

8/3/2016



August 03, 2016

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

Re: CHPRC SAF X16-043
Work Order: 401206
SDG: GEL401206

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 09, 2016. 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,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 304027 - 7H
Chain of Custody: X16-043-002
Enclosures

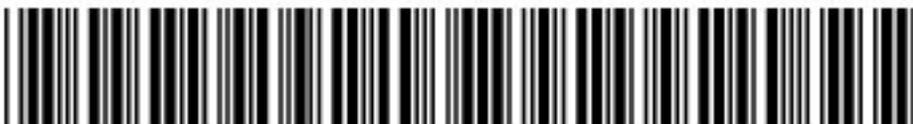


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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF X16-043
SDG: GEL401206**

August 03, 2016

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 July 09, 2016, for analysis. The sample was 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 and DER.

Sample Identification

The laboratory received the following sample:

Laboratory Identification	Sample Description
401206001	B35YX1

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 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.

8/3/2016

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL401206
Work Order #: 401206

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.

Quality Control (QC) Information

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
1203582165 (Non SDG 400887001PS)	Acetone	55* (70.0%-130.0%)
	Carbon tetrachloride	5* (70.0%-130.0%)
1203582166 (Non SDG 400887001PSD)	2-Butanone	65* (70.0%-130.0%)
	Acetone	53* (70.0%-130.0%)
	Carbon tetrachloride	21* (70.0%-130.0%)

Radiochemistry

TRITIUM_DIST_LSC: 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.

C14_LSC: 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.

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

CH2M Hill Plateau Remediation Company
 461206
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST
 C.O.C. # **X16-043-002**
 Page 1 of 1

Collector: **Chris Fulton CHPRC**
 SAF No.: **X16-043**
 Project Title: **100-KW Rebound Study, June 27, 2016**
 Shipped To (Lab): **GEL Laboratories, LLC**
 Protocol: **CERCLA**
 Contact/Requester: **WATERS-HUSTED, K**
 Sampling Origin: **Hanford Site**
 Logbook No.: **HNF-N-506 851 87**
 Method of Shipment: **Commercial Carrier**
 Priority: **30 Days**
 Telephone No.: **376-4650**
 Purchase Order/Charge Code: **304027**
 Ice Chest No.: **6WS-458**
 Bill of Lading/Air Bill No.: **776706158709**
 Offsite Property No.: **6810**

POSSIBLE SAMPLE HAZARDS/REMARKS
 *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.
 SPECIAL INSTRUCTIONS: **PRIORITY**
 Hold Time: _____
 Total Activity Exemption: Yes No

Sample No.	Filter	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35YX1	N	W JUL 08 2016	1049	1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B35YX1	N	W JUL 08 2016	1049	1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B35YX1	N	W JUL 08 2016	1049	4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool <=6C

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
Chris Fulton CHPRC			JUL 08 2016 1300	Lesly Wall CHPRC			JUL 08 2016 1300	S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other
					FEDEX			
				M. Carlson WHPRC			7-9-16 0955	

Relinquished By: _____ Date/Time: _____
 Disposed By: _____ Date/Time: _____
FINAL SAMPLE DISPOSITION
 Disposal Method (e.g., Return to customer, per lab procedure, used in process): _____
 PRINTED ON 6/16/2016 FSR ID = FSR33477 A-6004-842 (REV 2)

SAMPLE RECEIPT & REVIEW FORM

Client: <u>C/RC</u>		SDG/AR/COC/Work Order:	
Received By: <u>M/L</u>		Date Received: <u>7-9-16</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>C/RC</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?			

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>RC</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>130462461</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>			(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

16 Carrier and tracking number.

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

7767 0615 8709

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials EM Date 7/11/16 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 associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample	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 \geq 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 \geq 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 03 August 2016

State	Certification
Alaska	UST-0110
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	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
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
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-16-11
Utah NELAP	SC000122016-20
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 #: GEL401206
Work Order #: 401206**

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

Analytical Method: SW846 8260C

Analytical Procedure: GL-OA-E-038 REV# 22

Analytical Batch: 1580638

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401206001	B35YX1
1203582165	400887001(NonSDG) Post Spike (PS)
1203582166	400887001(NonSDG) Post Spike Duplicate (PSD)
1203583229	Method Blank (MB)
1203583230	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.

Quality Control (QC) Information

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
1203582165 (Non SDG 400887001PS)	Acetone	55* (70.0%-130.0%)
	Carbon tetrachloride	5* (70.0%-130.0%)
1203582166 (Non SDG 400887001PSD)	2-Butanone	65* (70.0%-130.0%)
	Acetone	53* (70.0%-130.0%)
	Carbon tetrachloride	21* (70.0%-130.0%)

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: GEL401206 GEL Work Order: 401206

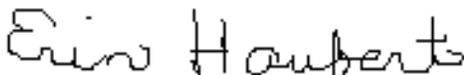
The Qualifiers in this report are defined as follows:

- 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
- 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: 29 JUL 2016

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: GEL401206	Date Collected: 07/08/2016 10:49	Matrix: WATER
Lab Sample ID: 401206001	Date Received: 07/09/2016 09:55	
Client ID: B35YX1	Client: CPRC001	Project: CPRC0X16043
Batch ID: 1580638	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 07/12/2016 15:03	Inst: VOA3.I	Dilution: 1
Prep Date: 07/12/2016 15:03	Analyst: CDS1	Purge Vol: 5 mL
Data File: 071216V3\3R215.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	TU	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	J	0.310	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	J	0.780	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: July 29, 2016

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 401206

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS										
Batch	1580638									
QC1203583230	LCS									
1,1,1-Trichloroethane	50.0		56.8	ug/L		114	(70%-130%)	CDS1	07/12/16	08:57
1,1,2-Trichloroethane	50.0		48.6	ug/L		97	(70%-130%)			
1,1-Dichloroethane	50.0		54.9	ug/L		110	(70%-130%)			
1,1-Dichloroethylene	50.0		55.8	ug/L		112	(70%-130%)			
1,2-Dichloroethane	50.0		50.2	ug/L		100	(70%-130%)			
2-Butanone	250		290	ug/L		116	(70%-130%)			
4-Methyl-2-pentanone	250		223	ug/L		89	(70%-130%)			
Acetone	250		287	ug/L		115	(70%-130%)			
Benzene	50.0		53.6	ug/L		107	(70%-130%)			
Carbon disulfide	250		253	ug/L		101	(70%-130%)			
Carbon tetrachloride	50.0		54.3	ug/L		109	(70%-130%)			
Chlorobenzene	50.0		50.7	ug/L		101	(70%-130%)			
Chloroform	50.0		52.7	ug/L		105	(70%-130%)			
Ethylbenzene	50.0		49.1	ug/L		98	(70%-130%)			
Methylene chloride	50.0		55.7	ug/L		111	(70%-130%)			
Tetrachloroethylene	50.0		50.5	ug/L		101	(70%-130%)			
Toluene	50.0		48.8	ug/L		98	(70%-130%)			
Trichloroethylene	50.0		54.0	ug/L		108	(70%-130%)			
Vinyl chloride	50.0		46.5	ug/L		93	(70%-130%)			
Xylenes (total)	150		148	ug/L		98	(70%-130%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 401206

Page 2 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1580638										
**1,2-Dichloroethane-d4	50.0			43.8	ug/L		88	(70%-130%)	CDS1	07/12/16	08:57
**Bromofluorobenzene	50.0			50.4	ug/L		101	(70%-130%)			
**Toluene-d8	50.0			43.9	ug/L		88	(70%-130%)			
QC1203583229	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					07/12/16	09:57
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						
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						

GEL LABORATORIES LLC

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QC Summary

Workorder: 401206

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1580638										
Vinyl chloride			U	0.300	ug/L				CDS1	07/12/16	09:57
Xylenes (total)			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			47.8	ug/L		96	(70%-130%)			
**Bromofluorobenzene	50.0			48.3	ug/L		97	(70%-130%)			
**Toluene-d8	50.0			46.2	ug/L		92	(70%-130%)			
QC1203582165 400887001 PS											
1,1,1-Trichloroethane	50.0	U	0.00	53.1	ug/L		106	(70%-130%)		07/12/16	17:05
1,1,2-Trichloroethane	50.0	U	0.00	49.0	ug/L		98	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	52.9	ug/L		106	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	51.1	ug/L		102	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	49.2	ug/L		98	(70%-130%)			
2-Butanone	250	TU	0.00	181	ug/L		72	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	228	ug/L		91	(70%-130%)			
Acetone	250	TU	0.00	T 139	ug/L		55 *	(70%-130%)			
Benzene	50.0	U	0.00	52.5	ug/L		105	(70%-130%)			
Carbon disulfide	250	U	0.00	254	ug/L		102	(70%-130%)			
Carbon tetrachloride	50.0	ET	183 ET	185	ug/L		5 *	(70%-130%)			
Chlorobenzene	50.0	U	0.00	49.2	ug/L		98	(70%-130%)			
Chloroform	50.0		8.32	56.5	ug/L		96	(70%-130%)			
Ethylbenzene	50.0	U	0.00	49.3	ug/L		99	(70%-130%)			
Methylene chloride	50.0	U	0.00	51.7	ug/L		103	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	47.6	ug/L		95	(70%-130%)			

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QC Summary

Workorder: 401206

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1580638										
Toluene	50.0	U	0.00	48.8	ug/L		98	(70%-130%)	CDS1	07/12/16	17:05
Trichloroethylene	50.0		8.15	58.8	ug/L		101	(70%-130%)			
Vinyl chloride	50.0	U	0.00	43.9	ug/L		88	(70%-130%)			
Xylenes (total)	150	U	0.00	142	ug/L		95	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		44.6	42.8	ug/L		86	(70%-130%)			
**Bromofluorobenzene	50.0		47.0	47.3	ug/L		95	(70%-130%)			
**Toluene-d8	50.0		48.5	46.9	ug/L		94	(70%-130%)			
QC1203582166 400887001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	53.3	ug/L	0	107	(0%-20%)		07/12/16	17:36
1,1,2-Trichloroethane	50.0	U	0.00	46.1	ug/L	6	92	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	51.6	ug/L	3	103	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	49.5	ug/L	3	99	(0%-20%)			
1,2-Dichloroethane	50.0	U	0.00	47.8	ug/L	3	96	(0%-20%)			
2-Butanone	250	TU	0.00	T 161	ug/L	12	65 *	(0%-20%)			
4-Methyl-2-pentanone	250	U	0.00	200	ug/L	13	80	(0%-20%)			
Acetone	250	TU	0.00	T 132	ug/L	5	53 *	(0%-20%)			
Benzene	50.0	U	0.00	50.8	ug/L	3	102	(0%-20%)			
Carbon disulfide	250	U	0.00	240	ug/L	6	96	(0%-20%)			
Carbon tetrachloride	50.0	ET	183	ET 193	ug/L	4	21 *	(0%-20%)			
Chlorobenzene	50.0	U	0.00	46.9	ug/L	5	94	(0%-20%)			
Chloroform	50.0		8.32	54.7	ug/L	3	93	(0%-20%)			
Ethylbenzene	50.0	U	0.00	45.9	ug/L	7	92	(0%-20%)			

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QC Summary

Workorder: 401206

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1580638										
Methylene chloride	50.0	U	0.00	51.7	ug/L	0	103	(0%-20%)	CDS1	07/12/16	17:36
Tetrachloroethylene	50.0	U	0.00	46.0	ug/L	3	92	(0%-20%)			
Toluene	50.0	U	0.00	45.5	ug/L	7	91	(0%-20%)			
Trichloroethylene	50.0		8.15	56.4	ug/L	4	96	(0%-20%)			
Vinyl chloride	50.0	U	0.00	41.2	ug/L	6	82	(0%-20%)			
Xylenes (total)	150	U	0.00	134	ug/L	6	90	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		44.6	41.8	ug/L		84	(70%-130%)			
**Bromofluorobenzene	50.0		47.0	47.6	ug/L		95	(70%-130%)			
**Toluene-d8	50.0		48.5	45.0	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)

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QC Summary

Workorder: 401206

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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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: GEL401206

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203583230	LCS for batch 1580638	88	88	101
1203583229	MB for batch 1580638	96	92	97
401206001	B35YX1	95	94	92
1203582165	B34Y05PS	86	94	95
1203582166	B34Y05PSD	84	90	95

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

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL401206
Work Order #: 401206

Product: TRITIUM_DIST_LSC: COMMON
Analytical Method: TRITIUM_DIST_LSC
Analytical Procedure: GL-RAD-A-002 REV# 21
Analytical Batch: 1582195

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401206001	B35YX1
1203586023	Method Blank (MB)
1203586024	400884001(NonSDG) Sample Duplicate (DUP)
1203586025	400884001(NonSDG) Matrix Spike (MS)
1203586026	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: C14_LSC: COMMON
Analytical Method: C14_LSC
Analytical Procedure: GL-RAD-A-003 REV# 15
Analytical Batch: 1583613

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401206001	B35YX1
1203589378	Method Blank (MB)
1203589379	401206001(B35YX1) Sample Duplicate (DUP)
1203589380	401206001(B35YX1) Matrix Spike (MS)
1203589381	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.

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.

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL401206 GEL Work Order: 401206

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.

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: Theresa Austin

Date: 03 AUG 2016

Title: Group Leader

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL401206	Client: CPRC001	Project: CPRC0X16043
Lab Sample ID: 401206001	Date Collected: 07/08/2016 10:49	Matrix: WATER
	Date Received: 07/09/2016 09:55	
Client ID: B35YX1	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1582195	Analyst: TXJ1	SOP Ref: GL-RAD-A-002
Run Date: 07/25/2016 09:37	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1582195.xls	Prep Method: EPA 906.0 Modified	Count Time: 40 min
Prep Batch: 1582195		
Prep Date: 07/22/2016 12:17		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		52900	pCi/L	+/-1080	10300	331	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL401206	Client: CPRC001	Project: CPRC0X16043
Lab Sample ID: 401206001	Date Collected: 07/08/2016 10:49	Matrix: WATER
	Date Received: 07/09/2016 09:55	
Client ID: B35YX1	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1583613	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 08/01/2016 23:53	Aliquot: 60 mL	Instrument: LSCGOLD
Data File: C1583613.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 10.75 min
Prep Batch: 1583613		
Prep Date: 08/01/2016 09:39		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		40100	pCi/L	+/-394	7460	49.3	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

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QC Summary

Report Date: August 3, 2016

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

Contact: Mr. Scot Fitzgerald

Workorder: 401206

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1582195								
QC1203586023	MB								
Tritium			U	-22.9	pCi/L			TXJ1	07/25/1617:19
				Uncert:					
				TPU:					
QC1203586024	400884001	DUP							
Tritium		U	39.3	U	165				07/25/1618:01
				Uncert:	+/-195	RPD:	0	N/A	
				TPU:	+/-195	RER:	0.882	(0-2)	
QC1203586025	400884001	MS							
Tritium	2320	U	39.3		1900	REC:	82	(75%-125%)	07/25/1618:43
				Uncert:	+/-195				
				TPU:	+/-195				
QC1203586026	LCS								
Tritium	2320				1940	REC:	84	(80%-120%)	07/25/1619:25
				Uncert:	+/-274				
				TPU:	+/-464				
Batch	1583613								
QC1203589378	MB								
Carbon-14			U	15.7	pCi/L			TXJ1	08/02/1603:21
				Uncert:	+/-20.6				
				TPU:	+/-20.8				
QC1203589379	401206001	DUP							
Carbon-14			40100		40300				08/02/1603:52
				Uncert:	+/-394	RPD:	0	(0% - 20%)	
				TPU:	+/-7460	RER:	0.0293	(0-2)	
QC1203589380	401206001	MS							
Carbon-14	1260		40100		41200	REC:	83	(75%-125%)	08/02/1604:04
				Uncert:	+/-394				
				TPU:	+/-7460				
QC1203589381	LCS								
Carbon-14	1260				1240	REC:	99	(80%-120%)	08/02/1604:16
				Uncert:	+/-46.0				
				TPU:	+/-235				

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 associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this 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

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QC Summary

Workorder: 401206

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
J										
N										
P										
T										
U										
UX										
X										
Y										
Z										
o										

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.