

May 09, 2018

Mr. Scot Fitzgerald
CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Re: CHPRC SAF S18-004
Work Order: 447943
SDG: GEL447943

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on April 13, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,



Anna Dupree for
Heather Shaffer
Project Manager

Purchase Order: 300071 - 7H
Chain of Custody: S18-004-140, S18-004-145 and S18-004-146
Enclosures



Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	8
Data Review Qualifier Definitions.....	13
Laboratory Certifications.....	15
Volatile Analysis.....	17
Case Narrative.....	18
Sample Data Summary.....	22
Quality Control Summary.....	24
Semi-Volatile Analysis.....	36
Case Narrative.....	37
Sample Data Summary.....	41
Quality Control Summary.....	43
Radiological Analysis.....	49
Case Narrative.....	50
Sample Data Summary.....	56
Quality Control Summary.....	65

Case Narrative

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S18-004
SDG: GEL447943

May 09, 2018

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on April 13, 2018, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Items of Note All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative.

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
447943001	B3HV38
447943002	B3HT13
447943003	B3HT17

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: GC/MS Semivolatile, GC/MS Volatile and Radiochemistry.

We certify that this package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.



Anna Dupree for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL447943
Work Order #: 447943

GC/MS Volatile

Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

Continuing Calibration Verification Requirements

The calibration verification standard requirements were not all met for sample 447943001 (B3HV38). The daily CCV analyzed on 4/18/18 was biased high for 1,1,1-Trichloroethane at 21.3%D and Carbon tetrachloride at 25.5%D. There were no positive results for any of the analytes that were outside the calibration criteria. The results are reported.

Quality Control (QC) Information

Blank (MB) Statement

Target analytes were detected in the blank 1204005998 (MB) below the reporting limit.

Laboratory Control Sample (LCS) Recovery

The LCS/and or LCSD (See Below) recovery was not within the acceptance limits for all analytes. The unacceptable analyte was not detected in the samples associated with the laboratory control sample. Therefore, the data were reported.

Sample	Analyte	Value
1204011650 (LCS)	2-Butanone	134* (70%-130%)

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The recoveries were similar. It is believed possible matrix interference has been demonstrated.

Sample	Analyte	Value
1204006001 (B3HVJ6PS)	2-Butanone	57* (70%-130%)
	Acetone	41* (70%-130%)
1204006003 (B3HVJ6PSD)	2-Butanone	55* (70%-130%)
	Acetone	39* (70%-130%)

GC/MS Semivolatile**Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information**Surrogate Recoveries**

Samples (See Below) did not meet surrogate recovery acceptance criteria. The samples were analyzed at a dilution. As a result, one or more surrogates were diluted out of the acceptance limits.

Sample	Analyte	Value
1204009716 (Non SDG 448082001MS)	2, 4, 6-Tribromophenol	0* (32%-124%)
	2-Fluorobiphenyl	9* (32%-112%)
	2-Fluorophenol	0* (15%-88%)
	Phenol-d5	0* (15%-91%)
	p-Terphenyl-d14	10* (36%-121%)
1204009717 (Non SDG 448082001MSD)	2, 4, 6-Tribromophenol	0* (32%-124%)
	2-Fluorophenol	0* (15%-88%)
	Phenol-d5	0* (15%-91%)
	p-Terphenyl-d14	33* (36%-121%)

Spike Recovery Statement

The MS or MSD (See Below) spike recoveries were not within the acceptance limits. The MS and MSD were analyzed at a dilution. As a result, the spikes were diluted outside of the acceptance limits.

Sample	Analyte	Value
1204009716 (Non SDG 448082001MS)	Several	See applicable report
1204009717 (Non SDG 448082001MSD)	Several	See applicable report

Radiochemistry**NP237_IE_PRECIP_AEA: COMMON**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

THISO_IE_PRECIP_AEA: COMMON

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

PUISO_PRECIP_AEA:COMMON

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information**Sample Re-prep/Re-analysis**

Samples were reprepared due to low carrier/tracer yield. The re-analysis is being reported.

Recounts

Sample 1204014341 (MB) was recounted due to a suspected blank false positive. The recount is reported.

GAMMA_GS:COMMON + Th234

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

I129LL_SEP_LEPS_GS: COMMON (low level)

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

C14_LSC: COMMON

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Miscellaneous Information**Additional Comments**

The matrix spike, 1204009087 (B3HV75MS), aliquot was reduced to conserve sample volume.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Chain of Custody and Supporting Documentation

CH2MHill Plateau Remediation Company C.O.C.# S18-004-145 Page 1 of 1		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 447943	
Collector: Kevin Patterson CHPRC	Contact/Requester: Karen Waters-Husted Telephone No.: 509-376-4650	SAF No.: S18-004	Purchase Order/Charge Code: 300071
Project Title: SURV, APRIL 2018	Sampling Origin: Hanford Site	Logbook No.: HNF-N-506 - 9781	Ice Chest No.: GWS-402
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Protocol: CERCLA	Bill of Lading/Air Bill No.: 771981165066
Priority: 30 Days	Offsite Property No.: 9303	SPECIAL INSTRUCTIONS N/A	
POSSIBLE SAMPLE HAZARDS/REMARK ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1			
Sample No. B3HT13	Filter * W	Date 4/11/18	No/Type Container 1x4-L G/P
Holding Time 6 Months	Sample Analysis I129LL_SEP_LEPS_GS_LL: COMMON	Preservative None	

Relinquished By: Kevin Patterson CHPRC	Signature [Signature]	Date APR 11 2018	Date/Time 1315	Received By: SSU-1 Print First and Last Name	Signature [Signature]	Date APR 11 2018	Date/Time 1315	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air	DS = Drum Solids DL = Drum Liquid T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: SSU-1 Print First and Last Name	Signature [Signature]	Date APR 12 2018	Date/Time 0700	Received By: Ivan Schaeffer CHPRC	Signature [Signature]	Date APR 12 2018	Date/Time 0700		
Relinquished By: Ivan Schaeffer CHPRC	Signature [Signature]	Date APR 12 2018	Date/Time 1400	Received By: FEDEX Print First and Last Name	Signature [Signature]	Date 4/13/18	Date/Time 905		
Relinquished By: [Signature] Print First and Last Name	Signature [Signature]	Date [Date]	Date/Time [Time]	Received By: [Signature] Print First and Last Name	Signature [Signature]	Date [Date]	Date/Time [Time]		
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:						

69 lbs

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C.# S18-004-146
Collector: Kevin Patterson <small>CHPRC</small>		Contact/Requester: Karen Waters-Husted		Page 1 of 1
SAF No.: S18-004	Project Title: SURV, APRIL 2018	Sampling Origin: Hanford Site	Telephone No.: 509-376-4650	
Shipped To (Lab): GEL Laboratories, LLC	Logbook No.: HNF-N-506	Method of Shipment: Commercial Carrier	Purchase Order/Charge Code: 300071	
Protocol: CERCLA	Priority: 30 Days	Bill of Lading/Air Bill No.: 771981165066	Ice Chest No.: GWS-402	
POSSIBLE SAMPLE HAZARDS/REMARK ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1		SPECIAL INSTRUCTIONS N/A		
Sample No. B3HT17	Filter N	Date 4/11/18	Time 1212	No/Type Container 1x4-L G/P
Sample Analysis		Holding Time 6 Months		
Preservative None				

Relinquished By: Kevin Patterson <small>CHPRC</small>	Signature	APR 11 2018	Date/Time	Received By: SSU-1	Signature	APR 11 2018	Date/Time	Matrix *
Relinquished By: SSU-1	Signature	APR 12 2018	Date/Time 0700	Received By: Ivan Schoeffler <small>CHPRC</small>	Signature	APR 12 2018	Date/Time 0700	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By: Ivan Schoeffler <small>CHPRC</small>	Signature	APR 12 2018	Date/Time 1400	Received By: FEDEX	Signature	4/13/18	Date/Time 905	DS = Drum Solids DL = Drum Liquid T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By:	Signature	FED EX	Date/Time	Disposed By:	Signature	Date/Time:		
FINAL SAMPLE DISPOSITION				Disposal Method (e.g., Return to customer, per lab procedure, used in process):				



SAMPLE RECEIPT & REVIEW FORM

Client: **CPRC**

SDG/AR/COC/Work Order: **447943**

Received By: **STACY BOONE**

Date Received: **APR 13, 2018**

Carrier and Tracking Number

Circle Applicable:
FedEx Express FedEx Ground UPS Field Services Courier Other

7719 8116 5066 - ic **7719 8476 6642 - ic**

Suspected Hazard Information

Yes No

*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

Shipped as a DOT Hazardous?

Yes No

Hazard Class Shipped: _____ UN#: _____

COC/Samples marked or classified as radioactive?

Yes No

Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr
Classified as: Rad 1 Rad 2 Rad 3

Is package, COC, and/or Samples marked HAZ?

Yes No

If yes, select Hazards below, and contact the GEL Safety Group.
PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: _____
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR3-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes <u> </u> No <u> </u> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <u> </u> No <u> </u> N/A <u> </u> (If unknown, select No) VOA vials free of headspace? Yes <u> </u> No <u> </u> N/A <u> </u> Sample ID's and containers affected: _____
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials ast Date 4/16/18 Page 1 of 1

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
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	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
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).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The analyte was detected in the associated method blank >= MDC or >5% sample activity.	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
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).	General Chemistry	
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.	Inorganics	Metals
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.	General Chemistry	
<	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	General Chemistry	
UX	Gamma Spectroscopy--Uncertain identification	Radiological	

Laboratory Certifications

List of current GEL Certifications as of 09 May 2018

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Volatile Analysis

Case Narrative

**GC/MS Volatile
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL447943
Work Order #: 447943**

Product: Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

Analytical Method: SW846 8260C

Analytical Procedure: GL-OA-E-038 REV# 26

Analytical Batch: 1754435

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
447943001	B3HV38
1204005998	Method Blank (MB)
1204005999	Laboratory Control Sample (LCS)
1204006001	447320005(B3HVJ6) Post Spike (PS)
1204006003	447320005(B3HVJ6) Post Spike Duplicate (PSD)
1204011649	Method Blank (MB)
1204011650	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

Continuing Calibration Verification Requirements

The calibration verification standard requirements were not all met for sample 447943001 (B3HV38). The daily CCV analyzed on 4/18/18 was biased high for 1,1,1-Trichloroethane at 21.3%D and Carbon tetrachloride at 25.5%D. There were no positive results for any of the analytes that were outside the calibration criteria. The results are reported.

Quality Control (QC) Information

Blank (MB) Statement

Target analytes were detected in the blank 1204005998 (MB) below the reporting limit.

Laboratory Control Sample (LCS) Recovery

The LCS/and or LCSD (See Below) recovery was not within the acceptance limits for all analytes. The unacceptable analyte was not detected in the samples associated with the laboratory control sample. Therefore, the data were reported.

Sample	Analyte	Value
1204011650 (LCS)	2-Butanone	134* (70%-130%)

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The

recoveries were similar. It is believed possible matrix interference has been demonstrated.

Sample	Analyte	Value
1204006001 (B3HVJ6PS)	2-Butanone	57* (70%-130%)
	Acetone	41* (70%-130%)
1204006003 (B3HVJ6PSD)	2-Butanone	55* (70%-130%)
	Acetone	39* (70%-130%)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL447943 GEL Work Order: 447943

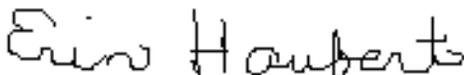
The Qualifiers in this report are defined as follows:

- B The analyte was detected in both the associated QC blank and in the sample.
- 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
- 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.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Erin Haubert

Date: 09 MAY 2018

Title: Data Validator

Sample Data Summary

May 9, 2018

Rev 0

Volatile

Page 1 of 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL447943	Date Collected: 04/11/2018 12:55	Matrix: WATER
Lab Sample ID: 447943001	Date Received: 04/13/2018 09:05	
Client ID: B3HV38	Client: CPRC001	Project: CPRC0S18004
Batch ID: 1754435	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 04/18/2018 15:10	Inst: VOA3.I	Dilution: 1
Prep Date: 04/18/2018 15:10	Analyst: JP1	Purge Vol: 5 mL
Data File: 041818V3\3E313.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	2.00	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	2.00	5.00
75-15-0	Carbon disulfide	U	1.60	ug/L	1.60	10.0	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	2.00	5.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	2.00	5.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	2.00	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	5.00
75-09-2	Methylene chloride	U	1.60	ug/L	1.60	5.00	5.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	2.00	5.00
108-88-3	Toluene	U	0.300	ug/L	0.300	2.00	5.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	2.00	5.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	2.00	10.0
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	2.00	10.0
78-93-3	2-Butanone	TU	3.00	ug/L	3.00	10.0	10.0
108-10-1	4-Methyl-2-pentanone	U	3.00	ug/L	3.00	10.0	10.0
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	2.00	10.0
1330-20-7	Xylenes (total)	U	0.300	ug/L	0.300	6.00	10.0
67-64-1	Acetone	TU	3.00	ug/L	3.00	10.0	20.0

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: April 23, 2018

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 447943

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
QC1204005999	LCS										
1,1,1-Trichloroethane	50.0			53.7	ug/L		107	(70%-130%)	JP1	04/10/18	10:04
1,1,2-Trichloroethane	50.0			48.7	ug/L		97	(70%-130%)			
1,1-Dichloroethane	50.0			50.9	ug/L		102	(70%-130%)			
1,1-Dichloroethylene	50.0			51.0	ug/L		102	(70%-130%)			
1,2-Dichloroethane	50.0			53.0	ug/L		106	(70%-130%)			
2-Butanone	250			272	ug/L		109	(70%-130%)			
4-Methyl-2-pentanone	250			264	ug/L		105	(70%-130%)			
Acetone	250			256	ug/L		103	(70%-130%)			
Benzene	50.0			51.8	ug/L		104	(70%-130%)			
Carbon disulfide	250			257	ug/L		103	(70%-130%)			
Carbon tetrachloride	50.0			54.5	ug/L		109	(70%-130%)			
Chlorobenzene	50.0			49.3	ug/L		99	(70%-130%)			
Chloroform	50.0		B	53.8	ug/L		108	(70%-130%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 2 of 10

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
Ethylbenzene	50.0			47.3	ug/L		95	(70%-130%)	JP1	04/10/18	10:04
Methylene chloride	50.0			49.8	ug/L		100	(70%-130%)			
Tetrachloroethylene	50.0			48.0	ug/L		96	(70%-130%)			
Toluene	50.0			45.8	ug/L		92	(70%-130%)			
Trichloroethylene	50.0			53.7	ug/L		107	(70%-130%)			
Vinyl chloride	50.0			52.6	ug/L		105	(70%-130%)			
Xylenes (total)	150			142	ug/L		94	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			51.4	ug/L		103	(70%-130%)			
**Bromofluorobenzene	50.0			46.6	ug/L		93	(70%-130%)			
**Toluene-d8	50.0			44.6	ug/L		89	(70%-130%)			
QC1204011650 LCS											
1,1,1-Trichloroethane	50.0			63.4	ug/L		127	(70%-130%)		04/18/18	09:54
1,1,2-Trichloroethane	50.0			52.3	ug/L		105	(70%-130%)			
1,1-Dichloroethane	50.0			58.3	ug/L		117	(70%-130%)			
1,1-Dichloroethylene	50.0			57.9	ug/L		116	(70%-130%)			
1,2-Dichloroethane	50.0			58.7	ug/L		117	(70%-130%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 3 of 10

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
2-Butanone	250			336	ug/L		134*	(70%-130%)	JP1	04/18/18	09:54
4-Methyl-2-pentanone	250			254	ug/L		102	(70%-130%)			
Acetone	250			307	ug/L		123	(70%-130%)			
Benzene	50.0			58.2	ug/L		116	(70%-130%)			
Carbon disulfide	250			286	ug/L		115	(70%-130%)			
Carbon tetrachloride	50.0			63.6	ug/L		127	(70%-130%)			
Chlorobenzene	50.0			49.9	ug/L		100	(70%-130%)			
Chloroform	50.0			61.1	ug/L		122	(70%-130%)			
Ethylbenzene	50.0			49.6	ug/L		99	(70%-130%)			
Methylene chloride	50.0			56.6	ug/L		113	(70%-130%)			
Tetrachloroethylene	50.0			52.4	ug/L		105	(70%-130%)			
Toluene	50.0			50.0	ug/L		100	(70%-130%)			
Trichloroethylene	50.0			62.8	ug/L		126	(70%-130%)			
Vinyl chloride	50.0			59.9	ug/L		120	(70%-130%)			
Xylenes (total)	150			152	ug/L		101	(70%-130%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
**1,2-Dichloroethane-d4	50.0			52.0	ug/L		104	(70%-130%)	JP1	04/18/18	09:54
**Bromofluorobenzene	50.0			50.3	ug/L		101	(70%-130%)			
**Toluene-d8	50.0			45.5	ug/L		91	(70%-130%)			
QC1204005998	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					04/10/18	11:37
1,1,2-Trichloroethane			U	0.300	ug/L						
1,1-Dichloroethane			U	0.300	ug/L						
1,1-Dichloroethylene			U	0.300	ug/L						
1,2-Dichloroethane			U	0.300	ug/L						
2-Butanone			U	3.00	ug/L						
4-Methyl-2-pentanone			U	3.00	ug/L						
Acetone			U	3.00	ug/L						
Benzene			U	0.300	ug/L						
Carbon disulfide			U	1.60	ug/L						
Carbon tetrachloride			U	0.300	ug/L						
Chlorobenzene			U	0.300	ug/L						

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
Chloroform			J	0.300	ug/L				JP1	04/10/18	11:37
Ethylbenzene			U	0.300	ug/L						
Methylene chloride			U	1.60	ug/L						
Tetrachloroethylene			U	0.300	ug/L						
Toluene			U	0.300	ug/L						
Trichloroethylene			U	0.300	ug/L						
Vinyl chloride			U	0.300	ug/L						
Xylenes (total)			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			49.2	ug/L		98	(70%-130%)			
**Bromofluorobenzene	50.0			49.0	ug/L		98	(70%-130%)			
**Toluene-d8	50.0			44.9	ug/L		90	(70%-130%)			
QC1204011649 MB											
1,1,1-Trichloroethane			U	0.300	ug/L					04/18/18	11:28
1,1,2-Trichloroethane			U	0.300	ug/L						
1,1-Dichloroethane			U	0.300	ug/L						
1,1-Dichloroethylene			U	0.300	ug/L						

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 6 of 10

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
1,2-Dichloroethane			U	0.300	ug/L				JP1	04/18/18	11:28
2-Butanone			U	3.00	ug/L						
4-Methyl-2-pentanone			U	3.00	ug/L						
Acetone			U	3.00	ug/L						
Benzene			U	0.300	ug/L						
Carbon disulfide			U	1.60	ug/L						
Carbon tetrachloride			U	0.300	ug/L						
Chlorobenzene			U	0.300	ug/L						
Chloroform			U	0.300	ug/L						
Ethylbenzene			U	0.300	ug/L						
Methylene chloride			U	1.60	ug/L						
Tetrachloroethylene			U	0.300	ug/L						
Toluene			U	0.300	ug/L						
Trichloroethylene			U	0.300	ug/L						
Vinyl chloride			U	0.300	ug/L						

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
Xylenes (total)			U	0.300	ug/L				JP1	04/18/18	11:28
**1,2-Dichloroethane-d4	50.0			52.1	ug/L		104	(70%-130%)			
**Bromofluorobenzene	50.0			48.4	ug/L		97	(70%-130%)			
**Toluene-d8	50.0			46.0	ug/L		92	(70%-130%)			
QC1204006001 447320005 PS											
1,1,1-Trichloroethane	50.0	U	0.00	49.4	ug/L		99	(70%-130%)		04/10/18	16:50
1,1,2-Trichloroethane	50.0	U	0.00	44.7	ug/L		89	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	48.2	ug/L		96	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	46.4	ug/L		93	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	52.1	ug/L		104	(70%-130%)			
2-Butanone	250	TU	0.00 T	143	ug/L		57 *	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	180	ug/L		72	(70%-130%)			
Acetone	250	TU	0.00 T	102	ug/L		41 *	(70%-130%)			
Benzene	50.0	U	0.00	47.2	ug/L		94	(70%-130%)			
Carbon disulfide	250	U	0.00	222	ug/L		89	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	50.0	ug/L		100	(70%-130%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 8 of 10

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
Chlorobenzene	50.0	U	0.00		42.7	ug/L	85	(70%-130%)	JP1	04/10/18	16:50
Chloroform	50.0	U	0.00	B	48.9	ug/L	98	(70%-130%)			
Ethylbenzene	50.0	U	0.00		40.7	ug/L	81	(70%-130%)			
Methylene chloride	50.0	U	1.01		47.2	ug/L	92	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00		41.4	ug/L	83	(70%-130%)			
Toluene	50.0	U	0.00		40.3	ug/L	81	(70%-130%)			
Trichloroethylene	50.0	U	0.00		49.2	ug/L	98	(70%-130%)			
Vinyl chloride	50.0	U	0.00		48.6	ug/L	97	(70%-130%)			
Xylenes (total)	150	U	0.00		119	ug/L	79	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		52.1		52.5	ug/L	105	(70%-130%)			
**Bromofluorobenzene	50.0		46.1		47.7	ug/L	95	(70%-130%)			
**Toluene-d8	50.0		43.3		44.5	ug/L	89	(70%-130%)			
QC1204006003 447320005 PSD											
1,1,1-Trichloroethane	50.0	U	0.00		48.9	ug/L	1	98	(0%-20%)	04/10/18	17:21
1,1,2-Trichloroethane	50.0	U	0.00		45.4	ug/L	2	91	(0%-20%)		
1,1-Dichloroethane	50.0	U	0.00		49.2	ug/L	2	98	(0%-20%)		

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 9 of 10

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
1,1-Dichloroethylene	50.0	U	0.00		45.6	ug/L	2	91	(0%-20%)	JP1	04/10/18 17:21
1,2-Dichloroethane	50.0	U	0.00		50.2	ug/L	4	100	(0%-20%)		
2-Butanone	250	TU	0.00	T	139	ug/L	3	55*	(0%-20%)		
4-Methyl-2-pentanone	250	U	0.00		190	ug/L	5	76	(0%-20%)		
Acetone	250	TU	0.00	T	97.4	ug/L	5	39*	(0%-20%)		
Benzene	50.0	U	0.00		47.1	ug/L	0	94	(0%-20%)		
Carbon disulfide	250	U	0.00		223	ug/L	0	89	(0%-20%)		
Carbon tetrachloride	50.0	U	0.00		50.6	ug/L	1	101	(0%-20%)		
Chlorobenzene	50.0	U	0.00		45.0	ug/L	5	90	(0%-20%)		
Chloroform	50.0	U	0.00	B	48.4	ug/L	1	97	(0%-20%)		
Ethylbenzene	50.0	U	0.00		44.8	ug/L	10	90	(0%-20%)		
Methylene chloride	50.0	U	1.01		48.4	ug/L	3	95	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00		42.7	ug/L	3	85	(0%-20%)		
Toluene	50.0	U	0.00		42.4	ug/L	5	85	(0%-20%)		
Trichloroethylene	50.0	U	0.00		48.9	ug/L	1	98	(0%-20%)		

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 10 of 10

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1754435										
Vinyl chloride	50.0	U	0.00	51.8	ug/L	6	104	(0%-20%)	JP1	04/10/18	17:21
Xylenes (total)	150	U	0.00	133	ug/L	11	89	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		52.1	50.4	ug/L		101	(70%-130%)			
**Bromofluorobenzene	50.0		46.1	48.3	ug/L		97	(70%-130%)			
**Toluene-d8	50.0		43.3	45.2	ug/L		90	(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 (Organics 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: GEL447943

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1204005999	LCS for batch 1754435	103	89	93
1204005998	MB for batch 1754435	98	90	98
1204006001	B3HVJ6PS	105	89	95
1204006003	B3HVJ6PSD	101	90	97
1204011650	LCS for batch 1754435	104	91	101
1204011649	MB for batch 1754435	104	92	97
447943001	B3HV38	107	88	99

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

Semi-Volatile Analysis

Case Narrative

**GC/MS Semivolatile
Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL447943
Work Order #: 447943**

Product: Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry

Analytical Method: SW846 3510C/8270D

Analytical Procedure: GL-OA-E-009 REV# 40

Analytical Batch: 1756081

Preparation Method: SW846 3510C

Preparation Procedure: GL-OA-E-013 REV# 32

Preparation Batch: 1756079

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
447943001	B3HV38
1204009714	Method Blank (MB)
1204009715	Laboratory Control Sample (LCS)
1204009716	448082001(NonSDG) Matrix Spike (MS)
1204009717	448082001(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Surrogate Recoveries

Samples (See Below) did not meet surrogate recovery acceptance criteria. The samples were analyzed at a dilution. As a result, one or more surrogates were diluted out of the acceptance limits.

Sample	Analyte	Value
1204009716 (Non SDG 448082001MS)	2, 4, 6-Tribromophenol	0* (32%-124%)
	2-Fluorobiphenyl	9* (32%-112%)
	2-Fluorophenol	0* (15%-88%)
	Phenol-d5	0* (15%-91%)
	p-Terphenyl-d14	10* (36%-121%)
1204009717 (Non SDG 448082001MSD)	2, 4, 6-Tribromophenol	0* (32%-124%)
	2-Fluorophenol	0* (15%-88%)
	Phenol-d5	0* (15%-91%)
	p-Terphenyl-d14	33* (36%-121%)

Spike Recovery Statement

The MS or MSD (See Below) spike recoveries were not within the acceptance limits. The MS and MSD were analyzed at a dilution. As a result, the spikes were diluted outside of the acceptance limits.

Sample	Analyte	Value
1204009716 (Non SDG 448082001MS)	Several	See applicable report
1204009717 (Non SDG 448082001MSD)	Several	See applicable report

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL447943 GEL Work Order: 447943

The Qualifiers in this report are defined as follows:

- D Results are reported from a diluted aliquot of sample.
- 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
- 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.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: **Barbara Bailey**

Date: **08 MAY 2018**

Title: **Data Validator**

Sample Data Summary

May 9, 2018

Rev 0

Semi-Volatile

Page 1 of 1

Certificate of Analysis

Sample Summary

SDG Number:	GEL447943	Date Collected:	04/11/2018 12:55	Matrix:	WATER
Lab Sample ID:	447943001	Date Received:	04/13/2018 09:05	Client:	CPRC001
Client ID:	B3HV38	Method:	SW846 3510C/8270D	Project:	CPRC0S18004
Batch ID:	1756081	Inst:	MSD5.I	SOP Ref:	GL-OA-E-009
Run Date:	04/19/2018 00:45	Analyst:	JLD1	Dilution:	1
Prep Date:	04/17/2018 10:26	Aliquot:	1020 mL	Inj. Vol:	1 uL
Data File:	s041818.B\s5d1817.D	Column:	DB-5ms	Final Volume:	1 mL

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
66-27-3	Methyl methanesulfonate	U	2.94	ug/L	2.94	9.80
621-64-7	N-Nitrosodipropylamine	U	2.94	ug/L	2.94	9.80
87-86-5	Pentachlorophenol	U	2.94	ug/L	2.94	9.80
117-81-7	bis(2-Ethylhexyl)phthalate	U	0.294	ug/L	0.294	0.980

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: April 23, 2018

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 447943

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1756081										
QC1204009715	LCS										
N-Nitrosodipropylamine	50.0			39.7	ug/L		79	(70%-130%)	JLD1	04/18/18	20:35
Pentachlorophenol	50.0			43.8	ug/L		88	(70%-130%)			
bis(2-Ethylhexyl)phthalate	50.0			44.9	ug/L		90	(70%-130%)			
**2,4,6-Tribromophenol	100			89.1	ug/L		89	(32%-124%)			
**2-Fluorobiphenyl	50.0			41.8	ug/L		84	(32%-112%)			
**2-Fluorophenol	100			46.5	ug/L		47	(15%-88%)			
**Nitrobenzene-d5	50.0			44.2	ug/L		88	(36%-115%)			
**Phenol-d5	100			28.6	ug/L		29	(15%-91%)			
**p-Terphenyl-d14	50.0			47.8	ug/L		96	(36%-121%)			
QC1204009714	MB										
Methyl methanesulfonate			U	3.00	ug/L					04/18/18	20:04
N-Nitrosodipropylamine			U	3.00	ug/L						
Pentachlorophenol			U	3.00	ug/L						
bis(2-Ethylhexyl)phthalate			U	0.300	ug/L						

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1756081										
**2,4,6-Tribromophenol	100			67.5	ug/L		67	(32%-124%)	JLD1	04/18/18	20:04
**2-Fluorobiphenyl	50.0			36.8	ug/L		74	(32%-112%)			
**2-Fluorophenol	100			36.4	ug/L		36	(15%-88%)			
**Nitrobenzene-d5	50.0			37.6	ug/L		75	(36%-115%)			
**Phenol-d5	100			22.9	ug/L		23	(15%-91%)			
**p-Terphenyl-d14	50.0			39.9	ug/L		80	(36%-121%)			
QC1204009716 448082001 MS											
N-Nitrosodipropylamine	125	DU	30.0	DJ	79.8	ug/L	64	(38%-114%)		04/20/18	14:02
Pentachlorophenol	125	DTU	30.0	DTU	75.0	ug/L	0*	(15%-135%)			
bis(2-Ethylhexyl)phthalate	125	DU	3.00	D	80.8	ug/L	65	(33%-128%)			
**2,4,6-Tribromophenol	250		0.00		0.00	ug/L	0*	(32%-124%)			
**2-Fluorobiphenyl	125		2.70		11.0	ug/L	9*	(32%-112%)			
**2-Fluorophenol	250		0.00		0.00	ug/L	0*	(15%-88%)			
**Nitrobenzene-d5	125		34.3		107	ug/L	85	(36%-115%)			
**Phenol-d5	250		0.00		0.00	ug/L	0*	(15%-91%)			
**p-Terphenyl-d14	125		2.80		12.8	ug/L	10*	(36%-121%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1756081										
QC1204009717	448082001	MSD									
N-Nitrosodipropylamine	125	DU	30.0	DJ	89.8	ug/L	12	72	(0%-20%)	JLD1	04/20/18 14:33
Pentachlorophenol	125	DTU	30.0	DTU	75.0	ug/L	N/A	0*	(0%-20%)		
bis(2-Ethylhexyl)phthalate	125	DU	3.00	D	83.3	ug/L	3	67	(0%-20%)		
**2,4,6-Tribromophenol	250		0.00		0.00	ug/L		0*	(32%-124%)		
**2-Fluorobiphenyl	125		2.70		80.8	ug/L		65	(32%-112%)		
**2-Fluorophenol	250		0.00		0.00	ug/L		0*	(15%-88%)		
**Nitrobenzene-d5	125		34.3		103	ug/L		82	(36%-115%)		
**Phenol-d5	250		0.00		0.00	ug/L		0*	(15%-91%)		
**p-Terphenyl-d14	125		2.80		41.5	ug/L		33*	(36%-121%)		

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

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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 (Organics 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.

May 9, 2018

Semi-Volatile

Rev 0

Surrogate Recovery Report

SDG Number: GEL447943

Matrix Type: LIQUID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1204009714	MB for batch 1756079	36	23	75	74	67	80
1204009715	LCS for batch 1756079	47	29	88	84	89	96
447943001	B3HV38	34	20	75	76	72	92
1204009716	WST03-18-154809MS	0 * D	0 * D	85 D	9 * D	0 * D	10 * D
1204009717	WST03-18-154809MSD	0 * D	0 * D	82 D	65 D	0 * D	33 * D

Surrogate

Acceptance Limits

2FP	= 2-Fluorophenol	(15%-88%)
PHL	= Phenol-d5	(15%-91%)
NBZ	= Nitrobenzene-d5	(36%-115%)
FBP	= 2-Fluorobiphenyl	(32%-112%)
TBP	= 2,4,6-Tribromophenol	(32%-124%)
TPH	= p-Terphenyl-d14	(36%-121%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL447943
Work Order #: 447943**

Product: NP237_IE_PRECIP_AEA: COMMON

Analytical Method: ASTM C 1475-00 Modified

Analytical Procedure: GL-RAD-A-032 REV# 21

Analytical Batch: 1755838

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
447943001	B3HV38
1204009163	Method Blank (MB)
1204009164	447943001(B3HV38) Sample Duplicate (DUP)
1204009165	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: THISO_IE_PRECIP_AEA: COMMON

Analytical Method: THISO_IE_PRECIP_AEA

Analytical Procedure: GL-RAD-A-038 REV# 17

Analytical Batch: 1755843

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
447943001	B3HV38
1204009179	Method Blank (MB)
1204009180	447943001(B3HV38) Sample Duplicate (DUP)
1204009181	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: PUISO_PRECIP_AEA:COMMON
Analytical Method: PUISO_PRECIP_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1757937

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
447943001	B3HV38
1204014341	Method Blank (MB)
1204014342	447943001(B3HV38) Sample Duplicate (DUP)
1204014343	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Re-prep/Re-analysis

Samples were re-prepped due to low carrier/tracer yield. The re-analysis is being reported.

Recounts

Sample 1204014341 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Product: GAMMA_GS:COMMON + Th234
Analytical Method: 901.1_GAMMA_GS
Analytical Procedure: GL-RAD-A-013 REV# 27
Analytical Batch: 1755931

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
447943001	B3HV38
1204009327	Method Blank (MB)
1204009328	447943001(B3HV38) Sample Duplicate (DUP)
1204009329	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: I129LL_SEP_LEPS_GS: COMMON (low level)

Analytical Method: DOE EML HASL-300,I-01 Modified

Analytical Procedure: GL-RAD-A-006 REV# 21

Analytical Batch: 1755934

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
447943001	B3HV38
447943002	B3HT13
447943003	B3HT17
1204009337	Method Blank (MB)
1204009338	447943002(B3HT13) Sample Duplicate (DUP)
1204009339	447943002(B3HT13) Matrix Spike (MS)
1204009340	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
X	Results are considered a false positive due to high counting uncertainty.	Iodine-129	447943002	B3HT13

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

Analytical Procedure: GL-RAD-A-003 REV# 16

Analytical Batch: 1755808

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
447943001	B3HV38
1204009085	Method Blank (MB)
1204009086	447575005(B3HV75) Sample Duplicate (DUP)
1204009087	447575005(B3HV75) Matrix Spike (MS)
1204009088	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Miscellaneous Information**Additional Comments**

The matrix spike, 1204009087 (B3HV75MS), aliquot was reduced to conserve sample volume.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL447943 GEL Work Order: 447943

The Qualifiers in this report are defined as follows:

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

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Kate Gellatly

Date: 08 MAY 2018

Title: Analyst I

Sample Data Summary

**Certificate of Analysis
Sample Summary**

SDG Number: GEL447943	Client: CPRC001	Project: CPRC0S18004
Lab Sample ID: 447943001	Date Collected: 04/11/2018 12:55	Matrix: WATER
	Date Received: 04/13/2018 09:05	
Client ID: B3HV38	Method: ASTM C 1475-00 Modified	Prep Basis: "As Received"
Batch ID: 1755838	Analyst: MXS2	SOP Ref: GL-RAD-A-032
Run Date: 04/21/2018 12:16	Aliquot: 0.1 L	Instrument: 1194
Data File: S0447943001_NP.1A.gcnf	Prep Method: ASTM C 1475-00 Modified	Count Time: 240 min
Prep Batch: 1755838		
Prep Date: 04/18/2018 23:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	-0.0681	pCi/L	+/-0.206	0.206	0.578	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1920	2140	pCi/L	89.7	(30%-105%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

May 9, 2018
Rad

Rev 0
Page 1 of 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL447943	Client: CPRC001	Project: CPRC0S18004
Lab Sample ID: 447943001	Date Collected: 04/11/2018 12:55	Matrix: WATER
	Date Received: 04/13/2018 09:05	
Client ID: B3HV38	Method: THISO_IE_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1755843	Analyst: MXS2	SOP Ref: GL-RAD-A-038
Run Date: 04/20/2018 09:01	Aliquot: 0.1 L	Instrument: 1188
Data File: S0447943001_TH.1A.gcnf	Prep Method: DOE EML HASL-300, Th-01-	Count Time: 240 min
Prep Batch: 1755843		
Prep Date: 04/18/2018 23:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14274-82-9	Thorium-228	U	0.295	pCi/L	+/-0.374	0.377	0.466	1.00
14269-63-7	Thorium-230	U	-0.138	pCi/L	+/-0.302	0.302	0.799	1.00
TH-232 <small>7440-29-1</small>	Thorium-232	U	0.139	pCi/L	+/-0.288	0.289	0.418	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Thorium-229 Tracer	15.1	17.6	pCi/L	85.4	(30%-105%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error. TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma). The MDC is a sample specific MDC.

**Certificate of Analysis
Sample Summary**

SDG Number: GEL447943	Client: CPRC001	Project: CPRC0S18004
Lab Sample ID: 447943001	Date Collected: 04/11/2018 12:55	Matrix: WATER
	Date Received: 04/13/2018 09:05	
Client ID: B3HV38	Method: PUIISO_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1757937	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 04/26/2018 08:50	Aliquot: 0.1 L	Instrument: 1218
Data File: S0447943001_PU.2A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 240 min
Prep Batch: 1757937		
Prep Date: 04/23/2018 23:04		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.425	pCi/L	+/-0.502	0.506	0.543	1.00
OER-100-70	Plutonium-239/240	U	0.095	pCi/L	+/-0.474	0.475	0.948	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	13.2	19.8	pCi/L	66.8	(30%-105%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

May 9, 2018

Rev 0

Rad

Page 1 of 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL447943
Lab Sample ID: 447943001

Client: CPRC001
Date Collected: 04/11/2018 12:55
Date Received: 04/13/2018 09:05

Project: CPRC0S18004
Matrix: WATER

Client ID: B3HV38
Batch ID: 1755931
Run Date: 04/16/2018 11:09
Data File: G447943001.CNF;1
Prep Batch: 1755931
Prep Date: 04/16/2018 06:02

Method: 901.1_GAMMA_GS
Analyst: BSW1
Aliquot: 0.5 L
Prep Method: EPA 901.1

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-013
Instrument: GAM43
Count Time: 240 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	1.63	pCi/L	+/-3.57	3.65	7.00	15.0
10198-40-0	Cobalt-60	U	-5.31	pCi/L	+/-5.43	5.95	7.41	
14683-23-9	Europium-152	U	2.66	pCi/L	+/-10.4	10.5	18.9	
15585-10-1	Europium-154	U	-5.45	pCi/L	+/-11.7	12.0	20.9	
14391-16-3	Europium-155	U	-2.87	pCi/L	+/-10.1	10.2	17.0	
15065-10-8	Thorium-234	U	203	pCi/L	+/-387	401	413	

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
---------------------------	--------	---------	-------	-----------	-------------------

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

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

The MDC is a sample specific MDC.

May 9, 2018

Rev 0

Rad

Page 1 of 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL447943	Client: CPRC001	Project: CPRC0S18004
Lab Sample ID: 447943001	Date Collected: 04/11/2018 12:55	Matrix: WATER
	Date Received: 04/13/2018 09:05	
Client ID: B3HV38	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1755934	Analyst: BSW1	SOP Ref: GL-RAD-A-006
Run Date: 04/23/2018 09:10	Aliquot: 1.2 L	Instrument: XRAY1
Data File: I447943001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 120 min
Prep Batch: 1755934		
Prep Date: 04/20/2018 10:25		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	-0.0685	pCi/L	+/-0.305	0.307	0.542	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
---------------------------	--------	---------	-------	-----------	-------------------

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

**Certificate of Analysis
Sample Summary**

SDG Number: GEL447943	Client: CPRC001	Project: CPRC0S18004
Lab Sample ID: 447943001	Date Collected: 04/11/2018 12:55	Matrix: WATER
	Date Received: 04/13/2018 09:05	
Client ID: B3HV38	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1755808	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 04/19/2018 18:15	Aliquot: 100 mL	Instrument: LSCGOLD
Data File: C1755808.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1755808		
Prep Date: 04/18/2018 11:56		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-17.1	pCi/L	+/-19.3	19.3	34.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
---------------------------	--------	---------	-------	-----------	-------------------

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

**Certificate of Analysis
Sample Summary**

SDG Number: GEL447943	Client: CPRC001	Project: CPRC0S18004
Lab Sample ID: 447943002	Date Collected: 04/11/2018 12:47	Matrix: WATER
	Date Received: 04/13/2018 09:05	
Client ID: B3HT13		Prep Basis: "As Received"
Batch ID: 1755934	Method: DOE EML HASL-300,I-01 Mo	SOP Ref: GL-RAD-A-006
Run Date: 04/23/2018 09:11	Analyst: BSW1	Instrument: XRAY4
Data File: I447943002.CNF;1	Aliquot: 1.2 L	Count Time: 120 min
Prep Batch: 1755934	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 04/20/2018 10:25		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	X	0.997	pCi/L	+/-0.824	0.830	0.747	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
---------------------------	--------	---------	-------	-----------	-------------------

Comments:

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

May 9, 2018

Rev 0

Rad

Page 1 of 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL447943	Client: CPRC001	Project: CPRC0S18004
Lab Sample ID: 447943003	Date Collected: 04/11/2018 12:12	Matrix: WATER
	Date Received: 04/13/2018 09:05	
Client ID: B3HT17	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1755934	Analyst: BSW1	SOP Ref: GL-RAD-A-006
Run Date: 04/23/2018 09:12	Aliquot: 1.2 L	Instrument: XRAY5
Data File: I447943003.CNF;2	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 150 min
Prep Batch: 1755934		
Prep Date: 04/20/2018 10:25		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.230	pCi/L	+/-0.319	0.337	0.763	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
---------------------------	--------	---------	-------	-----------	-------------------

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: May 8, 2018

Page 1 of 5

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 447943

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1755838								
QC1204009163 MB									
Neptunium-237			U	0.216	pCi/L			MXS2	04/21/1812:16
				Uncert: +/-0.321					
				TPU: +/-0.322					
**Americium-243 Tracer	2140			2170	pCi/L	REC: 101	(30%-105%)		
QC1204009164 447943001 DUP									
Neptunium-237		U	-0.0681	U	-0.0316				04/21/1812:16
			Uncert: +/-0.206		+/-0.273	RPD: 0	N/A		
			TPU: +/-0.206		+/-0.273	RER: 0.209	(0-2)		
**Americium-243 Tracer	2140		1920	1400	pCi/L	REC: 65	(30%-105%)		
QC1204009165 LCS									
Neptunium-237	44.7			50.1	pCi/L	REC: 112	(80%-120%)		04/21/1812:16
				Uncert: +/-4.19					
				TPU: +/-6.97					
**Americium-243 Tracer	2140			1700	pCi/L	REC: 80	(30%-105%)		
Batch	1755843								
QC1204009179 MB									
Thorium-228			U	0.0607	pCi/L			MXS2	04/20/1809:01
				Uncert: +/-0.339					
				TPU: +/-0.340					
Thorium-230			U	0.608	pCi/L				
				Uncert: +/-0.655					
				TPU: +/-0.671					
Thorium-232			U	0.344	pCi/L				
				Uncert: +/-0.462					
				TPU: +/-0.466					
**Thorium-229 Tracer	17.6			12.8	pCi/L	REC: 73	(30%-105%)		
				Uncert: +/-2.84					
				TPU: +/-4.31					
QC1204009180 447943001 DUP									
Thorium-228		U	0.295	U	0.160				04/20/1809:01
			Uncert: +/-0.374		+/-0.315	RPD: 0	N/A		
			TPU: +/-0.377		+/-0.317	RER: 0.538	(0-2)		
Thorium-230		U	-0.138	U	-0.0687				
			Uncert: +/-0.302		+/-0.319	RPD: 0	N/A		
			TPU: +/-0.302		+/-0.320	RER: 0.308	(0-2)		
Thorium-232		U	0.139	U	-0.0286				
			Uncert: +/-0.288		+/-0.187	RPD: 0	N/A		
			TPU: +/-0.289		+/-0.187	RER: 0.957	(0-2)		
**Thorium-229 Tracer	17.6		15.1	16.5	pCi/L	REC: 94	(30%-105%)		
			Uncert: +/-2.38		+/-2.51				
			TPU: +/-3.71		+/-3.87				
QC1204009181 LCS									
Thorium-228				17.5	pCi/L				04/20/1809:01

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 2 of 5

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1755843								
				Uncert:					
				TPU:					
Thorium-230				2.59	pCi/L				
				Uncert:					
				TPU:					
Thorium-232	19.9			18.0	pCi/L	REC:	91 (80%-120%)		
				Uncert:					
				TPU:					
**Thorium-229 Tracer	17.6			14.9	pCi/L	REC:	85 (30%-105%)		
				Uncert:					
				TPU:					
Batch	1757937								
QC1204014341	MB								
Plutonium-238			U	-0.494	pCi/L			MXS2	04/30/1809:34
				Uncert:					
				TPU:					
Plutonium-239/240			U	-0.139	pCi/L				
				Uncert:					
				TPU:					
**Plutonium-242 Tracer	19.8			13.2	pCi/L	REC:	67 (30%-105%)		
				Uncert:					
				TPU:					
QC1204014342	447943001	DUP							
Plutonium-238		U	0.425	0.636	pCi/L				04/26/1808:50
				Uncert:		RPD:	16 (0% - 100%)		
				TPU:		RER:	0.561 (0-2)		
Plutonium-239/240		U	0.095	0.124	pCi/L				
				Uncert:		RPD:	0 N/A		
				TPU:		RER:	0.093 (0-2)		
**Plutonium-242 Tracer	19.8		13.2	16.6	pCi/L	REC:	84 (30%-105%)		
				Uncert:					
				TPU:					
QC1204014343	LCS								
Plutonium-238			U	0.0267	pCi/L				04/26/1808:50
				Uncert:					
				TPU:					
Plutonium-239/240	19.8			17.1	pCi/L	REC:	86 (80%-120%)		
				Uncert:					
				TPU:					
**Plutonium-242 Tracer	19.8			15.4	pCi/L	REC:	78 (30%-105%)		
				Uncert:					
				TPU:					
Rad Gamma Spec									
Batch	1755931								
QC1204009327	MB								
Cesium-137			U	1.32	pCi/L			BSW1	04/16/1811:10
				Uncert:					
				TPU:					
Cobalt-60			U	-0.726	pCi/L				

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gamma Spec										
Batch	1755931									
				Uncert:						
				TPU:						
Europium-152			U	-3.25	pCi/L					
				Uncert:						
				TPU:						
Europium-154			U	5.21	pCi/L					
				Uncert:						
				TPU:						
Europium-155			U	-2.86	pCi/L					
				Uncert:						
				TPU:						
Thorium-234			U	122	pCi/L					
				Uncert:						
				TPU:						
QC1204009328	447943001	DUP								
Cesium-137		U	1.63	U	1.02	pCi/L				04/16/1815:25
			Uncert:	+/-3.57	+/-3.33		RPD: 0	N/A		
			TPU:	+/-3.65	+/-3.36		RER: 0.24	(0-2)		
Cobalt-60		U	-5.31	U	-0.611	pCi/L				
			Uncert:	+/-5.43	+/-2.89		RPD: 0	N/A		
			TPU:	+/-5.95	+/-2.90		RER: 1.39	(0-2)		
Europium-152		U	2.66	U	11.9	pCi/L				
			Uncert:	+/-10.4	+/-8.70		RPD: 0	N/A		
			TPU:	+/-10.5	+/-10.3		RER: 1.23	(0-2)		
Europium-154		U	-5.45	U	4.89	pCi/L				
			Uncert:	+/-11.7	+/-10.1		RPD: 0	N/A		
			TPU:	+/-12.0	+/-10.3		RER: 1.28	(0-2)		
Europium-155		U	-2.87	U	13.5	pCi/L				
			Uncert:	+/-10.1	+/-12.8		RPD: 0	N/A		
			TPU:	+/-10.2	+/-14.2		RER: 1.83	(0-2)		
Thorium-234		U	203	U	303	pCi/L				
			Uncert:	+/-387	+/-319		RPD: 0	N/A		
			TPU:	+/-401	+/-354		RER: 0.369	(0-2)		
QC1204009329	LCS									
Americium-241	1.10E+05				1.21E+05	pCi/L	REC: 110	(80%-120%)		04/17/1805:10
				Uncert:	+/-2320					
				TPU:	+/-10600					
Cesium-137	41200				42400	pCi/L	REC: 103	(80%-120%)		
				Uncert:	+/-733					
				TPU:	+/-3710					
Cobalt-60	34100				35300	pCi/L	REC: 103	(80%-120%)		
				Uncert:	+/-789					
				TPU:	+/-3230					
Europium-152			U	-39.7	pCi/L					
				Uncert:	+/-292					
				TPU:	+/-292					
Europium-154			U	283	pCi/L					
				Uncert:	+/-205					
				TPU:	+/-243					
Europium-155			U	-199	pCi/L					

QC Summary

Workorder: 447943

Page 4 of 5

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gamma Spec										
Batch	1755931									
				Uncert:		+/-286				
				TPU:		+/-301				
Thorium-234			U			-957				
				Uncert:		+/-3630				
				TPU:		+/-3660				
Batch	1755934									
QC1204009337	MB									
Iodine-129			U			-0.0707		BSW1	04/23/1810:53	
				Uncert:		+/-0.367				
				TPU:		+/-0.369				
QC1204009338	447943002	DUP								
Iodine-129		X	0.997	U		0.353				04/23/1811:06
				Uncert:	+/-0.824	+/-0.379	RPD: 29	(0% - 100%)		
				TPU:	+/-0.830	+/-0.412	RER: 1.36	(0-2)		
QC1204009339	447943002	MS								
Iodine-129		X	0.997			37.2	REC: 96	(75%-125%)		04/23/1811:16
				Uncert:	+/-0.824	+/-3.26				
				TPU:	+/-0.830	+/-4.94				
QC1204009340	LCS									
Iodine-129						37.8	REC: 101	(80%-120%)		04/23/1811:17
				Uncert:		+/-3.99				
				TPU:		+/-5.49				
Rad Liquid Scintillation										
Batch	1755808									
QC1204009085	MB									
Carbon-14			U			-10.2		BXM4	04/19/1818:31	
				Uncert:		+/-19.8				
				TPU:		+/-19.8				
QC1204009086	447575005	DUP								
Carbon-14		U	-16	U		-19.3				04/19/1818:48
				Uncert:	+/-19.3	+/-19.4	RPD: 0	N/A		
				TPU:	+/-19.3	+/-19.4	RER: 0.24	(0-2)		
QC1204009087	447575005	MS								
Carbon-14		U	-16			3330	REC: 89	(75%-125%)		04/19/1819:04
				Uncert:	+/-19.3	+/-190				
				TPU:	+/-19.3	+/-646				
QC1204009088	LCS									
Carbon-14						727	REC: 97	(80%-120%)		04/19/1819:21
				Uncert:		+/-39.4				
				TPU:		+/-141				

Notes:

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

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.
- B The analyte was detected in the associated method blank >= MDC or >5% sample activity.
- C Analyte has been confirmed by GC/MS analysis

GEL LABORATORIES LLC

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

QC Summary

Workorder: 447943

Page 5 of 5

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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.				
UX						Gamma Spectroscopy--Uncertain identification				
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 (Organics 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.

** Indicates analyte is a surrogate compound.

^ 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.

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.