



February 15, 2018

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

Re: CHPRC SAF F17-070  
Work Order: 443432  
SDG: GEL443432

Dear Mr. Fitzgerald:

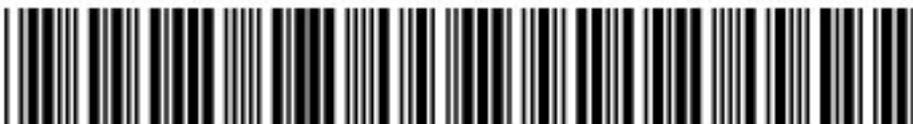
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 09, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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,

Heather Shaffer  
Project Manager

Purchase Order: 303979  
Chain of Custody: F17-070-259, F17-070-260 and F17-070-456  
Enclosures



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# Sample Issue Resolution

<b>SAMPLE ISSUE RESOLUTION (SIR) REPORT</b>		<b>SIR Number:</b> SIR18-0483 <b>Rev. Number:</b> 0 <b>Date Initiated:</b> 02/13/2018
<b><u>SAMPLE EVENT INFORMATION</u></b>		
<b>SAF NUM(S):</b>	F17-070	
<b>LABORATORY:</b>	GEL	
<b><u>SAMPLING INFORMATION</u></b>		
<b>NUMBER OF SAMPLES:</b>	1	
<b>SAMPLE NUMBERS:</b>	B3H7W7	
<b>SAMPLE MATRIX:</b>	WATER	
<b>SDG NUM(S):</b>	GEL443432	
<b><u>ISSUE BACKGROUND</u></b>		
<b>CLASS:</b>	Field Sampling Issue	
<b>TYPE:</b>	Insufficient Sample Volume Collected	
<b>DESCRIPTION:</b>	Two vials for 8260_VOA analysis on sample ID B3H7W7 was received with headspace.	
<b><u>RESOLUTION</u></b>		
<b>PROPOSED RESOLUTION:</b>	The lab will avoid using these vials.	
<b>FINAL RESOLUTION:</b>	Accept proposed resolution.	
<b>SUBMITTED BY:</b>		
SHAFFER, H	_____	02/12/2018 _____
<b>ACCEPTED BY:</b>		
NAGEL, SE	_____	02/13/2018 _____

# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F17-070  
SDG: GEL443432**

**February 15, 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 February 09, 2018, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

**Sample Identification**

The laboratory received the following samples:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
443432001	B3H7W6
443432002	B3H7W7
443432003	B3H913

**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, General Chemistry, Metals 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.



Heather Shaffer  
Project Manager

**Technical Case Narrative**  
**CH2M Hill Plateau Remediation Company (CPRC)**  
**SDG #: GEL443432**  
**Work Order #: 443432**

## **GC/MS Volatile**

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

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.

## **Metals**

### **Determination of Metals by ICP-MS**

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

### **Technical Information**

#### **Sample Dilutions**

Sample 443432001 (B3H7W6) was diluted to ensure that the analyte concentration was within the linear calibration range of the instrument.

Analyte	443432
	001
Manganese	5X

## **General Chemistry**

### **Ion Chromatography**

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

### **Technical Information**

#### **Sample Dilutions**

The following samples 1203968840 (Non SDG 443435002DUP), 1203968841 (Non SDG 443435002PS) and

443432003 (B3H913) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	443432
	003
Chloride	5X
Sulfate	5X

### **Miscellaneous Information**

#### **Manual Integrations**

Samples 1203968841 (Non SDG 443435002PS) and 443432003 (B3H913) were manually integrated to correctly position the baseline as set in the calibration standards.

### **Radiochemistry**

#### **I129LL\_SEP\_LEPS\_GS: COMMON (low level)**

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

#### **9310\_ALPHABETA\_GPC: COMMON**

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

### **Technical Information**

#### **Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

#### **Recounts**

Sample 1203969160 (B3H7W6MSD) was recounted due to high recovery. The recount is reported. Samples 1203969158 (B3H7W6DUP) and 443432001 (B3H7W6) were recounted due to high relative percent difference/relative error ratio. The recounts are reported.

### **Miscellaneous Information**

#### **Additional Comments**

The matrix spike and matrix spike duplicate, 1203969159 (B3H7W6MS) and 1203969160 (B3H7W6MSD), aliquots were reduced to conserve sample volume.

**TC99\_EIE\_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.

**TRITIUM\_DIST\_LSC: COMMON**

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

**Miscellaneous Information****Additional Comments**

The matrix spike, 1203969354 (B3H7W6MS), aliquot was reduced to conserve sample volume.

**Certification Statement**

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

# **Chain of Custody and Supporting Documentation**



CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F17-070-456	PAGE 1 OF 1
COLLECTOR Jeff Tuckesen CHPRC	COMPANY CONTACT LYNCH, SA	TELEPHONE NO. 373-5586	PROJECT COORDINATOR LYNCH, SA	REQUIRED TAT 7 Days	
SAMPLING LOCATION C9607, I-001	PROJECT DESIGNATION 200-UP-1 Remedial Action Wells Sampling and Analysis - Water	ACTUAL SAMPLE DEPTH 333.97	SAF NO. F17-070	METHOD OF SHIPMENT FEDERAL EXPRESS	
ICE CHEST NO. GWS-408	FIELD LOGBOOK NO. HNF-N-645 6-82	OFFSITE PROPERTY NO. 9039	PURCHASE ORDER/CHARGE CODE 300192	ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	BILL OF LADING/AIR BILL NO. 7714 40949789				

MATRIX* A=Air DL=Drum L=Liquids DS=Drum S=Solids L=Liquid O=Oil S=Soil SF=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	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.	PRESERVATION Cool <=6C	HOLDING TIME 48 Hours	TYPE OF CONTAINER P	NO. OF CONTAINER(S) 1	VOLUME 125mL	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SPECIAL HANDLING AND/OR STORAGE N/A							
SAMPLE NO. B3H913	FILTERED Yes	MATRIX*	WATER	SAMPLE DATE FEB 08 2018	SAMPLE TIME 1211		

443432

CHAIN OF POSSESSION RELINQUISHED BY/REMOVED FROM		SIGN/ PRINT NAMES RECEIVED BY/STORED IN		DATE/TIME	
Jeff Tuckesen CHPRC		SSU-1	Troy Bacon CHPRC	FEB 08 2018	1310
SSU-1		FEDEX	Troy Bacon CHPRC	FEB 08 2018	1323
Troy Bacon CHPRC		FEDEX	Troy Bacon CHPRC	FEB 08 2018	1400
		FEDEX	C. Taplin	2/18/2018	0855
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	
PRINTED ON 12/13/2017		TRVL NUM = TRVL-18-058		A-6003-618 (REV 3)	

SPECIAL INSTRUCTIONS

TRVL-18-058; Water samples to be purged until field readings of DO stabilize at or above 7,000 µg/L and REDOX potential is at least 200 Mv  
(1) 300.0\_ANTONS\_IC: COMMON {Chloride, Nitrogen in Nitrate, Sulfate};

**CH2M Hill Plateau Remediation Company**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

FL17-070-260 PAGE 1 OF 1

**REQUIRED TAT**  
7 Days

**METHOD OF SHIPMENT**  
FEDERAL EXPRESS

**ORIGINAL**

**PROJECT COORDINATOR**  
LYNCH, SA

**SAF NO.**  
F17-070

**PURCHASE ORDER/CHARGE CODE**  
300192

**BILL OF LADING/AIR BILL NO.**  
7714 40949789

**TELEPHONE NO.**  
373-5586

**PROJECT DESIGNATION**  
200-UP-1 Remedial Action Wells Sampling and Analysis - Water

**ACTUAL SAMPLE DEPTH**  
333.97

**FIELD LOGBOOK NO.**  
HNF-N-645 6-82

**OFFSITE PROPERTY NO.**  
9039

<b>MATRIX*</b> A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	<b>POSSIBLE SAMPLE HAZARDS/ REMARKS</b> *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.	<b>PRESERVATION</b> HCl or H2SO4 to pH <2/Cool <=6C	<b>HOLDING TIME</b> 14 Days	<b>TYPE OF CONTAINER</b> aGs*	<b>NO. OF CONTAINER(S)</b> 5	<b>VOLUME</b> 40ml	<b>SAMPLE ANALYSIS</b> 8260_VOA_GCM S: COMMON {Carbon tetrachloride, Trichloroethene };
<b>SPECIAL HANDLING AND/OR STORAGE</b> N/A							
<b>SAMPLE NO.</b> B3H7W7	<b>FILTERED</b> No	<b>MATRIX*</b> WATER	<b>SAMPLE DATE</b> FEB 08 2018	<b>SAMPLE TIME</b> 1211			<input checked="" type="checkbox"/>

443432

**CHAIN OF POSSESSION**  
RELINQUISHED BY/REMOVED FROM  
Jeff Tuckeen  
CHPRC

**DATE/TIME**  
FEB 08 2018 1310

**SIGN/ PRINT NAMES**  
RECEIVED BY/STORED IN  
SSU-1

**DATE/TIME**  
FEB 08 2018 1310

**CHAIN OF POSSESSION**  
RELINQUISHED BY/REMOVED FROM  
Troy Bacon  
CHPRC

**DATE/TIME**  
FEB 08 2018 1323

**SIGN/ PRINT NAMES**  
RECEIVED BY/STORED IN  
Troy Bacon  
CHPRC

**DATE/TIME**  
FEB 09 2018 1323

**DISPOSAL METHOD**  
FEDEX

**DATE/TIME**  
2/9/18 0855

**DISPOSED BY**  
C-Troplin

**DATE/TIME**  
2/9/18 0855

**FINAL SAMPLE DISPOSITION**  
PRINTED ON 12/13/2017

**DISPOSED BY**  
DATE/TIME

**FRS ID = FSR55024**

**TRVL NUM = TRVL-18-058**

**A-6003-618 (REV 3)**

**SPECIAL INSTRUCTIONS**

TRVL-18-058; Water samples to be purged until field readings of DO stabilize at or above 7,000 µg/L and REDOX potential is at least 200 Mv



SAMPLE RECEIPT & REVIEW FORM

HS

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>443432</u>	
Received By: <u>C. Tarplin</u>		Date Received: <u>09 Feb 2018</u>	
Carrier and Tracking Number		Circle Applicable: <u>FedEx Express</u> FedEx Ground   UPS   Field Services   Courier   Other  <u>7714 3637 7448</u> <u>7714 4694 9789</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input 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> <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"/>			Circle Applicable: Seals broken   Damaged container   Leaking container   Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius      TEMP: <u>2°C</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR4-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken   Damaged container   Leaking container   Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No <input checked="" type="checkbox"/> N/A ___ Sample ID's and containers affected: <u>2 vials for B3H7W7 has headspace</u>
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials OS Date 2/12/18 Page \_\_\_ of \_\_\_

# **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 $\geq$ 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 $\geq$ 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 15 February 2018**

<b>State</b>	<b>Certification</b>
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	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 Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Volatile Analysis**

# Case Narrative

**GC/MS Volatile  
Technical Case Narrative  
CH2M Hill Plateau Remediation Company (CPRC)  
SDG #: GEL443432  
Work Order #: 443432**

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

**Analytical Method: SW846 8260C**

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

**Analytical Batch: 1738696**

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
443432002	B3H7W7
1203970329	Method Blank (MB)
1203970330	Laboratory Control Sample (LCS)
1203970331	443432002(B3H7W7) Post Spike (PS)
1203970332	443432002(B3H7W7) Post Spike Duplicate (PSD)

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.

**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: GEL443432 GEL Work Order: 443432

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

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

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.

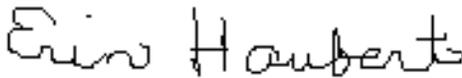
RA Indicates that sample is re-analyzed without re-extraction.

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: 15 FEB 2018

Title: Data Validator

# Sample Data Summary

Volatile  
Certificate of Analysis  
Sample Summary

Page 1 of 1

<b>SDG Number:</b> GEL443432	<b>Date Collected:</b> 02/08/2018 12:11	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 443432002	<b>Date Received:</b> 02/09/2018 08:55	
<b>Client ID:</b> B3H7W7	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F17070
<b>Batch ID:</b> 1738696	<b>Method:</b> SW846 8260C	<b>SOP Ref:</b> GL-OA-E-038
<b>Run Date:</b> 02/12/2018 15:54	<b>Inst:</b> VOA3.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 02/12/2018 15:54	<b>Analyst:</b> JP1	<b>Purge Vol:</b> 5 mL
<b>Data File:</b> 021218V3\3V111.D	<b>Column:</b> DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
56-23-5	Carbon tetrachloride		7.51	ug/L	0.300	2.00	5.00
79-01-6	Trichloroethylene	J	2.17	ug/L	0.300	2.00	5.00

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: February 15, 2018

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 443432

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1738696										
QC1203970330	LCS										
Carbon tetrachloride	50.0			56.7	ug/L		113	(70%-130%)	JP1	02/12/18	11:43
Trichloroethylene	50.0			54.7	ug/L		109	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			51.9	ug/L		104	(70%-130%)			
**Bromofluorobenzene	50.0			51.9	ug/L		104	(70%-130%)			
**Toluene-d8	50.0			47.6	ug/L		95	(70%-130%)			
QC1203970329	MB										
Carbon tetrachloride			U	0.300	ug/L					02/12/18	14:20
Trichloroethylene			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			52.8	ug/L		106	(70%-130%)			
**Bromofluorobenzene	50.0			48.0	ug/L		96	(70%-130%)			
**Toluene-d8	50.0			47.6	ug/L		95	(70%-130%)			
QC1203970331	443432002	PS									
Carbon tetrachloride	50.0	7.51		58.5	ug/L		102	(70%-130%)		02/12/18	19:34
Trichloroethylene	50.0	J	2.17	53.0	ug/L		102	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		52.9	50.8	ug/L		102	(70%-130%)			

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**QC Summary**

Workorder: 443432

Page 2 of 3

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1738696										
**Bromofluorobenzene	50.0	49.2		51.4	ug/L		103	(70%-130%)	JP1	02/12/18	19:34
**Toluene-d8	50.0	47.5		47.8	ug/L		96	(70%-130%)			
QC1203970332 443432002 PSD											
Carbon tetrachloride	50.0	7.51		57.5	ug/L	2	100	(0%-20%)		02/12/18	20:05
Trichloroethylene	50.0	J	2.17	52.5	ug/L	1	101	(0%-20%)			
**1,2-Dichloroethane-d4	50.0	52.9		50.0	ug/L		100	(70%-130%)			
**Bromofluorobenzene	50.0	49.2		51.1	ug/L		102	(70%-130%)			
**Toluene-d8	50.0	47.5		45.1	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: 443432

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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.

Volatile  
Surrogate Recovery Report

Page 1 of 1

SDG Number: GEL443432

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203970330	LCS for batch 1738696	104	95	104
1203970329	MB for batch 1738696	106	95	96
443432002	B3H7W7	106	95	98
1203970331	B3H7W7PS	102	96	103
1203970332	B3H7W7PSD	100	90	102

**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

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL443432**  
**Work Order #: 443432**

**Product: Determination of Metals by ICP-MS****Analytical Method:** SW846 3005A/6020B**Analytical Procedure:** GL-MA-E-014 REV# 32**Analytical Batch:** 1738210**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 14**Preparation Batch:** 1738209

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
443432001	B3H7W6
1203969035	Method Blank (MB)ICP-MS
1203969036	Laboratory Control Sample (LCS)
1203969039	443432001(B3H7W6L) Serial Dilution (SD)
1203969037	443432001(B3H7W6S) Matrix Spike (MS)
1203969038	443432001(B3H7W6SD) Matrix Spike Duplicate (MSD)

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

**Data Summary:**

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

**Calibration Information****ICSA/ICSAB Statement**

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

**Technical Information****Sample Dilutions**

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. Sample 443432001 (B3H7W6) was diluted to ensure that the analyte concentration was within the linear calibration range of the instrument.

Analyte	443432
	001
Manganese	5X

**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**

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL443432 GEL Work Order: 443432

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

- \* Duplicate analysis not within control limits
- 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).
- D Results are reported from a diluted aliquot of sample.
- 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: Jamie Johnson****Date: 15 FEB 2018****Title: Group Leader**

# Sample Data Summary

**METALS**  
-1-  
**INORGANICS ANALYSIS DATA PACKAGE**

**SDG No:** GEL443432

**CONTRACT:** CPRC0F17070

**METHOD TYPE:** SW846

**SAMPLE ID:**443432001

**BASIS:** As Received

**DATE COLLECTED** 08-FEB-18

**CLIENT ID:** B3H7W6

**LEVEL:** Low

**DATE RECEIVED** 09-FEB-18

**MATRIX:** WATER

**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	SKJ	02/13/18 17:44	180213-1	1738210
7439-96-5	Manganese	146	ug/L	D	5	25	25	5	MS	SKJ	02/13/18 17:31	180213-1	1738210
7440-61-1	Uranium	2.11	ug/L		0.067	0.2	0.2	1	MS	SKJ	02/13/18 17:44	180213-1	1738210

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1738210	1738209	SW846 3005A	50	mL	50	mL	02/09/18	JXM8

**\*Analytical Methods:**

**MS SW846 3005A/6020B**

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: February 15, 2018

Page 1 of 2

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 443432

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1738210										
QC1203969036	LCS										
Chromium	50.0			51.0	ug/L		102	(80%-120%)	SKJ	02/13/18	17:29
Manganese	50.0			50.4	ug/L		101	(80%-120%)			
Uranium	50.0			49.6	ug/L		99.2	(80%-120%)			
QC1203969035	MB										
Chromium			U	3.00	ug/L					02/13/18	17:27
Manganese			U	1.00	ug/L						
Uranium			U	0.067	ug/L						
QC1203969037	443432001	MS									
Chromium	50.0	U	3.00	49.4	ug/L		98.4	(75%-125%)		02/13/18	17:46
Manganese	50.0	D	146 D	197	ug/L		103	(75%-125%)		02/13/18	17:33
Uranium	50.0		2.11	52.2	ug/L		100	(75%-125%)		02/13/18	17:46
QC1203969038	443432001	MSD									
Chromium	50.0	U	3.00	49.0	ug/L	0.962	97.5	(0%-20%)		02/13/18	17:48
Manganese	50.0	D	146 D	198	ug/L	0.228	104	(0%-20%)		02/13/18	17:35
Uranium	50.0		2.11	51.9	ug/L	0.667	99.5	(0%-20%)		02/13/18	17:48

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**QC Summary**

Workorder: 443432

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1738210										
QC1203969039	443432001	SDILT									
Chromium	U	0.228	DU	15.0	ug/L	N/A		(0%-20%)	SKJ	02/13/18	17:52
Manganese	D	29.2	D	6.01	ug/L	2.88		(0%-20%)		02/13/18	17:38
Uranium		2.11	D	0.448	ug/L	6.06		(0%-20%)		02/13/18	17:52

**Notes:**

The Qualifiers in this report are defined as follows:

- \* Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is  $\geq$  EQL or is  $>$  5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- 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

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.

# General Chem Analysis

# Case Narrative

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL443432  
Work Order #: 443432**

**Product: Ion Chromatography****Analytical Method:** 300.0\_ANIONS\_IC**Analytical Procedure:** GL-GC-E-086 REV# 25**Analytical Batch:** 1738159

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
443432003	B3H913
1203968838	Method Blank (MB)
1203968839	Laboratory Control Sample (LCS)
1203968840	443435002(NonSDG) Sample Duplicate (DUP)
1203968841	443435002(NonSDG) Post Spike (PS)

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

**Data Summary:**

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

**Technical Information****Sample Dilutions**

The following samples 1203968840 (Non SDG 443435002DUP), 1203968841 (Non SDG 443435002PS) and 443432003 (B3H913) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	<b>443432</b>
	<b>003</b>
Chloride	5X
Sulfate	5X

**Miscellaneous Information****Manual Integrations**

Samples 1203968841 (Non SDG 443435002PS) and 443432003 (B3H913) were manually integrated to correctly position the baseline as set in the calibration standards.

**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: GEL443432 GEL Work Order: 443432

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

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).

D Results are reported from a diluted aliquot of sample.

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:** Kristen Mizzell

**Date:** 15 FEB 2018

**Title:** Team Leader

# Sample Data Summary

**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: February 15, 2018

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F17-070

Client Sample ID: B3H913 Project: CPRC0F17070  
 Sample ID: 443432003 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 08-FEB-18 12:11  
 Receive Date: 09-FEB-18  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
300.0_ANIONS_IC: COMMON "As Received"												
Nitrate-N		3040	33.0	250	ug/L		1	LXA2	02/09/18	1028	1738159	1
Chloride	D	22600	335	1000	ug/L		5	LXA2	02/09/18	2249	1738159	2
Sulfate	D	41600	665	2000	ug/L		5					

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	300.0_ANIONS_IC		
2	300.0_ANIONS_IC		

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level  
 DL: Detection Limit PF: Prep Factor  
 MDA: Minimum Detectable Activity RL: Reporting Limit  
 MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: February 15, 2018

Page 1 of 2

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 443432

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1738159										
QC1203968840	443435002	DUP									
Chloride	D	10300	D	10800	ug/L	4.86		(0%-20%)	LXA2	02/09/18	13:33
Nitrate-N	D	3110	D	3180	ug/L	2.29		(0%-20%)			
Sulfate	D	36800	D	38400	ug/L	4.27		(0%-20%)			
QC1203968839	LCS										
Chloride	5000			4890	ug/L		97.7	(80%-120%)		02/09/18	09:57
Nitrate-N	2500			2450	ug/L		97.9	(80%-120%)			
Sulfate	10000			10000	ug/L		100	(80%-120%)			
QC1203968838	MB										
Chloride			U	67.0	ug/L					02/09/18	09:27
Nitrate-N			U	33.0	ug/L						
Sulfate			U	133	ug/L						
QC1203968841	443435002	PS									
Chloride	5.00	D	1.03	D	6.35	mg/L		106	(75%-125%)	02/09/18	14:04
Nitrate-N	2.50	D	0.311	D	2.80	mg/L		99.4	(75%-125%)		
Sulfate	10.0	D	3.68	D	14.5	mg/L		109	(75%-125%)		

Notes:

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**QC Summary**

Workorder: 443432

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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The Qualifiers in this report are defined as follows:

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

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.

# Radiological Analysis

# Case Narrative

**Radiochemistry**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL443432**  
**Work Order #: 443432**

**Product:** I129LL\_SEP\_LEPS\_GS: COMMON (low level)

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

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

**Analytical Batch:** 1737753

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
443432001	B3H7W6
1203967760	Method Blank (MB)
1203967761	443264025(NonSDG) Sample Duplicate (DUP)
1203967762	443264025(NonSDG) Matrix Spike (MS)
1203967763	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:** 9310\_ALPHABETA\_GPC: COMMON

**Analytical Method:** 9310\_ALPHABETA\_GPC

**Analytical Procedure:** GL-RAD-A-001 REV# 19

**Analytical Batch:** 1738264

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
443432001	B3H7W6
1203969157	Method Blank (MB)
1203969158	443432001(B3H7W6) Sample Duplicate (DUP)
1203969159	443432001(B3H7W6) Matrix Spike (MS)
1203969160	443432001(B3H7W6) Matrix Spike Duplicate (MSD)
1203969161	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Technical Information****Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

**Recounts**

Sample 1203969160 (B3H7W6MSD) was recounted due to high recovery. The recount is reported. Samples 1203969158 (B3H7W6DUP) and 443432001 (B3H7W6) were recounted due to high relative percent difference/relative error ratio. The recounts are reported.

**Miscellaneous Information****Additional Comments**

The matrix spike and matrix spike duplicate, 1203969159 (B3H7W6MS) and 1203969160 (B3H7W6MSD), aliquots were reduced to conserve sample volume.

**Product:** TC99\_EIE\_LSC: COMMON

**Analytical Method:** TC99\_EIE\_LSC

**Analytical Procedure:** GL-RAD-A-059 REV# 5

**Analytical Batch:** 1738265

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
443432001	B3H7W6
1203969162	Method Blank (MB)
1203969163	443432001(B3H7W6) Sample Duplicate (DUP)
1203969164	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:** TRITIUM\_DIST\_LSC: COMMON

**Analytical Method:** TRITIUM\_DIST\_LSC

**Analytical Procedure:** GL-RAD-A-002 REV# 22

**Analytical Batch:** 1738342

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
443432001	B3H7W6
1203969352	Method Blank (MB)
1203969353	443432001(B3H7W6) Sample Duplicate (DUP)
1203969354	443432001(B3H7W6) Matrix Spike (MS)
1203969355	Laboratory Control Sample (LCS)

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

#### **Data Summary:**

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

#### **Miscellaneous Information**

##### **Additional Comments**

The matrix spike, 1203969354 (B3H7W6MS), aliquot was reduced to conserve sample volume.

#### **Certification Statement**

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

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL443432 GEL Work Order: 443432

**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:** Heather McCarty

**Date:** 14 FEB 2018

**Title:** Analyst II

# Sample Data Summary

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

SDG Number: GEL443432	Client: CPRC001	Project: CPRC0F17070
Lab Sample ID: 443432001	Date Collected: 02/08/2018 12:11	Matrix: WATER
	Date Received: 02/09/2018 08:55	
Client ID: B3H7W6	Method: 9310_ALPHABETA_GPC	Prep Basis: "As Received"
Batch ID: 1738264	Analyst: AXH4	SOP Ref: GL-RAD-A-001
Run Date: 02/13/2018 10:44	Aliquot: 150 mL	Instrument: PIC2A
Data File: AB1738264r2.xls	Prep Method: EPA 900.0/SW846 9310	Count Time: 150 min
Prep Batch: 1738264		
Prep Date: 02/12/2018 12:10		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha <i>ALPHA</i>		5.92	pCi/L	+/-3.04	3.59	2.95	3.00
12587-47-2	Beta <i>BETA</i>		418	pCi/L	+/-8.32	69.7	1.29	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

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

**Rad  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL443432	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F17070
<b>Lab Sample ID:</b> 443432001	<b>Date Collected:</b> 02/08/2018 12:11	<b>Matrix:</b> WATER
	<b>Date Received:</b> 02/09/2018 08:55	
<b>Client ID:</b> B3H7W6	<b>Method:</b> DOE EML HASL-300,I-01 Mo	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1737753	<b>Analyst:</b> BSW1	<b>SOP Ref:</b> GL-RAD-A-006
<b>Run Date:</b> 02/13/2018 11:33	<b>Aliquot:</b> 1.2 L	<b>Instrument:</b> XRAY4
<b>Data File:</b> I443432001.CNF;1	<b>Prep Method:</b> DOE EML HASL-300,I-01 M	<b>Count Time:</b> 120 min
<b>Prep Batch:</b> 1737753		
<b>Prep Date:</b> 02/13/2018 09:24		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.687	pCi/L	+/-0.992	0.994	0.878	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

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

**Rad**  
**Certificate of Analysis**  
**Sample Summary**

SDG Number: GEL443432	Client: CPRC001	Project: CPRC0F17070
Lab Sample ID: 443432001	Date Collected: 02/08/2018 12:11	Matrix: WATER
	Date Received: 02/09/2018 08:55	
Client ID: B3H7W6	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1738265	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 02/13/2018 05:16	Aliquot: 100 mL	Instrument: LSCRED
Data File: E1738265.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 15 min
Prep Batch: 1738265		
Prep Date: 02/09/2018 14:19		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		679	pCi/L	+/-44.6	87.3	40.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	30700	30900	CPM	99.2	(30%-105%)

**Comments:**

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

**Rad  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL443432	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F17070
<b>Lab Sample ID:</b> 443432001	<b>Date Collected:</b> 02/08/2018 12:11	<b>Matrix:</b> WATER
	<b>Date Received:</b> 02/09/2018 08:55	
<b>Client ID:</b> B3H7W6	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1738342	<b>Analyst:</b> MXH8	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 02/13/2018 19:43	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCYELLOW
<b>Data File:</b> T1738342.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 50 min
<b>Prep Batch:</b> 1738342		
<b>Prep Date:</b> 02/13/2018 07:54		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		5040	pCi/L	+/-362	1040	292	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

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

# Quality Control Summary

**GEL LABORATORIES LLC**

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**QC Summary**

Report Date: February 14, 2018  
Page 1 of 3

**Client :** CH2MHill Plateau Remediation Company  
MSIN R3-50 CHPRC  
PO Box 1600  
Richland, Washington 99352  
**Contact:** Mr. Scot Fitzgerald  
**Workorder:** 443432

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1737753								
QC1203967760	MB								
Iodine-129			U	0.0086	pCi/L			BSW1	02/13/1811:34
				Uncert: +/-0.303					
				TPU: +/-0.303					
QC1203967761	443264025	DUP							
Iodine-129		U	0.364	U	0.0851				02/13/1814:24
				Uncert: +/-0.502		RPD: 0	N/A		
				TPU: +/-0.529		RER: 0.769	(0-2)		
QC1203967762	443264025	MS							
Iodine-129		U	0.364		33.3	REC: 95	(75%-125%)		02/13/1814:23
				Uncert: +/-0.502					
				TPU: +/-0.529					
QC1203967763	LCS								
Iodine-129					36.6	REC: 105	(80%-120%)		02/13/1814:24
				Uncert: +/-3.09					
				TPU: +/-4.79					
<b>Rad Gas Flow</b>									
Batch	1738264								
QC1203969157	MB								
Alpha			U	0.193	pCi/L			AXH4	02/12/1816:40
				Uncert: +/-1.24					
				TPU: +/-1.24					
Beta			U	0.802	pCi/L				
				Uncert: +/-1.47					
				TPU: +/-1.47					
QC1203969158	443432001	DUP							
Alpha			5.92		9.50				02/13/1810:42
				Uncert: +/-3.04		RPD: 46	(0% - 100%)		
				TPU: +/-3.59		RER: 1.25	(0-2)		
Beta			418		448				
				Uncert: +/-8.32		RPD: 7	(0%-20%)		
				TPU: +/-69.7		RER: 0.577	(0-2)		
QC1203969159	443432001	MS							
Alpha			242	5.92	272	REC: 110	(75%-125%)		02/12/1816:40
				Uncert: +/-3.04					
				TPU: +/-3.59					
Beta			942	418	1380	REC: 102	(75%-125%)		
				Uncert: +/-8.32					
				TPU: +/-69.7					
QC1203969160	443432001	MSD							
Alpha			242	5.92	254	REC: 103	(75%-125%)		02/13/1807:25
				Uncert: +/-3.04		RPD: 7	(0%-20%)		
				TPU: +/-3.59		RER: 0.465	(0-2)		
Beta			942	418	1460	REC: 111	(75%-125%)		
				Uncert: +/-8.32		RPD: 5	(0%-20%)		

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**QC Summary**

Workorder: 443432

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gas Flow</b>									
Batch	1738264								
		TPU:	+/-69.7	+/-240					
						RER:	0.461 (0-2)		
QC1203969161 LCS									
Alpha	80.6			80.2	pCi/L	REC:	100 (80%-120%)		02/12/1816:40
		Uncert:		+/-7.46					
		TPU:		+/-15.3					
Beta	314			333	pCi/L	REC:	106 (80%-120%)		
		Uncert:		+/-11.3					
		TPU:		+/-55.3					
<b>Rad Liquid Scintillation</b>									
Batch	1738265								
QC1203969162 MB									
Technetium-99			U	7.85	pCi/L			CXS7	02/13/1805:33
		Uncert:		+/-25.6					
		TPU:		+/-25.6					
**Technetium-99m Tracer	30900			28500	CPM	REC:	92 (30%-105%)		
QC1203969163 443432001 DUP									
Technetium-99		679		729	pCi/L				02/13/1805:49
		Uncert:	+/-44.6	+/-46.7		RPD:	7 (0%-20%)		
		TPU:	+/-87.3	+/-93.1		RER:	0.762 (0-2)		
**Technetium-99m Tracer	30900	30700		30700	CPM	REC:	99 (30%-105%)		
QC1203969164 LCS									
Technetium-99	888			731	pCi/L	REC:	82 (80%-120%)		02/13/1806:06
		Uncert:		+/-47.0					
		TPU:		+/-93.4					
**Technetium-99m Tracer	30900			30200	CPM	REC:	98 (30%-105%)		
Batch	1738342								
QC1203969352 MB									
Tritium			U	-84.1	pCi/L			MXH8	02/13/1820:34
		Uncert:		+/-161					
		TPU:		+/-161					
QC1203969353 443432001 DUP									
Tritium		5040		5330	pCi/L				02/13/1821:26
		Uncert:	+/-362	+/-372		RPD:	6 (0%-20%)		
		TPU:	+/-1040	+/-1100		RER:	0.374 (0-2)		
QC1203969354 443432001 MS									
Tritium	5170	5040		10300	pCi/L	REC:	102 (75%-125%)		02/13/1822:17
		Uncert:	+/-362	+/-731					
		TPU:	+/-1040	+/-2120					
QC1203969355 LCS									
Tritium	2580			2680	pCi/L	REC:	104 (80%-120%)		02/13/1823:08
		Uncert:		+/-291					
		TPU:		+/-594					

**Notes:**

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

The Qualifiers in this report are defined as follows:

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**QC Summary**

Workorder: 443432

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
*						Duplicate analysis not within control limits				
+						Correlation coefficient for Method of Standard Additions (MSA) is < 0.995				
<						Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide				
>						Result greater than quantifiable range or greater than upper limit of the analysis range				
A						The TIC is a suspected aldol-condensation product				
B						The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).				
B						The analyte was detected in both the associated QC blank and in the sample.				
B						The analyte was detected in the associated method blank >= MDC or >5% sample activity.				
C						Analyte has been confirmed by GC/MS analysis				
C						Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.				
D						Results are reported from a diluted aliquot of sample.				
E						Concentration exceeds the calibration range of the instrument				
E						Reported value is estimated due to interferences. See comment in narrative.				
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				
M						Duplicate precision not met.				
N						Spike Sample recovery is outside control limits.				
P						Aroclor target analyte with greater than 25% difference between column analyses.				
S						Reported value determined by the Method of Standard Additions (MSA)				
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				
W						Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.				
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.