+/-0.405		RER:	0.17	(0-2)		
**Americium-243 Tracer	2120	2030		1940	pCi/g	REC:	92	(30%-105%)		
QC1203829539 LCS										
Neptunium-237	41.7			46.9	pCi/g	REC:	112	(80%-120%)		07/17/1715:33
Uncert:				+/-3.83						
TPU:				+/-6.64						
**Americium-243 Tracer	2000			1930	pCi/g	REC:	96	(30%-105%)		
Batch 1681763										
QC1203829543 MB										
Plutonium-238			U	-0.0158	pCi/g				HAKB	07/15/1710:41
Uncert:				+/-0.137						
TPU:				+/-0.137						
Plutonium-239/240			U	0.00264	pCi/g					
Uncert:				+/-0.196						

QC Summary

Workorder: 427585

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1681763									
	TPU:			+/-0.196					
**Plutonium-242 Tracer	17.9			14.2	pCi/g	REC:	80 (30%-105%)		
	Uncert:			+/-2.14					
	TPU:			+/-3.19					
QC1203829544 427585001 DUP									
Plutonium-238	U	0.0519	U	-0.0105	pCi/g				
	Uncert:	+/-0.195		+/-0.376		RPD:	0 N/A		
	TPU:	+/-0.195		+/-0.376		RER:	0.289 (0-2)		
Plutonium-239/240	U	0.0547	U	-0.252	pCi/g				
	Uncert:	+/-0.245		+/-0.227		RPD:	0 N/A		
	TPU:	+/-0.245		+/-0.227		RER:	1.8 (0-2)		
**Plutonium-242 Tracer	19.1	12.6		14.2	pCi/g	REC:	74 (30%-105%)		
	Uncert:	+/-2.18		+/-2.56					
	TPU:	+/-3.25		+/-3.78					
QC1203829545 LCS									
Plutonium-238			U	0.0831	pCi/g				07/18/1710:32
	Uncert:			+/-0.229					
	TPU:			+/-0.229					
Plutonium-239/240	18.0			19.4	pCi/g	REC:	108 (80%-120%)		
	Uncert:			+/-2.20					
	TPU:			+/-3.36					
**Plutonium-242 Tracer	17.9			14.4	pCi/g	REC:	81 (30%-105%)		
	Uncert:			+/-2.12					
	TPU:			+/-3.16					
Batch 1681764									
QC1203829546 MB									
Uranium-233/234			U	-0.101	pCi/g			HAKB	07/19/1709:44
	Uncert:			+/-0.127					
	TPU:			+/-0.127					
Uranium-235/236			U	-0.0311	pCi/g				
	Uncert:			+/-0.138					
	TPU:			+/-0.138					
Uranium-238			U	0.0273	pCi/g				
	Uncert:			+/-0.151					
	TPU:			+/-0.152					
**Uranium-232 Tracer	19.1			19.0	pCi/g	REC:	100 (30%-105%)		
	Uncert:			+/-1.98					
	TPU:			+/-3.14					
QC1203829547 427585001 DUP									
Uranium-233/234		0.669		0.794	pCi/g				
	Uncert:	+/-0.488		+/-0.486		RPD:	17 (0% - 100%)		
	TPU:	+/-0.497		+/-0.498		RER:	0.347 (0-2)		
Uranium-235/236	U	0.00	U	0.137	pCi/g				
	Uncert:	+/-0.184		+/-0.270		RPD:	0 N/A		
	TPU:	+/-0.185		+/-0.271		RER:	0.822 (0-2)		
Uranium-238	U	0.296		0.713	pCi/g				
	Uncert:	+/-0.326		+/-0.451		RPD:	83 (0% - 100%)		
	TPU:	+/-0.329		+/-0.461		RER:	1.44 (0-2)		
**Uranium-232 Tracer	20.4	16.7		17.5	pCi/g	REC:	86 (30%-105%)		
	Uncert:	+/-2.34		+/-2.26					

QC Summary

Workorder: 427585

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1681764									
	TPU:	+/-3.60		+/-3.55					
QC1203829548 LCS									
Uranium-233/234				23.6	pCi/g				07/15/1710:09
	Uncert:			+/-2.54					
	TPU:			+/-4.18					
Uranium-235/236				0.610	pCi/g				
	Uncert:			+/-0.485					
	TPU:			+/-0.492					
Uranium-238	24.6			28.3	pCi/g	REC:	115 (80%-120%)		
	Uncert:			+/-2.77					
	TPU:			+/-4.85					
**Uranium-232 Tracer	19.1			17.8	pCi/g	REC:	93 (30%-105%)		
	Uncert:			+/-2.28					
	TPU:			+/-3.53					
Rad Gamma Spec									
Batch 1681640									
QC1203829297 MB									
Cesium-137			U	-0.0067	pCi/g			MXR1	07/13/1715:47
	Uncert:			+/-0.0234					
	TPU:			+/-0.0236					
Cobalt-60			U	0.00606	pCi/g				
	Uncert:			+/-0.0166					
	TPU:			+/-0.0168					
Europium-152			U	0.0765	pCi/g				
	Uncert:			+/-0.0807					
	TPU:			+/-0.0881					
Europium-154			U	-0.0486	pCi/g				
	Uncert:			+/-0.0504					
	TPU:			+/-0.0551					
Europium-155			U	0.0177	pCi/g				
	Uncert:			+/-0.0368					
	TPU:			+/-0.0377					
QC1203829298 427585001 DUP									
Cesium-137		U -0.0184	U	0.00343	pCi/g				07/14/1707:12
	Uncert:	+/-0.0162		+/-0.0209		RPD:	0 N/A		
	TPU:	+/-0.0182		+/-0.021		RER:	1.54 (0-2)		
Cobalt-60		U -0.003	U	0.00118	pCi/g				
	Uncert:	+/-0.0176		+/-0.0242		RPD:	0 N/A		
	TPU:	+/-0.0177		+/-0.0242		RER:	0.274 (0-2)		
Europium-152		U 0.0198	U	0.0281	pCi/g				
	Uncert:	+/-0.0381		+/-0.0515		RPD:	0 N/A		
	TPU:	+/-0.0392		+/-0.0531		RER:	0.247 (0-2)		
Europium-154		U 0.0365	U	-0.00403	pCi/g				
	Uncert:	+/-0.0495		+/-0.0718		RPD:	0 N/A		
	TPU:	+/-0.0522		+/-0.0718		RER:	0.894 (0-2)		
Europium-155		U -0.00119	U	0.0168	pCi/g				
	Uncert:	+/-0.0363		+/-0.0564		RPD:	0 N/A		
	TPU:	+/-0.0363		+/-0.0569		RER:	0.522 (0-2)		
QC1203829299 LCS									
Americium-241	489			542	pCi/g	REC:	111 (80%-120%)		07/14/1707:12

QC Summary

Workorder: 427585

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Gamma Spec										
Batch 1681640										
	Uncert:			+/-5.05						
	TPU:			+/-39.9						
Cesium-137	176			187	pCi/g	REC:	106	(80%-120%)		
	Uncert:			+/-3.04						
	TPU:			+/-8.56						
Cobalt-60	145			140	pCi/g	REC:	97	(80%-120%)		
	Uncert:			+/-3.23						
	TPU:			+/-6.10						
Europium-152			U	-0.119	pCi/g					
	Uncert:			+/-1.18						
	TPU:			+/-1.18						
Europium-154			U	-0.381	pCi/g					
	Uncert:			+/-0.764						
	TPU:			+/-0.783						
Europium-155			U	0.256	pCi/g					
	Uncert:			+/-0.807						
	TPU:			+/-0.815						
Rad Gas Flow										
Batch 1681608										
QC1203829209 MB										
Total Strontium			U	0.191	pCi/g				KSD1	07/14/1715:27
	Uncert:			+/-0.891						
	TPU:			+/-0.893						
**Strontium Carrier	7.75			4.90	mg	REC:	63	(40%-110%)		
QC1203829210 427585005 DUP										
Total Strontium	U	-0.351	U	-0.873	pCi/g					07/14/1715:32
	Uncert:	+/-0.678		+/-0.941		RPD:	0	N/A		
	TPU:	+/-0.678		+/-0.941		RER:	0.881	(0-2)		
**Strontium Carrier	7.75	5.80		6.20	mg	REC:	80	(40%-110%)		
QC1203829211 LCS										
Total Strontium	54.4			55.1	pCi/g	REC:	101	(80%-120%)		07/14/1715:32
	Uncert:			+/-3.47						
	TPU:			+/-14.7						
**Strontium Carrier	7.75			6.20	mg	REC:	80	(40%-110%)		
Rad Liquid Scintillation										
Batch 1682150										
QC1203830476 MB										
Nickel-63			U	1.90	pCi/g				TXJ1	07/20/1707:41
	Uncert:			+/-3.73						
	TPU:			+/-3.75						
**Nickel Carrier	25.2			22.2	mg	REC:	88	(40%-110%)		
QC1203830477 427585001 DUP										
Nickel-63	U	-0.0606	U	1.24	pCi/g					07/20/1708:13
	Uncert:	+/-4.19		+/-3.79		RPD:	0	N/A		
	TPU:	+/-4.19		+/-3.79		RER:	0.453	(0-2)		
**Nickel Carrier	25.2	19.3		21.7	mg	REC:	86	(40%-110%)		
QC1203830478 LCS										
Nickel-63	259			297	pCi/g	REC:	115	(80%-120%)		07/20/1708:44
	Uncert:			+/-10.3						

QC Summary

Workorder: 427585

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch 1682150									
TPU:				+/-55.8					
**Nickel Carrier	25.2			18.5	mg	REC: 73	(40%-110%)		
Batch 1682162									
QC1203830520 MB									
Technetium-99			U	0.959	pCi/g			CXS7	07/23/1710:03
Uncert:				+/-1.86					
TPU:				+/-1.86					
**Technetium-99m Tracer	4.55E+05			4.13E+05	CPM	REC: 91	(30%-105%)		
QC1203830521 427585001 DUP									
Technetium-99	U	2.02	U	0.899	pCi/g				07/23/1710:19
Uncert:		+/-2.19		+/-2.31		RPD: 0	N/A		
TPU:		+/-2.20		+/-2.32		RER: 0.687	(0-2)		
**Technetium-99m Tracer	4.55E+05	3.96E+05		3.68E+05	CPM	REC: 81	(30%-105%)		
QC1203830522 LCS									
Technetium-99	62.2			57.2	pCi/g	REC: 92	(80%-120%)		07/23/1708:41
Uncert:				+/-3.73					
TPU:				+/-7.54					
**Technetium-99m Tracer	4.55E+05			3.84E+05	CPM	REC: 84	(30%-105%)		
Batch 1682166									
QC1203830526 MB									
Tritium			U	5.03	pCi/g			BXM4	07/20/1717:23
Uncert:				+/-10.6					
TPU:				+/-10.6					
QC1203830527 427585001 DUP									
Tritium	U	0.113	U	2.42	pCi/g				07/20/1717:55
Uncert:		+/-10.2		+/-10.4		RPD: 0	N/A		
TPU:		+/-10.2		+/-10.5		RER: 0.309	(0-2)		
QC1203830528 427585001 MS									
Tritium	148 U	0.113		131	pCi/g	REC: 89	(75%-125%)		07/20/1714:45
Uncert:		+/-10.2		+/-24.3					
TPU:		+/-10.2		+/-38.4					
QC1203830529 LCS									
Tritium	88.7			76.8	pCi/g	REC: 87	(80%-120%)		07/20/1718:26
Uncert:				+/-14.8					
TPU:				+/-22.9					

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 28, 2017
Page 1 of 6

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Alpha Spec										
Batch 1683193										
QC1203833229 MB										
Americium-241			U	-0.0488	pCi/g				MXS2	07/20/1709:54
Uncert:				+/-0.147						
TPU:				+/-0.148						
**Americium-243 Tracer	18.7			14.7	pCi/g	REC:	79	(30%-105%)		
Uncert:				+/-2.20						
TPU:				+/-3.36						
QC1203833230 428015004 DUP										
Americium-241	U	0.173	U	-0.0861	pCi/g					07/20/1709:54
Uncert:		+/-0.297		+/-0.200		RPD:	0	N/A		
TPU:		+/-0.298		+/-0.200		RER:	1.42	(0-2)		
**Americium-243 Tracer	20.4	13.5		14.6	pCi/g	REC:	72	(30%-105%)		
Uncert:		+/-2.49		+/-2.64						
TPU:		+/-3.74		+/-3.98						
QC1203833231 LCS										
Americium-241	17.6			15.0	pCi/g	REC:	85	(80%-120%)		
Uncert:				+/-1.73						
TPU:				+/-2.52						
**Americium-243 Tracer	18.7			18.5	pCi/g	REC:	99	(30%-105%)		
Uncert:				+/-1.91						
TPU:				+/-2.98						
Batch 1683194										
QC1203833232 MB										
Neptunium-237			U	-0.0252	pCi/g				MXS2	07/19/1714:24
Uncert:				+/-0.174						
TPU:				+/-0.174						
**Americium-243 Tracer	1940			1850	pCi/g	REC:	95	(30%-105%)		
QC1203833233 428015004 DUP										
Neptunium-237	U	0.336	U	0.0912	pCi/g					07/19/1714:25
Uncert:		+/-0.296		+/-0.256		RPD:	0	N/A		
TPU:		+/-0.298		+/-0.256		RER:	1.22	(0-2)		
**Americium-243 Tracer	2100	1910		1910	pCi/g	REC:	91	(30%-105%)		
QC1203833234 LCS										
Neptunium-237	40.6			43.9	pCi/g	REC:	108	(80%-120%)		07/19/1714:25
Uncert:				+/-3.56						
TPU:				+/-5.95						
**Americium-243 Tracer	1940			1900	pCi/g	REC:	98	(30%-105%)		
Batch 1683196										
QC1203833235 MB										
Plutonium-238			U	0.169	pCi/g				MXS2	07/20/1709:54
Uncert:				+/-0.364						
TPU:				+/-0.365						
Plutonium-239/240			U	0.00287	pCi/g					
Uncert:				+/-0.213						

QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Alpha Spec										
Batch 1683196										
TPU:				+/-0.213						
**Plutonium-236 Tracer	12.6			11.6	pCi/g	REC:	92	(30%-105%)		
Uncert:				+/-1.87						
TPU:				+/-2.75						
QC1203833236 428015004 DUP										
Plutonium-238	U	0.508	U	-0.0382	pCi/g					07/20/1709:54
Uncert:		+/-0.691		+/-0.264		RPD:	0	N/A		
TPU:		+/-0.696		+/-0.264		RER:	1.44	(0-2)		
Plutonium-239/240	U	0.0665	U	0.0902	pCi/g					
Uncert:		+/-0.357		+/-0.308		RPD:	0	N/A		
TPU:		+/-0.357		+/-0.309		RER:	0.0984	(0-2)		
**Plutonium-236 Tracer	13.8	9.80		10.3	pCi/g	REC:	75	(30%-105%)		
Uncert:		+/-1.93		+/-2.15						
TPU:		+/-2.82		+/-3.15						
QC1203833237 LCS										
Plutonium-238			U	0.0925	pCi/g					
Uncert:				+/-0.254						
TPU:				+/-0.255						
Plutonium-239/240	17.6			16.0	pCi/g	REC:	91	(80%-120%)		
Uncert:				+/-2.12						
TPU:				+/-3.32						
**Plutonium-236 Tracer	12.6			9.59	pCi/g	REC:	76	(30%-105%)		
Uncert:				+/-1.88						
TPU:				+/-2.75						
Batch 1683197										
QC1203833238 MB										
Uranium-233/234			U	0.107	pCi/g				MXS2	07/20/1709:22
Uncert:				+/-0.238						
TPU:				+/-0.238						
Uranium-235/236			U	-0.0459	pCi/g					
Uncert:				+/-0.139						
TPU:				+/-0.139						
Uranium-238			U	0.0785	pCi/g					
Uncert:				+/-0.180						
TPU:				+/-0.180						
**Uranium-232 Tracer	18.8			18.8	pCi/g	REC:	100	(30%-105%)		
Uncert:				+/-1.96						
TPU:				+/-3.12						
QC1203833239 428015004 DUP										
Uranium-233/234		1.08		0.572	pCi/g					07/20/1709:22
Uncert:		+/-0.525		+/-0.468		RPD:	61	(0% - 100%)		
TPU:		+/-0.543		+/-0.475		RER:	1.37	(0-2)		
Uranium-235/236	U	0.0363	U	0.171	pCi/g					
Uncert:		+/-0.201		+/-0.336		RPD:	0	N/A		
TPU:		+/-0.202		+/-0.337		RER:	0.672	(0-2)		
Uranium-238		0.988	U	0.374	pCi/g					
Uncert:		+/-0.484		+/-0.381		RPD:	90	(0% - 100%)		
TPU:		+/-0.501		+/-0.384		RER:	1.91	(0-2)		
**Uranium-232 Tracer	20.4	17.0		15.3	pCi/g	REC:	75	(30%-105%)		
Uncert:		+/-2.05		+/-2.51						

QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1683197									
TPU:		+/-3.23		+/-3.88					
QC1203833240 LCS									
Uranium-233/234				22.5	pCi/g				07/20/1710:32
Uncert:				+/-2.57					
TPU:				+/-4.15					
Uranium-235/236				1.68	pCi/g				
Uncert:				+/-0.800					
TPU:				+/-0.836					
Uranium-238	24.1			25.5	pCi/g	REC: 106	(80%-120%)		
Uncert:				+/-2.73					
TPU:				+/-4.59					
**Uranium-232 Tracer	18.8			16.0	pCi/g	REC: 85	(30%-105%)		
Uncert:				+/-2.36					
TPU:				+/-3.63					
Rad Gamma Spec									
Batch 1683314									
QC1203833585 MB									
Cesium-137			U	0.0106	pCi/g			MXR1	07/27/1712:19
Uncert:				+/-0.0143					
TPU:				+/-0.0151					
Cobalt-60			U	-0.0016	pCi/g				
Uncert:				+/-0.00938					
TPU:				+/-0.0094					
Europium-152			U	-0.00751	pCi/g				
Uncert:				+/-0.0384					
TPU:				+/-0.0385					
Europium-154			U	-0.0199	pCi/g				
Uncert:				+/-0.0475					
TPU:				+/-0.0484					
Europium-155			U	-0.0337	pCi/g				
Uncert:				+/-0.0429					
TPU:				+/-0.0457					
QC1203833586 428015004 DUP									
Cesium-137	U	-0.00561	U	0.00264	pCi/g				07/27/1715:39
Uncert:		+/-0.0233		+/-0.0161		RPD: 0	N/A		
TPU:		+/-0.0235		+/-0.0162		RER: 0.568	(0-2)		
Cobalt-60	U	0.00302	U	-0.00389	pCi/g				
Uncert:		+/-0.0223		+/-0.0199		RPD: 0	N/A		
TPU:		+/-0.0223		+/-0.0199		RER: 0.453	(0-2)		
Europium-152	U	0.00347	U	0.043	pCi/g				
Uncert:		+/-0.0473		+/-0.0455		RPD: 0	N/A		
TPU:		+/-0.0473		+/-0.0495		RER: 1.13	(0-2)		
Europium-154	U	-0.0168	U	0.00815	pCi/g				
Uncert:		+/-0.0679		+/-0.060		RPD: 0	N/A		
TPU:		+/-0.0684		+/-0.0601		RER: 0.537	(0-2)		
Europium-155	U	0.0436	U	0.0544	pCi/g				
Uncert:		+/-0.0567		+/-0.0361		RPD: 0	N/A		
TPU:		+/-0.060		+/-0.0438		RER: 0.283	(0-2)		
QC1203833587 LCS									
Americium-241	488			511	pCi/g	REC: 105	(80%-120%)		07/27/1714:36

QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Gamma Spec										
Batch 1683314										
	Uncert:			+/-12.0						
	TPU:			+/-60.0						
Cesium-137	176			177	pCi/g	REC:	101	(80%-120%)		
	Uncert:			+/-3.46						
	TPU:			+/-19.4						
Cobalt-60	144			142	pCi/g	REC:	99	(80%-120%)		
	Uncert:			+/-3.60						
	TPU:			+/-12.5						
Europium-152			U	0.716	pCi/g					
	Uncert:			+/-1.47						
	TPU:			+/-1.51						
Europium-154			U	-0.148	pCi/g					
	Uncert:			+/-0.829						
	TPU:			+/-0.832						
Europium-155			U	-1.37	pCi/g					
	Uncert:			+/-1.46						
	TPU:			+/-1.59						
Rad Gas Flow										
Batch 1683027										
QC1203832684 MB										
Total Strontium			U	1.09	pCi/g				LXB3	07/21/1708:12
	Uncert:			+/-0.854						
	TPU:			+/-0.901						
**Strontium Carrier	7.75			7.50	mg	REC:	97	(40%-110%)		
QC1203832685 428015006 DUP										
Total Strontium	U	0.895	U	0.782	pCi/g					07/21/1708:12
	Uncert:	+/-0.660		+/-0.692		RPD:	0	N/A		
	TPU:	+/-0.698		+/-0.719		RER:	0.222	(0-2)		
**Strontium Carrier	7.75	8.20		7.70	mg	REC:	99	(40%-110%)		
QC1203832686 LCS										
Total Strontium	77.5			71.2	pCi/g	REC:	92	(80%-120%)		07/21/1708:14
	Uncert:			+/-3.68						
	TPU:			+/-18.4						
**Strontium Carrier	7.75			7.70	mg	REC:	99	(40%-110%)		
Rad Liquid Scintillation										
Batch 1682992										
QC1203832573 MB										
Nickel-63			U	-1.16	pCi/g				TXJ1	07/21/1701:05
	Uncert:			+/-4.06						
	TPU:			+/-4.06						
**Nickel Carrier	25.2			21.0	mg	REC:	83	(40%-110%)		
QC1203832574 428015004 DUP										
Nickel-63	U	-2.88	U	-1.05	pCi/g					07/21/1701:36
	Uncert:	+/-3.88		+/-3.80		RPD:	0	N/A		
	TPU:	+/-3.88		+/-3.80		RER:	0.658	(0-2)		
**Nickel Carrier	25.2	21.2		22.3	mg	REC:	89	(40%-110%)		
QC1203832575 LCS										
Nickel-63	264			239	pCi/g	REC:	90	(80%-120%)		07/21/1702:08
	Uncert:			+/-8.53						

QC Summary

Workorder: 428015

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch 1682992									
TPU:				+/-44.9					
**Nickel Carrier	25.2			22.5	mg	REC: 89	(40%-110%)		
Batch 1682995									
QC1203832583 MB									
Tritium			U	14.4	pCi/g			BXM4	07/20/1707:10
Uncert:				+/-14.7					
TPU:				+/-15.1					
QC1203832584 428015004 DUP									
Tritium	U	5.88	U	13.7	pCi/g				07/20/1707:27
Uncert:		+/-14.6		+/-15.7		RPD: 0	N/A		
TPU:		+/-14.6		+/-16.1		RER: 0.71	(0-2)		
QC1203832585 428015004 MS									
Tritium	154 U	5.88		180	pCi/g	REC: 117	(75%-125%)		07/20/1707:43
Uncert:		+/-14.6		+/-37.5					
TPU:		+/-14.6		+/-55.5					
QC1203832586 LCS									
Tritium	88.6			81.2	pCi/g	REC: 92	(80%-120%)		07/20/1707:59
Uncert:				+/-20.0					
TPU:				+/-27.2					
Batch 1683148									
QC1203833109 MB									
Technetium-99			U	1.12	pCi/g			CXS7	07/25/1705:55
Uncert:				+/-1.78					
TPU:				+/-1.78					
**Technetium-99m Tracer	70300			63900	CPM	REC: 91	(30%-105%)		
QC1203833110 428015006 DUP									
Technetium-99	U	0.426	U	1.23	pCi/g				07/25/1706:17
Uncert:		+/-2.01		+/-2.19		RPD: 0	N/A		
TPU:		+/-2.01		+/-2.19		RER: 0.533	(0-2)		
**Technetium-99m Tracer	70300	64400		60200	CPM	REC: 86	(30%-105%)		
QC1203833111 LCS									
Technetium-99	63.3			59.9	pCi/g	REC: 95	(80%-120%)		07/25/1706:38
Uncert:				+/-3.34					
TPU:				+/-7.65					
**Technetium-99m Tracer	70300			64400	CPM	REC: 92	(30%-105%)		

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- A The TIC is a suspected aldol-condensation product
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The analyte was detected in both the associated QC blank and in the sample.
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: August 1, 2017
Page 1 of 6

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Alpha Spec										
Batch 1684092										
QC1203835456 MB										
Americium-241			U	0.0585	pCi/g				HAKB	07/25/1709:04
Uncert:				+/-0.219						
TPU:				+/-0.220						
**Americium-243 Tracer	18.7			15.2	pCi/g	REC:	81	(30%-105%)		
Uncert:				+/-2.35						
TPU:				+/-3.55						
QC1203835457 428197002 DUP										
Americium-241	U	0.171	U	0.0628	pCi/g					07/25/1709:04
Uncert:		+/-0.277		+/-0.236		RPD:	0	N/A		
TPU:		+/-0.278		+/-0.236		RER:	0.582	(0-2)		
**Americium-243 Tracer	20.0	17.6		15.3	pCi/g	REC:	77	(30%-105%)		
Uncert:		+/-2.13		+/-2.51						
TPU:		+/-3.28		+/-3.80						
QC1203835458 LCS										
Americium-241	17.6			15.2	pCi/g	REC:	86	(80%-120%)		07/25/1714:26
Uncert:				+/-2.03						
TPU:				+/-2.91						
**Americium-243 Tracer	18.7			17.8	pCi/g	REC:	95	(30%-105%)		
Uncert:				+/-2.23						
TPU:				+/-3.40						
Batch 1684093										
QC1203835459 MB										
Neptunium-237			U	-0.0222	pCi/g				HAKB	07/25/1709:54
Uncert:				+/-0.154						
TPU:				+/-0.154						
**Americium-243 Tracer	1890			1930	pCi/g	REC:	102	(30%-105%)		
QC1203835460 428197002 DUP										
Neptunium-237	U	0.0382	U	-0.0383	pCi/g					07/24/1715:30
Uncert:		+/-0.171		+/-0.173		RPD:	0	N/A		
TPU:		+/-0.171		+/-0.173		RER:	0.615	(0-2)		
**Americium-243 Tracer	2060	1930		2030	pCi/g	REC:	99	(30%-105%)		
QC1203835461 LCS										
Neptunium-237	39.5			45.3	pCi/g	REC:	115	(80%-120%)		07/24/1715:30
Uncert:				+/-3.66						
TPU:				+/-6.16						
**Americium-243 Tracer	1890			1610	pCi/g	REC:	85	(30%-105%)		
Batch 1684094										
QC1203835462 MB										
Plutonium-238			U	0.188	pCi/g				HAKB	07/25/1709:04
Uncert:				+/-0.257						
TPU:				+/-0.258						
Plutonium-239/240			U	-0.138	pCi/g					
Uncert:				+/-0.144						

QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1684094									
	TPU:			+/-0.144					
**Plutonium-242 Tracer	17.6			15.9	pCi/g	REC: 90	(30%-105%)		
	Uncert:			+/-1.97					
	TPU:			+/-2.97					
QC1203835463 428197002 DUP									
Plutonium-238	U	0.101	U	-0.38	pCi/g				07/25/1709:04
	Uncert:	+/-0.279		+/-0.443		RPD: 0	N/A		
	TPU:	+/-0.279		+/-0.443		RER: 1.8	(0-2)		
Plutonium-239/240	U	-0.263	U	-0.0216	pCi/g				
	Uncert:	+/-0.273		+/-0.324		RPD: 0	N/A		
	TPU:	+/-0.273		+/-0.325		RER: 1.11	(0-2)		
**Plutonium-242 Tracer	18.7	11.0		10.7	pCi/g	REC: 57	(30%-105%)		
	Uncert:	+/-2.37		+/-2.81					
	TPU:	+/-3.51		+/-4.11					
QC1203835464 LCS									
Plutonium-238			U	0.0581	pCi/g				
	Uncert:			+/-0.163					
	TPU:			+/-0.164					
Plutonium-239/240	17.6			17.9	pCi/g	REC: 102	(80%-120%)		
	Uncert:			+/-2.01					
	TPU:			+/-3.04					
**Plutonium-242 Tracer	17.6			16.3	pCi/g	REC: 93	(30%-105%)		
	Uncert:			+/-2.00					
	TPU:			+/-3.00					
Batch 1684096									
QC1203835465 MB									
Uranium-233/234			U	0.280	pCi/g			HAKB	07/25/1709:04
	Uncert:			+/-0.286					
	TPU:			+/-0.289					
Uranium-235/236			U	0.172	pCi/g				
	Uncert:			+/-0.248					
	TPU:			+/-0.249					
Uranium-238			U	0.0141	pCi/g				
	Uncert:			+/-0.148					
	TPU:			+/-0.148					
**Uranium-232 Tracer	18.8			19.1	pCi/g	REC: 102	(30%-105%)		
	Uncert:			+/-1.93					
	TPU:			+/-3.06					
QC1203835466 428197002 DUP									
Uranium-233/234		0.775		0.545	pCi/g				
	Uncert:	+/-0.517		+/-0.422		RPD: 35	(0% - 100%)		
	TPU:	+/-0.529		+/-0.428		RER: 0.662	(0-2)		
Uranium-235/236	U	0.0708	U	0.308	pCi/g				
	Uncert:	+/-0.266		+/-0.352		RPD: 0	N/A		
	TPU:	+/-0.266		+/-0.355		RER: 1.05	(0-2)		
Uranium-238		0.567		0.513	pCi/g				
	Uncert:	+/-0.448		+/-0.385		RPD: 10	(0% - 100%)		
	TPU:	+/-0.455		+/-0.390		RER: 0.177	(0-2)		
**Uranium-232 Tracer	20.0	17.0		18.3	pCi/g	REC: 92	(30%-105%)		
	Uncert:	+/-2.39		+/-2.14					

QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Alpha Spec										
Batch 1684096										
	TPU:	+/-3.68		+/-3.38						
QC1203835467 LCS										
Uranium-233/234				23.9	pCi/g					
	Uncert:			+/-2.18						
	TPU:			+/-3.74						
Uranium-235/236				1.81	pCi/g					
	Uncert:			+/-0.685						
	TPU:			+/-0.723						
Uranium-238	24.1			23.6	pCi/g	REC:	98	(80%-120%)		
	Uncert:			+/-2.16						
	TPU:			+/-3.71						
**Uranium-232 Tracer	18.8			19.5	pCi/g	REC:	104	(30%-105%)		
	Uncert:			+/-1.95						
	TPU:			+/-3.09						
Rad Gamma Spec										
Batch 1683509										
QC1203834010 MB										
Cesium-137			U	-0.0307	pCi/g				MXR1	07/20/1710:47
	Uncert:			+/-0.0254						
	TPU:			+/-0.0291						
Cobalt-60			U	-0.0219	pCi/g					
	Uncert:			+/-0.030						
	TPU:			+/-0.0317						
Europium-152			U	0.00051	pCi/g					
	Uncert:			+/-0.0489						
	TPU:			+/-0.0489						
Europium-154			U	-0.00959	pCi/g					
	Uncert:			+/-0.0623						
	TPU:			+/-0.0625						
Europium-155			U	-0.00869	pCi/g					
	Uncert:			+/-0.0459						
	TPU:			+/-0.046						
QC1203834011 428197002 DUP										
Cesium-137	U	0.0107	U	-0.0173	pCi/g					07/20/1713:40
	Uncert:	+/-0.0239		+/-0.0335		RPD:	0	N/A		
	TPU:	+/-0.0244		+/-0.0344		RER:	1.3	(0-2)		
Cobalt-60	U	0.00479	U	0.001	pCi/g					
	Uncert:	+/-0.028		+/-0.0343		RPD:	0	N/A		
	TPU:	+/-0.0281		+/-0.0343		RER:	0.168	(0-2)		
Europium-152	U	-0.00103	U	0.00463	pCi/g					
	Uncert:	+/-0.0581		+/-0.0862		RPD:	0	N/A		
	TPU:	+/-0.0581		+/-0.0863		RER:	0.107	(0-2)		
Europium-154	U	0.0296	U	0.060	pCi/g					
	Uncert:	+/-0.091		+/-0.112		RPD:	0	N/A		
	TPU:	+/-0.092		+/-0.115		RER:	0.404	(0-2)		
Europium-155	U	0.0586	U	0.0571	pCi/g					
	Uncert:	+/-0.0534		+/-0.108		RPD:	0	N/A		
	TPU:	+/-0.0597		+/-0.108		RER:	0.0231	(0-2)		
QC1203834012 LCS										
Americium-241	693			731	pCi/g	REC:	105	(80%-120%)		07/20/1710:47

QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch 1683509									
	Uncert:			+/-14.7					
	TPU:			+/-60.2					
Cesium-137	222			240	pCi/g	REC: 108	(80%-120%)		
	Uncert:			+/-3.91					
	TPU:			+/-27.6					
Cobalt-60	127			135	pCi/g	REC: 106	(80%-120%)		
	Uncert:			+/-3.68					
	TPU:			+/-11.7					
Europium-152			U	-1.44	pCi/g				
	Uncert:			+/-1.73					
	TPU:			+/-1.85					
Europium-154			U	-0.261	pCi/g				
	Uncert:			+/-1.03					
	TPU:			+/-1.03					
Europium-155			U	-0.575	pCi/g				
	Uncert:			+/-1.38					
	TPU:			+/-1.41					
Rad Gas Flow									
Batch 1684045									
QC1203835309 MB									
Total Strontium			U	1.02	pCi/g			LXB3	07/25/1713:01
	Uncert:			+/-0.780					
	TPU:			+/-0.822					
**Strontium Carrier	7.75			7.30	mg	REC: 94	(40%-110%)		
QC1203835310 428197005 DUP									
Total Strontium	U	0.122	U	-0.897	pCi/g				07/25/1713:01
	Uncert:	+/-0.769		+/-0.627		RPD: 0	N/A		
	TPU:	+/-0.769		+/-0.627		RER: 2.01	(0-2)		
**Strontium Carrier	7.75	6.60		6.90	mg	REC: 89	(40%-110%)		
QC1203835311 LCS									
Total Strontium	68.4			78.1	pCi/g	REC: 114	(80%-120%)		07/25/1713:01
	Uncert:			+/-4.52					
	TPU:			+/-20.3					
**Strontium Carrier	7.75			6.00	mg	REC: 77	(40%-110%)		
Rad Liquid Scintillation									
Batch 1683797									
QC1203834690 MB									
Tritium			U	-12.6	pCi/g			BXM4	07/22/1717:04
	Uncert:			+/-12.5					
	TPU:			+/-12.5					
QC1203834691 428197005 DUP									
Tritium	U	3.63	U	2.53	pCi/g				07/22/1717:35
	Uncert:	+/-13.8		+/-13.8		RPD: 0	N/A		
	TPU:	+/-13.9		+/-13.8		RER: 0.11	(0-2)		
QC1203834692 428197005 MS									
Tritium	147 U	3.63		119	pCi/g	REC: 81	(75%-125%)		07/22/1718:07
	Uncert:	+/-13.8		+/-29.8					
	TPU:	+/-13.9		+/-40.3					
QC1203834693 LCS									
						REC:			

QC Summary

Workorder: 428197

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Liquid Scintillation										
Batch 1683797										
Tritium	87.8			94.6	pCi/g		108	(80%-120%)		
	Uncert:			+/-19.1						
	TPU:			+/-28.7						
Batch 1684727										
QC1203836935 MB										
Technetium-99			U	0.525	pCi/g				CXS7	07/30/1708:31
	Uncert:			+/-1.81						
	TPU:			+/-1.81						
**Technetium-99m Tracer	4.22E+05			3.79E+05	CPM	REC:	90	(30%-105%)		
QC1203836936 428197002 DUP										
Technetium-99	U	-0.455	U	1.37	pCi/g					07/30/1708:47
	Uncert:	+/-1.75		+/-2.26		RPD:	0	N/A		
	TPU:	+/-1.75		+/-2.27		RER:	1.25	(0-2)		
**Technetium-99m Tracer	4.22E+05	3.84E+05		3.67E+05	CPM	REC:	87	(30%-105%)		
QC1203836937 LCS										
Technetium-99	59.3			52.6	pCi/g	REC:	89	(80%-120%)		08/01/1706:53
	Uncert:			+/-3.56						
	TPU:			+/-6.99						
**Technetium-99m Tracer	4.22E+05			3.46E+05	CPM	REC:	82	(30%-105%)		
Batch 1684890										
QC1203837480 MB										
Nickel-63			U	-1.04	pCi/g				TXJ1	07/26/1721:03
	Uncert:			+/-3.86						
	TPU:			+/-3.86						
**Nickel Carrier	25.2			21.1	mg	REC:	84	(40%-110%)		
QC1203837481 428197002 DUP										
Nickel-63	U	-5.74	U	-2.56	pCi/g					07/26/1721:35
	Uncert:	+/-4.29		+/-4.14		RPD:	0	N/A		
	TPU:	+/-4.29		+/-4.14		RER:	1.05	(0-2)		
**Nickel Carrier	25.2	18.8		19.8	mg	REC:	79	(40%-110%)		
QC1203837482 LCS										
Nickel-63	255			233	pCi/g	REC:	91	(80%-120%)		07/26/1722:06
	Uncert:			+/-8.80						
	TPU:			+/-43.9						
**Nickel Carrier	25.2			20.3	mg	REC:	81	(40%-110%)		

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- A The TIC is a suspected aldol-condensation product
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The analyte was detected in both the associated QC blank and in the sample.
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample

GEL LABORATORIES LLC

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QC Summary

Report Date: August 1, 2017
Page 1 of 6

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 428313

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Alpha Spec										
Batch 1684092										
QC1203835456 MB										
Americium-241			U	0.0585	pCi/g				HAKB	07/25/1709:04
Uncert:				+/-0.219						
TPU:				+/-0.220						
**Americium-243 Tracer	18.7			15.2	pCi/g	REC:	81	(30%-105%)		
Uncert:				+/-2.35						
TPU:				+/-3.55						
QC1203835457 428197002 DUP										
Americium-241	U	0.171	U	0.0628	pCi/g					07/25/1709:04
Uncert:		+/-0.277		+/-0.236		RPD:	0	N/A		
TPU:		+/-0.278		+/-0.236		RER:	0.582	(0-2)		
**Americium-243 Tracer	20.0	17.6		15.3	pCi/g	REC:	77	(30%-105%)		
Uncert:		+/-2.13		+/-2.51						
TPU:		+/-3.28		+/-3.80						
QC1203835458 LCS										
Americium-241	17.6			15.2	pCi/g	REC:	86	(80%-120%)		07/25/1714:26
Uncert:				+/-2.03						
TPU:				+/-2.91						
**Americium-243 Tracer	18.7			17.8	pCi/g	REC:	95	(30%-105%)		
Uncert:				+/-2.23						
TPU:				+/-3.40						
Batch 1684093										
QC1203835459 MB										
Neptunium-237			U	-0.0222	pCi/g				HAKB	07/25/1709:54
Uncert:				+/-0.154						
TPU:				+/-0.154						
**Americium-243 Tracer	1890			1930	pCi/g	REC:	102	(30%-105%)		
QC1203835460 428197002 DUP										
Neptunium-237	U	0.0382	U	-0.0383	pCi/g					07/24/1715:30
Uncert:		+/-0.171		+/-0.173		RPD:	0	N/A		
TPU:		+/-0.171		+/-0.173		RER:	0.615	(0-2)		
**Americium-243 Tracer	2060	1930		2030	pCi/g	REC:	99	(30%-105%)		
QC1203835461 LCS										
Neptunium-237	39.5			45.3	pCi/g	REC:	115	(80%-120%)		07/24/1715:30
Uncert:				+/-3.66						
TPU:				+/-6.16						
**Americium-243 Tracer	1890			1610	pCi/g	REC:	85	(30%-105%)		
Batch 1684094										
QC1203835462 MB										
Plutonium-238			U	0.188	pCi/g				HAKB	07/25/1709:04
Uncert:				+/-0.257						
TPU:				+/-0.258						
Plutonium-239/240			U	-0.138	pCi/g					
Uncert:				+/-0.144						

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QC Summary

Workorder: 428313

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1684094									
	TPU:			+/-0.144					
**Plutonium-242 Tracer	17.6			15.9	pCi/g	REC: 90	(30%-105%)		
	Uncert:			+/-1.97					
	TPU:			+/-2.97					
QC1203835463 428197002 DUP									
Plutonium-238	U	0.101	U	-0.38	pCi/g				07/25/17 09:04
	Uncert:	+/-0.279		+/-0.443		RPD: 0	N/A		
	TPU:	+/-0.279		+/-0.443		RER: 1.8	(0-2)		
Plutonium-239/240	U	-0.263	U	-0.0216	pCi/g				
	Uncert:	+/-0.273		+/-0.324		RPD: 0	N/A		
	TPU:	+/-0.273		+/-0.325		RER: 1.11	(0-2)		
**Plutonium-242 Tracer	18.7	11.0		10.7	pCi/g	REC: 57	(30%-105%)		
	Uncert:	+/-2.37		+/-2.81					
	TPU:	+/-3.51		+/-4.11					
QC1203835464 LCS									
Plutonium-238			U	0.0581	pCi/g				
	Uncert:			+/-0.163					
	TPU:			+/-0.164					
Plutonium-239/240	17.6			17.9	pCi/g	REC: 102	(80%-120%)		
	Uncert:			+/-2.01					
	TPU:			+/-3.04					
**Plutonium-242 Tracer	17.6			16.3	pCi/g	REC: 93	(30%-105%)		
	Uncert:			+/-2.00					
	TPU:			+/-3.00					
Batch 1684096									
QC1203835465 MB									
Uranium-233/234			U	0.280	pCi/g			HAKB	07/25/17 09:04
	Uncert:			+/-0.286					
	TPU:			+/-0.289					
Uranium-235/236			U	0.172	pCi/g				
	Uncert:			+/-0.248					
	TPU:			+/-0.249					
Uranium-238			U	0.0141	pCi/g				
	Uncert:			+/-0.148					
	TPU:			+/-0.148					
**Uranium-232 Tracer	18.8			19.1	pCi/g	REC: 102	(30%-105%)		
	Uncert:			+/-1.93					
	TPU:			+/-3.06					
QC1203835466 428197002 DUP									
Uranium-233/234		0.775		0.545	pCi/g				
	Uncert:	+/-0.517		+/-0.422		RPD: 35	(0% - 100%)		
	TPU:	+/-0.529		+/-0.428		RER: 0.662	(0-2)		
Uranium-235/236	U	0.0708	U	0.308	pCi/g				
	Uncert:	+/-0.266		+/-0.352		RPD: 0	N/A		
	TPU:	+/-0.266		+/-0.355		RER: 1.05	(0-2)		
Uranium-238		0.567		0.513	pCi/g				
	Uncert:	+/-0.448		+/-0.385		RPD: 10	(0% - 100%)		
	TPU:	+/-0.455		+/-0.390		RER: 0.177	(0-2)		
**Uranium-232 Tracer	20.0	17.0		18.3	pCi/g	REC: 92	(30%-105%)		
	Uncert:	+/-2.39		+/-2.14					

QC Summary

Workorder: 428313

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1684096									
TPU:		+/-3.68		+/-3.38					
QC1203835467 LCS									
Uranium-233/234				23.9	pCi/g				
Uncert:				+/-2.18					
TPU:				+/-3.74					
Uranium-235/236				1.81	pCi/g				
Uncert:				+/-0.685					
TPU:				+/-0.723					
Uranium-238	24.1			23.6	pCi/g	REC: 98	(80%-120%)		
Uncert:				+/-2.16					
TPU:				+/-3.71					
**Uranium-232 Tracer	18.8			19.5	pCi/g	REC: 104	(30%-105%)		
Uncert:				+/-1.95					
TPU:				+/-3.09					
Rad Gamma Spec									
Batch 1683993									
QC1203835171 MB									
Cesium-137			U	-0.0244	pCi/g			MXR1	07/25/1708:54
Uncert:				+/-0.0263					
TPU:				+/-0.0286					
Cobalt-60			U	-0.0136	pCi/g				
Uncert:				+/-0.0284					
TPU:				+/-0.0291					
Europium-152			U	0.0184	pCi/g				
Uncert:				+/-0.0606					
TPU:				+/-0.0612					
Europium-154			U	-0.0422	pCi/g				
Uncert:				+/-0.0688					
TPU:				+/-0.0715					
Europium-155			U	0.0166	pCi/g				
Uncert:				+/-0.0556					
TPU:				+/-0.0561					
QC1203835172 428313001 DUP									
Cesium-137	U	-0.00112	U	0.0108	pCi/g				07/25/1708:55
Uncert:		+/-0.0254		+/-0.0311		RPD: 0	N/A		
TPU:		+/-0.0254		+/-0.0315		RER: 0.579	(0-2)		
Cobalt-60	U	0.0007	U	-0.0317	pCi/g				
Uncert:		+/-0.0314		+/-0.0413		RPD: 0	N/A		
TPU:		+/-0.0314		+/-0.0438		RER: 1.18	(0-2)		
Europium-152	U	0.0185	U	0.0218	pCi/g				
Uncert:		+/-0.0614		+/-0.0912		RPD: 0	N/A		
TPU:		+/-0.0619		+/-0.0917		RER: 0.0597	(0-2)		
Europium-154	U	0.067	U	0.0298	pCi/g				
Uncert:		+/-0.0845		+/-0.102		RPD: 0	N/A		
TPU:		+/-0.090		+/-0.103		RER: 0.534	(0-2)		
Europium-155	U	0.024	U	0.0398	pCi/g				
Uncert:		+/-0.0617		+/-0.0745		RPD: 0	N/A		
TPU:		+/-0.0627		+/-0.0767		RER: 0.313	(0-2)		
QC1203835173 LCS									
Americium-241	686			713	pCi/g	REC: 104	(80%-120%)		07/25/1708:55

QC Summary

Workorder: 428313

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Gamma Spec										
Batch 1683993										
Uncert:				+/-11.1						
TPU:				+/-58.0						
Cesium-137	220			245	pCi/g	REC:	111	(80%-120%)		
Uncert:				+/-4.75						
TPU:				+/-26.2						
Cobalt-60	126			135	pCi/g	REC:	107	(80%-120%)		
Uncert:				+/-4.33						
TPU:				+/-13.7						
Europium-152			U	0.202	pCi/g					
Uncert:				+/-1.74						
TPU:				+/-1.75						
Europium-154			U	-0.00766	pCi/g					
Uncert:				+/-1.44						
TPU:				+/-1.44						
Europium-155			U	1.12	pCi/g					
Uncert:				+/-1.50						
TPU:				+/-1.59						
Rad Gas Flow										
Batch 1684045										
QC1203835309 MB										
Total Strontium			U	1.02	pCi/g				LXB3	07/25/1713:01
Uncert:				+/-0.780						
TPU:				+/-0.822						
**Strontium Carrier	7.75			7.30	mg	REC:	94	(40%-110%)		
QC1203835310 428197005 DUP										
Total Strontium		U 0.122	U	-0.897	pCi/g					07/25/1713:01
Uncert:		+/-0.769		+/-0.627		RPD:	0	N/A		
TPU:		+/-0.769		+/-0.627		RER:	2.01	(0-2)		
**Strontium Carrier	7.75	6.60		6.90	mg	REC:	89	(40%-110%)		
QC1203835311 LCS										
Total Strontium	68.4			78.1	pCi/g	REC:	114	(80%-120%)		07/25/1713:01
Uncert:				+/-4.52						
TPU:				+/-20.3						
**Strontium Carrier	7.75			6.00	mg	REC:	77	(40%-110%)		
Rad Liquid Scintillation										
Batch 1684727										
QC1203836935 MB										
Technetium-99			U	0.525	pCi/g				CXS7	07/30/1708:31
Uncert:				+/-1.81						
TPU:				+/-1.81						
**Technetium-99m Tracer	4.22E+05			3.79E+05	CPM	REC:	90	(30%-105%)		
QC1203836936 428197002 DUP										
Technetium-99		U -0.455	U	1.37	pCi/g					07/30/1708:47
Uncert:		+/-1.75		+/-2.26		RPD:	0	N/A		
TPU:		+/-1.75		+/-2.27		RER:	1.25	(0-2)		
**Technetium-99m Tracer	4.22E+05	3.84E+05		3.67E+05	CPM	REC:	87	(30%-105%)		
QC1203836937 LCS										
Technetium-99	59.3			52.6	pCi/g	REC:	89	(80%-120%)		08/01/1706:53
Uncert:				+/-3.56						

QC Summary

Workorder: 428313

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch 1684727									
TPU:				+/-6.99					
**Technetium-99m Tracer	4.22E+05			3.46E+05	CPM	REC: 82	(30%-105%)		
Batch 1684890									
QC1203837480 MB									
Nickel-63			U	-1.04	pCi/g			TXJ1	07/26/1721:03
Uncert:				+/-3.86					
TPU:				+/-3.86					
**Nickel Carrier	25.2			21.1	mg	REC: 84	(40%-110%)		
QC1203837481 428197002 DUP									
Nickel-63	U	-5.74	U	-2.56	pCi/g				07/26/1721:35
Uncert:		+/-4.29		+/-4.14		RPD: 0	N/A		
TPU:		+/-4.29		+/-4.14		RER: 1.05	(0-2)		
**Nickel Carrier	25.2	18.8		19.8	mg	REC: 79	(40%-110%)		
QC1203837482 LCS									
Nickel-63	255			233	pCi/g	REC: 91	(80%-120%)		07/26/1722:06
Uncert:				+/-8.80					
TPU:				+/-43.9					
**Nickel Carrier	25.2			20.3	mg	REC: 81	(40%-110%)		
Batch 1684988									
QC1203837768 MB									
Tritium			U	-3.81	pCi/g			BXM4	07/26/1710:25
Uncert:				+/-11.6					
TPU:				+/-11.6					
QC1203837769 428313001 DUP									
Tritium	U	-6.71	U	-5.17	pCi/g				07/26/1710:47
Uncert:		+/-13.1		+/-11.5		RPD: 0	N/A		
TPU:		+/-13.1		+/-11.5		RER: 0.173	(0-2)		
QC1203837770 428313001 MS									
Tritium	150 U	-6.71		154	pCi/g	REC: 103	(75%-125%)		07/26/1707:55
Uncert:		+/-13.1		+/-33.4					
TPU:		+/-13.1		+/-48.4					
QC1203837771 LCS									
Tritium	88.0			71.8	pCi/g	REC: 82	(80%-120%)		07/27/1707:44
Uncert:				+/-20.8					
TPU:				+/-26.4					

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.

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QC Summary

Report Date: August 1, 2017
Page 1 of 6

Client : **CH2MHill Plateau Remediation Company**
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: **Mr. Scot Fitzgerald**

Workorder: **428482**

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Alpha Spec										
Batch 1684350										
QC1203836062 MB										
Americium-241			U	0.053	pCi/g				JXR5	07/27/1709:37
Uncert:				+/-0.315						
TPU:				+/-0.315						
**Americium-243 Tracer	20.6			19.2	pCi/g	REC:	93	(30%-105%)		
Uncert:				+/-2.96						
TPU:				+/-4.41						
QC1203836063 428482004 DUP										
Americium-241	U	0.217	U	0.0713	pCi/g					
Uncert:		+/-0.619		+/-0.424		RPD:	0	N/A		
TPU:		+/-0.620		+/-0.424		RER:	0.381	(0-2)		
**Americium-243 Tracer	20.8	15.5		14.7	pCi/g	REC:	71	(30%-105%)		
Uncert:		+/-3.75		+/-3.46						
TPU:		+/-5.49		+/-5.09						
QC1203836064 LCS										
Americium-241	19.3			18.2	pCi/g	REC:	95	(80%-120%)		07/27/1709:37
Uncert:				+/-3.02						
TPU:				+/-4.32						
**Americium-243 Tracer	20.6			17.1	pCi/g	REC:	83	(30%-105%)		
Uncert:				+/-3.19						
TPU:				+/-4.72						
Batch 1684352										
QC1203836065 MB										
Neptunium-237			U	0.0475	pCi/g				JXR5	07/27/1709:36
Uncert:				+/-0.213						
TPU:				+/-0.213						
**Americium-243 Tracer	2080			1880	pCi/g	REC:	91	(30%-105%)		
QC1203836066 428482004 DUP										
Neptunium-237	U	-0.00808	U	0.00222	pCi/g					
Uncert:		+/-0.187		+/-0.165		RPD:	0	N/A		
TPU:		+/-0.187		+/-0.165		RER:	0.081	(0-2)		
**Americium-243 Tracer	2100	2090		2070	pCi/g	REC:	99	(30%-105%)		
QC1203836067 LCS										
Neptunium-237	43.4			44.6	pCi/g	REC:	103	(80%-120%)		07/27/1709:37
Uncert:				+/-3.47						
TPU:				+/-6.00						
**Americium-243 Tracer	2080			1900	pCi/g	REC:	92	(30%-105%)		
Batch 1684353										
QC1203836073 MB										
Plutonium-238			U	-0.132	pCi/g				JXR5	07/27/1709:37
Uncert:				+/-0.249						
TPU:				+/-0.250						
Plutonium-239/240			U	-0.0219	pCi/g					
Uncert:				+/-0.329						

QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1684353									
	TPU:			+/-0.329					
**Plutonium-242 Tracer	19.3			11.5	pCi/g	REC:	60 (30%-105%)		
	Uncert:			+/-2.86					
	TPU:			+/-4.20					
QC1203836074 428482004 DUP									
Plutonium-238	U	0.0372	U	0.127	pCi/g				
	Uncert:	+/-0.207		+/-0.569		RPD:	0 N/A		
	TPU:	+/-0.207		+/-0.570		RER:	0.29 (0-2)		
Plutonium-239/240	U	0.0745	U	-0.146	pCi/g				
	Uncert:	+/-0.254		+/-0.493		RPD:	0 N/A		
	TPU:	+/-0.255		+/-0.494		RER:	0.777 (0-2)		
**Plutonium-242 Tracer	19.5	16.3		7.17	pCi/g	REC:	37 (30%-105%)		
	Uncert:	+/-2.31		+/-3.55					
	TPU:	+/-3.46		+/-5.14					
QC1203836075 LCS									
Plutonium-238			U	0.0973	pCi/g				07/27/1709:38
	Uncert:			+/-0.274					
	TPU:			+/-0.274					
Plutonium-239/240	19.4			20.4	pCi/g	REC:	105 (80%-120%)		
	Uncert:			+/-2.77					
	TPU:			+/-4.15					
**Plutonium-242 Tracer	19.3			16.7	pCi/g	REC:	87 (30%-105%)		
	Uncert:			+/-2.70					
	TPU:			+/-3.97					
Batch 1684354									
QC1203836076 MB									
Uranium-233/234			U	-0.0229	pCi/g			JXR5	07/27/1709:29
	Uncert:			+/-0.344					
	TPU:			+/-0.344					
Uranium-235/236			U	-0.102	pCi/g				
	Uncert:			+/-0.308					
	TPU:			+/-0.309					
Uranium-238			U	0.0321	pCi/g				
	Uncert:			+/-0.335					
	TPU:			+/-0.336					
**Uranium-232 Tracer	20.6			13.2	pCi/g	REC:	64 (30%-105%)		
	Uncert:			+/-3.03					
	TPU:			+/-4.56					
QC1203836077 428482004 DUP									
Uranium-233/234		0.626	U	0.448	pCi/g				07/31/1713:37
	Uncert:	+/-0.470		+/-0.447		RPD:	19 (0% - 100%)		
	TPU:	+/-0.478		+/-0.452		RER:	0.531 (0-2)		
Uranium-235/236	U	0.0669	U	-0.0252	pCi/g				
	Uncert:	+/-0.251		+/-0.217		RPD:	0 N/A		
	TPU:	+/-0.251		+/-0.218		RER:	0.543 (0-2)		
Uranium-238		0.678		0.574	pCi/g				
	Uncert:	+/-0.466		+/-0.474		RPD:	17 (0% - 100%)		
	TPU:	+/-0.476		+/-0.481		RER:	0.301 (0-2)		
**Uranium-232 Tracer	20.8	19.7		17.7	pCi/g	REC:	85 (30%-105%)		
	Uncert:	+/-2.40		+/-2.62					

QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1684354									
	TPU:	+/-3.73		+/-4.02					
QC1203836078 LCS									
Uranium-233/234				22.7	pCi/g				07/27/17 09:29
	Uncert:			+/-2.88					
	TPU:			+/-4.51					
Uranium-235/236				1.73	pCi/g				
	Uncert:			+/-0.921					
	TPU:			+/-0.958					
Uranium-238	26.5			24.2	pCi/g	REC: 92	(80%-120%)		
	Uncert:			+/-2.98					
	TPU:			+/-4.75					
**Uranium-232 Tracer	20.6			15.5	pCi/g	REC: 75	(30%-105%)		
	Uncert:			+/-2.75					
	TPU:			+/-4.18					
Rad Gamma Spec									
Batch 1684390									
QC1203836156 MB									
Cesium-137			U	-0.00965	pCi/g			MXR1	07/25/17 08:57
	Uncert:			+/-0.031					
	TPU:			+/-0.0313					
Cobalt-60			U	0.000574	pCi/g				
	Uncert:			+/-0.0226					
	TPU:			+/-0.0226					
Europium-152			U	0.0646	pCi/g				
	Uncert:			+/-0.0622					
	TPU:			+/-0.0689					
Europium-154			U	0.0467	pCi/g				
	Uncert:			+/-0.0484					
	TPU:			+/-0.0529					
Europium-155			U	0.00298	pCi/g				
	Uncert:			+/-0.051					
	TPU:			+/-0.051					
QC1203836157 428482006 DUP									
Cesium-137	U	0.0126	U	0.0119	pCi/g				07/27/17 08:43
	Uncert:	+/-0.0347		+/-0.0379		RPD: 0	N/A		
	TPU:	+/-0.0352		+/-0.0383		RER: 0.0264	(0-2)		
Cobalt-60	U	-0.0175	U	0.0272	pCi/g				
	Uncert:	+/-0.0451		+/-0.0327		RPD: 0	N/A		
	TPU:	+/-0.0458		+/-0.035		RER: 1.52	(0-2)		
Europium-152	U	0.025	U	0.0425	pCi/g				
	Uncert:	+/-0.0859		+/-0.0969		RPD: 0	N/A		
	TPU:	+/-0.0866		+/-0.0988		RER: 0.26	(0-2)		
Europium-154	U	-0.0156	U	0.00906	pCi/g				
	Uncert:	+/-0.137		+/-0.137		RPD: 0	N/A		
	TPU:	+/-0.137		+/-0.137		RER: 0.249	(0-2)		
Europium-155	U	0.0689	U	0.0949	pCi/g				
	Uncert:	+/-0.0841		+/-0.113		RPD: 0	N/A		
	TPU:	+/-0.0898		+/-0.121		RER: 0.338	(0-2)		
QC1203836158 LCS									
Americium-241	489			523	pCi/g	REC: 107	(80%-120%)		07/25/17 09:17

QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Gamma Spec										
Batch 1684390										
	Uncert:			+/-9.34						
	TPU:			+/-46.2						
Cesium-137	176			174	pCi/g	REC:	99	(80%-120%)		
	Uncert:			+/-2.58						
	TPU:			+/-15.2						
Cobalt-60	144			144	pCi/g	REC:	100	(80%-120%)		
	Uncert:			+/-2.74						
	TPU:			+/-14.7						
Europium-152			U	-0.883	pCi/g					
	Uncert:			+/-1.24						
	TPU:			+/-1.30						
Europium-154			U	0.452	pCi/g					
	Uncert:			+/-0.850						
	TPU:			+/-0.875						
Europium-155			U	-0.488	pCi/g					
	Uncert:			+/-1.13						
	TPU:			+/-1.15						
Rad Gas Flow										
Batch 1684816										
QC1203837208 MB										
Total Strontium			U	-0.199	pCi/g				KSD1	07/31/1711:23
	Uncert:			+/-0.268						
	TPU:			+/-0.268						
**Strontium Carrier	7.75			7.50	mg	REC:	97	(40%-110%)		
QC1203837209 428482006 DUP										
Total Strontium	U	-0.159	U	0.341	pCi/g					07/29/1710:47
	Uncert:	+/-0.517		+/-0.620		RPD:	0	N/A		
	TPU:	+/-0.517		+/-0.626		RER:	1.21	(0-2)		
**Strontium Carrier	7.75	7.10		7.30	mg	REC:	94	(40%-110%)		
QC1203837210 LCS										
Total Strontium	52.6			49.1	pCi/g	REC:	93	(80%-120%)		07/29/1710:49
	Uncert:			+/-2.48						
	TPU:			+/-12.8						
**Strontium Carrier	7.75			7.30	mg	REC:	94	(40%-110%)		
Rad Liquid Scintillation										
Batch 1684727										
QC1203836935 MB										
Technetium-99			U	0.525	pCi/g				CXS7	07/30/1708:31
	Uncert:			+/-1.81						
	TPU:			+/-1.81						
**Technetium-99m Tracer	4.22E+05			3.79E+05	CPM	REC:	90	(30%-105%)		
QC1203836936 428197002 DUP										
Technetium-99	U	-0.455	U	1.37	pCi/g					07/30/1708:47
	Uncert:	+/-1.75		+/-2.26		RPD:	0	N/A		
	TPU:	+/-1.75		+/-2.27		RER:	1.25	(0-2)		
**Technetium-99m Tracer	4.22E+05	3.84E+05		3.67E+05	CPM	REC:	87	(30%-105%)		
QC1203836937 LCS										
Technetium-99	59.3			52.6	pCi/g	REC:	89	(80%-120%)		08/01/1706:53
	Uncert:			+/-3.56						

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 428482

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria		Range	Analyst	Date Time
Rad Liquid Scintillation										
Batch 1684727										
TPU:				+/-6.99						
**Technetium-99m Tracer	4.22E+05			3.46E+05	CPM	REC:	82	(30%-105%)		
Batch 1684890										
QC1203837480 MB										
Nickel-63			U	-1.04	pCi/g				TXJ1	07/26/1721:03
Uncert:				+/-3.86						
TPU:				+/-3.86						
**Nickel Carrier	25.2			21.1	mg	REC:	84	(40%-110%)		
QC1203837481 428197002 DUP										
Nickel-63	U	-5.74	U	-2.56	pCi/g					07/26/1721:35
Uncert:		+/-4.29		+/-4.14		RPD:	0	N/A		
TPU:		+/-4.29		+/-4.14		RER:	1.05	(0-2)		
**Nickel Carrier	25.2	18.8		19.8	mg	REC:	79	(40%-110%)		
QC1203837482 LCS										
Nickel-63	255			233	pCi/g	REC:	91	(80%-120%)		07/26/1722:06
Uncert:				+/-8.80						
TPU:				+/-43.9						
**Nickel Carrier	25.2			20.3	mg	REC:	81	(40%-110%)		
Batch 1684988										
QC1203837768 MB										
Tritium			U	-3.81	pCi/g				BXM4	07/26/1710:25
Uncert:				+/-11.6						
TPU:				+/-11.6						
QC1203837769 428313001 DUP										
Tritium	U	-6.71	U	-5.17	pCi/g					07/26/1710:47
Uncert:		+/-13.1		+/-11.5		RPD:	0	N/A		
TPU:		+/-13.1		+/-11.5		RER:	0.173	(0-2)		
QC1203837770 428313001 MS										
Tritium	150 U	-6.71		154	pCi/g	REC:	103	(75%-125%)		07/26/1707:55
Uncert:		+/-13.1		+/-33.4						
TPU:		+/-13.1		+/-48.4						
QC1203837771 LCS										
Tritium	88.0			71.8	pCi/g	REC:	82	(80%-120%)		07/27/1707:44
Uncert:				+/-20.8						
TPU:				+/-26.4						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- A The TIC is a suspected aldol-condensation product
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The analyte was detected in both the associated QC blank and in the sample.
- B The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample