



July 19, 2017

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

Re: CHPRC SAF F17-048
Work Order: 427211
SDG: GEL427211

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 06, 2017. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 302887 - 9C
Chain of Custody: F17-048-001, F17-048-003, F17-048-005 and F17-048-007
Enclosures



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Case Narrative

July 20, 2017

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F17-048
SDG: GEL427211

July 19, 2017

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on July 06, 2017, 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:

<u>Laboratory Identification</u>	<u>Sample Description</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4

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.

July 20, 2017

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.


Brielle Luthman for
Heather Shaffer
Project Manager

July 20, 2017

Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL427211
Work Order #: 427211

GC/MS Volatile

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

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

Calibration Information

Continuing Calibration Verification Requirements

The calibration verification standard requirements were not all met for samples. Acetone recovered at 30.4%D/drift in the daily CCV analyzed on 7/11/17. Acetone recovered at 37.3%D/drift in the daily CCV analyzed on 7/13/17. There were no positive results for any of the analytes that were outside the calibration criteria. The results are reported.

Technical Information

Holding Time Specifications

QC samples 1203830997 (Non SDG 426852001PS) and 1203830998 (Non SDG 426852001PSD) were loaded onto the GC/MS on the last day of holding. They injected after the holding time expired. The parent sample was analyzed within holding. The results are qualified accordingly and reported.

Sample Dilutions/Methanol Dilutions

Samples 427211001 (B3BLD7), 427211002 (B3BLD9), 427211003 (B3BLF1) and 427211004 (B3BLH4) were analyzed using a methanol dilution extraction procedure because the sample matrices were not amenable to more concentrated analyses.

Analyte	427211			
	001	002	003	004
Several	50X	50X	50X	50X

Metals

Determination of Metals by ICP

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

Preparation Information

The samples and associated matrix QC were prepared at a ten times or greater dilution factor to minimize potential interferences arising from the high sodium content in the TCLP leaching solution.

General Chemistry

Cyanide, Total

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 1203825434 (LCS), 1203825435 (B3BLD7DUP), 1203825436 (B3BLD7MS), 427211001 (B3BLD7), 427211002 (B3BLD9) and 427211003 (B3BLF1) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	427211		
	001	002	003
Cyanide, Total	5X	5X	5X

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.

Quality Control (QC) Information

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

Analyte	Sample	Value
Nitrate	1203828935 (B3BLH4MS)	50* (75%-125%)

Radiochemistry

UIISO_IE_PRECIP_AEA:COMMON

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

Quality Control (QC) Information

QC Information

Refer to Miscellaneous Information section.

RDL Met

The blank, 1203829460 (MB), did not meet the detection limit for U-238, U-233/234, U-235/236 due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

Technical Information

Sample Re-prep/Re-analysis

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

Recounts

Sample 1203829462 (LCS) was recounted due to high carrier/tracer yield. The recount is reported.

Miscellaneous Information

Dry Weight

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.

SRTOT_SEP_PRECIP_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.

Quality Control (QC) Information

QC Information

The sample and the duplicate, 1203827176 (B3BLH4DUP) and 427211004 (B3BLH4) , did not meet the relative error ratio requirement; however, both results are less than MDA.

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.

Quality Control (QC) Information

QC Information

The matrix spike and matrix spike duplicate, 1203830816 (B3BLH4MS) and 1203830817 (B3BLH4MSD), did not meet the alpha recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

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

Samples 1203830817 (B3BLH4MSD) and 1203830818 (LCS) were recounted due to high recovery. The recounts are reported.

TC99_SEP_GPC

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

Quality Control (QC) Information

QC Information

The sample and the duplicate, 1203826497 (B3BLD7DUP) and 427211001 (B3BLD7), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with a value of 1.8862.

TRITIUM_DIST_LSC: COMMON

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

C14_LSC: COMMON

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.

July 20, 2017

Miscellaneous Information

Additional Comments

The matrix spike, 1203826522 (B3BLD7MS), 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

July 20, 2017

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		PAGE 1 OF 1	
COLLECTOR Malcom Chum CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	PRICE CODE 9C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION Resin Waste Box No. KR4-17-001	PROJECT DESIGNATION 100-KR-4 and 100-KX Pump & Treat - Spent-Resin Waste Designation	ACTUAL SAMPLE DEPTH N/A	SAF NO. F17-048	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. GWS-595	FIELD LOGBOOK NO. MNF-N-491-16	OFFSITE PROPERTY NO. 8135	COA 302887	BILL OF LADING/AIR BILL NO. 17995 5440 6911	

MATRIX* A=Air DL=Drum L=Liquid O=Oil S=Soil SE=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	None	None
HOLDING TIME	14 Days	180/180 Days	6 Months	
TYPE OF CONTAINER	G	G	G/P	
NO. OF CONTAINER(S)	3	1	1	
VOLUME	40mL	500mL	250mL	
SAMPLE ANALYSIS	8260_VOA_GOM S: COMMON; 8260_VOA_GOM S: CH 01;	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	
SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B3BLD8				
SAMPLE NO. B3BLD7	MATRIX* OTHER SOLID	SAMPLE DATE JUN 28 2017	SAMPLE TIME 1130	<input checked="" type="checkbox"/>

yafer

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM Malcom Chum CHPRC	RECEIVED BY/STORED IN SSU-1	DATE/TIME JUN 28 2017 1325	DATE/TIME JUN 28 2017 1325	TRVL-17-168	
RELINQUISHED BY/REMOVED FROM SSU-1	RECEIVED BY/STORED IN Lesly Wall CHPRC	DATE/TIME JUL 05 2017 0715	DATE/TIME JUL 05 2017 0715	(1) 1311/6010_TCLP_METALS: COMMON {Arsenic, Barium, Cadmium, Chromium, Lead}; 1311/6010_TCLP_METALS: COMMON (Add-on) {Antimony, Beryllium, Nickel, Thallium, Uranium, Vanadium, Zinc}; 9012_CYANIDE (TOTAL): COMMON; 300.0_ANIONS_IC: COMMON {Nitrogen in Nitrate};	
RELINQUISHED BY/REMOVED FROM Lesly Wall CHPRC	RECEIVED BY/STORED IN FEDEX	DATE/TIME JUL 05 2017 1400	DATE/TIME JUL 05 2017 1400	(2) 9310_ALPHABETA_GPC: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON; UIISO_IE_PRECIP_AEA: COMMON; C14_LSC: COMMON; TRITIUM_DIST_LSC: COMMON; TC99_EIE_LSC: COMMON;	
RELINQUISHED BY/REMOVED FROM F50 5A	RECEIVED BY/STORED IN STACY BOONC BPR	DATE/TIME 7/6/17 6:50	DATE/TIME 7/6/17 6:50		
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	DATE/TIME	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	
PRINTED ON 6/21/2017	FRS ID = FSR46961	TRVL NUM = TRVL-17-168		A-6003-618 (REV 2)	

July 20, 2017

CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST

CH2MHill Plateau Remediation Company

COLLECTOR: Malcom Chumh CHPRC

COMPANY CONTACT: SUMNER, LC

TELEPHONE NO.: 376-3922

PROJECT COORDINATOR: SUMNER, LC

PRICE CODE: 9C

DATA TURNAROUND: 15 Days / 15 Days

SAMPLING LOCATION: Resin Waste Box No. KX17-003

PROJECT DESIGNATION: 100-KR-4 and 100-KX Pump & Treat - Spent Resin Waste Designation

FIELD LOGBOOK NO.: HNF-N-491-16

ACTUAL SAMPLE DEPTH: N/A

SAF NO.: F17-048

AIR QUALITY:

METHOD OF SHIPMENT: FEDERAL EXPRESS

ICE CHEST NO.: 6005-5915

OFFSITE PROPERTY NO.: 8135

COA: 302887

BILL OF LADING/AIR BILL NO.: 7795 5440 6911

ORIGINAL

F17-048-005

PAGE 1 OF 1

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SPECIAL HANDLING AND/OR STORAGE	SAMPLE NO.	MATRIX*
A=Air DL=Drum L=Liquid DS=Drum S=Soil T=Tissue V=Vegetation W=Water WI=Wipe X=Other	*Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	Cool <=6C	14 Days	G	3	40mL	8260_YOY_GCM S: COMMON; 8260_YOY_GCM S: CH 01;	RADIOACTIVE TIE TO: B3BLF2	B3BLF1	OTHER SOLID
		None	180/180 Days	G	1	500mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS		JUN 28 2017	1206
		None	6 Months	G/P	1	250mL	SEE ITEM (2) IN SPECIAL INSTRUCTIONS		JUN 28 2017	1206

427211

SPECIAL INSTRUCTIONS

TRVL-17-168

(1) 1311/6010_TCLP_METALS: COMMON {Arsenic, Barium, Cadmium, Chromium, Lead}; 1311/6010_TCLP_METALS: COMMON (Add-on) {Antimony, Beryllium, Nickel, Thallium, Uranium, Vanadium, Zinc}; 9012_CYANIDE (TOTAL): COMMON; 300.0_ANIONS_IC: COMMON {Nitrogen in Nitrate};

(2) 9310_ALPHABETA_GPC: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON; UISO_IE_PRECIP_AEA: COMMON; C14_LSC: COMMON; TRITIUM_DIST_LSC: COMMON; TC99_EIE_LSC: COMMON;

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Malcom Chumh CHPRC	JUN 28 2017 1325	SSU-1	JUN 28 2017 1325
SSU-1	JUL 05 2017 0715	Leahy Walsh CHPRC	JUL 05 2017 0715
Leahy Walsh CHPRC	JUL 05 2017 1400	FEDEX	JUL 05 2017 1400
FEDEX	7/6/17 8:50	STACY BOONE	7/6/17 8:50
STACY BOONE			

LABORATORY SECTION RECEIVED BY

FINAL SAMPLE DISPOSITION DISPOSAL METHOD

PRINTED ON 6/21/2017

FSR ID = FSR47134

TRVL NUM = TRVL-17-168

A-6003-618 (REV 2)

July 20, 2017



SAMPLE RECEIPT & REVIEW FORM

Client: CPRC		SDG/AR/COC/Work Order: 427211	
Received By: STACY BOONE		Date Received: 7-6-17	
Carrier and Tracking Number		Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 7795 6015 4851-1c 7795 5723 4904-3c 7795 5440 6304-1c 7795 5440 6911-5c	
Suspected Hazard Information		Yes	No
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked or classified as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is package, COC, and/or Samples marked HAZ?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation. Hazard Class Shipped: _____ UN#: _____ Maximum Net Counts Observed (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: <u>Rad 1</u> Rad 2 Rad 3 FRC1703 only If yes, select Hazards below, and contact the GEL Safety Group. <input checked="" type="checkbox"/> PCB's <input type="checkbox"/> Flammable <input type="checkbox"/> Foreign Soil <input type="checkbox"/> RCRA <input type="checkbox"/> Asbestos <input type="checkbox"/> Beryllium <input type="checkbox"/> Other: _____			
Sample Receipt Criteria	Yes	NA	No
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>		
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"/>		
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>		
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>		
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>		
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>		
8 Samples received within holding time?	<input checked="" type="checkbox"/>		
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>		
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>		
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>		
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 DS Date 7/6/17 Page 1 of 1

GL-CHL-SR-001 Rev 5

Data Review Qualifier Definitions

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

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	General Chemistry	
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Inorganics	Metals
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.	General Chemistry	
<	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	General Chemistry	
UX	Gamma Spectroscopy--Uncertain identification	Radiological	

Laboratory Certifications

List of current GEL Certifications as of 19 July 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122017-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-22
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Volatile Analysis

Case Narrative

July 20, 2017

GC/MS Volatile

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL427211

Work Order #: 427211

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

Analytical Method: SW846 5035A/8260C

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

Analytical Batch: 1681390

Preparation Method: SW846 5035A

Preparation Procedure: GL-OA-E-039 REV# 11

Preparation Batch: 1681389

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203828644	Method Blank (MB)
1203828645	Laboratory Control Sample (LCS)
1203828978	High Blank (HB)
1203830995	Method Blank (MB)
1203830996	Laboratory Control Sample (LCS)
1203830997	426852001(NonSDG) Post Spike (PS)
1203830998	426852001(NonSDG) Post Spike Duplicate (PSD)

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

Data Summary:

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

Calibration Information

Continuing Calibration Verification Requirements

The calibration verification standard requirements were not all met for samples . Acetone recovered at 30.4%D/drift in the daily CCV analyzed on 7/11/17. Acetone recovered at 37.3%D/drift in the daily CCV analyzed on 7/13/17. There were no positive results for any of the analytes that were outside the calibration criteria. The results are reported.

Technical Information

Holding Time Specifications

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. QC samples 1203830997 (Non SDG 426852001PS) and 1203830998 (Non SDG 426852001PSD) were loaded onto the GC/MS on the last day of holding. They injected after the holding time expired. The parent sample was analyzed within holding.

The results are qualified accordingly and reported.

Sample Dilutions/Methanol Dilutions

Samples 427211001 (B3BLD7), 427211002 (B3BLD9), 427211003 (B3BLF1) and 427211004 (B3BLH4) were analyzed using a methanol dilution extraction procedure because the sample matrices were not amenable to more concentrated analyses.

Analyte	427211			
	001	002	003	004
Several	50X	50X	50X	50X

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.

July 20, 2017

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: GEL427211 GEL Work Order: 427211

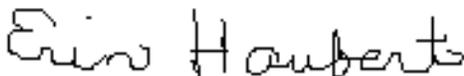
The Qualifiers in this report are defined as follows:

- D Results are reported from a diluted aliquot of sample.
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- 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: 18 JUL 2017

Title: Data Validator

Sample Data Summary

July 20, 2017

Volatile

Certificate of Analysis
Sample Summary

SDG Number: GEL427211	Date Collected: 06/28/2017 11:30	Matrix: OTHER SOLID
Lab Sample ID: 427211001	Date Received: 07/06/2017 08:50	%Moisture: 64.9
Client ID: B3BLD7	Client: CPRC001	Project: CPRC0F17048
Batch ID: 1681390	Method: SW846 5035A/8260C	SOP Ref: GL-OA-E-038
Run Date: 07/11/2017 20:39	Inst: VOA3.I	Dilution: 50
Prep Date: 07/11/2017 14:43	Analyst: VXY1	Purge Vol: 5 mL
Data File: 071117V3\3L219.D	Aliquot: 5 g	Final Volume: 10 mL
	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
71-55-6	1,1,1-Trichloroethane	DU	30.0	ug/kg	30.0	200
79-34-5	1,1,2,2-Tetrachloroethane	DU	30.0	ug/kg	30.0	200
79-00-5	1,1,2-Trichloroethane	DU	30.0	ug/kg	30.0	200
75-34-3	1,1-Dichloroethane	DU	30.0	ug/kg	30.0	200
75-35-4	1,1-Dichloroethylene	DU	30.0	ug/kg	30.0	200
107-06-2	1,2-Dichloroethane	DU	30.0	ug/kg	30.0	200
540-59-0	1,2-Dichloroethylene (total)	DU	30.0	ug/kg	30.0	400
78-87-5	1,2-Dichloropropane	DU	30.0	ug/kg	30.0	200
78-93-3	2-Butanone	DU	300	ug/kg	300	1000
591-78-6	2-Hexanone	DU	300	ug/kg	300	1000
108-10-1	4-Methyl-2-pentanone	DU	300	ug/kg	300	1000
67-64-1	Acetone	DU	300	ug/kg	300	1000
71-43-2	Benzene	DU	30.0	ug/kg	30.0	200
75-27-4	Bromodichloromethane	DU	30.0	ug/kg	30.0	200
75-25-2	Bromoform	DU	30.0	ug/kg	30.0	200
74-83-9	Bromomethane	DU	30.0	ug/kg	30.0	200
75-15-0	Carbon disulfide	DU	160	ug/kg	160	1000
56-23-5	Carbon tetrachloride	DJ	36.0	ug/kg	30.0	200
108-90-7	Chlorobenzene	DU	30.0	ug/kg	30.0	200
75-00-3	Chloroethane	DU	30.0	ug/kg	30.0	200
67-66-3	Chloroform	DU	30.0	ug/kg	30.0	200
74-87-3	Chloromethane	DU	30.0	ug/kg	30.0	200
124-48-1	Dibromochloromethane	DU	30.0	ug/kg	30.0	200
100-41-4	Ethylbenzene	DU	30.0	ug/kg	30.0	200
75-09-2	Methylene chloride	DU	160	ug/kg	160	500
100-42-5	Styrene	DU	30.0	ug/kg	30.0	200
127-18-4	Tetrachloroethylene	DU	30.0	ug/kg	30.0	200
108-88-3	Toluene	DU	30.0	ug/kg	30.0	200
79-01-6	Trichloroethylene	DU	30.0	ug/kg	30.0	200
75-01-4	Vinyl chloride	DU	30.0	ug/kg	30.0	200
1330-20-7	Xylenes (total)	DU	30.0	ug/kg	30.0	600
10061-01-5	cis-1,3-Dichloropropylene	DU	30.0	ug/kg	30.0	200
10061-02-6	trans-1,3-Dichloropropylene	DU	30.0	ug/kg	30.0	200

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Certificate of Analysis
Sample Summary

SDG Number: GEL427211	Date Collected: 06/28/2017 11:49	Matrix: OTHER SOLID
Lab Sample ID: 427211002	Date Received: 07/06/2017 08:50	%Moisture: 75.2
Client ID: B3BLD9	Client: CPRC001	Project: CPRC0F17048
Batch ID: 1681390	Method: SW846 5035A/8260C	SOP Ref: GL-OA-E-038
Run Date: 07/11/2017 21:10	Inst: VOA3.I	Dilution: 50
Prep Date: 07/11/2017 14:44	Analyst: VXY1	Purge Vol: 5 mL
Data File: 071117V3\3L220.D	Aliquot: 5 g	Final Volume: 10 mL
	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
71-55-6	1,1,1-Trichloroethane	DU	30.0	ug/kg	30.0	200
79-34-5	1,1,2,2-Tetrachloroethane	DU	30.0	ug/kg	30.0	200
79-00-5	1,1,2-Trichloroethane	DU	30.0	ug/kg	30.0	200
75-34-3	1,1-Dichloroethane	DU	30.0	ug/kg	30.0	200
75-35-4	1,1-Dichloroethylene	DU	30.0	ug/kg	30.0	200
107-06-2	1,2-Dichloroethane	DU	30.0	ug/kg	30.0	200
540-59-0	1,2-Dichloroethylene (total)	DU	30.0	ug/kg	30.0	400
78-87-5	1,2-Dichloropropane	DU	30.0	ug/kg	30.0	200
78-93-3	2-Butanone	DU	300	ug/kg	300	1000
591-78-6	2-Hexanone	DU	300	ug/kg	300	1000
108-10-1	4-Methyl-2-pentanone	DU	300	ug/kg	300	1000
67-64-1	Acetone	DU	300	ug/kg	300	1000
71-43-2	Benzene	DU	30.0	ug/kg	30.0	200
75-27-4	Bromodichloromethane	DU	30.0	ug/kg	30.0	200
75-25-2	Bromoform	DU	30.0	ug/kg	30.0	200
74-83-9	Bromomethane	DU	30.0	ug/kg	30.0	200
75-15-0	Carbon disulfide	DU	160	ug/kg	160	1000
56-23-5	Carbon tetrachloride	DU	30.0	ug/kg	30.0	200
108-90-7	Chlorobenzene	DU	30.0	ug/kg	30.0	200
75-00-3	Chloroethane	DU	30.0	ug/kg	30.0	200
67-66-3	Chloroform	DU	30.0	ug/kg	30.0	200
74-87-3	Chloromethane	DU	30.0	ug/kg	30.0	200
124-48-1	Dibromochloromethane	DU	30.0	ug/kg	30.0	200
100-41-4	Ethylbenzene	DU	30.0	ug/kg	30.0	200
75-09-2	Methylene chloride	DU	160	ug/kg	160	500
100-42-5	Styrene	DU	30.0	ug/kg	30.0	200
127-18-4	Tetrachloroethylene	DU	30.0	ug/kg	30.0	200
108-88-3	Toluene	DU	30.0	ug/kg	30.0	200
79-01-6	Trichloroethylene	DU	30.0	ug/kg	30.0	200
75-01-4	Vinyl chloride	DU	30.0	ug/kg	30.0	200
1330-20-7	Xylenes (total)	DU	30.0	ug/kg	30.0	600
10061-01-5	cis-1,3-Dichloropropylene	DU	30.0	ug/kg	30.0	200
10061-02-6	trans-1,3-Dichloropropylene	DU	30.0	ug/kg	30.0	200

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Certificate of Analysis
Sample Summary

SDG Number: GEL427211	Date Collected: 06/28/2017 12:06	Matrix: OTHER SOLID
Lab Sample ID: 427211003	Date Received: 07/06/2017 08:50	%Moisture: 73.8
Client ID: B3BLF1	Client: CPRC001	Project: CPRC0F17048
Batch ID: 1681390	Method: SW846 5035A/8260C	SOP Ref: GL-OA-E-038
Run Date: 07/11/2017 21:40	Inst: VOA3.I	Dilution: 50
Prep Date: 07/11/2017 14:45	Analyst: VXY1	Purge Vol: 5 mL
Data File: 071117V3\3L221.D	Aliquot: 5 g	Final Volume: 10 mL
	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
71-55-6	1,1,1-Trichloroethane	DU	30.0	ug/kg	30.0	200
79-34-5	1,1,2,2-Tetrachloroethane	DU	30.0	ug/kg	30.0	200
79-00-5	1,1,2-Trichloroethane	DU	30.0	ug/kg	30.0	200
75-34-3	1,1-Dichloroethane	DU	30.0	ug/kg	30.0	200
75-35-4	1,1-Dichloroethylene	DU	30.0	ug/kg	30.0	200
107-06-2	1,2-Dichloroethane	DU	30.0	ug/kg	30.0	200
540-59-0	1,2-Dichloroethylene (total)	DU	30.0	ug/kg	30.0	400
78-87-5	1,2-Dichloropropane	DU	30.0	ug/kg	30.0	200
78-93-3	2-Butanone	DU	300	ug/kg	300	1000
591-78-6	2-Hexanone	DU	300	ug/kg	300	1000
108-10-1	4-Methyl-2-pentanone	DU	300	ug/kg	300	1000
67-64-1	Acetone	DU	300	ug/kg	300	1000
71-43-2	Benzene	DU	30.0	ug/kg	30.0	200
75-27-4	Bromodichloromethane	DU	30.0	ug/kg	30.0	200
75-25-2	Bromoform	DU	30.0	ug/kg	30.0	200
74-83-9	Bromomethane	DU	30.0	ug/kg	30.0	200
75-15-0	Carbon disulfide	DU	160	ug/kg	160	1000
56-23-5	Carbon tetrachloride	DU	30.0	ug/kg	30.0	200
108-90-7	Chlorobenzene	DU	30.0	ug/kg	30.0	200
75-00-3	Chloroethane	DU	30.0	ug/kg	30.0	200
67-66-3	Chloroform	DU	30.0	ug/kg	30.0	200
74-87-3	Chloromethane	DU	30.0	ug/kg	30.0	200
124-48-1	Dibromochloromethane	DU	30.0	ug/kg	30.0	200
100-41-4	Ethylbenzene	DU	30.0	ug/kg	30.0	200
75-09-2	Methylene chloride	DU	160	ug/kg	160	500
100-42-5	Styrene	DU	30.0	ug/kg	30.0	200
127-18-4	Tetrachloroethylene	DU	30.0	ug/kg	30.0	200
108-88-3	Toluene	DU	30.0	ug/kg	30.0	200
79-01-6	Trichloroethylene	DU	30.0	ug/kg	30.0	200
75-01-4	Vinyl chloride	DU	30.0	ug/kg	30.0	200
1330-20-7	Xylenes (total)	DU	30.0	ug/kg	30.0	600
10061-01-5	cis-1,3-Dichloropropylene	DU	30.0	ug/kg	30.0	200
10061-02-6	trans-1,3-Dichloropropylene	DU	30.0	ug/kg	30.0	200

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Date Collected: 06/28/2017 12:28	Matrix: OTHER SOLID
Lab Sample ID: 427211004	Date Received: 07/06/2017 08:50	%Moisture: 69.5
Client ID: B3BLH4	Client: CPRC001	Project: CPRC0F17048
Batch ID: 1681390	Method: SW846 5035A/8260C	SOP Ref: GL-OA-E-038
Run Date: 07/11/2017 22:12	Inst: VOA3.I	Dilution: 50
Prep Date: 07/11/2017 14:46	Analyst: VXY1	Purge Vol: 5 mL
Data File: 071117V3\3L222.D	Aliquot: 5 g	Final Volume: 10 mL
	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
71-55-6	1,1,1-Trichloroethane	DU	30.0	ug/kg	30.0	200
79-34-5	1,1,2,2-Tetrachloroethane	DU	30.0	ug/kg	30.0	200
79-00-5	1,1,2-Trichloroethane	DU	30.0	ug/kg	30.0	200
75-34-3	1,1-Dichloroethane	DU	30.0	ug/kg	30.0	200
75-35-4	1,1-Dichloroethylene	DU	30.0	ug/kg	30.0	200
107-06-2	1,2-Dichloroethane	DU	30.0	ug/kg	30.0	200
540-59-0	1,2-Dichloroethylene (total)	DU	30.0	ug/kg	30.0	400
78-87-5	1,2-Dichloropropane	DU	30.0	ug/kg	30.0	200
78-93-3	2-Butanone	DU	300	ug/kg	300	1000
591-78-6	2-Hexanone	DU	300	ug/kg	300	1000
108-10-1	4-Methyl-2-pentanone	DU	300	ug/kg	300	1000
67-64-1	Acetone	DU	300	ug/kg	300	1000
71-43-2	Benzene	DU	30.0	ug/kg	30.0	200
75-27-4	Bromodichloromethane	DU	30.0	ug/kg	30.0	200
75-25-2	Bromoform	DU	30.0	ug/kg	30.0	200
74-83-9	Bromomethane	DU	30.0	ug/kg	30.0	200
75-15-0	Carbon disulfide	DU	160	ug/kg	160	1000
56-23-5	Carbon tetrachloride	DU	30.0	ug/kg	30.0	200
108-90-7	Chlorobenzene	DU	30.0	ug/kg	30.0	200
75-00-3	Chloroethane	DU	30.0	ug/kg	30.0	200
67-66-3	Chloroform	DU	30.0	ug/kg	30.0	200
74-87-3	Chloromethane	DU	30.0	ug/kg	30.0	200
124-48-1	Dibromochloromethane	DU	30.0	ug/kg	30.0	200
100-41-4	Ethylbenzene	DU	30.0	ug/kg	30.0	200
75-09-2	Methylene chloride	DU	160	ug/kg	160	500
100-42-5	Styrene	DU	30.0	ug/kg	30.0	200
127-18-4	Tetrachloroethylene	DU	30.0	ug/kg	30.0	200
108-88-3	Toluene	DU	30.0	ug/kg	30.0	200
79-01-6	Trichloroethylene	DU	30.0	ug/kg	30.0	200
75-01-4	Vinyl chloride	DU	30.0	ug/kg	30.0	200
1330-20-7	Xylenes (total)	DU	30.0	ug/kg	30.0	600
10061-01-5	cis-1,3-Dichloropropylene	DU	30.0	ug/kg	30.0	200
10061-02-6	trans-1,3-Dichloropropylene	DU	30.0	ug/kg	30.0	200

Quality Control Summary

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GEL LABORATORIES LLC

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QC Summary

Report Date: July 18, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 427211

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
QC1203828978	HB										
1,1,1-Trichloroethane			DU	30.0	ug/kg				VXY1	07/11/17	20:08
1,1,2,2-Tetrachloroethane			DU	30.0	ug/kg						
1,1,2-Trichloroethane			DU	30.0	ug/kg						
1,1-Dichloroethane			DU	30.0	ug/kg						
1,1-Dichloroethylene			DU	30.0	ug/kg						
1,2-Dichloroethane			DU	30.0	ug/kg						
1,2-Dichloroethylene (total)			DU	30.0	ug/kg						
1,2-Dichloropropane			DU	30.0	ug/kg						
2-Butanone			DU	300	ug/kg						
2-Hexanone			DU	300	ug/kg						
4-Methyl-2-pentanone			DU	300	ug/kg						
Acetone			DU	300	ug/kg						
Benzene			DU	30.0	ug/kg						

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
Bromodichloromethane			DU	30.0	ug/kg				VXY1	07/11/17	20:08
Bromoform			DU	30.0	ug/kg						
Bromomethane			DU	30.0	ug/kg						
Carbon disulfide			DU	160	ug/kg						
Carbon tetrachloride			DU	30.0	ug/kg						
Chlorobenzene			DU	30.0	ug/kg						
Chloroethane			DU	30.0	ug/kg						
Chloroform			DU	30.0	ug/kg						
Chloromethane			DU	30.0	ug/kg						
Dibromochloromethane			DU	30.0	ug/kg						
Ethylbenzene			DU	30.0	ug/kg						
Methylene chloride			DU	160	ug/kg						
Styrene			DU	30.0	ug/kg						
Tetrachloroethylene			DU	30.0	ug/kg						
Toluene			DU	30.0	ug/kg						

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
Trichloroethylene			DU	30.0	ug/kg				VXY1	07/11/17	20:08
Vinyl chloride			DU	30.0	ug/kg						
Xylenes (total)			DU	30.0	ug/kg						
cis-1,3-Dichloropropylene			DU	30.0	ug/kg						
trans-1,3-Dichloropropylene			DU	30.0	ug/kg						
**1,2-Dichloroethane-d4	50.0			44.8	ug/L		90	(70%-130%)			
**Bromofluorobenzene	50.0			45.6	ug/L		91	(70%-130%)			
**Toluene-d8	50.0			49.7	ug/L		99	(70%-130%)			
QC1203828645 LCS											
1,1,1-Trichloroethane	50.0			47.4	ug/kg		95	(70%-130%)		07/11/17	12:57
1,1,2,2-Tetrachloroethane	50.0			50.2	ug/kg		100	(70%-130%)			
1,1,2-Trichloroethane	50.0			47.0	ug/kg		94	(70%-130%)			
1,1-Dichloroethane	50.0			45.3	ug/kg		91	(70%-130%)			
1,1-Dichloroethylene	50.0			42.9	ug/kg		86	(70%-130%)			
1,2-Dichloroethane	50.0			44.7	ug/kg		89	(70%-130%)			
1,2-Dichloroethylene (total)	100			88.2	ug/kg		88	(70%-130%)			

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
1,2-Dichloropropane	50.0			42.8	ug/kg		86	(70%-130%)	VXY1	07/11/17	12:57
2-Butanone	250			208	ug/kg		83	(70%-130%)			
2-Hexanone	250			216	ug/kg		86	(70%-130%)			
4-Methyl-2-pentanone	250			198	ug/kg		79	(70%-130%)			
Acetone	250			232	ug/kg		93	(70%-130%)			
Benzene	50.0			44.0	ug/kg		88	(70%-130%)			
Bromodichloromethane	50.0			49.0	ug/kg		98	(70%-130%)			
Bromoform	50.0			48.0	ug/kg		96	(70%-130%)			
Bromomethane	50.0			51.1	ug/kg		102	(70%-130%)			
Carbon disulfide	250			198	ug/kg		79	(70%-130%)			
Carbon tetrachloride	50.0			45.7	ug/kg		91	(70%-130%)			
Chlorobenzene	50.0			44.3	ug/kg		89	(70%-130%)			
Chloroethane	50.0			47.7	ug/kg		95	(70%-130%)			
Chloroform	50.0			45.0	ug/kg		90	(70%-130%)			
Chloromethane	50.0			44.9	ug/kg		90	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
Dibromochloromethane	50.0			51.3	ug/kg		103	(70%-130%)	VXY1	07/11/17	12:57
Ethylbenzene	50.0			43.2	ug/kg		86	(70%-130%)			
Methylene chloride	50.0			41.8	ug/kg		84	(70%-130%)			
Styrene	50.0			45.5	ug/kg		91	(70%-130%)			
Tetrachloroethylene	50.0			42.7	ug/kg		85	(70%-130%)			
Toluene	50.0			46.5	ug/kg		93	(70%-130%)			
Trichloroethylene	50.0			45.8	ug/kg		92	(70%-130%)			
Vinyl chloride	50.0			48.5	ug/kg		97	(70%-130%)			
Xylenes (total)	150			132	ug/kg		88	(70%-130%)			
cis-1,3-Dichloropropylene	50.0			48.2	ug/kg		96	(70%-130%)			
trans-1,3-Dichloropropylene	50.0			49.1	ug/kg		98	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			45.3	ug/L		91	(70%-130%)			
**Bromofluorobenzene	50.0			54.2	ug/L		108	(70%-130%)			
**Toluene-d8	50.0			48.6	ug/L		97	(70%-130%)			
QC1203830996 LCS											
1,1,1-Trichloroethane	50.0			50.3	ug/kg		101	(70%-130%)		07/13/17	21:12

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QC Summary

Workorder: 427211

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
1,1,2,2-Tetrachloroethane	50.0			45.6	ug/kg		91	(70%-130%)	VXY1	07/13/17	21:12
1,1,2-Trichloroethane	50.0			45.0	ug/kg		90	(70%-130%)			
1,1-Dichloroethane	50.0			46.4	ug/kg		93	(70%-130%)			
1,1-Dichloroethylene	50.0			45.5	ug/kg		91	(70%-130%)			
1,2-Dichloroethane	50.0			45.1	ug/kg		90	(70%-130%)			
1,2-Dichloroethylene (total)	100			93.2	ug/kg		93	(70%-130%)			
1,2-Dichloropropane	50.0			45.5	ug/kg		91	(70%-130%)			
2-Butanone	250			186	ug/kg		74	(70%-130%)			
2-Hexanone	250			190	ug/kg		76	(70%-130%)			
4-Methyl-2-pentanone	250			195	ug/kg		78	(70%-130%)			
Acetone	250			212	ug/kg		85	(70%-130%)			
Benzene	50.0			45.2	ug/kg		90	(70%-130%)			
Bromodichloromethane	50.0			49.0	ug/kg		98	(70%-130%)			
Bromoform	50.0			44.7	ug/kg		89	(70%-130%)			
Bromomethane	50.0			44.2	ug/kg		88	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
Carbon disulfide	250			209	ug/kg		84	(70%-130%)	VXY1	07/13/17	21:12
Carbon tetrachloride	50.0			47.2	ug/kg		94	(70%-130%)			
Chlorobenzene	50.0			45.4	ug/kg		91	(70%-130%)			
Chloroethane	50.0			44.3	ug/kg		89	(70%-130%)			
Chloroform	50.0			47.3	ug/kg		95	(70%-130%)			
Chloromethane	50.0			39.3	ug/kg		79	(70%-130%)			
Dibromochloromethane	50.0			50.0	ug/kg		100	(70%-130%)			
Ethylbenzene	50.0			44.2	ug/kg		88	(70%-130%)			
Methylene chloride	50.0			43.8	ug/kg		88	(70%-130%)			
Styrene	50.0			46.1	ug/kg		92	(70%-130%)			
Tetrachloroethylene	50.0			44.4	ug/kg		89	(70%-130%)			
Toluene	50.0			46.9	ug/kg		94	(70%-130%)			
Trichloroethylene	50.0			46.5	ug/kg		93	(70%-130%)			
Vinyl chloride	50.0			40.7	ug/kg		81	(70%-130%)			
Xylenes (total)	150			135	ug/kg		90	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
cis-1,3-Dichloropropylene	50.0			47.0	ug/kg		94	(70%-130%)	VXY1	07/13/17	21:12
trans-1,3-Dichloropropylene	50.0			49.2	ug/kg		98	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			41.7	ug/L		83	(70%-130%)			
**Bromofluorobenzene	50.0			54.0	ug/L		108	(70%-130%)			
**Toluene-d8	50.0			46.5	ug/L		93	(70%-130%)			
QC1203828644 MB											
1,1,1-Trichloroethane			U	0.300	ug/kg					07/11/17	15:00
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg						
1,1,2-Trichloroethane			U	0.300	ug/kg						
1,1-Dichloroethane			U	0.300	ug/kg						
1,1-Dichloroethylene			U	0.300	ug/kg						
1,2-Dichloroethane			U	0.300	ug/kg						
1,2-Dichloroethylene (total)			U	0.300	ug/kg						
1,2-Dichloropropane			U	0.300	ug/kg						
2-Butanone			U	3.00	ug/kg						
2-Hexanone			U	3.00	ug/kg						

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
4-Methyl-2-pentanone			U	3.00	ug/kg				VXY1	07/11/17	15:00
Acetone			U	3.00	ug/kg						
Benzene			U	0.300	ug/kg						
Bromodichloromethane			U	0.300	ug/kg						
Bromoform			U	0.300	ug/kg						
Bromomethane			U	0.300	ug/kg						
Carbon disulfide			U	1.60	ug/kg						
Carbon tetrachloride			U	0.300	ug/kg						
Chlorobenzene			U	0.300	ug/kg						
Chloroethane			U	0.300	ug/kg						
Chloroform			U	0.300	ug/kg						
Chloromethane			U	0.300	ug/kg						
Dibromochloromethane			U	0.300	ug/kg						
Ethylbenzene			U	0.300	ug/kg						
Methylene chloride			U	1.60	ug/kg						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
Styrene			U	0.300	ug/kg				VXY1	07/11/17	15:00
Tetrachloroethylene			U	0.300	ug/kg						
Toluene			U	0.300	ug/kg						
Trichloroethylene			U	0.300	ug/kg						
Vinyl chloride			U	0.300	ug/kg						
Xylenes (total)			U	0.300	ug/kg						
cis-1,3-Dichloropropylene			U	0.300	ug/kg						
trans-1,3-Dichloropropylene			U	0.300	ug/kg						
**1,2-Dichloroethane-d4	50.0			50.1	ug/L		100	(70%-130%)			
**Bromofluorobenzene	50.0			51.1	ug/L		102	(70%-130%)			
**Toluene-d8	50.0			49.8	ug/L		100	(70%-130%)			
QC1203830995 MB											
1,1,1-Trichloroethane			U	0.300	ug/kg					07/13/17	23:15
1,1,2,2-Tetrachloroethane			U	0.300	ug/kg						
1,1,2-Trichloroethane			U	0.300	ug/kg						
1,1-Dichloroethane			U	0.300	ug/kg						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
1,1-Dichloroethylene			U	0.300	ug/kg				VXY1	07/13/17	23:15
1,2-Dichloroethane			U	0.300	ug/kg						
1,2-Dichloroethylene (total)			U	0.300	ug/kg						
1,2-Dichloropropane			U	0.300	ug/kg						
2-Butanone			U	3.00	ug/kg						
2-Hexanone			U	3.00	ug/kg						
4-Methyl-2-pentanone			U	3.00	ug/kg						
Acetone			U	3.00	ug/kg						
Benzene			U	0.300	ug/kg						
Bromodichloromethane			U	0.300	ug/kg						
Bromoform			U	0.300	ug/kg						
Bromomethane			U	0.300	ug/kg						
Carbon disulfide			U	1.60	ug/kg						
Carbon tetrachloride			U	0.300	ug/kg						
Chlorobenzene			U	0.300	ug/kg						

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
Chloroethane			U	0.300	ug/kg				VXY1	07/13/17	23:15
Chloroform			U	0.300	ug/kg						
Chloromethane			U	0.300	ug/kg						
Dibromochloromethane			U	0.300	ug/kg						
Ethylbenzene			U	0.300	ug/kg						
Methylene chloride			U	1.60	ug/kg						
Styrene			U	0.300	ug/kg						
Tetrachloroethylene			U	0.300	ug/kg						
Toluene			U	0.300	ug/kg						
Trichloroethylene			U	0.300	ug/kg						
Vinyl chloride			U	0.300	ug/kg						
Xylenes (total)			U	0.300	ug/kg						
cis-1,3-Dichloropropylene			U	0.300	ug/kg						
trans-1,3-Dichloropropylene			U	0.300	ug/kg						
**1,2-Dichloroethane-d4	50.0			44.8	ug/L		90	(70%-130%)			

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch	1681390											
**Bromofluorobenzene	50.0				49.2	ug/L		98	(70%-130%)	VXY1	07/13/17	23:15
**Toluene-d8	50.0				49.0	ug/L		98	(70%-130%)			
QC1203830997 426852001 PS												
1,1,1-Trichloroethane	50.0	U	0.00	X	49.0	ug/L		98	(70%-130%)		07/14/17	00:17
1,1,2,2-Tetrachloroethane	50.0	U	0.00	X	46.4	ug/L		93	(70%-130%)			
1,1,2-Trichloroethane	50.0	U	0.00	X	46.5	ug/L		93	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	X	48.6	ug/L		97	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	X	44.2	ug/L		88	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	X	46.0	ug/L		92	(70%-130%)			
1,2-Dichloroethylene (total)	100	U	0.00	X	90.1	ug/L		90	(70%-130%)			
1,2-Dichloropropane	50.0	U	0.00	X	45.3	ug/L		91	(70%-130%)			
2-Butanone	250	U	0.00	X	251	ug/L		101	(70%-130%)			
2-Hexanone	250	U	0.00	X	242	ug/L		97	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	X	222	ug/L		89	(70%-130%)			
Acetone	250	U	0.00	X	282	ug/L		113	(70%-130%)			
Benzene	50.0	U	0.00	X	44.0	ug/L		88	(70%-130%)			

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch	1681390											
Bromodichloromethane	50.0	U	0.00	X	50.8	ug/L		102	(70%-130%)	VXY1	07/14/17	00:17
Bromoform	50.0	U	0.00	X	44.6	ug/L		89	(70%-130%)			
Bromomethane	50.0	U	0.00	X	46.2	ug/L		92	(70%-130%)			
Carbon disulfide	250	U	0.00	X	208	ug/L		83	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	X	44.9	ug/L		90	(70%-130%)			
Chlorobenzene	50.0	U	0.00	X	42.6	ug/L		85	(70%-130%)			
Chloroethane	50.0	U	0.00	X	43.0	ug/L		86	(70%-130%)			
Chloroform	50.0	U	0.00	X	47.4	ug/L		95	(70%-130%)			
Chloromethane	50.0	U	0.00	X	41.9	ug/L		84	(70%-130%)			
Dibromochloromethane	50.0	U	0.00	X	50.4	ug/L		101	(70%-130%)			
Ethylbenzene	50.0	U	0.00	X	41.8	ug/L		84	(70%-130%)			
Methylene chloride	50.0	U	0.00	X	44.7	ug/L		89	(70%-130%)			
Styrene	50.0	U	0.00	X	42.0	ug/L		84	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	X	41.1	ug/L		82	(70%-130%)			
Toluene	50.0	U	0.00	X	44.6	ug/L		89	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
Trichloroethylene	50.0	U	0.00	X	47.5	ug/L	95	(70%-130%)	VXY1	07/14/17	00:17
Vinyl chloride	50.0	U	0.00	X	41.5	ug/L	83	(70%-130%)			
Xylenes (total)	150	U	0.00	X	122	ug/L	82	(70%-130%)			
cis-1,3-Dichloropropylene	50.0	U	0.00	X	47.9	ug/L	96	(70%-130%)			
trans-1,3-Dichloropropylene	50.0	U	0.00	X	48.7	ug/L	97	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		44.3		41.5	ug/L	83	(70%-130%)			
**Bromofluorobenzene	50.0		47.5		53.0	ug/L	106	(70%-130%)			
**Toluene-d8	50.0		48.8		45.6	ug/L	91	(70%-130%)			
QC1203830998 426852001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	X	48.8	ug/L	0	98	(0%-20%)		07/14/17 00:47
1,1,2,2-Tetrachloroethane	50.0	U	0.00	X	42.2	ug/L	10	84	(0%-20%)		
1,1,2-Trichloroethane	50.0	U	0.00	X	42.8	ug/L	8	86	(0%-20%)		
1,1-Dichloroethane	50.0	U	0.00	X	48.0	ug/L	1	96	(0%-20%)		
1,1-Dichloroethylene	50.0	U	0.00	X	43.0	ug/L	3	86	(0%-20%)		
1,2-Dichloroethane	50.0	U	0.00	X	43.4	ug/L	6	87	(0%-20%)		
1,2-Dichloroethylene (total)	100	U	0.00	X	87.9	ug/L	2	88	(0%-20%)		

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch 1681390												
1,2-Dichloropropane	50.0	U	0.00	X	42.1	ug/L	7	84	(0%-20%)	VXY1	07/14/17	00:47
2-Butanone	250	U	0.00	X	215	ug/L	16	86	(0%-20%)			
2-Hexanone	250	U	0.00	X	205	ug/L	16	82	(0%-20%)			
4-Methyl-2-pentanone	250	U	0.00	X	197	ug/L	12	79	(0%-20%)			
Acetone	250	U	0.00	X	234	ug/L	19	94	(0%-20%)			
Benzene	50.0	U	0.00	X	43.6	ug/L	1	87	(0%-20%)			
Bromodichloromethane	50.0	U	0.00	X	46.4	ug/L	9	93	(0%-20%)			
Bromoform	50.0	U	0.00	X	41.2	ug/L	8	82	(0%-20%)			
Bromomethane	50.0	U	0.00	X	44.4	ug/L	4	89	(0%-20%)			
Carbon disulfide	250	U	0.00	X	207	ug/L	0	83	(0%-20%)			
Carbon tetrachloride	50.0	U	0.00	X	44.7	ug/L	0	89	(0%-20%)			
Chlorobenzene	50.0	U	0.00	X	38.9	ug/L	9	78	(0%-20%)			
Chloroethane	50.0	U	0.00	X	43.6	ug/L	1	87	(0%-20%)			
Chloroform	50.0	U	0.00	X	45.7	ug/L	4	91	(0%-20%)			
Chloromethane	50.0	U	0.00	X	40.2	ug/L	4	80	(0%-20%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1681390										
Dibromochloromethane	50.0	U	0.00	X	46.2	ug/L	9	92	(0%-20%)	VXY1	07/14/17 00:47
Ethylbenzene	50.0	U	0.00	X	37.5	ug/L	11	75	(0%-20%)		
Methylene chloride	50.0	U	0.00	X	42.4	ug/L	5	85	(0%-20%)		
Styrene	50.0	U	0.00	X	37.5	ug/L	12	75	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00	X	36.6	ug/L	12	73	(0%-20%)		
Toluene	50.0	U	0.00	X	40.6	ug/L	9	81	(0%-20%)		
Trichloroethylene	50.0	U	0.00	X	44.6	ug/L	6	89	(0%-20%)		
Vinyl chloride	50.0	U	0.00	X	40.5	ug/L	2	81	(0%-20%)		
Xylenes (total)	150	U	0.00	X	108	ug/L	12	72	(0%-20%)		
cis-1,3-Dichloropropylene	50.0	U	0.00	X	42.9	ug/L	11	86	(0%-20%)		
trans-1,3-Dichloropropylene	50.0	U	0.00	X	45.1	ug/L	8	90	(0%-20%)		
**1,2-Dichloroethane-d4	50.0		44.3		38.7	ug/L		77	(70%-130%)		
**Bromofluorobenzene	50.0		47.5		52.0	ug/L		104	(70%-130%)		
**Toluene-d8	50.0		48.8		43.3	ug/L		87	(70%-130%)		

Notes:

The Qualifiers in this report are defined as follows:

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
A											
B											
C											
D											
E											
J											
N											
P											
T											
U											
X											
Y											
Z											
o											

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.

July 20, 2017
Surrogate Recovery Report

SDG Number: GEL427211

Matrix Type: SOLID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203828645	LCS for batch 1681389	91	97	108
1203828644	MB for batch 1681389	100	100	102
1203828978	HB for batch 1681389	90 D	99 D	91 D
427211001	B3BLD7	89 D	96 D	89 D
427211002	B3BLD9	90 D	98 D	90 D
427211003	B3BLF1	92 D	98 D	89 D
427211004	B3BLH4	90 D	99 D	90 D
1203830996	LCS for batch 1681389	83	93	108
1203830995	MB for batch 1681389	90	98	98
1203830997	B3BBC2PS	83	91	106
1203830998	B3BBC2PSD	77	87	104

Surrogate

DCED4 = 1,2-Dichloroethane-d4
 TOL = Toluene-d8
 BFB = Bromofluorobenzene

Acceptance Limits

(70%-130%)
 (70%-130%)
 (70%-130%)

* Recovery outside Acceptance Limits
 # Column to be used to flag recovery values
 D Sample Diluted

Metals Analysis

Case Narrative

July 20, 2017

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL427211

Work Order #: 427211

Product: Determination of Metals by ICP

Analytical Method: SW846 3010A/6010D

Analytical Procedure: GL-MA-E-013 REV# 28

Analytical Batch: 1680395

Preparation Method: SW846 3010A

Preparation Procedure: GL-MA-E-008 REV# 18

Preparation Batch: 1680394

TCLP Preparation Method: SW846 1311

TCLP Preparation Procedure: GL-LB-E-006 REV# 20

TCLP Preparation Batch: 1680113

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203825431	Tumble Blank (TB)
1203826089	Method Blank (MB)ICP
1203826090	Laboratory Control Sample (LCS)
1203826093	427211001(B3BLD7L) Serial Dilution (SD)
1203826091	427211001(B3BLD7D) Sample Duplicate (DUP)
1203825430	427211001(B3BLD7S) Matrix Spike (MS)

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

Preparation Information

The samples and associated matrix QC were prepared at a ten times or greater dilution factor to minimize potential interferences arising from the high sodium content in the TCLP leaching solution.

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.

July 20, 2017

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL427211 GEL Work Order: 427211

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: Nik-Cole Elmore

Date: 14 JUL 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL427211

CONTRACT: CPRC0F17048

METHOD TYPE: SW846

SAMPLE ID: 427211001

BASIS: As Received

DATE COLLECTED 28-JUN-17

CLIENT ID: B3BLD7

LEVEL: Low

DATE RECEIVED 06-JUL-17

MATRIX: OTHER SOLID

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	35	ug/L	U	35	100	100	1	P	HSC	07/07/17 15:25	070717-1	1680395
7440-38-2	Arsenic	50	ug/L	U	50	300	300	1	P	HSC	07/07/17 15:25	070717-1	1680395
7440-39-3	Barium	21.7	ug/L	B	10	50	50	1	P	HSC	07/07/17 15:25	070717-1	1680395
7440-41-7	Beryllium	10	ug/L	U	10	50	50	1	P	HSC	07/07/17 15:25	070717-1	1680395
7440-43-9	Cadmium	10	ug/L	U	10	50	50	1	P	HSC	07/07/17 15:25	070717-1	1680395
7440-47-3	Chromium	9480	ug/L		10	50	50	1	P	HSC	07/07/17 15:25	070717-1	1680395
7439-92-1	Lead	33	ug/L	U	33	100	100	1	P	HSC	07/12/17 12:13	071217-2	1680395
7440-02-0	Nickel	19.7	ug/L	B	15	50	50	1	P	HSC	07/07/17 15:25	070717-1	1680395
7440-28-0	Thallium	50	ug/L	U	50	200	200	1	P	HSC	07/12/17 12:13	071217-2	1680395
7440-61-1	Uranium	717	ug/L		100	500	500	1	P	HSC	07/12/17 12:13	071217-2	1680395
7440-62-2	Vanadium	3060	ug/L		10	50	50	1	P	HSC	07/07/17 15:25	070717-1	1680395
7440-66-6	Zinc	88.9	ug/L	B	33	100	100	1	P	HSC	07/07/17 15:25	070717-1	1680395

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1680395	1680394	SW846 3010A	5	mL	50	mL	07/07/17	SXW1

***Analytical Methods:**

P SW846 3010A/6010D

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL427211

CONTRACT: CPRC0F17048

METHOD TYPE: SW846

SAMPLE ID: 427211002

BASIS: As Received

DATE COLLECTED 28-JUN-17

CLIENT ID: B3BLD9

LEVEL: Low

DATE RECEIVED 06-JUL-17

MATRIX: OTHER SOLID

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	35	ug/L	U	35	100	100	1	P	HSC	07/07/17 15:38	070717-1	1680395
7440-38-2	Arsenic	50	ug/L	U	50	300	300	1	P	HSC	07/07/17 15:38	070717-1	1680395
7440-39-3	Barium	12.9	ug/L	B	10	50	50	1	P	HSC	07/07/17 15:38	070717-1	1680395
7440-41-7	Beryllium	10	ug/L	U	10	50	50	1	P	HSC	07/07/17 15:38	070717-1	1680395
7440-43-9	Cadmium	10	ug/L	U	10	50	50	1	P	HSC	07/07/17 15:38	070717-1	1680395
7440-47-3	Chromium	6100	ug/L		10	50	50	1	P	HSC	07/07/17 15:38	070717-1	1680395
7439-92-1	Lead	33	ug/L	U	33	100	100	1	P	HSC	07/12/17 12:04	071217-2	1680395
7440-02-0	Nickel	15	ug/L	U	15	50	50	1	P	HSC	07/07/17 15:38	070717-1	1680395
7440-28-0	Thallium	50	ug/L	U	50	200	200	1	P	HSC	07/12/17 12:04	071217-2	1680395
7440-61-1	Uranium	964	ug/L		100	500	500	1	P	HSC	07/12/17 12:04	071217-2	1680395
7440-62-2	Vanadium	2620	ug/L		10	50	50	1	P	HSC	07/07/17 15:38	070717-1	1680395
7440-66-6	Zinc	33	ug/L	U	33	100	100	1	P	HSC	07/07/17 15:38	070717-1	1680395

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1680395	1680394	SW846 3010A	5	mL	50	mL	07/07/17	SXW1

***Analytical Methods:**

P SW846 3010A/6010D

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL427211

CONTRACT: CPRC0F17048

METHOD TYPE: SW846

SAMPLE ID: 427211003

BASIS: As Received

DATE COLLECTED 28-JUN-17

CLIENT ID: B3BLF1

LEVEL: Low

DATE RECEIVED 06-JUL-17

MATRIX: OTHER SOLID

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	35	ug/L	U	35	100	100	1	P	HSC	07/07/17 15:41	070717-1	1680395
7440-38-2	Arsenic	50	ug/L	U	50	300	300	1	P	HSC	07/07/17 15:41	070717-1	1680395
7440-39-3	Barium	21.7	ug/L	B	10	50	50	1	P	HSC	07/07/17 15:41	070717-1	1680395
7440-41-7	Beryllium	10	ug/L	U	10	50	50	1	P	HSC	07/07/17 15:41	070717-1	1680395
7440-43-9	Cadmium	10	ug/L	U	10	50	50	1	P	HSC	07/07/17 15:41	070717-1	1680395
7440-47-3	Chromium	3330	ug/L		10	50	50	1	P	HSC	07/07/17 15:41	070717-1	1680395
7439-92-1	Lead	33	ug/L	U	33	100	100	1	P	HSC	07/12/17 12:07	071217-2	1680395
7440-02-0	Nickel	15	ug/L	U	15	50	50	1	P	HSC	07/07/17 15:41	070717-1	1680395
7440-28-0	Thallium	50	ug/L	U	50	200	200	1	P	HSC	07/12/17 12:07	071217-2	1680395
7440-61-1	Uranium	548	ug/L		100	500	500	1	P	HSC	07/12/17 12:07	071217-2	1680395
7440-62-2	Vanadium	1190	ug/L		10	50	50	1	P	HSC	07/07/17 15:41	070717-1	1680395
7440-66-6	Zinc	33	ug/L	U	33	100	100	1	P	HSC	07/07/17 15:41	070717-1	1680395

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1680395	1680394	SW846 3010A	5	mL	50	mL	07/07/17	SXW1

***Analytical Methods:**

P SW846 3010A/6010D

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL427211

CONTRACT: CPRC0F17048

METHOD TYPE: SW846

SAMPLE ID:427211004

BASIS: As Received

DATE COLLECTED 28-JUN-17

CLIENT ID: B3BLH4

LEVEL: Low

DATE RECEIVED 06-JUL-17

MATRIX: OTHER SOLID

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	35	ug/L	U	35	100	100	1	P	HSC	07/07/17 15:44	070717-1	1680395
7440-38-2	Arsenic	50	ug/L	U	50	300	300	1	P	HSC	07/07/17 15:44	070717-1	1680395
7440-39-3	Barium	13.4	ug/L	B	10	50	50	1	P	HSC	07/07/17 15:44	070717-1	1680395
7440-41-7	Beryllium	10	ug/L	U	10	50	50	1	P	HSC	07/07/17 15:44	070717-1	1680395
7440-43-9	Cadmium	10	ug/L	U	10	50	50	1	P	HSC	07/07/17 15:44	070717-1	1680395
7440-47-3	Chromium	1260	ug/L		10	50	50	1	P	HSC	07/07/17 15:44	070717-1	1680395
7439-92-1	Lead	33	ug/L	U	33	100	100	1	P	HSC	07/12/17 12:10	071217-2	1680395
7440-02-0	Nickel	15	ug/L	U	15	50	50	1	P	HSC	07/07/17 15:44	070717-1	1680395
7440-28-0	Thallium	50	ug/L	U	50	200	200	1	P	HSC	07/12/17 12:10	071217-2	1680395
7440-61-1	Uranium	448	ug/L	B	100	500	500	1	P	HSC	07/12/17 12:10	071217-2	1680395
7440-62-2	Vanadium	1130	ug/L		10	50	50	1	P	HSC	07/07/17 15:44	070717-1	1680395
7440-66-6	Zinc	33	ug/L	U	33	100	100	1	P	HSC	07/07/17 15:44	070717-1	1680395

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1680395	1680394	SW846 3010A	5	mL	50	mL	07/07/17	SXW1

***Analytical Methods:**

P SW846 3010A/6010D

Quality Control Summary

July 20, 2017

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 14, 2017

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 427211

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1680395										
QC1203826091 427211001 DUP											
Antimony	U	35.0	U	35.0	ug/L	N/A			HSC	07/07/17	15:28
Arsenic	U	50.0	U	50.0	ug/L	N/A					
Barium	B	21.7	B	23.5	ug/L	8.08 ^		(+/-50.0)			
Beryllium	U	10.0	U	10.0	ug/L	N/A					
Cadmium	U	10.0	U	10.0	ug/L	N/A					
Chromium		9480		9960	ug/L	4.96		(0%-20%)			
Lead	B	-34	U	33.0	ug/L	29.1 ^		(+/-100)		07/12/17	12:17
Nickel	B	19.7	B	18.8	ug/L	4.64 ^		(+/-50.0)		07/07/17	15:28
Thallium	U	50.0	U	50.0	ug/L	N/A				07/12/17	12:17
Uranium		717		657	ug/L	8.66 ^		(+/-500)			
Vanadium		3060		3220	ug/L	5.05		(0%-20%)		07/07/17	15:28
Zinc	B	88.9	B	68.8	ug/L	25.5 ^		(+/-100)			
QC1203826090 LCS											
Antimony		5000		5030	ug/L		101	(80%-120%)		07/07/17	15:22

July 20, 2017

GEL LABORATORIES LLC

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

QC Summary

Workorder: 427211

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1680395										
Arsenic	5000			4980	ug/L		99.6	(80%-120%)	HSC	07/07/17	15:22
Barium	5000			5140	ug/L		103	(80%-120%)			
Beryllium	5000			5000	ug/L		100	(80%-120%)			
Cadmium	5000			5000	ug/L		100	(80%-120%)			
Chromium	5000			5060	ug/L		101	(80%-120%)			
Lead	5000			5040	ug/L		101	(80%-120%)		07/12/17	12:01
Nickel	5000			5210	ug/L		104	(80%-120%)		07/07/17	15:22
Thallium	5000			4920	ug/L		98.3	(80%-120%)		07/12/17	12:01
Uranium	5000			4840	ug/L		96.8	(80%-120%)			
Vanadium	5000			5110	ug/L		102	(80%-120%)		07/07/17	15:22
Zinc	5000			4830	ug/L		96.7	(80%-120%)			
QC1203826089	MB										
Antimony			U	35.0	ug/L					07/07/17	15:16
Arsenic			U	50.0	ug/L						
Barium			U	10.0	ug/L						
Beryllium			U	10.0	ug/L						

July 20, 2017

GEL LABORATORIES LLC

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

QC Summary

Workorder: 427211

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1680395										
Cadmium			U	10.0	ug/L				HSC	07/07/17	15:16
Chromium			U	10.0	ug/L						
Lead			U	33.0	ug/L					07/12/17	11:55
Nickel			U	15.0	ug/L					07/07/17	15:16
Thallium			U	50.0	ug/L					07/12/17	11:55
Uranium			U	100	ug/L						
Vanadium			U	10.0	ug/L					07/07/17	15:16
Zinc			U	33.0	ug/L						
QC1203825430 427211001 MS											
Antimony	2000	U	35.0	1940	ug/L		96.9	(75%-125%)		07/07/17	15:32
Arsenic	5000	U	50.0	4990	ug/L		99.7	(75%-125%)			
Barium	10000	B	21.7	9750	ug/L		97.3	(75%-125%)			
Beryllium	2000	U	10.0	1940	ug/L		97.1	(75%-125%)			
Cadmium	1000	U	10.0	922	ug/L		92.2	(75%-125%)			
Chromium	5000		9480	14500	ug/L		101	(75%-125%)			
Lead	5000	B	-34	4800	ug/L		96.1	(75%-125%)		07/12/17	12:20

July 20, 2017

GEL LABORATORIES LLC

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

QC Summary

Workorder: 427211

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1680395										
Nickel	2000	B	19.7	1920	ug/L		95.1	(75%-125%)	HSC	07/07/17	15:32
Thallium	2000	U	50.0	1880	ug/L		92.4	(75%-125%)		07/12/17	12:20
Uranium	1000		717	1910	ug/L		119	(75%-125%)			
Vanadium	2000		3060	5120	ug/L		103	(75%-125%)		07/07/17	15:32
Zinc	2000	B	88.9	2010	ug/L		96.3	(75%-125%)			
QC1203826093 427211001 SDILT											
Antimony		U	-0.891	BD	-4.79	ug/L	N/A	(0%-20%)		07/07/17	15:35
Arsenic		U	0.339	DU	250	ug/L	N/A	(0%-20%)			
Barium		B	2.17	DU	50.0	ug/L	N/A	(0%-20%)			
Beryllium		U	-0.36	DU	50.0	ug/L	N/A	(0%-20%)			
Cadmium		U	-0.361	DU	50.0	ug/L	N/A	(0%-20%)			
Chromium			948	D	183	ug/L	3.38	(0%-20%)			
Lead		B	-3.4	DU	165	ug/L	N/A	(0%-20%)		07/12/17	12:23
Nickel		B	1.97	DU	75.0	ug/L	N/A	(0%-20%)		07/07/17	15:35
Thallium		U	2.72	DU	250	ug/L	N/A	(0%-20%)		07/12/17	12:23
Uranium			71.7	BD	16.6	ug/L	15.9	(0%-20%)			

July 20, 2017

GEL LABORATORIES LLC

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QC Summary

Workorder: 427211

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1680395										
Vanadium		306	D	59.7	ug/L	2.5		(0%-20%)	HSC	07/07/17	15:35
Zinc	B	8.89	BD	6.31	ug/L	255		(0%-20%)			
QC1203825431	TB										
Antimony			U	35.0	ug/L					07/07/17	15:19
Arsenic			B	-56.1	ug/L						
Barium			U	10.0	ug/L						
Beryllium			U	10.0	ug/L						
Cadmium			U	10.0	ug/L						
Chromium			U	10.0	ug/L						
Lead			U	33.0	ug/L					07/12/17	11:58
Nickel			U	15.0	ug/L					07/07/17	15:19
Thallium			U	50.0	ug/L					07/12/17	11:58
Uranium			U	100	ug/L						
Vanadium			U	10.0	ug/L					07/07/17	15:19
Zinc			U	33.0	ug/L						

Notes:

The Qualifiers in this report are defined as follows:

July 20, 2017

GEL LABORATORIES LLC

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

QC Summary

Workorder: 427211

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
*	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 >= 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 #: GEL427211
 Work Order #: 427211**

Product: Cyanide, Total

Analytical Method: 9012_CYANIDE

Analytical Procedure: GL-GC-E-095 REV# 20

Analytical Batches: 1680116 and 1680115

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203825433	Method Blank (MB)
1203825434	Laboratory Control Sample (LCS)
1203825435	427211001(B3BLD7) Sample Duplicate (DUP)
1203825436	427211001(B3BLD7) Matrix Spike (MS)

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 1203825434 (LCS), 1203825435 (B3BLD7DUP), 1203825436 (B3BLD7MS), 427211001 (B3BLD7), 427211002 (B3BLD9) and 427211003 (B3BLF1) 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	427211		
	001	002	003
Cyanide, Total	5X	5X	5X

Product: Ion Chromatography

Analytical Method: 300.0_ANIONS_IC

Analytical Procedure: GL-GC-E-086 REV# 25

Analytical Batch: 1681516

Preparation Method: EPA 300.0 PREP

Preparation Procedure: GL-GC-E-086 REV# 25

Preparation Batch: 1681515

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203828932	Method Blank (MB)
1203828933	Laboratory Control Sample (LCS)
1203828934	427211004(B3BLH4) Sample Duplicate (DUP)
1203828935	427211004(B3BLH4) Matrix Spike (MS)

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

Data Summary:

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

Quality Control (QC) Information

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

Analyte	Sample	Value
Nitrate	1203828935 (B3BLH4MS)	50* (75%-125%)

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.

July 20, 2017

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: GEL427211 GEL Work Order: 427211

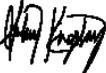
The Qualifiers in this report are defined as follows:

- 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.

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: Aubrey Kingsbury

Date: 19 JUL 2017

Title: Analyst I

Sample Data Summary

Certificate of Analysis

Report Date: July 19, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-048

Client Sample ID: B3BLD7	Project: CPRC0F17048
Sample ID: 427211001	Client ID: CPRC001
Matrix: OTHER SOLID	
Collect Date: 28-JUN-17 11:30	
Receive Date: 06-JUL-17	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9010_CYANIDE: COMMON "As Received"												
Cyanide, Total	D	19800	380	1140	ug/kg	45.5	5	AXH3	07/11/17	1303	1680116	1
Ion Chromatography												
300.0_ANIONS_IC: COMMON "As Received"												
Nitrate-N	N	11300	329	998	ug/kg	9.98	1	MAR1	07/17/17	1219	1681516	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 300.0 PREP	EPA 300.0 Total Anions in Soil	MAR1	07/17/17	0805	1681515
SW846 9010C Distillation	SW846 9010C Prep	AXH3	07/11/17	1014	1680115

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
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

Certificate of Analysis

Report Date: July 19, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-048

Client Sample ID: B3BLD9	Project: CPRC0F17048
Sample ID: 427211002	Client ID: CPRC001
Matrix: OTHER SOLID	
Collect Date: 28-JUN-17 11:49	
Receive Date: 06-JUL-17	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9010_CYANIDE: COMMON "As Received"												
Cyanide, Total	D	15400	380	1140	ug/kg	45.5	5	AXH3	07/11/17	1332	1680116	1
Ion Chromatography												
300.0_ANIONS_IC: COMMON "As Received"												
Nitrate-N	N	13800	328	995	ug/kg	9.95	1	MAR1	07/17/17	1248	1681516	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 300.0 PREP	EPA 300.0 Total Anions in Soil	MAR1	07/17/17	0805	1681515
SW846 9010C Distillation	SW846 9010C Prep	AXH3	07/11/17	1014	1680115

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
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

Certificate of Analysis

Report Date: July 19, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-048

Client Sample ID: B3BLF1	Project: CPRC0F17048
Sample ID: 427211003	Client ID: CPRC001
Matrix: OTHER SOLID	
Collect Date: 28-JUN-17 12:06	
Receive Date: 06-JUL-17	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9010_CYANIDE: COMMON "As Received"												
Cyanide, Total	D	32800	360	1080	ug/kg	43.1	5	AXH3	07/11/17	1333	1680116	1
Ion Chromatography												
300.0_ANIONS_IC: COMMON "As Received"												
Nitrate-N	N	10900	328	993	ug/kg	9.93	1	MAR1	07/17/17	1317	1681516	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 300.0 PREP	EPA 300.0 Total Anions in Soil	MAR1	07/17/17	0805	1681515
SW846 9010C Distillation	SW846 9010C Prep	AXH3	07/11/17	1014	1680115

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
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

Certificate of Analysis

Report Date: July 19, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-048

Client Sample ID: B3BLH4	Project: CPRC0F17048
Sample ID: 427211004	Client ID: CPRC001
Matrix: OTHER SOLID	
Collect Date: 28-JUN-17 12:28	
Receive Date: 06-JUL-17	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9010_CYANIDE: COMMON "As Received"												
Cyanide, Total		8980	77.3	231	ug/kg	46.3	1	AXH3	07/11/17	1308	1680116	1
Ion Chromatography												
300.0_ANIONS_IC: COMMON "As Received"												
Nitrate-N	N	9270	328	993	ug/kg	9.93	1	MAR1	07/17/17	1346	1681516	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 300.0 PREP	EPA 300.0 Total Anions in Soil	MAR1	07/17/17	0805	1681515
SW846 9010C Distillation	SW846 9010C Prep	AXH3	07/11/17	1014	1680115

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
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

July 20, 2017

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 19, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 427211

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

Flow Injection Analysis

Batch	1680116										
QC1203825435	427211001	DUP									
Cyanide, Total		D	19800	D	25200	ug/kg	24.3	(0%-35%)	AXH3	07/11/17	13:04
QC1203825434	LCS										
Cyanide, Total	108000			D	92700	ug/kg		85.8	(80%-120%)		07/11/17 12:56
QC1203825433	MB										
Cyanide, Total				U	83.5	ug/kg					07/11/17 12:54
QC1203825436	427211001	MS									
Cyanide, Total	4170	D	19800	D	28500	ug/kg		N/A	(75%-125%)		07/11/17 13:05

Ion Chromatography

Batch	1681516										
QC1203828934	427211004	DUP									
Nitrate-N		N	9270		9210	ug/kg	0.58	(0%-35%)	MAR1	07/17/17	14:15
QC1203828933	LCS										
Nitrate-N	25000				23300	ug/kg		93.3	(80%-120%)		07/17/17 11:50
QC1203828932	MB										
Nitrate-N				U	330	ug/kg					07/17/17 11:22
QC1203828935	427211004	MS									
Nitrate-N	24800	N	9270	N	21600	ug/kg		50*	(75%-125%)		07/17/17 14:43

Notes:

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

July 20, 2017

GEL LABORATORIES LLC

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

QC Summary

Workorder: 427211

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

July 20, 2017

Radiochemistry

Technical Case Narrative

CH2M Hill Plateau Remediation Company (CPRC)

SDG #: GEL427211

Work Order #: 427211

Product: UISO_IE_PRECIP_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

Analytical Procedure: GL-RAD-A-011 REV# 26

Analytical Batch: 1681706

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 21

Preparation Batch: 1680072

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203829460	Method Blank (MB)
1203829461	427211001(B3BLD7) Sample Duplicate (DUP)
1203829462	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Quality Control (QC) Information

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: Refer to Miscellaneous Information section.

RDL Met

The blank, 1203829460 (MB), did not meet the detection limit for U-238, U-233/234, U-235/236 due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

Technical Information

Sample Re-prep/Re-analysis

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

Recounts

Sample 1203829462 (LCS) was recounted due to high carrier/tracer yield. The recount is reported.

Miscellaneous Information

1. The QC Sample and Duplicate, 427211001 and 1203829461, did not meet the duplication criteria for U-238, U233/234, and U-235/236 due to the extremely small aliquot size used not being a true representative of the samples. The aliquots were reduced on the reanalysis due to the high levels of activity in the samples. 1. The sample aliquots were reduced due to high activity. The samples were misc. solid and were not homogeneous. Reporting results.

Product: Dry Weight

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 21

Preparation Batch: 1680072

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4

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: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 18

Analytical Batch: 1680834

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 21

Preparation Batch: 1680072

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203827175	Method Blank (MB)
1203827176	427211004(B3BLH4) Sample Duplicate (DUP)

July 20, 2017

1203827177

Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Quality Control (QC) Information

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203827176 (B3BLH4DUP) and 427211004 (B3BLH4) , did not meet the relative error ratio requirement; however, both results are less than MDA.

Product: 9310_ALPHABETA_GPC: COMMON

Analytical Method: 9310_ALPHABETA_GPC

Analytical Procedure: GL-RAD-A-001B REV# 18

Analytical Batch: 1682260

Preparation Method: Dry Soil Prep

Preparation Procedure: GL-RAD-A-021 REV# 21

Preparation Batch: 1680072

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203830814	Method Blank (MB)
1203830815	427211004(B3BLH4) Sample Duplicate (DUP)
1203830816	427211004(B3BLH4) Matrix Spike (MS)
1203830817	427211004(B3BLH4) Matrix Spike Duplicate (MSD)
1203830818	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Quality Control (QC) Information

QC Information

July 20, 2017

All of the QC samples meet the required acceptance limits with the following exceptions: The matrix spike and matrix spike duplicate, 1203830816 (B3BLH4MS) and 1203830817 (B3BLH4MSD), did not meet the alpha recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

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

Samples 1203830817 (B3BLH4MSD) and 1203830818 (LCS) were recounted due to high recovery. The recounts are reported.

Product: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

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

Analytical Batch: 1680562

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203826496	Method Blank (MB)
1203826497	427211001(B3BLD7) Sample Duplicate (DUP)
1203826498	Laboratory Control Sample (LCS)

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

Data Summary:

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

Quality Control (QC) Information

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203826497 (B3BLD7DUP) and 427211001 (B3BLD7), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with a value of 1.8862.

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1680565

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203826503	Method Blank (MB)
1203826504	427211001(B3BLD7) Sample Duplicate (DUP)
1203826505	427211001(B3BLD7) Matrix Spike (MS)
1203826506	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

Analytical Procedure: GL-RAD-A-003 REV# 15

Analytical Batch: 1680569

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427211001	B3BLD7
427211002	B3BLD9
427211003	B3BLF1
427211004	B3BLH4
1203826520	Method Blank (MB)
1203826521	427211001(B3BLD7) Sample Duplicate (DUP)
1203826522	427211001(B3BLD7) Matrix Spike (MS)
1203826523	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

July 20, 2017

applicable, with the following exceptions.

Miscellaneous Information

Additional Comments

The matrix spike, 1203826522 (B3BLD7MS), 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.

July 20, 2017

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL427211 GEL Work Order: 427211

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: 19 JUL 2017

Title: Analyst II

Sample Data Summary

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211001	Date Collected: 06/28/2017 11:30	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 64.9
Client ID: B3BLD7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681706	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/13/2017 08:51	Analyst: BXA4	Instrument: 1004
Data File: S0427211001_UU.2A.gcnf	Aliquot: 0.005 g	Count Time: 240 min
Prep Batch: 1681706	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		1000	pCi/g	+/-81.5	172	12.7	1.00
15117-96-1/13982-7	Uranium-235/236		31.2	pCi/g	+/-16.7	17.3	10.2	1.00
7440-61-1	Uranium-238		789	pCi/g	+/-72.2	139	9.49	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	315	421	pCi/g	74.8	(30%-105%)

Comments:

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

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211001	Date Collected: 06/28/2017 11:30	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 64.9
Client ID: B3BLD7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1680834	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 07/11/2017 14:30	Analyst: MYM1	Instrument: PIC11A
Data File: S1680834.xls	Aliquot: 0.301 g	Count Time: 60 min
Prep Batch: 1680834	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/10/2017 14:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	1.17	pCi/g	+/-0.807	0.860	1.22	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.50	7.75	mg	96.8	(40%-110%)

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211001	Date Collected: 06/28/2017 11:30	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 64.9
Client ID: B3BLD7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1682260	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001B
Run Date: 07/14/2017 15:37	Analyst: LXB3	Instrument: PIC11A
Data File: AB1682260r1.xls	Aliquot: 0.105 g	Count Time: 60 min
Prep Batch: 1682260	Prep Method: EPA 900.0/SW846 9310/SM 71	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 09:13		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA		1680	pCi/g	+/-41.2	326	3.63	5.00
12587-47-2	Beta BETA		1540	pCi/g	+/-30.1	228	3.08	10.0

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211001	Date Collected: 06/28/2017 11:30	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 64.9
Client ID: B3BLD7		Prep Basis: "As Received"
Batch ID: 1680562	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/19/2017 04:44	Analyst: CXS7	Instrument: LSCBROWN
Data File: E1680562.xls	Aliquot: 1.209 g	Count Time: 15 min
Prep Batch: 1680562	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 07/13/2017 15:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		36.7	pCi/g	+/-4.29	6.01	5.14	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.72E+05	4.17E+05	CPM	89.2	(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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211001	Date Collected: 06/28/2017 11:30	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 64.9
Client ID: B3BLD7		Prep Basis: "As Received"
Batch ID: 1680565	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 07/10/2017 15:24	Analyst: BXM4	Instrument: LSCSILVER
Data File: T1680565.xls	Aliquot: 1.253 g	Count Time: 20 min
Prep Batch: 1680565	Prep Method: EPA 906.0 Modified	
Prep Date: 07/10/2017 09:40		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	2.27	pCi/g	+/-11.3	11.3	20.1	30.0

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211001	Date Collected: 06/28/2017 11:30	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 64.9
Client ID: B3BLD7		Prep Basis: "As Received"
Batch ID: 1680569	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 07/12/2017 18:22	Analyst: TXJ1	Instrument: LSCRED
Data File: C1680569.xls	Aliquot: 0.512 g	Count Time: 45 min
Prep Batch: 1680569	Prep Method: EPA EERF C-01 Modified	
Prep Date: 07/12/2017 10:15		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		34.8	pCi/g	+/-2.68	3.71	3.15	5.00

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211002	Date Collected: 06/28/2017 11:49	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 75.2
Client ID: B3BLD9		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681706	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/13/2017 08:51	Analyst: BXA4	Instrument: 1005
Data File: S0427211002_UU.2A.gcnf	Aliquot: 0.005 g	Count Time: 240 min
Prep Batch: 1681706	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		1090	pCi/g	+/-77.5	172	8.76	1.00
15117-96-1/13982-7	Uranium-235/236		35.5	pCi/g	+/-15.9	16.7	5.32	1.00
7440-61-1	Uranium-238		834	pCi/g	+/-67.9	136	8.76	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	372	421	pCi/g	88.5	(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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211002	Date Collected: 06/28/2017 11:49	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 75.2
Client ID: B3BLD9		Prep Basis: "Dry Weight Corrected"
Batch ID: 1680834	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 07/11/2017 14:30	Analyst: MYM1	Instrument: PIC11B
Data File: S1680834.xls	Aliquot: 0.317 g	Count Time: 60 min
Prep Batch: 1680834	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/10/2017 14:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.877	pCi/g	+/-0.814	0.843	1.32	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.10	7.75	mg	91.6	(40%-110%)

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211
Lab Sample ID: 427211002

Client: CPRC001
Date Collected: 06/28/2017 11:49
Date Received: 07/06/2017 08:50

Project: CPRC0F17048
Matrix: OTHER SOLID
%Moisture: 75.2

Client ID: B3BLD9
Batch ID: 1682260
Run Date: 07/14/2017 15:37
Data File: AB1682260r1.xls
Prep Batch: 1682260
Prep Date: 07/14/2017 09:13

Method: 9310_ALPHABETA_GPC
Analyst: LXB3
Aliquot: 0.1 g
Prep Method: EPA 900.0/SW846 9310/SM 71

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-001B
Instrument: PIC11B
Count Time: 60 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA		2050	pCi/g	+/-45.7	377	3.66	5.00
12587-47-2	Beta BETA		1860	pCi/g	+/-33.3	242	3.48	10.0

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211002	Date Collected: 06/28/2017 11:49	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 75.2
Client ID: B3BLD9		Prep Basis: "As Received"
Batch ID: 1680562	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/19/2017 05:05	Analyst: CXS7	Instrument: LSCBROWN
Data File: E1680562.xls	Aliquot: 1.215 g	Count Time: 15 min
Prep Batch: 1680562	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 07/13/2017 15:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		16.9	pCi/g	+/-3.26	3.79	4.52	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.49E+05	4.17E+05	CPM	83.7	(30%-105%)

Comments:

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

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211002	Date Collected: 06/28/2017 11:49	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 75.2
Client ID: B3BLD9		Prep Basis: "As Received"
Batch ID: 1680565	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 07/10/2017 15:46	Analyst: BXM4	Instrument: LSCSILVER
Data File: T1680565.xls	Aliquot: 1.259 g	Count Time: 20 min
Prep Batch: 1680565	Prep Method: EPA 906.0 Modified	
Prep Date: 07/10/2017 09:40		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	7.66	pCi/g	+/-11.8	11.9	20.2	30.0

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211002	Date Collected: 06/28/2017 11:49	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 75.2
Client ID: B3BLD9		Prep Basis: "As Received"
Batch ID: 1680569	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 07/12/2017 19:08	Analyst: TXJ1	Instrument: LSCRED
Data File: C1680569.xls	Aliquot: 0.502 g	Count Time: 45 min
Prep Batch: 1680569	Prep Method: EPA EERF C-01 Modified	
Prep Date: 07/12/2017 10:15		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		28.8	pCi/g	+/-2.59	3.35	3.21	5.00

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211003	Date Collected: 06/28/2017 12:06	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 73.8
Client ID: B3BLF1		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681706	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/13/2017 08:51	Analyst: BXA4	Instrument: 1006
Data File: S0427211003_UU.2A.gcnf	Aliquot: 0.005 g	Count Time: 240 min
Prep Batch: 1681706	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		1190	pCi/g	+/-83.2	191	7.22	1.00
15117-96-1/13982-7	Uranium-235/236		46.6	pCi/g	+/-18.6	19.8	5.59	1.00
7440-61-1	Uranium-238		936	pCi/g	+/-73.7	153	9.20	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	398	421	pCi/g	94.6	(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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211003	Date Collected: 06/28/2017 12:06	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 73.8
Client ID: B3BLF1	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "Dry Weight Corrected"
Batch ID: 1680834	Analyst: MYM1	SOP Ref: GL-RAD-A-004
Run Date: 07/11/2017 14:30	Aliquot: 0.316 g	Instrument: PIC12A
Data File: S1680834.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1680834		Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/10/2017 14:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	1.06	pCi/g	+/-0.893	0.934	1.43	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.50	7.75	mg	96.8	(40%-110%)

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211003	Date Collected: 06/28/2017 12:06	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 73.8
Client ID: B3BLF1		Prep Basis: "Dry Weight Corrected"
Batch ID: 1682260	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001B
Run Date: 07/14/2017 15:37	Analyst: LXB3	Instrument: PIC11C
Data File: AB1682260r1.xls	Aliquot: 0.104 g	Count Time: 60 min
Prep Batch: 1682260	Prep Method: EPA 900.0/SW846 9310/SM 71	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 09:13		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA		1510	pCi/g	+/-39.6	295	2.56	5.00
12587-47-2	Beta BETA		1420	pCi/g	+/-29.2	210	5.52	10.0

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211003	Date Collected: 06/28/2017 12:06	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 73.8
Client ID: B3BLF1		Prep Basis: "As Received"
Batch ID: 1680562	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/19/2017 05:27	Analyst: CXS7	Instrument: LSCBROWN
Data File: E1680562.xls	Aliquot: 1.206 g	Count Time: 15 min
Prep Batch: 1680562	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 07/13/2017 15:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		18.4	pCi/g	+/-3.59	4.17	5.00	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.36E+05	4.17E+05	CPM	80.7	(30%-105%)

Comments:

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

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211003	Date Collected: 06/28/2017 12:06	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 73.8
Client ID: B3BLF1	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1680565	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 07/10/2017 16:07	Aliquot: 1.253 g	Instrument: LSCSILVER
Data File: T1680565.xls	Prep Method: EPA 906.0 Modified	Count Time: 20 min
Prep Batch: 1680565		
Prep Date: 07/10/2017 09:40		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-0.825	pCi/g	+/-11.4	11.4	20.7	30.0

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211003	Date Collected: 06/28/2017 12:06	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 73.8
Client ID: B3BLF1		Prep Basis: "As Received"
Batch ID: 1680569	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 07/12/2017 19:55	Analyst: TXJ1	Instrument: LSCRED
Data File: C1680569.xls	Aliquot: 0.503 g	Count Time: 45 min
Prep Batch: 1680569	Prep Method: EPA EERF C-01 Modified	
Prep Date: 07/12/2017 10:15		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		39.3	pCi/g	+/-2.80	4.04	3.21	5.00

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211004	Date Collected: 06/28/2017 12:28	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 69.5
Client ID: B3BLH4		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681706	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/13/2017 08:51	Analyst: BXA4	Instrument: 1007
Data File: S0427211004_UU.2B.gcnf	Aliquot: 0.005 g	Count Time: 239.9998 min
Prep Batch: 1681706	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		754	pCi/g	+/-64.7	125	4.33	1.00
15117-96-1/13982-7	Uranium-235/236		25.0	pCi/g	+/-13.6	14.0	5.36	1.00
7440-61-1	Uranium-238		627	pCi/g	+/-59.1	107	8.82	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	407	421	pCi/g	96.8	(30%-105%)

Comments:

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

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211004	Date Collected: 06/28/2017 12:28	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 69.5
Client ID: B3BLH4		Prep Basis: "Dry Weight Corrected"
Batch ID: 1680834	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 07/11/2017 14:30	Analyst: MYM1	Instrument: PIC12B
Data File: S1680834.xls	Aliquot: 0.308 g	Count Time: 60 min
Prep Batch: 1680834	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/10/2017 14:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.993	pCi/g	+/-0.783	0.783	1.71	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.30	7.75	mg	94.2	(40%-110%)

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211
Lab Sample ID: 427211004

Client: CPRC001
Date Collected: 06/28/2017 12:28
Date Received: 07/06/2017 08:50

Project: CPRC0F17048
Matrix: OTHER SOLID
%Moisture: 69.5

Client ID: B3BLH4
Batch ID: 1682260
Run Date: 07/14/2017 15:37
Data File: AB1682260r1.xls
Prep Batch: 1682260
Prep Date: 07/14/2017 09:13

Method: 9310_ALPHABETA_GPC
Analyst: LXB3
Aliquot: 0.1 g
Prep Method: EPA 900.0/SW846 9310/SM 71

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-001B
Instrument: PIC11D
Count Time: 60 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA		1340	pCi/g	+/-36.7	249	3.12	5.00
12587-47-2	Beta BETA		1210	pCi/g	+/-26.6	158	4.17	10.0

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211004	Date Collected: 06/28/2017 12:28	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 69.5
Client ID: B3BLH4		Prep Basis: "As Received"
Batch ID: 1680562	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/19/2017 05:50	Analyst: CXS7	Instrument: LSCBROWN
Data File: E1680562.xls	Aliquot: 1.273 g	Count Time: 15 min
Prep Batch: 1680562	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 07/13/2017 15:42		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		19.8	pCi/g	+/-3.20	3.92	4.25	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.95E+05	4.17E+05	CPM	94.8	(30%-105%)

Comments:

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

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211004	Date Collected: 06/28/2017 12:28	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 69.5
Client ID: B3BLH4		Prep Basis: "As Received"
Batch ID: 1680565	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 07/10/2017 16:29	Analyst: BXM4	Instrument: LSCSILVER
Data File: T1680565.xls	Aliquot: 1.255 g	Count Time: 20 min
Prep Batch: 1680565	Prep Method: EPA 906.0 Modified	
Prep Date: 07/10/2017 09:40		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-3.77	pCi/g	+/-11.1	11.1	20.6	30.0

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.

July 20, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427211	Client: CPRC001	Project: CPRC0F17048
Lab Sample ID: 427211004	Date Collected: 06/28/2017 12:28	Matrix: OTHER SOLID
	Date Received: 07/06/2017 08:50	%Moisture: 69.5
Client ID: B3BLH4		Prep Basis: "As Received"
Batch ID: 1680569	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 07/12/2017 20:41	Analyst: TXJ1	Instrument: LSCRED
Data File: C1680569.xls	Aliquot: 0.506 g	Count Time: 45 min
Prep Batch: 1680569	Prep Method: EPA EERF C-01 Modified	
Prep Date: 07/12/2017 10:15		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		20.5	pCi/g	+/-2.41	2.84	3.22	5.00

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.

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 19, 2017
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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 427211

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1681706								
QC1203829460	MB								
Uranium-233/234			U	2.24	pCi/g			BXA4	07/13/1708:51
				Uncert: +/-5.91					
				TPU: +/-5.92					
Uranium-235/236			U	2.70	pCi/g				
				Uncert: +/-6.21					
				TPU: +/-6.22					
Uranium-238			U	-1.73	pCi/g				
				Uncert: +/-3.27					
				TPU: +/-3.28					
**Uranium-232 Tracer	420			340	pCi/g	REC: 81	(30%-105%)		
				Uncert: +/-49.2					
				TPU: +/-77.6					
QC1203829461	427211001	DUP							
Uranium-233/234		1000		1950	pCi/g				
				Uncert: +/-81.5		RPD: 64*	(0% - 20%)		
				TPU: +/-172		RER: 5.57*	(0-2)		
Uranium-235/236		31.2		78.8	pCi/g				
				Uncert: +/-16.7		RPD: 87*	(0% - 20%)		
				TPU: +/-17.3		RER: 3.07*	(0-2)		
Uranium-238		789		1530	pCi/g				
				Uncert: +/-72.2		RPD: 64*	(0% - 20%)		
				TPU: +/-139		RER: 5.42*	(0-2)		
**Uranium-232 Tracer	421	315		380	pCi/g	REC: 91	(30%-105%)		
				Uncert: +/-53.3					
				TPU: +/-83.0					
QC1203829462	LCS								
Uranium-233/234				501	pCi/g				07/14/1708:55
				Uncert: +/-51.5					
				TPU: +/-86.9					
Uranium-235/236				17.8	pCi/g				
				Uncert: +/-11.6					
				TPU: +/-11.8					
Uranium-238	540			514	pCi/g	REC: 95	(80%-120%)		
				Uncert: +/-52.2					
				TPU: +/-88.6					
**Uranium-232 Tracer	420			436	pCi/g	REC: 104	(30%-105%)		
				Uncert: +/-47.3					
				TPU: +/-75.3					
Rad Gas Flow									
Batch	1680834								
QC1203827175	MB								
Total Strontium			U	0.205	pCi/g			MYM1	07/11/1714:30
				Uncert: +/-0.646					

QC Summary

Workorder: 427211

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1680834								
		TPU:		+/-0.648					
**Strontium Carrier	7.75			7.50	mg	REC: 97	(40%-110%)		
QC1203827176	427211004	DUP							
Total Strontium		U	-0.993	U	1.25				07/11/1714:30
		Uncert:	+/-0.783	+/-0.838		RPD: 0	N/A		
		TPU:	+/-0.783	+/-0.895		RER: 3.69	(0-2)		
**Strontium Carrier	7.75		7.30	7.40	mg	REC: 96	(40%-110%)		
QC1203827177	LCS								
Total Strontium	68.9			67.0	pCi/g	REC: 97	(80%-120%)		07/11/1714:30
		Uncert:		+/-3.95					
		TPU:		+/-17.6					
**Strontium Carrier	7.75			7.50	mg	REC: 97	(40%-110%)		
Batch	1682260								
QC1203830814	MB								
Alpha			U	-0.412	pCi/g			LXB3	07/14/1715:37
		Uncert:		+/-1.06					
		TPU:		+/-1.06					
Beta			U	0.823	pCi/g				
		Uncert:		+/-1.97					
		TPU:		+/-1.98					
QC1203830815	427211004	DUP							
Alpha				1340	1370	pCi/g			07/14/1715:37
		Uncert:	+/-36.7	+/-37.6		RPD: 2	(0% - 20%)		
		TPU:	+/-249	+/-266		RER: 0.124	(0-2)		
Beta				1210	1140	pCi/g			
		Uncert:	+/-26.6	+/-25.8		RPD: 5	(0% - 20%)		
		TPU:	+/-158	+/-167		RER: 0.526	(0-2)		
QC1203830816	427211004	MS							
Alpha				112	1340	1500	pCi/g	REC: N/A	07/14/1715:37
		Uncert:	+/-36.7	+/-38.4					
		TPU:	+/-249	+/-296					
Beta				404	1210	1640	pCi/g	REC: 106	(75%-125%)
		Uncert:	+/-26.6	+/-30.2					
		TPU:	+/-158	+/-237					
QC1203830817	427211004	MSD							
Alpha				113	1340	1490	pCi/g	REC: N/A	07/15/1711:55
		Uncert:	+/-36.7	+/-38.0		RPD: 1	(0%-20%)		
		TPU:	+/-249	+/-288		RER: 0.0522	(0-2)		
Beta				408	1210	1630	pCi/g	REC: 105	(75%-125%)
		Uncert:	+/-26.6	+/-29.7		RPD: 0	(0%-20%)		
		TPU:	+/-158	+/-231		RER: 0.00284	(0-2)		
QC1203830818	LCS								
Alpha				112		116	pCi/g	REC: 104	(80%-120%)
		Uncert:		+/-10.6					
		TPU:		+/-24.8					
Beta				404		458	pCi/g	REC: 113	(80%-120%)
		Uncert:		+/-16.1					
		TPU:		+/-65.4					
Rad Liquid Scintillation									
Batch	1680562								

QC Summary

Workorder: 427211

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1680562								
QC1203826496	MB								
Technetium-99			U	1.46	pCi/g			CXS7	07/19/1706:07
				Uncert:					
				TPU:					
*Technetium-99m Tracer	4.17E+05			3.96E+05	CPM	REC: 95 (30%-105%)			
QC1203826497	427211001	DUP							
Technetium-99		36.7		45.4	pCi/g				07/19/1706:27
				Uncert:		RPD: 21* (0% - 20%)			
				TPU:		RER: 1.89 (0-2)			
*Technetium-99m Tracer	4.17E+05	3.72E+05		3.70E+05	CPM	REC: 89 (30%-105%)			
QC1203826498	LCS								
Technetium-99		67.6		55.2	pCi/g	REC: 82 (80%-120%)			07/19/1706:43
				Uncert:					
				TPU:					
*Technetium-99m Tracer	4.17E+05			3.79E+05	CPM	REC: 91 (30%-105%)			
Batch	1680565								
QC1203826503	MB								
Tritium			U	3.52	pCi/g			BXM4	07/10/1716:50
				Uncert:					
				TPU:					
QC1203826504	427211001	DUP							
Tritium		U	2.27	U	-2.82	pCi/g			07/10/1717:11
				Uncert:		RPD: 0 N/A			
				TPU:		RER: 0.627 (0-2)			
QC1203826505	427211001	MS							
Tritium		89.4	U	2.27	96.7	pCi/g	REC: 108 (75%-125%)		07/10/1717:33
				Uncert:					
				TPU:					
QC1203826506	LCS								
Tritium		88.6		73.8	pCi/g	REC: 83 (80%-120%)			07/10/1717:54
				Uncert:					
				TPU:					
Batch	1680569								
QC1203826520	MB								
Carbon-14			U	-2.33	pCi/g			TXJ1	07/12/1721:28
				Uncert:					
				TPU:					
QC1203826521	427211001	DUP							
Carbon-14		34.8		33.1	pCi/g				07/12/1722:14
				Uncert:		RPD: 5 (0% - 20%)			
				TPU:		RER: 0.613 (0-2)			
QC1203826522	427211001	MS							
Carbon-14		287	34.8	290	pCi/g	REC: 89 (75%-125%)			07/12/1723:01
				Uncert:					
				TPU:					
QC1203826523	LCS								
Carbon-14		145		137	pCi/g	REC: 94 (80%-120%)			07/12/1723:47
				Uncert:					
				TPU:					

Notes:

QC Summary

Workorder: 427211

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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
- < 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 associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- C Analyte has been confirmed by GC/MS analysis
- 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 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.