

May 10, 2018

May 09, 2018

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

Re: CHPRC SAF X18-005
Work Order: 447940
SDG: GEL447940

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: X18-005-237
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF X18-005
SDG: GEL447940**

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 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.

Sample Identification

The laboratory received the following sample:

Laboratory Identification	Sample Description
447940001	B3HLK8

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.

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.

May 10, 2018

Rev 0


Anna Dupree for
Heather Shaffer
Project Manager

**GC/MS Volatile
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL447940
Work Order #: 447940**

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 447940001 (B3HLK8). 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 (Non SDG 447320005PS)	2-Butanone	57* (70%-130%)
	Acetone	41* (70%-130%)
1204006003 (Non SDG 447320005PSD)	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.

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 447940		C.O.C.# X18-005-237 Page 1 of 1
Collector: Jeff Lucas JCHPRC	Contact/Requester: WATERS-HUSTED, K	Telephone No.: 376-4650	Purchase Order/Charge Code: 300071	
SAF No.: X18-005	Sampling Origin: Hanford Site	Logbook No.: HNF-N-506 100113	Ice Chest No.: GWS-402	Bill of Lading/Air Bill No.: 771981165066
Project Title: Groundwater Background Study,	Method of Shipment: Commercial Carrier	Shipped To (Lab): GEL Laboratories, LLC	Priority: 30 Days	Offsite Property No.: 9303
Protocol: SURV	SPECIAL INSTRUCTIONS Batch with A, I, S, and W SAFs.			
POSSIBLE SAMPLE HAZARDS/REMARK *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 Batch with A, I, S, and W SAFs.		
Sample No. B3HLK8	Filter N	Date APR 11 2018	Time 1255	No/Type Container 5x40-mL aGs*
Sample Analysis 8260_VOA_GCMS: COMMON		Holding Time 14 Days	Preservative HCl or H2SO4 to pH <2 / Cool <=6C	

Relinquished By: Jeff Lucas JCHPRC	Signature [Signature]	Date/Time APR 11 2018 1350	Received By: SSU-1	Signature [Signature]	Date/Time APR 11 2018 1350
Relinquished By: SSU-1	Signature [Signature]	Date/Time APR 12 2018 0700	Received By: Ivan Schaeffer JCHPRC	Signature [Signature]	Date/Time APR 12 2018 0700
Relinquished By: Ivan Schaeffer JCHPRC	Signature [Signature]	Date/Time APR 12 2018 1900	Received By: FEDEX	Signature [Signature]	Date/Time 4/13/18
Relinquished By: [Signature]	Signature [Signature]	Date/Time FBO EX	Received By: [Signature]	Signature [Signature]	Date/Time 905
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):			
Disposed By:	Disposed By:				
Date/Time:	Date/Time:				



SAMPLE RECEIPT & REVIEW FORM

Client: CPRC		SDG/AR/COC/Work Order: 447940		
Received By: STACY BOONE		Date Received: APR 13, 2018		
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other		
		7719 8116 5066 -1c 7719 8476 6642 -1c		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: <u>Rad 1</u> Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	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: Wet Ice 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 <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A (If unknown, select No) VOA vials free of headspace? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A 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 #: GEL447940
Work Order #: 447940**

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>
447940001	B3HLK8
1204005998	Method Blank (MB)
1204005999	Laboratory Control Sample (LCS)
1204006001	447320005(NonSDG) Post Spike (PS)
1204006003	447320005(NonSDG) 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 447940001 (B3HLK8). 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 (Non SDG 447320005PS)	2-Butanone	57* (70%-130%)
	Acetone	41* (70%-130%)
1204006003 (Non SDG 447320005PSD)	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: GEL447940 GEL Work Order: 447940

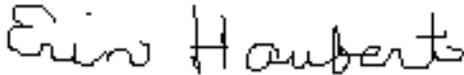
The Qualifiers in this report are defined as follows:

- 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

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL447940	Date Collected: 04/11/2018 12:55	Matrix: WATER
Lab Sample ID: 447940001	Date Received: 04/13/2018 09:05	
Client ID: B3HLK8	Client: CPRC001	Project: CPRC0X18005
Batch ID: 1754435	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 04/18/2018 14:38	Inst: VOA3.I	Dilution: 1
Prep Date: 04/18/2018 14:38	Analyst: JP1	Purge Vol: 5 mL
Data File: 041818V3\3E312.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		6.33	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: 447940

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: 447940

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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: 447940

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Parname	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%)			

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QC Summary

Workorder: 447940

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						

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QC Summary

Workorder: 447940

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						

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QC Summary

Workorder: 447940

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						

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QC Summary

Workorder: 447940

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%)			

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QC Summary

Workorder: 447940

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%)		

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QC Summary

Workorder: 447940

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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%)		

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QC Summary

Workorder: 447940

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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: GEL447940

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
447940001	B3HLK8	106	92	94

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