



February 16, 2015

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

Re: CHPRC SAF X15-004  
Work Order: 365700  
SDG: GEL365700

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 23, 2015. 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,

Heather Shaffer  
Project Manager

Purchase Order: 300071ES20 - 7H  
Chain of Custody: X15-004-001  
Enclosures



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# Case Narrative

February 19, 2015

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF X15-004  
SDG: GEL365700

February 16, 2015

**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 January 23, 2015, 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:

<b>Laboratory Identification</b>	<b>Sample Description</b>
365700001	B2Y465

**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.

This package, to the best of my knowledge, 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.

February 19, 2015  
*Heather Shaffer*

Heather Shaffer  
Project Manager

# **Chain of Custody and Supporting Documentation**

February 19, 2015

CH2M Hill Plateau Remediation Company		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>				C.O.C.# <b>X15-004-001</b>
305700						Page 1 of 1
Collector	S.W. King/CHPRC	Contact/Requester	WATERS-HUSTED, K		Telephone No.	376-4650
SAF No.	X15-004	Sampling Origin	HANFORD SITE		Purchase Order/Charge Code	300071ES20
Project Title	GW Sitewide Surv, FY15	Logbook No.	HNF-N-50671 / 52		Ice Chest No.	GWOS-180
Shipped To (Lab)	GEL Laboratories, LLC	Method of Shipment	Commercial Carrier		Bill of Lading/Air Bill No.	772678627759
Protocol	SURV	Priority:	30 Days	<b>PRIORITY</b>	Offsite Property No.	5360
<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b>		<b>SPECIAL INSTRUCTIONS</b>		Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
*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.		Batch with A, I, S, and W SAFs.				
Sample No.	B2Y465	Filter	*	Date	Time	No/Type Container
		N		JAN 22 2015	0837	4x40-mL aGs*
						8260_VOA_GCMS: COMMON
						Sample Analysis
						Holding Time
						14 Days
						Preservative
						HCl or H2SO4 to pH <2/Cool <=6C

Relinquished By	S.W. King/CHPRC	Print	<i>[Signature]</i>	Sign		Date/Time	JAN 22 2015 1109	Received By	R.A. Shepard/CHPRC	Print	<i>[Signature]</i>	Sign		Date/Time	JAN 22 2015 1100	Matrix *
Relinquished By	R.A. Shepard/CHPRC					Date/Time	JAN 22 2015 1400	Received By	FEDEX					Date/Time	JAN 22 2015	S = Soil
Relinquished By						Date/Time		Received By	H. Ershaw					Date/Time	1-23-15 0855	SE = Sediment
Relinquished By						Date/Time		Received By						Date/Time		SO = Solid
						Date/Time								Date/Time		SL = Sludge
						Date/Time								Date/Time		W = Water
						Date/Time								Date/Time		O = Oil
						Date/Time								Date/Time		A = Air
						Date/Time								Date/Time		DS = Drum Solids
						Date/Time								Date/Time		DL = Drum Liquids
						Date/Time								Date/Time		T = Tissue
						Date/Time								Date/Time		WI = Wipe
						Date/Time								Date/Time		L = Liquid
						Date/Time								Date/Time		V = Vegetation
						Date/Time								Date/Time		X = Other
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process)															
PRINTED O 9/12/2014	Disposed By															
	Date/Time															

A-6004-842 (REV 2)



Client: CPRC SDG/AR/COC/Work Order: 365700  
 Received By: mk Date Received: 1-23-15  
 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?  Yes  No Maximum Net Counts Observed\* (Observed Counts - Area Background Counts): cpm 0  
 Classified Radioactive II or III by RSO?  Yes  No If yes, Were swipes taken of sample containers < action levels?  
 COC/Samples marked containing PCBs?  Yes  No  
 Package, COC, and/or Samples marked as beryllium or asbestos containing?  Yes  No If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.  
 Shipped as a DOT Hazardous?  Yes  No Hazard Class Shipped: UN#:           
 Samples identified as Foreign Soil?  Yes  No

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 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>130532776</u> Secondary Temperature Device Serial # (if Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4 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)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
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"/>	
14 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other  7726 7431 6298 2.2c 7726 7862 7910 2.3c 7726 7862 7759 1.9c

Comments (Use Continuation Form if needed):

# **Data Review Qualifier Definitions**

## Project Specific Qualifier Definitions for GEL Client Code: **CPRC**

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
U	Programmed	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.	Y			Includes MDA, TPU, count uncert.
J	Programmed	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	Y	Organics		Organics only
P	Programmed	Aroclor target analyte with greater than 25% difference between column analyses.	Y	Organics		PCB only
C	Manual	Analyte has been confirmed by GC/MS analysis	Y	Organics	Pesticide	IF GC/MS confirmation was attempted but unsuccessful do not qualify with C
B	Programmed	The analyte was detected in both the associated QC blank and in the sample.	Y	Organics		
E	Manual	Concentration exceeds the calibration range of the instrument	Y	Organics		Qualifier Uploaded
A	Manual	The TIC is a suspected aldol-condensation product	Y	Organics	Semi-Volatile	Uploaded with TIC
X	Programmed	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			Replaces H Hold Date In RAD replaces UI. Same usage as standard X as well.
N	Programmed	Spike Sample recovery is outside control limits.	Y			
*	Programmed	Duplicate analysis not within control limits	Y	Inorganics		
>	Programmed	Result greater than quantifiable range or greater than upper limit of the analysis range	Y	General Chemistry		
Z	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
B	Programmed	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).	Y	Inorganics	Metals	Replaces J Estimated Value
D	Programmed	Results are reported from a diluted aliquot of sample.	Y			Dilution
E	Programmed	Reported value is estimated due to interferences. See comment in narrative.	Y	Inorganics	Metals	GEL E
M	Manual	Duplicate precision not met.	Y	Inorganics	Metals	Replaces *
o	Programmed	Analyte failed to recover within LCS limits (Organics only)	Y	Organics		
S	Manual	Reported value determined by the Method of Standard Additions (MSA)	Y	Inorganics		Not coded B/C Rarely performed
T	Programmed	Spike and/or spike duplicate sample recovery is outside control limits.	Y	Organics		GC/MS only
W	Manual	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Y	Inorganics		No GFAA in house.
B	Programmed	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is $\geq$ MDA for this sample	Y	Radiological		
Y	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
+	Manual	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Y	Inorganics		
B	Programmed	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).	Y	General Chemistry		Replaces J Estimated Value
C	Programmed	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.	Y	Inorganics	Metals	Replaces B Blank Detection
C	Programmed	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.	Y	General Chemistry		Replaces B Blank Detection
<	Programmed	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	Y	General Chemistry		for Reactive CN/S

**Project Specific Qualifier Definitions for GEL Client Code: CPRC**

<b>Code</b>	<b>Status</b>	<b>Qualifier Definition</b>	<b>CofA</b>	<b>Department</b>	<b>Fraction</b>	<b>Additional Comments</b>
UX	Manual	Gamma Spectroscopy--Uncertain identification	Y	Radiological		

# Laboratory Certifications

**List of current GEL Certifications as of 16 February 2015**

<b>State</b>	<b>Certification</b>
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
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	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122014-16
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12

# **Volatile Analysis**

# Case Narrative

**February 19, 2015**  
**GC/MS Volatile**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL365700**  
**Work Order #: 365700**

**Method/Analysis Information**

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

Analytical Method: SW846 8260C

Analytical Batch Number: 1452976

**Sample Analysis**

The following client and quality control samples were analyzed to complete this SDG using the methods referenced in the Analysis Information section:

<b>Sample ID</b>	<b>Client ID</b>
365700001	B2Y465
1203251575	Method Blank (MB)
1203251576	Laboratory Control Sample (LCS)
1203251578	365749002(B30188) Post Spike (PS)
1203251579	365749002(B30188) Post Spike Duplicate (PSD)
1203254660	Method Blank (MB)
1203254661	Laboratory Control Sample (LCS)

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

The data results reported met all SOP and method criteria, unless otherwise discussed below.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-038 REV# 21.

**Calibration Information**

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package. The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

February 19, 2015

**Continuing Calibration Verification Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

**Quality Control (QC) Information**

**Blank (MB) Statement**

The blanks analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

Surrogate recoveries in all client and quality control samples were within the acceptance limits.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**QC Sample Designation**

Sample 365749002 (B30188) was designated for spike analysis.

**Matrix Spike/Matrix Spike Duplicate Recovery Statement**

The spike and/or spike duplicate 1203251578 (Non SDG 365749002PS) and 1203251579 (Non SDG 365749002PSD) recoveries were not all within the acceptance limits.

**Relative Percent Difference (RPD) Statement**

The RPDs between the matrix spike pair met the acceptance limits.

**Internal Standard (ISTD) Acceptance**

The internal standard responses in all client and quality control samples met the required acceptance criteria.

**Technical Information**

**Holding Time Specifications**

All samples in this SDG met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the ALPHALIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

**Sample Preservation and Integrity**

All samples met the sample preservation and integrity requirements.

**Sample Dilutions/Methanol Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

Re-analyses were not required for samples in this SDG.

**Miscellaneous Information**

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated

electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**Data Exception (DER) Documentation**

The following DER was generated for this SDG: 1377629.

**Manual Integrations**

Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

**TIC Comment**

Tentatively identified compounds (TIC) were not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**Residual Chlorine**

Residual Chlorine was not detected in any of the samples in this SDG.

**System Configuration**

The Volatile-GC/MS analysis was performed on the following instrument configuration:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>	<b>P &amp; T Trap</b>
VOA2.I	Agilent 7890/5975 GC/MS w/ OI Eclipse/Archon Autosampler	HP7890N/HP5975C	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

**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.

February 19, 2015

**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: GEL365700 GEL Work Order: 365700

**The Qualifiers in this report are defined as follows:**

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.

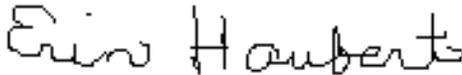
RA Indicates that sample is re-analyzed without re-extraction.

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:** 19 FEB 2015

**Title:** Data Validator

# Sample Data Summary

## Certificate of Analysis

Company : CH2MHill Plateau Remediation  
 Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: **CHPRC SAF X15-004**

Report Date: February 18, 2015

Client Sample ID:	B2Y465	Project:	CPRC0X15004
Sample ID:	365700001	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	22-JAN-15 08:37		
Receive Date:	23-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Volatile Organics</b>										
<i>8260VOA_GCMS: COMMON "As Received"</i>										
1,1,1-Trichloroethane 71-55-6	U	0.00	0.300	5.00	ug/L	1	CDS1 01/27/15	1509	1452976	1
1,1,2-Trichloroethane 79-00-5	U	0.00	0.300	5.00	ug/L	1				
1,1-Dichloroethane 75-34-3	U	0.00	0.300	10.0	ug/L	1				
1,1-Dichloroethylene 75-35-4	U	0.00	0.300	10.0	ug/L	1				
1,2-Dichloroethane 107-06-2	U	0.00	0.300	5.00	ug/L	1				
2-Butanone 78-93-3	TU	0.00	3.00	10.0	ug/L	1				
4-Methyl-2-pentanone 108-10-1	U	0.00	3.00	10.0	ug/L	1				
Acetone 67-64-1	TU	0.00	3.00	20.0	ug/L	1				
Benzene 71-43-2	U	0.00	0.300	5.00	ug/L	1				
Carbon disulfide 75-15-0	U	0.00	1.60	10.0	ug/L	1				
Carbon tetrachloride 56-23-5	U	0.00	0.300	5.00	ug/L	1				
Chlorobenzene 108-90-7	U	0.00	0.300	5.00	ug/L	1				
Chloroform 67-66-3	U	0.00	0.300	5.00	ug/L	1				
Ethylbenzene 100-41-4	U	0.00	0.300	5.00	ug/L	1				
Methylene chloride 75-09-2		11.5	1.60	5.00	ug/L	1				
Tetrachloroethylene 127-18-4	U	0.00	0.300	5.00	ug/L	1				
Toluene 108-88-3	U	0.00	0.300	5.00	ug/L	1				
Trichloroethylene 79-01-6	U	0.00	0.300	5.00	ug/L	1				

## Certificate of Analysis

Company : CH2MHill Plateau Remediation  
 Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: **CHPRC SAF X15-004**

Report Date: February 18, 2015

Client Sample ID: B2Y465      Project: CPRC0X15004  
 Sample ID: 365700001      Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Volatile Organics</b>											
<i>8260VOA_GCMS: COMMON "As Received"</i>											
Vinyl chloride 75-01-4	U	0.00	0.300	10.0	ug/L	1					
Xylenes (total) 1330-20-7	U	0.00	0.300	10.0	ug/L	1					

**The following Analytical Methods were performed**

Method	Description	Analyst	Comments
1	SW846 8260C		

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	8260VOA_GCMS: COMMON "As Received"	49.9 ug/L	50.0	99.8	(77%-123%)
Bromofluorobenzene	8260VOA_GCMS: COMMON "As Received"	52.6 ug/L	50.0	105	(80%-120%)
Toluene-d8	8260VOA_GCMS: COMMON "As Received"	46.5 ug/L	50.0	93.1	(80%-120%)

# Quality Control Summary

**February 19, 2015**  
**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: February 18, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 365700

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1452976										
QC1203251576	LCS										
1,1,1-Trichloroethane	50.0			58.5	ug/L		117	(70%-130%)	CDS1	01/27/15	07:04
1,1,2-Trichloroethane	50.0			50.6	ug/L		101	(70%-130%)			
1,1-Dichloroethane	50.0			55.1	ug/L		110	(70%-130%)			
1,1-Dichloroethylene	50.0			55.3	ug/L		111	(70%-130%)			
1,2-Dichloroethane	50.0			52.0	ug/L		104	(70%-130%)			
2-Butanone	250			257	ug/L		103	(70%-130%)			
4-Methyl-2-pentanone	250			250	ug/L		100	(70%-130%)			
Acetone	250			265	ug/L		106	(70%-130%)			
Benzene	50.0			54.2	ug/L		108	(70%-130%)			
Carbon disulfide	250			282	ug/L		113	(70%-130%)			
Carbon tetrachloride	50.0			58.8	ug/L		118	(70%-130%)			
Chlorobenzene	50.0			52.8	ug/L		106	(70%-130%)			
Chloroform	50.0			54.5	ug/L		109	(70%-130%)			
Ethylbenzene	50.0			55.9	ug/L		112	(70%-130%)			
Methylene chloride	50.0			48.3	ug/L		96.6	(70%-130%)			
Tetrachloroethylene	50.0			54.1	ug/L		108	(70%-130%)			
Toluene	50.0			52.8	ug/L		106	(70%-130%)			
Trichloroethylene	50.0			55.4	ug/L		111	(70%-130%)			
Vinyl chloride	50.0			46.6	ug/L		93.2	(70%-130%)			
Xylenes (total)	150			166	ug/L		111	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1452976										
**1,2-Dichloroethane-d4	50.0			50.5	ug/L		101	(77%-123%)	CDS1	01/27/15	07:04
**Bromofluorobenzene	50.0			49.3	ug/L		98.7	(80%-120%)			
**Toluene-d8	50.0			49.0	ug/L		98.1	(80%-120%)			
QC1203254661	LCS										
1,1,1-Trichloroethane	50.0			49.2	ug/L		98.5	(70%-130%)		01/28/15	09:29
1,1,2-Trichloroethane	50.0			48.1	ug/L		96.3	(70%-130%)			
1,1-Dichloroethane	50.0			44.7	ug/L		89.4	(70%-130%)			
1,1-Dichloroethylene	50.0			43.5	ug/L		86.9	(70%-130%)			
1,2-Dichloroethane	50.0			50.0	ug/L		100	(70%-130%)			
2-Butanone	250			267	ug/L		107	(70%-130%)			
4-Methyl-2-pentanone	250			249	ug/L		99.5	(70%-130%)			
Acetone	250			281	ug/L		112	(70%-130%)			
Benzene	50.0			44.0	ug/L		88	(70%-130%)			
Carbon disulfide	250			220	ug/L		87.8	(70%-130%)			
Carbon tetrachloride	50.0			48.7	ug/L		97.3	(70%-130%)			
Chlorobenzene	50.0			45.3	ug/L		90.5	(70%-130%)			
Chloroform	50.0			47.0	ug/L		94	(70%-130%)			
Ethylbenzene	50.0			46.0	ug/L		92	(70%-130%)			
Methylene chloride	50.0			41.8	ug/L		83.6	(70%-130%)			
Tetrachloroethylene	50.0			43.7	ug/L		87.5	(70%-130%)			
Toluene	50.0			42.5	ug/L		85.1	(70%-130%)			
Trichloroethylene	50.0			45.2	ug/L		90.5	(70%-130%)			

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<b>Parmname</b>	<b>NOM</b>	<b>Sample</b>	<b>Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
<b>Volatile-GC/MS</b>											
Batch	1452976										
Vinyl chloride	50.0			46.2	ug/L		92.4	(70%-130%)	CDS1	01/28/15	09:29
Xylenes (total)	150			139	ug/L		92.4	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			51.2	ug/L		102	(77%-123%)			
**Bromofluorobenzene	50.0			49.7	ug/L		99.4	(80%-120%)			
**Toluene-d8	50.0			47.6	ug/L		95.1	(80%-120%)			
QC1203251575	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					01/27/15	08:08
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						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1452976										
Toluene			U	0.300	ug/L				CDS1	01/27/15	08:08
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			50.0	ug/L		99.9	(77%-123%)			
**Bromofluorobenzene	50.0			51.9	ug/L		104	(80%-120%)			
**Toluene-d8	50.0			47.0	ug/L		94	(80%-120%)			
QC1203254660	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					01/28/15	10:28
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						
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						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1452976										
Methylene chloride			U	1.60	ug/L				CDS1	01/28/15	10:28
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			51.0	ug/L		102	(77%-123%)			
**Bromofluorobenzene	50.0			52.9	ug/L		106	(80%-120%)			
**Toluene-d8	50.0			46.6	ug/L		93.3	(80%-120%)			
QC1203251578 365749002 PS											
1,1,1-Trichloroethane	50.0	U	0.00	59.1	ug/L		118	(70%-130%)		01/28/15	13:58
1,1,2-Trichloroethane	50.0	U	0.00	51.0	ug/L		102	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	55.0	ug/L		110	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	56.8	ug/L		114	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	53.0	ug/L		106	(70%-130%)			
2-Butanone	250	TU	0.00 T	153	ug/L		61.3 *	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	232	ug/L		92.7	(70%-130%)			
Acetone	250	TU	0.00 T	107	ug/L		42.9 *	(70%-130%)			
Benzene	50.0	U	0.00	54.5	ug/L		109	(70%-130%)			
Carbon disulfide	250	U	0.00	291	ug/L		116	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	60.5	ug/L		121	(70%-130%)			
Chlorobenzene	50.0	U	0.00	54.1	ug/L		108	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1452976										
Chloroform	50.0	U	0.00	54.4	ug/L		109	(70%-130%)	CDS1	01/28/15	13:58
Ethylbenzene	50.0	U	0.00	57.4	ug/L		115	(70%-130%)			
Methylene chloride	50.0	J	4.18	51.2	ug/L		94	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	55.0	ug/L		110	(70%-130%)			
Toluene	50.0	U	0.00	52.6	ug/L		105	(70%-130%)			
Trichloroethylene	50.0	U	0.00	56.7	ug/L		113	(70%-130%)			
Vinyl chloride	50.0	U	0.00	49.7	ug/L		99.3	(70%-130%)			
Xylenes (total)	150	U	0.00	168	ug/L		112	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		51.4	49.4	ug/L		98.7	(77%-123%)			
**Bromofluorobenzene	50.0		53.2	49.0	ug/L		98	(80%-120%)			
**Toluene-d8	50.0		46.5	47.7	ug/L		95.5	(80%-120%)			
QC1203251579 365749002 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	59.3	ug/L	0.304	119	(0%-20%)		01/28/15	14:28
1,1,2-Trichloroethane	50.0	U	0.00	51.1	ug/L	0.274	102	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	54.3	ug/L	1.28	109	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	56.1	ug/L	1.24	112	(0%-20%)			
1,2-Dichloroethane	50.0	U	0.00	53.1	ug/L	0.207	106	(0%-20%)			
2-Butanone	250	TU	0.00	T 153	ug/L	0.379	61.1 *	(0%-20%)			
4-Methyl-2-pentanone	250	U	0.00	238	ug/L	2.44	95	(0%-20%)			
Acetone	250	TU	0.00	T 112	ug/L	4.23	44.8 *	(0%-20%)			
Benzene	50.0	U	0.00	53.0	ug/L	2.88	106	(0%-20%)			
Carbon disulfide	250	U	0.00	278	ug/L	4.57	111	(0%-20%)			

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<b>Parmname</b>	<b>NOM</b>	<b>Sample</b>	<b>Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
<b>Volatile-GC/MS</b>											
Batch	1452976										
Carbon tetrachloride	50.0	U	0.00	59.7	ug/L	1.30	119	(0%-20%)	CDS1	01/28/15	14:28
Chlorobenzene	50.0	U	0.00	52.9	ug/L	2.15	106	(0%-20%)			
Chloroform	50.0	U	0.00	54.4	ug/L	0.00	109	(0%-20%)			
Ethylbenzene	50.0	U	0.00	55.7	ug/L	3.04	111	(0%-20%)			
Methylene chloride	50.0	J	4.18	50.9	ug/L	0.549	93.4	(0%-20%)			
Tetrachloroethylene	50.0	U	0.00	54.1	ug/L	1.63	108	(0%-20%)			
Toluene	50.0	U	0.00	51.3	ug/L	2.64	103	(0%-20%)			
Trichloroethylene	50.0	U	0.00	55.1	ug/L	2.93	110	(0%-20%)			
Vinyl chloride	50.0	U	0.00	47.3	ug/L	4.97	94.5	(0%-20%)			
Xylenes (total)	150	U	0.00	164	ug/L	2.46	109	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		51.4	50.6	ug/L		101	(77%-123%)			
**Bromofluorobenzene	50.0		53.2	50.5	ug/L		101	(80%-120%)			
**Toluene-d8	50.0		46.5	48.2	ug/L		96.4	(80%-120%)			

**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.

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

# Miscellaneous

<b>DATA EXCEPTION REPORT</b>			
<b>Mo.Day Yr.</b> 30-JAN-15	<b>Division:</b> Industrial	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> VOA GC/MS	<b>Test / Method:</b> SW846 8260C	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> CPRC
<b>Batch ID:</b> 1452976	<b>Sample Numbers:</b> See Below		
<p><b>Potentially affected work order(s)(SDG):</b> 365553(GEL365553),365663(GEL365663),365668(GEL365668),365700(GEL365700),365749(GEL365749),365755(GEL365755),365758(GEL365758),365759(GEL365759)</p> <p><b>Application Issues:</b></p> <p>Failed Recovery for PS/PSD Failed Recovery for MS/MSD, or PS/PSD</p>			
<b>Specification and Requirements</b>		<b>DER Disposition:</b>	
<b>Exception Description:</b>			
<p>1. The recoveries for Acetone and 2-Butanone were outside of acceptance limits in the matrix spike and in the matrix spike duplicate performed on sample 365749002. The calculated relative percent differences between the MS and MSD were within acceptance limits for all client requested compounds.</p>		<p>1. Narrate and report data.</p>	

**Originator's Name:**  
Crystal Stacey      30-JAN-15

**Data Validator/Group Leader:**  
Erin Haubert      18-FEB-15