



October 05, 2015

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

Re: CHPRC SAF F15-053
Work Order: 381174
SDG: GEL381174

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 15, 2015. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

Sarah Edwards for
Heather Shaffer
Project Manager

Purchase Order: 300058 8H
Chain of Custody: F15-053-008 and F15-053-009
Enclosures



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Case Narrative

October 12, 2015

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F15-053
SDG: GEL381174**

October 05, 2015

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on September 15, 2015, 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 and DER

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
381174001	B32KB3
381174002	B32KB4

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Diesel Range Organics, GC/MS Semivolatile, GC/MS Volatile, Metals and Radiochemistry.

This package, to the best of my knowledge, is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.

Sarah M Edwards
October 12, 2015

Sarah Edwards for
Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 381174				F15-053-008	PAGE 1 OF 1
COLLECTOR E.L. Kauer/CHPRC		COMPANY CONTACT TODAK, D		TELEPHONE NO. 376-6436		PROJECT COORDINATOR TODAK, D	
SAMPLING LOCATION C9520, Interval 3 WASTE		PROJECT DESIGNATION 216-U-8 Uranium Sequestration Pilot Test Waste Designation - Soil				SAF NO. F15-053	
ICE CHEST NO. GWS-365		FIELD LOGBOOK NO. HNF-N-645-2 05 71		ACTUAL SAMPLE DEPTH		COA 300058	
SHIPPED TO GEL Laboratories, LLC		OFFSITE PROPERTY NO. N/A				BILL OF LADING/AIR BILL NO. 774501843988	
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	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. N/A		PRESERVATION		None	None	Cool <=6C
			HOLDING TIME		6 Months	6 Months	14/40 Days
			TYPE OF CONTAINER		G/P	G/P	aG
			NO. OF CONTAINER(S)		1	1	1
			VOLUME		250mL	500mL	250mL
			SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	GAMMA_GS: COMMON;	8270_SVOA_GC MS: COMMON;
SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B32KB2				WTPH_KEROSE NE: COMMON;	SEE ITEM (2) IN SPECIAL INSTRUCTIONS		
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME				
B32KB3	SOIL	SEP 03 2015	1345	✓	✓	✓	✓

October 12, 2015

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM E.L. Kauer/CHPRC	DATE/TIME SEP 03 2015	RECEIVED BY/STORED IN SSU #1	DATE/TIME SEP 03 2015	TRVL-15-152, (1) ALPHA_GPC: COMMON; BETA_GPC: COMMON; PUISO_PLATE_AEA: COMMON; SRISO_SEP_PRECIP_GPC: COMMON; TC99_SEP_GPC: COMMON; UISO_PLATE_AEA: COMMON; (2) 6020_METALS_ICPMS: COMMON {Aluminum, Antimony, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Selenium, Silver}; 6020_METALS_ICPMS: COMMON (Add-on) {Arsenic, Uranium}; 7471_MERCURY_CV: COMMON (SOLIDS) {Mercury};	
RELINQUISHED BY/REMOVED FROM SSU #1	DATE/TIME SEP 14 2015 1020	RECEIVED BY/STORED IN L.D. Wall	DATE/TIME SEP 14 2015 1020		
RELINQUISHED BY/REMOVED FROM L.D. Wall	DATE/TIME SEP 14 2015 1400	RECEIVED BY/STORED IN CHPRC	DATE/TIME		
RELINQUISHED BY/REMOVED FROM Fed Ex	DATE/TIME	RECEIVED BY/STORED IN FEDEX	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN M. Kriston	DATE/TIME 9-15-15 0855		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	

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CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 381174		F15-053-009	PAGE 1 OF 1
COLLECTOR E.L. Kauer/CHPRC		COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6437	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9520, Interval 3 WASTE		PROJECT DESIGNATION 216-U-8 Uranium Sequestration Pilot Test Waste Designation - Soil		SAF NO. F15-053	AIR QUALITY <input type="checkbox"/>
ICE CHEST NO. 6005-365		FIELD LOGBOOK NO. HNF-N-645-2 pg 71	ACTUAL SAMPLE DEPTH 35.5 - 36.5 ft.	COA 300058	METHOD OF SHIPMENT FEDERAL EXPRESS ORIGINAL
SHIPPED TO GEL Laboratories, LLC		OFFSITE PROPERTY NO. N/A	BILL OF LADING/AIR BILL NO. 7745 0184 3988		

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	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. N/A	PRESERVATION	Frozen
		HOLDING TIME	14 Days
		TYPE OF CONTAINER	aGs
		NO. OF CONTAINER(S)	5
		VOLUME	40mL
	SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: B32KB2	SAMPLE ANALYSIS	5035/8260_VOA : LOW LEVEL: COMMON;
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B32KB4	SOIL	SEP 03 2015	1345 ✓

October 12, 2015

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM E.L. Kauer/CHPRC	RECEIVED BY/STORED IN SSU #1	TRVL-15-152,
DATE/TIME SEP 03 2015 1530	DATE/TIME SEP 03 2015 1530	
RELINQUISHED BY/REMOVED FROM SSU-1	RECEIVED BY/STORED IN L.D. Wall	
DATE/TIME SEP 14 2015 0950	DATE/TIME SEP 14 2015 0950	
RELINQUISHED BY/REMOVED FROM L.D. Wall	RECEIVED BY/STORED IN FEDEX	
DATE/TIME SEP 14 2015 1400	DATE/TIME	
RELINQUISHED BY/REMOVED FROM CHPRC	RECEIVED BY/STORED IN M. Kinshon	
DATE/TIME SEP 15 2015 0855	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

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SAMPLE RECORD SHEET FOR VOC SAMPLE COLLECTION

Location: C9520 Int 3

Sampler Initials and Date: ELK SEP 03 2015

Sample Number ¹	Sample Suffix	Initial Weight ² (grams)	Total Weight ³ (grams)	Soil Weight ⁴ (grams)
B32KB4	K	29.9	36.1	6.2
B32KB4	L	29.5	35.7	6.2
B32KB4	M	30.2	36.0	5.8
B32KB4	N	30.1	37.2	7.1
B32KB4	P	30.3	36.8	6.5

¹ Enter sample number associated with the sampling event.

² Initial weight is to include all labels, stickers, bags, spin bars (for samples with suffix K, L, M, N and P) and anything else that will be associated with the bottle when it is weighed with the sample.

³ Ensure that everything weighed for the empty bottle and no additional items (besides the sample) is weighed.

⁴ Soil weight is the vial with sample minus Initial Weight.



October 12, 2015
SAMPLE RECEIPT & REVIEW FORM

Client: <u>OPRC</u>		SDG/AR/COC/Work Order:
Received By: <u>mk</u>		Date Received: <u>9-15-15</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>MR/HR = 1.0 R</u>
Classified Radioactive II or III by RSO?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: UN#: <u>2910</u>
Samples identified as Foreign Soil?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>OC</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>EVO92024932</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7745 0184 3983</u>

Comments (Use Continuation Form if needed):

Data Review Qualifier Definitions

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

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
U	Programmed	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.	Y			Includes MDA, TPU, count uncert.
J	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Y	Organics		Organics only
P	Programmed	Aroclor target analyte with greater than 25% difference between column analyses.	Y	Organics		PCB only
C	Manual	Analyte has been confirmed by GC/MS analysis	Y	Organics	Pesticide	IF GC/MS confirmation was attempted but unsuccessful do not qualify with C
B	Programmed	The analyte was detected in both the associated QC blank and in the sample.	Y	Organics		
E	Manual	Concentration exceeds the calibration range of the instrument	Y	Organics		Qualifier Uploaded
A	Manual	The TIC is a suspected aldol-condensation product	Y	Organics	Semi-Volatile	Uploaded with TIC
X	Programmed	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			Replaces H Hold Date In RAD replaces UI. Same usage as standard X as well.
N	Programmed	Spike Sample recovery is outside control limits.	Y			
*	Programmed	Duplicate analysis not within control limits	Y	Inorganics		
>	Programmed	Result greater than quantifiable range or greater than upper limit of the analysis range	Y	General Chemistry		
Z	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	Inorganics	Metals	Replaces J Estimated Value
D	Programmed	Results are reported from a diluted aliquot of sample.	Y			Dilution
E	Programmed	Reported value is estimated due to interferences. See comment in narrative.	Y	Inorganics	Metals	GEL E
M	Manual	Duplicate precision not met.	Y	Inorganics	Metals	Replaces *
o	Programmed	Analyte failed to recover within LCS limits (Organics only)	Y	Organics		
S	Manual	Reported value determined by the Method of Standard Additions (MSA)	Y	Inorganics		Not coded B/C Rarely performed
T	Programmed	Spike and/or spike duplicate sample recovery is outside control limits.	Y	Organics		GC/MS only
W	Manual	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Y	Inorganics		No GFAA in house.
B	Programmed	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample	Y	Radiological		
Y	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
+	Manual	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Y	Inorganics		
B	Programmed	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Y	General Chemistry		Replaces J Estimated Value
C	Programmed	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Y	Inorganics	Metals	Replaces B Blank Detection
C	Programmed	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Y	General Chemistry		Replaces B Blank Detection
<	Programmed	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	Y	General Chemistry		for Reactive CN/S

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 05 October 2015

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-18
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Volatile Analysis

Case Narrative

October 12, 2015
GC/MS Volatile
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL381174
Work Order #: 381174

Method/Analysis Information

Procedure:	Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer
Analytical Method:	SW846 5035/8260C
Prep Method:	SW846 5035
Analytical Batch Number:	1508044
Prep Batch Number:	1508043

Sample Analysis

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

Sample ID	Client ID
381174002	B32KB4
1203394322	Method Blank (MB)
1203394323	Laboratory Control Sample (LCS)
1203394324	381174002(B32KB4) Post Spike (PS)
1203394325	381174002(B32KB4) Post Spike Duplicate (PSD)

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

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

SOP Reference

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

Calibration Information

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

Initial Calibration

October 12, 2015

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

Continuing Calibration Verification Requirements

The calibration verification standard requirements were not all met for samples . There were no positive results for any of the analytes that were outside the calibration criteria. The results are reported.

Quality Control (QC) Information

Blank (MB) Statement

The blank analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

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

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 381174002 (B32KB4) was designated for spike analysis.

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the required acceptance limits.

Relative Percent Difference (RPD) Statement

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

Internal Standard (ISTD) Acceptance

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

Technical Information

Holding Time Specifications

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

Sample Preservation and Integrity

All samples met the sample preservation and integrity requirements.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

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

Miscellaneous Information

Data Exception (DER) Documentation

A data exception report (DER) 1450499 was generated for samples in this SDG/batch.

Manual Integrations

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

TIC Comment

October 12, 2015

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

Additional Comments

Additional comments were not required for this SDG.

System Configuration

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

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

Certification Statement

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

October 12, 2015

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL381174 GEL Work Order: 381174

The Qualifiers in this report are defined as follows:

J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

DL Indicates that sample is diluted.

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

RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Erin Haubert

Date: 12 OCT 2015

Title: Data Validator

Sample Data Summary

October 12, 2015

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Certificate of Analysis
Sample Summary

SDG Number: GEL381174	Date Collected: 09/03/2015 13:45	Matrix: OTHERSOLID
Lab Sample ID: 381174002	Date Received: 09/15/2015 08:55	
	Client: CPRC001	Project: CPRC0F15053
Client ID: B32KB4	Method: SW846 5035/8260C	SOP Ref: GL-OA-E-038
Batch ID: 1508044	Inst: VOA2.I	Dilution: 1
Run Date: 09/16/2015 12:15	Analyst: CDS1	Purge Vol: 5 mL
Prep Date: 09/03/2015 13:45	Aliquot: 6.2 g	Final Volume: 5 mL
Data File: 091615V2.b\2A312.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
71-55-6	1,1,1-Trichloroethane	U	0.242	ug/kg	0.242	1.61
79-34-5	1,1,2,2-Tetrachloroethane	U	0.242	ug/kg	0.242	1.61
79-00-5	1,1,2-Trichloroethane	U	0.242	ug/kg	0.242	1.61
75-34-3	1,1-Dichloroethane	U	0.242	ug/kg	0.242	1.61
75-35-4	1,1-Dichloroethylene	U	0.242	ug/kg	0.242	1.61
107-06-2	1,2-Dichloroethane	U	0.242	ug/kg	0.242	1.61
540-59-0	1,2-Dichloroethylene (total)	U	0.242	ug/kg	0.242	3.23
78-87-5	1,2-Dichloropropane	U	0.242	ug/kg	0.242	1.61
78-93-3	2-Butanone	U	2.42	ug/kg	2.42	8.06
591-78-6	2-Hexanone	U	2.42	ug/kg	2.42	8.06
108-10-1	4-Methyl-2-pentanone	U	2.42	ug/kg	2.42	8.06
67-64-1	Acetone	J	2.90	ug/kg	2.42	8.06
71-43-2	Benzene	U	0.242	ug/kg	0.242	1.61
75-27-4	Bromodichloromethane	U	0.242	ug/kg	0.242	1.61
75-25-2	Bromoform	U	0.242	ug/kg	0.242	1.61
74-83-9	Bromomethane	U	0.242	ug/kg	0.242	1.61
75-15-0	Carbon disulfide	U	1.29	ug/kg	1.29	8.06
56-23-5	Carbon tetrachloride	U	0.242	ug/kg	0.242	1.61
108-90-7	Chlorobenzene	U	0.242	ug/kg	0.242	1.61
75-00-3	Chloroethane	U	0.242	ug/kg	0.242	1.61
67-66-3	Chloroform	U	0.242	ug/kg	0.242	1.61
74-87-3	Chloromethane	U	0.242	ug/kg	0.242	1.61
124-48-1	Dibromochloromethane	U	0.242	ug/kg	0.242	1.61
100-41-4	Ethylbenzene	U	0.242	ug/kg	0.242	1.61
75-09-2	Methylene chloride	U	1.29	ug/kg	1.29	4.03
100-42-5	Styrene	U	0.242	ug/kg	0.242	1.61
127-18-4	Tetrachloroethylene	U	0.242	ug/kg	0.242	1.61
108-88-3	Toluene	J	0.363	ug/kg	0.242	1.61
79-01-6	Trichloroethylene	U	0.242	ug/kg	0.242	1.61
75-01-4	Vinyl chloride	U	0.242	ug/kg	0.242	1.61
1330-20-7	Xylenes (total)	J	0.250	ug/kg	0.242	4.84
10061-01-5	cis-1,3-Dichloropropylene	U	0.242	ug/kg	0.242	1.61
10061-02-6	trans-1,3-Dichloropropylene	U	0.242	ug/kg	0.242	1.61

Quality Control Summary

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QC Summary

Report Date: October 12, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 381174

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS										
Batch	1508044									
QC1203394323	LCS									
1,1,1-Trichloroethane	50.0		56.2	ug/kg		112	(70%-130%)	CDS1	09/16/15	08:47
1,1,2,2-Tetrachloroethane	50.0		52.1	ug/kg		104	(70%-130%)			
1,1,2-Trichloroethane	50.0		50.9	ug/kg		102	(70%-130%)			
1,1-Dichloroethane	50.0		52.4	ug/kg		105	(70%-130%)			
1,1-Dichloroethylene	50.0		52.6	ug/kg		105	(70%-130%)			
1,2-Dichloroethane	50.0		50.1	ug/kg		100	(70%-130%)			
1,2-Dichloroethylene (total)	100		104	ug/kg		104	(70%-130%)			
1,2-Dichloropropane	50.0		52.0	ug/kg		104	(70%-130%)			
2-Butanone	250		246	ug/kg		98	(70%-130%)			
2-Hexanone	250		254	ug/kg		102	(70%-130%)			
4-Methyl-2-pentanone	250		253	ug/kg		101	(70%-130%)			
Acetone	250		248	ug/kg		99	(70%-130%)			
Benzene	50.0		52.0	ug/kg		104	(70%-130%)			
Bromodichloromethane	50.0		53.7	ug/kg		107	(70%-130%)			
Bromoform	50.0		57.7	ug/kg		115	(70%-130%)			
Bromomethane	50.0		51.8	ug/kg		104	(70%-130%)			
Carbon disulfide	250		291	ug/kg		116	(70%-130%)			
Carbon tetrachloride	50.0		55.3	ug/kg		111	(70%-130%)			
Chlorobenzene	50.0		51.9	ug/kg		104	(70%-130%)			
Chloroethane	50.0		51.7	ug/kg		103	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1508044										
Chloroform	50.0			52.2	ug/kg		104	(70%-130%)	CDS1	09/16/15	08:47
Chloromethane	50.0			52.2	ug/kg		104	(70%-130%)			
Dibromochloromethane	50.0			55.9	ug/kg		112	(70%-130%)			
Ethylbenzene	50.0			53.5	ug/kg		107	(70%-130%)			
Methylene chloride	50.0			47.7	ug/kg		95	(70%-130%)			
Styrene	50.0			54.9	ug/kg		110	(70%-130%)			
Tetrachloroethylene	50.0			54.9	ug/kg		110	(70%-130%)			
Toluene	50.0			51.7	ug/kg		103	(70%-130%)			
Trichloroethylene	50.0			53.7	ug/kg		107	(70%-130%)			
Vinyl chloride	50.0			53.0	ug/kg		106	(70%-130%)			
Xylenes (total)	150			160	ug/kg		107	(70%-130%)			
cis-1,3-Dichloropropylene	50.0			54.6	ug/kg		109	(70%-130%)			
trans-1,3-Dichloropropylene	50.0			55.1	ug/kg		110	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			49.8	ug/L		100	(81%-124%)			
**Bromofluorobenzene	50.0			48.8	ug/L		98	(70%-130%)			
**Toluene-d8	50.0			49.7	ug/L		99	(81%-120%)			
QC1203394322 MB											
1,1,1-Trichloroethane			U	0.300	ug/kg					09/16/15	11:16
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						

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1508044										
1,2-Dichloroethane			U	0.300	ug/kg				CDS1	09/16/15	11:16
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						
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						
Styrene			U	0.300	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	1508044										
Tetrachloroethylene			U	0.300	ug/kg						
Toluene			U	0.300	ug/kg				CDS1	09/16/15	11:16
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			51.1	ug/L		102	(81%-124%)			
**Bromofluorobenzene	50.0			50.8	ug/L		102	(70%-130%)			
**Toluene-d8	50.0			49.5	ug/L		99	(81%-120%)			
QC1203394324 381174002 PS											
1,1,1-Trichloroethane	50.0	U	0.00	60.1	ug/L		120	(70%-130%)		09/16/15	13:15
1,1,2,2-Tetrachloroethane	50.0	U	0.00	59.6	ug/L		119	(70%-130%)			
1,1,2-Trichloroethane	50.0	U	0.00	55.7	ug/L		111	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	56.2	ug/L		112	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	57.3	ug/L		115	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	54.8	ug/L		110	(70%-130%)			
1,2-Dichloroethylene (total)	100	U	0.00	111	ug/L		111	(70%-130%)			
1,2-Dichloropropane	50.0	U	0.00	55.9	ug/L		112	(70%-130%)			
2-Butanone	250	U	0.00	312	ug/L		125	(70%-130%)			
2-Hexanone	250	U	0.00	323	ug/L		129	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	302	ug/L		121	(70%-130%)			
Acetone	250	J	3.59	321	ug/L		127	(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	1508044										
Benzene	50.0	U	0.00	55.2	ug/L		110	(70%-130%)	CDS1	09/16/15	13:15
Bromodichloromethane	50.0	U	0.00	56.9	ug/L		114	(70%-130%)			
Bromoform	50.0	U	0.00	62.7	ug/L		125	(70%-130%)			
Bromomethane	50.0	U	0.00	44.8	ug/L		90	(70%-130%)			
Carbon disulfide	250	U	0.00	308	ug/L		123	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	58.9	ug/L		118	(70%-130%)			
Chlorobenzene	50.0	U	0.00	54.1	ug/L		108	(70%-130%)			
Chloroethane	50.0	U	0.00	54.0	ug/L		108	(70%-130%)			
Chloroform	50.0	U	0.00	56.2	ug/L		112	(70%-130%)			
Chloromethane	50.0	U	0.00	55.8	ug/L		112	(70%-130%)			
Dibromochloromethane	50.0	U	0.00	59.4	ug/L		119	(70%-130%)			
Ethylbenzene	50.0	U	0.00	56.5	ug/L		113	(70%-130%)			
Methylene chloride	50.0	U	0.00	50.2	ug/L		100	(70%-130%)			
Styrene	50.0	U	0.00	57.0	ug/L		114	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	57.5	ug/L		115	(70%-130%)			
Toluene	50.0	J	0.450	55.5	ug/L		110	(70%-130%)			
Trichloroethylene	50.0	U	0.00	56.9	ug/L		114	(70%-130%)			
Vinyl chloride	50.0	U	0.00	57.8	ug/L		116	(70%-130%)			
Xylenes (total)	150	J	0.310	168	ug/L		112	(70%-130%)			
cis-1,3-Dichloropropylene	50.0	U	0.00	57.7	ug/L		115	(70%-130%)			
trans-1,3-Dichloropropylene	50.0	U	0.00	59.9	ug/L		120	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1508044										
**1,2-Dichloroethane-d4	50.0	60.0		53.9	ug/L		108	(81%-124%)			
**Bromofluorobenzene	50.0	58.7		52.4	ug/L		105	(70%-130%)	CDS1	09/16/15	13:15
**Toluene-d8	50.0	56.2		51.5	ug/L		103	(81%-120%)			
QC1203394325 381174002 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	59.2	ug/L	1	118	(0%-20%)		09/16/15	13:44
1,1,2,2-Tetrachloroethane	50.0	U	0.00	56.3	ug/L	6	113	(0%-20%)			
1,1,2-Trichloroethane	50.0	U	0.00	53.4	ug/L	4	107	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	55.2	ug/L	2	110	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	56.1	ug/L	2	112	(0%-20%)			
1,2-Dichloroethane	50.0	U	0.00	52.6	ug/L	4	105	(0%-20%)			
1,2-Dichloroethylene (total)	100	U	0.00	108	ug/L	3	108	(0%-20%)			
1,2-Dichloropropane	50.0	U	0.00	54.3	ug/L	3	109	(0%-20%)			
2-Butanone	250	U	0.00	271	ug/L	14	108	(0%-20%)			
2-Hexanone	250	U	0.00	280	ug/L	14	112	(0%-20%)			
4-Methyl-2-pentanone	250	U	0.00	273	ug/L	10	109	(0%-20%)			
Acetone	250	J	3.59	277	ug/L	15	109	(0%-20%)			
Benzene	50.0	U	0.00	53.8	ug/L	3	108	(0%-20%)			
Bromodichloromethane	50.0	U	0.00	55.3	ug/L	3	111	(0%-20%)			
Bromoform	50.0	U	0.00	60.4	ug/L	4	121	(0%-20%)			
Bromomethane	50.0	U	0.00	52.6	ug/L	16	105	(0%-20%)			
Carbon disulfide	250	U	0.00	302	ug/L	2	121	(0%-20%)			
Carbon tetrachloride	50.0	U	0.00	57.8	ug/L	2	116	(0%-20%)			
Chlorobenzene	50.0	U	0.00	51.9	ug/L	4	104	(0%-20%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1508044										
Chloroethane	50.0	U	0.00	53.9	ug/L	0	108	(0%-20%)	CDS1	09/16/15	13:44
Chloroform	50.0	U	0.00	54.6	ug/L	3	109	(0%-20%)			
Chloromethane	50.0	U	0.00	55.6	ug/L	0	111	(0%-20%)			
Dibromochloromethane	50.0	U	0.00	57.4	ug/L	3	115	(0%-20%)			
Ethylbenzene	50.0	U	0.00	53.6	ug/L	5	107	(0%-20%)			
Methylene chloride	50.0	U	0.00	49.1	ug/L	2	98	(0%-20%)			
Styrene	50.0	U	0.00	54.0	ug/L	5	108	(0%-20%)			
Tetrachloroethylene	50.0	U	0.00	55.3	ug/L	4	111	(0%-20%)			
Toluene	50.0	J	0.450	53.8	ug/L	3	107	(0%-20%)			
Trichloroethylene	50.0	U	0.00	55.1	ug/L	3	110	(0%-20%)			
Vinyl chloride	50.0	U	0.00	57.0	ug/L	1	114	(0%-20%)			
Xylenes (total)	150	J	0.310	159	ug/L	5	106	(0%-20%)			
cis-1,3-Dichloropropylene	50.0	U	0.00	55.6	ug/L	4	111	(0%-20%)			
trans-1,3-Dichloropropylene	50.0	U	0.00	57.4	ug/L	4	115	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		60.0	52.3	ug/L		105	(81%-124%)			
**Bromofluorobenzene	50.0		58.7	51.7	ug/L		103	(70%-130%)			
**Toluene-d8	50.0		56.2	51.2	ug/L		102	(81%-120%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
D	Results are reported from a diluted aliquot of sample.										
E	Concentration exceeds the calibration range of the instrument										
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated										
N	Spike Sample recovery is outside control limits.										
P	Aroclor target analyte with greater than 25% difference between column analyses.										
T	Spike and/or spike duplicate sample recovery is outside control limits.										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
o	Analyte failed to recover within LCS limits (Organics only)										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
 ^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
 * Indicates that a Quality Control parameter was not within specifications.
 For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

October 12, 2015
Surrogate Recovery Report

SDG Number: GEL381174

Matrix Type: SOLID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203394323	LCS for batch 1508043	100	99	98
1203394322	MB for batch 1508043	102	99	102
381174002	B32KB4	120	112	117
1203394324	B32KB4PS	108	103	105
1203394325	B32KB4PSD	105	102	103

Surrogate**Acceptance Limits**

DCED4 = 1,2-Dichloroethane-d4	(81%-124%)
TOL = Toluene-d8	(81%-120%)
BFB = Bromofluorobenzene	(70%-130%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 22-SEP-15	Division: Federal	Quality Criteria: SOP	Type: Process
Instrument Type: VOA GC/MS	Test / Method: 8260C	Matrix Type: Solid	Client Code: CPRC001
Batch ID: 1508044	Sample Numbers: 381174002		
Potentially affected work order(s)(SDG): 381174(GEL381174)			
Application Issues: Other			
Specification and Requirements Exception Description:		DER Disposition:	
1. The percent drift for bromomethane was outside of acceptance limits in the calibration verification sample with high bias. The compound was not detected in the associated sample.		1. The data is reported.	

Originator's Name:

Crystal Stacey 22-SEP-15

Data Validator/Group Leader:

Erin Haubert 12-OCT-15

Semi-Volatile Analysis

Case Narrative

October 12, 2015
GC/MS Semivolatile
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL381174
Work Order #: 381174

Method/Analysis Information

Procedure: Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry

Analytical Method: 8270_SVOA_GCMS

Prep Method: SW846 3541

Analytical Batch Number: 1507996

Prep Batch Number: 1507995

Sample Analysis

The following samples were analyzed using the analytical protocol as established in 8270_SVOA_GCMS:

Sample ID	Client ID
381174001	B32KB3
1203394199	Method Blank (MB)
1203394200	Laboratory Control Sample (LCS)
1203394201	381204001(RA007-015) Matrix Spike (MS)
1203394202	381204001(RA007-015) Matrix Spike Duplicate (MSD)

Sample 381174 001 in this SDG was analyzed on a "dry weight corrected" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-009 REV# 35.

Raw data reports are processed and reviewed by the analyst using the data analysis software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package. The various calibration mixes may not be calibrated using all of the calibration levels. In addition, not all of the mixes are calibrated using the same levels.

October 12, 2015

Diphenylamine has now superseded N-Nitroso-diphenylamine on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Methodologies referenced N-Nitroso-diphenylamine. However, as stated in EPA Methodology, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, showed that they not only co-elute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG) in this batch. A second source initial calibration verification (ICV) was included in the standard section directly behind the initial calibration.

CCV Requirements

All associated calibration verification standards (ICV or CCV) met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG in this batch met the acceptance criteria.

Surrogate Recoveries

All the surrogate recoveries were within the established acceptance criteria for this SDG in this batch.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 381204001 (RA007-015) was selected for analysis as the matrix spike and matrix spike duplicate.

Spike Recovery Statement

The MS and MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD values between the MS and MSD met the acceptance limits.

Internal Standard (ISTD) Acceptance

The internal standard responses used to quantitate the requested target analytes were within the required acceptance criteria for the SDG associated samples in this batch.

Technical Information:

Holding Time Specifications

All samples in this SDG in this batch met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All reported compound mass spectra met the detection specifications in the method.

Sample Dilutions

Samples 1203394201 (Non SDG 381204001MS) and 1203394202 (Non SDG 381204001MSD) were diluted because the extracts were very dark and viscous. The data from the dilutions are reported.

Sample Re-extraction/Re-analysis

The MB, 1203394199 (MB), was re-analyzed due to marginally low surrogate recovery. The re-analysis was within the acceptance criteria and were reported.

Miscellaneous Information:

Data Exception (DER) Documentation

A data exception report (DER) was not required for sample 381174001 (B32KB3) in this batch.

Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or samples may require manual integrations due to software limitations. Manual integrations, if any, are included with the raw data.

TIC Comment

Tentatively identified compounds (TIC) were not required for the samples in this SDG for this batch.

Additional Comments

Additional comments were not required for the SDG associated samples in this batch.

Electronic Package Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the reviewer name associated with the generation of the data and package. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

System Configuration

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

Instrument ID	Instrument	System Configuration	Column ID	Column Description
MSD3.I	Agilent 7890A/5975C GC/MS w/ 7683 Autosampler	HP7890A/HP5975C	DB-5MS	25m x 0.2mm, 0.33um (5% Phenylmethylpolysiloxane)

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.

October 12, 2015

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL381174 GEL Work Order: 381174

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.
- 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: **Barbara Bailey**

Date: **12 OCT 2015**

Title: **Data Validator**

Sample Data Summary

October 12, 2015
Semi-Volatile

Page 1 of 1

Certificate of Analysis
Sample Summary

SDG Number: GEL381174	Date Collected: 09/03/2015 13:45	Matrix: OTHERSOLID
Lab Sample ID: 381174001	Date Received: 09/15/2015 08:55	%Moisture: 4.8
Client ID: B32KB3	Client: CPRC001	Project: CPRC0F15053
Batch ID: 1507996	Method: 8270_SVOA_GCMS	SOP Ref: GL-OA-E-009
Run Date: 09/17/2015 23:53	Inst: MSD3.I	Dilution: 1
Prep Date: 09/17/2015 10:35	Analyst: JLD1	Inj. Vol: 1 uL
Data File: s091715a.B\s3i1723.D	Aliquot: 30.148 g	Final Volume: 1 mL
	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
120-83-2	2,4-Dichlorophenol	U	105	ug/kg	105	348
88-75-5	2-Nitrophenol	U	105	ug/kg	105	348
91-20-3	Naphthalene	U	10.5	ug/kg	10.5	34.8
87-86-5	Pentachlorophenol	U	105	ug/kg	105	348
108-95-2	Phenol	U	105	ug/kg	105	348
117-81-7	bis(2-Ethylhexyl)phthalate	U	105	ug/kg	105	348
95-48-7	o-Cresol	U	105	ug/kg	105	348

Quality Control Summary

October 12, 2015
GEL LABORATORIES LLC

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QC Summary

Report Date: October 9, 2015

Page 1 of 4

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 381174

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1507996										
QC1203394200	LCS										
2,4-Dichlorophenol	1670			1370	ug/kg		82	(44%-108%)	JLD1	09/17/15	23:23
2-Nitrophenol	1670			1340	ug/kg		81	(42%-112%)			
Naphthalene	1670			1320	ug/kg		79	(43%-103%)			
Pentachlorophenol	1670			1090	ug/kg		65	(30%-106%)			
Phenol	1670			1400	ug/kg		84	(38%-111%)			
bis(2-Ethylhexyl)phthalate	1670			1900	ug/kg		114	(42%-120%)			
o-Cresol	1670			1340	ug/kg		80	(40%-111%)			
**2,4,6-Tribromophenol	3330			3270	ug/kg		98	(12%-129%)			
**2-Fluorobiphenyl	1670			1230	ug/kg		74	(15%-110%)			
**2-Fluorophenol	3330			2580	ug/kg		77	(10%-115%)			
**Nitrobenzene-d5	1670			1390	ug/kg		84	(13%-112%)			
**Phenol-d5	3330			2660	ug/kg		80	(15%-117%)			
**p-Terphenyl-d14	1670			1860	ug/kg		112	(24%-141%)			
QC1203394199	MB										
2,4-Dichlorophenol			U	100	ug/kg					09/18/15	15:13
2-Nitrophenol			U	100	ug/kg						
Naphthalene			U	10.0	ug/kg						
Pentachlorophenol			U	100	ug/kg						
Phenol			U	100	ug/kg						
bis(2-Ethylhexyl)phthalate			U	100	ug/kg						

October 12, 2015

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QC Summary

Workorder: 381174

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1507996										
o-Cresol			U	100	ug/kg						
**2,4,6-Tribromophenol	3330			3030	ug/kg		91	(12%-129%)	JLD1	09/18/15	15:13
**2-Fluorobiphenyl	1670			1410	ug/kg		84	(15%-110%)			
**2-Fluorophenol	3330			2940	ug/kg		88	(10%-115%)			
**Nitrobenzene-d5	1670			1550	ug/kg		93	(13%-112%)			
**Phenol-d5	3330			2940	ug/kg		88	(15%-117%)			
**p-Terphenyl-d14	1670			2130	ug/kg		128	(24%-141%)			
QC1203394201 381204001 MS											
2,4-Dichlorophenol	1830	DU	549 DJ	1400	ug/kg		76	(21%-119%)		09/18/15	00:54
2-Nitrophenol	1830	DU	549 DJ	1250	ug/kg		68	(23%-115%)			
Naphthalene	1830	DU	54.9 D	1350	ug/kg		74	(23%-111%)			
Pentachlorophenol	1830	DU	549 DJ	811	ug/kg		44	(17%-119%)			
Phenol	1830	DU	549 DJ	1370	ug/kg		75	(28%-111%)			
bis(2-Ethylhexyl)phthalate	1830	DU	549 D	2390	ug/kg		131	(27%-131%)			
o-Cresol	1830	DU	549 DJ	1410	ug/kg		77	(28%-114%)			
**2,4,6-Tribromophenol	3660		3240	3370	ug/kg		92	(12%-129%)			
**2-Fluorobiphenyl	1830		1260	1360	ug/kg		75	(15%-110%)			
**2-Fluorophenol	3660		2610	2720	ug/kg		74	(10%-115%)			
**Nitrobenzene-d5	1830		1260	1460	ug/kg		80	(13%-112%)			
**Phenol-d5	3660		2630	2760	ug/kg		75	(15%-117%)			
**p-Terphenyl-d14	1830		2590	2440	ug/kg		133	(24%-141%)			
QC1203394202 381204001 MSD											
2,4-Dichlorophenol	1830	DU	549 DJ	1230	ug/kg	13	67	(0%-30%)		09/18/15	01:24
2-Nitrophenol	1830	DU	549 DJ	1050	ug/kg	17	58	(0%-30%)			

October 12, 2015

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QC Summary

Workorder: 381174

Page 3 of 4

Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD%, REC%, Range, Anlst, Date, Time. Rows include Naphthalene, Pentachlorophenol, Phenol, bis(2-Ethylhexyl)phthalate, o-Cresol, and various substituted phenols.

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
B The analyte was detected in both the associated QC blank and in the sample.
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of sample.
E Concentration exceeds the calibration range of the instrument
J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
N Spike Sample recovery is outside control limits.
P Aroclor target analyte with greater than 25% difference between column analyses.
T Spike and/or spike duplicate sample recovery is outside control limits.
U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

October 12, 2015

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QC Summary

Workorder: 381174

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

- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

October 12, 2015
 See Volatile

Surrogate Recovery Report

SDG Number: GEL381174

Matrix Type: SOLID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203394200	LCS for batch 1507995	77	80	84	74	98	112
381174001	B32KB3	84	85	87	79	90	116
1203394201	RA007-015(381204001MS)	74 D	75 D	80 D	75 D	92 D	133 D
1203394202	RA007-015(381204001MSD)	63 D	66 D	68 D	64 D	75 D	114 D
1203394199	MB for batch 1507995	88	88	93	84	91	128

Surrogate

Acceptance Limits

2FP	= 2-Fluorophenol	(10%-115%)
PHL	= Phenol-d5	(15%-117%)
NBZ	= Nitrobenzene-d5	(13%-112%)
FBP	= 2-Fluorobiphenyl	(15%-110%)
TBP	= 2,4,6-Tribromophenol	(12%-129%)
TPH	= p-Terphenyl-d14	(24%-141%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

FID Diesel Range Organics Analysis

Case Narrative

October 12, 2015
Diesel Range Organics
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL381174
Work Order #: 381174

Method/Analysis Information

Procedure: Analysis of Diesel Range Organics by Flame Ionization Detector
Analytical Method: NWTPH-Dx in Soil
Prep Method: SW846 3541
Analytical Batch Number: 1508242
Prep Batch Number: 1508241

Sample Analysis

The following samples were analyzed using the analytical protocol as established in NWTPH-Dx in Soil:

Sample ID	Client ID
381174001	B32KB3
1203394792	Method Blank (MB)
1203394793	Laboratory Control Sample (LCS)
1203394794	Laboratory Control Sample Duplicate (LCSD)

Sample 381174 001 in this SDG was analyzed on a "dry weight corrected" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-003 REV# 25.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

Initial Calibration

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

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria. Analyte peaks eluted within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS/LCSD) Recovery

The LCS and LCSD did not meet the spike recovery acceptance limits. The data were reported at the client's instruction because the re-extraction was out of holding.

Sample	Analyte	Value
1203394793 (LCS)	Kerosene	50* (70%-130%)
1203394794 (LCSD)	Kerosene	55* (70%-130%)

LCS/LCSD Relative Percent Difference (RPD) Statement

The RPD between the LCS and LCSD met the acceptance limits.

QC Sample Designation

A matrix spike and matrix spike duplicate analysis was not performed for this SDG in this batch.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of 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. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Analyte peaks eluted within the established retention time windows for this method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Sample 381174001 (B32KB3) was extracted and analyzed twice. The LCS recovery was below the acceptance limits in both analyses; furthermore, the second extracted was performed out of holding. The sample results are similar in both analyses. The first analysis was reported at the client's instruction.

Miscellaneous Information

Electronic Package Comment

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

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative.

Data Exception (DER) Documentation

Data exception report (DER) 1455112 was generated for this batch of the samples.

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The additional comments were not required.

System Configuration

The Diesel Range Organics analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
FID7.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	DB-5MS	30m x 0.25mm, 0.25um(J&W)

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.

October 12, 2015

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL381174 GEL Work Order: 381174

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.

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: Jimin Cao

Date: 12 OCT 2015

Title: Data Validator

Sample Data Summary

FD Diesel Range, Organics
 October 12, 2015

**Certificate of Analysis
 Sample Summary**

SDG Number: GEL381174	Date Collected: 09/03/2015 13:45	Matrix: OTHERSOLID
Lab Sample ID: 381174001	Date Received: 09/15/2015 08:55	%Moisture: 4.8
Client ID: B32KB3	Client: CPRC001	Project: CPRC0F15053
Batch ID: 1508242	Method: NWTPH-Dx in Soil	SOP Ref: GL-OA-E-003
Run Date: 09/18/2015 18:21	Inst: FID7.I	Dilution: 1
Prep Date: 09/17/2015 10:45	Analyst: LXA1	Inj. Vol: 1 uL
Data File: 091815KERO\7i1813.D	Aliquot: 30.3 g	Final Volume: 1 mL
	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
8008-20-6	Kerosene	U	1150	UG/KG	1150	6930

Quality Control Summary

October 12, 2015

GEL LABORATORIES LLC

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QC Summary

Report Date: October 12, 2015

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 381174

Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD%, REC%, Range, Anlst, Date, Time. Rows include Diesel Range Organics, Kerosene, and **o-Terphenyl for various batches and samples.

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
B The analyte was detected in both the associated QC blank and in the sample.
C Analyte has been confirmed by GC/MS analysis
D Results are reported from a diluted aliquot of sample.
E Concentration exceeds the calibration range of the instrument
J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
N Spike Sample recovery is outside control limits.
P Aroclor target analyte with greater than 25% difference between column analyses.
T Spike and/or spike duplicate sample recovery is outside control limits.
U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
o Analyte failed to recover within LCS limits (Organics only)

October 12, 2015

GEL LABORATORIES LLC

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QC Summary

Workorder: 381174

Page 2 of 2

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

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.

October 12, 2015
FID/MS Range Organic

Surrogate Recovery Report

SDG Number: GEL381174

Matrix Type: SOLID

Sample ID	Client ID	OTP %REC
1203394792	MB for batch 1508241	51
1203394793	LCS for batch 1508241	57
1203394794	LCSD for batch 1508241	64
381174001	B32KB3	74

Surrogate

OTP = o-Terphenyl

Acceptance Limits

(50%-150%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 07-OCT-15	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/FID	Test / Method: NWTPH-Dx in Soil	Matrix Type: Solid	Client Code: CPRC
Batch ID: 1508242	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 381174(GEL381174)			
Application Issues: Failed Recovery for LCS/LCSD Failed Yield for Surrogates			
Specification and Requirements Exception Description:		DER Disposition:	
1. The LCS and LCSD did not meet the spike recovery acceptance limits.		1. The LCS and LCSD did not meet the spike recovery acceptance limits. The data were reported at the client's instruction because the re-extraction was out of holding. 1203394793 (LCS) Kerosene [50* (70%-130%)]. 1203394794 (LCSD) Kerosene [55* (70%-130%)].	

Originator's Name:

Lindsey Jensen 07-OCT-15

Data Validator/Group Leader:

Jimin Cao 12-OCT-15

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL381174
Work Order #: 381174

Sample ID	Client ID
381174001	B32KB3
1203394805	Method Blank (MB)ICP
1203394806	Laboratory Control Sample (LCS)
1203394809	381174001(B32KB3L) Serial Dilution (SD)
1203394807	381174001(B32KB3D) Sample Duplicate (DUP)
1203394808	381174001(B32KB3S) Matrix Spike (MS)
1203394810	Method Blank (MB)ICP-MS
1203394811	Laboratory Control Sample (LCS)
1203394814	381174001(B32KB3L) Serial Dilution (SD)
1203394812	381174001(B32KB3D) Sample Duplicate (DUP)
1203394813	381174001(B32KB3S) Matrix Spike (MS)
1203404321	381174001(B32KB3PS) Post Spike (PS)
1203395309	Method Blank (MB)CVAA
1203395310	Laboratory Control Sample (LCS)
1203395320	381174001(B32KB3L) Serial Dilution (SD)
1203395318	381174001(B32KB3D) Sample Duplicate (DUP)
1203395319	381174001(B32KB3S) Matrix Spike (MS)

Sample Analysis

Sample 381174 001 in this SDG was analyzed on a "dry weight corrected" basis.

Method/Analysis Information

Analytical Batch:	1508248, 1508250 and 1508430
Prep Batch :	1508247, 1508249 and 1508429
Standard Operating Procedures:	GL-MA-E-013 REV# 24, GL-MA-E-009 REV# 25, GL-MA-E-014 REV# 26 and GL-MA-E-010 REV# 30
Analytical Method:	6010_METALS_ICP, 6020_METALS_ICPMS and 7471_HG_CVAA
Prep Method :	SW846 3050B and SW846 7471B Prep

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL

Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm.

Calibration Information

Instrument Calibration

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

CRDL/PQL Requirements

The CRDL/PQL standard recoveries met the referenced advisory control limits.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blanks (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 381174001 (B32KB3)-ICP, ICP-MS and CVAA.

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits for some of the analyte. This verifies the absence of a matrix interference in the post-digested sample. For other analyte the post spike failed verifying the presence of a matrix interference in the post-digested sample. The failing spike recovery may be attributed to possible matrix interference and/or sample non-homogeneity.

Sample	Analyte	Value
1203394813 (B32KB3MS)	Cobalt	45* (75%-125%)
	Lead	71.8* (75%-125%)
	Selenium	61.1* (75%-125%)

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203394812 (B32KB3DUP)	Cobalt	35.9* (0%-20%)
	Lead	38.9* (0%-20%)

Serial Dilution % Difference Statement

All applicable analytes in the serial dilution (SDILT) demonstrated acceptable correlation to its associated sample and met the established acceptance percent difference criteria.

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS did not meet the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the presence of matrix interferences.

Sample	Analyte	Value
1203404321 (B32KB3PS)	Selenium	70.9* (80%-120%)

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. 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. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Sample required dilution for silver in order to minimize suppression due to matrix interferences. 381174001 (B32KB3)-ICP. Sample 381174001 (B32KB3)-ICP-MS was diluted to ensure that the analyte concentration was within the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

Analyte	381174
	001
Several	5X 200X 20X 2X 10X 1X

Preparation Information

The samples in this SDG were not diluted and prepared according to the cited SOP.

Miscellaneous Information

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator’s signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

A Data exception report (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1455976 was generated for

samples 1203394812 (B32KB3DUP), 1203394813 (B32KB3MS) and 1203404321 (B32KB3PS) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

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.

October 12, 2015

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL381174 GEL Work Order: 381174

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.
- 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: Jamie Johnson

Date: 12 OCT 2015

Title: Group Leader

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL381174

METHOD TYPE: SW846

SAMPLE ID: 381174001

CLIENT ID: B32KB3

CONTRACT: CPRC0F15053

MATRIX: OTHERSOLID

DATE RECEIVED 15-SEP-15

LEVEL: Low %SOLIDS: 95.2

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7429-90-5	Aluminum	8740000	ug/kg	D		MS	2930	2	ICPMS7	151001-4
7440-36-0	Antimony	332	ug/kg	U		P	332	1	OPTIMA3	091815A-2
7440-38-2	Arsenic	1950	ug/kg	D		MS	196	2	ICPMS7	151001-4
7440-39-3	Barium	51100	ug/kg	D		MS	489	10	ICPMS7	151008-5
7440-41-7	Beryllium	233	ug/kg	D		MS	19.6	2	ICPMS7	151001-4
7440-43-9	Cadmium	186	ug/kg	BD		MS	19.6	2	ICPMS7	151001-4
7440-47-3	Chromium	10000	ug/kg	D		MS	196	2	ICPMS7	151001-4
7440-48-4	Cobalt	11100	ug/kg	D	*N	MS	58.7	2	ICPMS7	151001-4
7440-50-8	Copper	13100	ug/kg	D		MS	64.5	2	ICPMS7	151001-4
7439-92-1	Lead	3990	ug/kg	D	*N	MS	97.8	2	ICPMS7	151001-4
7439-97-6	Mercury	1050	ug/kg	D		AV	79.4	20	HG3	091815S1-6
7439-98-7	Molybdenum	745	ug/kg	D		MS	58.7	2	ICPMS5	151008-3
7782-49-2	Selenium	1510	ug/kg	D	N	MS	323	2	ICPMS7	151001-4
7440-22-4	Silver	611	ug/kg	BD		P	503	5	OPTIMA3	092115-1
7440-61-1	Uranium	1210000	ug/kg	D		MS	1290	200	ICPMS7	151008-5

***Analytical Methods:**

AV SW846 7471B

P SW846 3050B/6010C

MS SW846 3050B/6020A

Quality Control Summary

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QC Summary

Report Date: October 12, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 381174

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1508250										
QC1203394812 381174001 DUP											
Aluminum	D	8740000	D	8270000	ug/kg	5.52		(0%-20%)	SKJ	10/02/15	00:48
Arsenic	D	1950	D	1620	ug/kg	18.8	^	(+/-980)			
Barium	D	51100	D	44700	ug/kg	13.2		(0%-20%)		10/08/15	14:49
Beryllium	D	233	D	209	ug/kg	10.7	^	(+/-98.0)		10/02/15	00:48
Cadmium	BD	186	BD	176	ug/kg	5.65	^	(+/-196)			
Chromium	D	10000	D	8630	ug/kg	14.8		(0%-20%)			
Cobalt	*DN	11100	*D	7690	ug/kg	35.9*		(0%-20%)			
Copper	D	13100	D	11800	ug/kg	10.6		(0%-20%)			
Lead	*DN	3990	*D	2690	ug/kg	38.9*		(0%-20%)			
Molybdenum	D	745	D	559	ug/kg	28.4	^	(+/-196)	BCD1	10/08/15	22:54
Selenium	DN	1510	BD	751	ug/kg	67.1	^	(+/-980)	SKJ	10/02/15	00:48
Uranium	D	1210000	D	1120000	ug/kg	7.41		(0%-20%)		10/08/15	14:39
QC1203394811 LCS											
Aluminum		197000	D	200000	ug/kg			101 (80%-120%)		10/02/15	00:32
Arsenic		4920	D	4660	ug/kg			94.8 (80%-120%)			
Barium		4920	D	5410	ug/kg			110 (80%-120%)		10/08/15	14:34
Beryllium		4920	D	4880	ug/kg			99.1 (80%-120%)		10/02/15	00:32
Cadmium		4920	D	4780	ug/kg			97.2 (80%-120%)			
Chromium		4920	D	4970	ug/kg			101 (80%-120%)			
Cobalt		4920	D	5020	ug/kg			102 (80%-120%)			

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QC Summary

Workorder: 381174

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1508250										
Copper	4920		D	5040	ug/kg		102	(80%-120%)			
Lead	4920		D	5030	ug/kg		102	(80%-120%)	SKJ	10/02/15	00:32
Molybdenum	4920		D	5190	ug/kg		105	(80%-120%)	BCD1	10/08/15	22:41
Selenium	4920		D	4500	ug/kg		91.3	(80%-120%)	SKJ	10/02/15	00:32
Uranium	4920		D	5630	ug/kg		114	(34%-166%)		10/08/15	14:34
QC1203394810 MB											
Aluminum			DU	ND	ug/kg					10/02/15	00:29
Arsenic			DU	ND	ug/kg						
Barium			DU	ND	ug/kg					10/08/15	14:32
Beryllium			DU	ND	ug/kg					10/02/15	00:29
Cadmium			DU	ND	ug/kg						
Chromium			DU	ND	ug/kg						
Cobalt			DU	ND	ug/kg						
Copper			DU	ND	ug/kg						
Lead			DU	ND	ug/kg						
Molybdenum			DU	ND	ug/kg				BCD1	10/08/15	22:34
Selenium			DU	ND	ug/kg				SKJ	10/02/15	00:29
Uranium			DU	ND	ug/kg					10/08/15	14:32
QC1203394813 381174001 MS											
Aluminum	196000	D	8740000	D	9010000	ug/kg	N/A	(75%-125%)		10/02/15	00:51
Arsenic	4890	D	1950	D	6330	ug/kg	89.6	(75%-125%)			
Barium	4890	D	51100	D	50300	ug/kg	N/A	(75%-125%)		10/08/15	14:50
Beryllium	4890	D	233	D	4750	ug/kg	92.4	(75%-125%)		10/02/15	00:51
Cadmium	4890	BD	186	D	4890	ug/kg	96.1	(75%-125%)			

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QC Summary

Workorder: 381174

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1508250										
Chromium	4890	D	10000	D	15200	ug/kg	105	(75%-125%)	SKJ	10/02/15	00:51
Cobalt	4890	*DN	11100	DN	13300	ug/kg	45 *	(75%-125%)			
Copper	4890	D	13100	D	16900	ug/kg	78.9	(75%-125%)			
Lead	4890	*DN	3990	DN	7500	ug/kg	71.8 *	(75%-125%)			
Molybdenum	4890	D	745	D	5400	ug/kg	95.2	(75%-125%)	BCD1	10/08/15	23:00
Selenium	4890	DN	1510	DN	4490	ug/kg	61.1 *	(75%-125%)	SKJ	10/02/15	00:51
Uranium	4890	D	1210000	D	1030000	ug/kg	N/A	(75%-125%)		10/08/15	14:40
QC1203404321 381174001 PS											
Cobalt	25.0	*DN	56.5	D	77.3	ug/L	83.2	(80%-120%)		10/02/15	00:55
Lead	25.0	*DN	20.4	D	44.0	ug/L	94.4	(80%-120%)			
Selenium	25.0	DN	7.72	D	25.4	ug/L	70.9 *	(80%-120%)			
QC1203394814 381174001 SDILT											
Aluminum		D	44700	D	9650	ug/L	7.89	(0%-10%)		10/02/15	00:59
Arsenic		D	9.98	D	1.29	ug/L	35.5	(0%-10%)			
Barium		D	52.2	D	10.5	ug/L	.126	(0%-10%)		10/08/15	14:51
Beryllium		D	1.19	D	0.235	ug/L	1.18	(0%-10%)		10/02/15	00:59
Cadmium		BD	0.952	D	0.164	ug/L	13.9	(0%-10%)			
Chromium		D	51.2	D	10.4	ug/L	1.71	(0%-10%)			
Cobalt		*DN	56.5	D	12.3	ug/L	8.81	(0%-10%)			
Copper		D	66.8	D	14.5	ug/L	8.38	(0%-10%)			
Lead		*DN	20.4	D	4.38	ug/L	7.32	(0%-10%)			
Molybdenum		D	3.81	D	0.764	ug/L	.315	(0%-10%)	BCD1	10/08/15	23:14
Selenium		DN	7.72	DU	ND	ug/L	N/A	(0%-10%)	SKJ	10/02/15	00:59

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1508250										
Uranium	D	61.7	D	13.0	ug/L	5.29		(0%-10%)	SKJ	10/08/15	14:42
Metals Analysis-ICP											
Batch	1508248										
QC1203394807	381174001	DUP									
Antimony	U	ND	U	ND	ug/kg	N/A			HSC	09/18/15	18:10
Silver	BD	611	BD	774	ug/kg	23.4 ^		(+/-2560)		09/21/15	11:49
QC1203394806	LCS										
Antimony	48700			46000	ug/kg		94.5	(80%-120%)		09/18/15	18:03
Silver	48700			48000	ug/kg		98.4	(80%-120%)		09/21/15	11:43
QC1203394805	MB										
Antimony			U	ND	ug/kg					09/18/15	18:00
Silver			U	ND	ug/kg					09/21/15	11:39
QC1203394808	381174001	MS									
Antimony	49700	U	ND	42400	ug/kg		85.3	(75%-125%)		09/18/15	18:14
Silver	49700	BD	611	D	51900	ug/kg		103	(75%-125%)	09/21/15	11:53
QC1203394809	381174001	SDILT									
Antimony	U	ND	DU	ND	ug/L	N/A		(0%-10%)		09/18/15	18:20
Silver	BD	1.22	DU	ND	ug/L	N/A		(0%-10%)		09/21/15	11:59
Metals Analysis-Mercury											
Batch	1508430										
QC1203395318	381174001	DUP									
Mercury	D	1050	D	1000	ug/kg	4.41 ^		(+/-240)	MTM1	09/18/15	12:06
QC1203395310	LCS										
Mercury	10400		D	9600	ug/kg		92.3	(80%-120%)		09/18/15	12:02
QC1203395309	MB										
Mercury			U	ND	ug/kg					09/18/15	10:15
QC1203395319	381174001	MS									
Mercury	121	D	1050	D	929	ug/kg		N/A	(80%-120%)	09/18/15	12:08
QC1203395320	381174001	SDILT									

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QC Summary

Workorder: 381174

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch	1508430										
Mercury	D	0.886	D	0.174	ug/L	1.81		(0%-10%)		09/18/15	12:09

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= 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.

Miscellaneous

DATA EXCEPTION REPORT

Mo.Day Yr. 10-OCT-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP/MS	Test / Method: SW846 3050B/6020A	Matrix Type: Solid	Client Code: CPRC
Batch ID: 1508250	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 381174(GEL381174)

Application Issues:

Failed Recovery for MS/MSD, or PS/PSD

Failed RPD for DUP

Failed Recovery for PS/PSD

Specification and Requirements Exception Description:	DER Disposition:
<p>1. Failed RPD for DUP: QC 1203394812DUP</p> <p>2. Failed Recovery for MS/MSD, or PS/PSD: QC 1203394813MS</p> <p>3. Failed Recovery for PS/PSD: QC 1203404321PS</p>	<p>1. Not all the applicable analyte RPD values were within the acceptance criteria. 1203394812 (B32KB3DUP) Cobalt [35.9* (0%-20%)] and Lead [38.9* (0%-20%)].</p> <p>2. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits for some of the analyte. This verifies the absence of a matrix interference in the post-digested sample. For other analyte the post spike failed verifying the presence of a matrix interference in the post-digested sample. The failing spike recovery may be attributed to possible matrix interference and/or sample non-homogeneity. 1203394813 (B32KB3MS) Cobalt [45* (75%-125%)], Lead [71.8* (75%-125%)] and Selenium [61.1* (75%-125%)].</p> <p>3. The PS did not meet the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the presence of matrix interferences. 1203404321 (B32KB3PS) Selenium [70.9* (80%-120%)].</p>

Originator's Name:

Samantha Jacobs 10-OCT-15

Data Validator/Group Leader:

Elizabeth Janssen 12-OCT-15

Radiological Analysis

October 12, 2015

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL381174

Work Order #: 381174

Method/Analysis Information

Product: PUIISO_PLATE_AEA:COMMON

Analytical Method: PUIISO_PLATE_AEA

Prep Method: Dry Soil Prep

Analytical Batch Number: 1508663

Prep Batch Number: 1508070

Sample ID	Client ID
381174001	B32KB3
1203395863	Method Blank (MB)
1203395865	Laboratory Control Sample (LCS)
1203395864	381174001(B32KB3) Sample Duplicate (DUP)

Sample 381174 001 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 381174001 (B32KB3).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: Refer to Data Exception Report (DER).

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

A data exception report (DER) 1454613 was generated for sample 1203395865 (LCS) in this SDG/batch. DER 1454613 was generated due to Other. 1. Sample 1203395865 does not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-236 tracer. 1. The sample does meet the tracer yield requirement, the detection limits, and its tracer peak is within the Pu-236 region of interest. Reporting results.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	UIISO_PLATE_AEA:COMMON
Analytical Method:	UIISO_IE_PRECIP_AEA
Prep Method:	Dry Soil Prep
Analytical Batch Number:	1508667
Prep Batch Number:	1508070

Sample ID	Client ID
381174001	B32KB3
1203395875	Method Blank (MB)

October 12, 2015

1203395877 Laboratory Control Sample (LCS)
1203395876 381174001(B32KB3) Sample Duplicate (DUP)

Sample 381174 001 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 381174001 (B32KB3).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The U-233/234 and U-235/236 blank activities are greater than the MDC but is less than five percent of the lowest activity in the batch.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GAMMA_GS:COMMON

Analytical Method: GAMMA_GS

Prep Method: Dry Soil Prep

Analytical Batch Number: 1508074

Prep Batch Number: 1508070

Sample ID	Client ID
381174001	B32KB3
1203394403	Method Blank (MB)
1203394405	Laboratory Control Sample (LCS)
1203394404	381174001(B32KB3) Sample Duplicate (DUP)

Sample 381174 001 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 381174001 (B32KB3).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The blank 1203394403 (MB) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: DER 1450385 was generated due to RDL less than MDA. 1. RDL less than MDA for Co-60, Eu-152, Eu-154 and Eu-155 due to high sample activity: 381174001 and 1203394404DUP 1. Reporting Results.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	SRISO_SEP_PRECIP_GPC: COMMON
Analytical Method:	SRISO_SEP_PRECIP_GPC
Prep Method:	Dry Soil Prep
Analytical Batch Number:	1508674
Prep Batch Number:	1508070

Sample ID Client ID

October 12, 2015

381174001 B32KB3
1203395888 Method Blank (MB)
1203395890 Laboratory Control Sample (LCS)
1203395889 381174001(B32KB3) Sample Duplicate (DUP)

Sample 381174 001 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 17.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 381174001 (B32KB3).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203395888 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Chemical Recoveries

All chemical recoveries meet the required acceptance limits for this sample set.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: 9310_ALPHABETA_GPC: COMMON
Analytical Method: 9310_ALPHABETA_GPC
Prep Method: Dry Soil Prep
Analytical Batch Number: 1508676
Prep Batch Number: 1508070

Sample ID	Client ID
381174001	B32KB3
1203395891	Method Blank (MB)
1203395895	Laboratory Control Sample (LCS)
1203395892	381174001(B32KB3) Sample Duplicate (DUP)
1203395893	381174001(B32KB3) Matrix Spike (MS)
1203395894	381174001(B32KB3) Matrix Spike Duplicate (MSD)

Sample 381174 001 in this SDG was analyzed on a "dry weight corrected" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001B REV# 17.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The discrimination settings are calibrated in beta discriminating mode to reduce beta to alpha crosstalk.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 381174001 (B32KB3).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203395891 (MB) , did not meet the alpha nor beta detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required prep or reanalysis.

Gross Alpha/Beta Preparation Information

None of the samples have been flamed.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

Analytical Batch Number: 1508677

Sample ID	Client ID
381174001	B32KB3
1203395896	Method Blank (MB)
1203395898	Laboratory Control Sample (LCS)
1203395897	381174001(B32KB3) Sample Duplicate (DUP)

Sample 381174 001 in this SDG was analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-059 REV# 3.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 381174001 (B32KB3).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

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.

October 12, 2015

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL381174 GEL Work Order: 381174

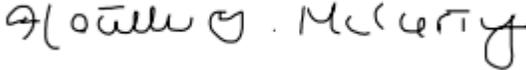
The Qualifiers in this report are defined as follows:

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: 09 OCT 2015

Title: Analyst II

DATA EXCEPTION REPORT

Mo.Day Yr. 22-SEP-15	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: GAMMA SPECTROMETER	Test / Method: DOE HASL 300, 4.5.2.3/Ga-01-R	Matrix Type: Solid	Client Code: CPRC
Batch ID: 1508074	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 381174(GEL381174)			
Application Issues: RDL less than MDA			
Specification and Requirements Exception Description:		DER Disposition:	
1. RDL less than MDA for Co-60, Eu-152, Eu-154 and Eu-155 due to high sample activity: 381174001 and 1203394404DUP		1. Reporting Results.	

Originator's Name:

Tim Winters 22-SEP-15

Data Validator/Group Leader:

Shenise Gerideau 28-SEP-15

DATA EXCEPTION REPORT

Mo.Day Yr. 06-OCT-15	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: ALPHA SPECTROMETER	Test / Method: DOE EML HASL-300, Pu-11-RC Modified	Matrix Type: Solid	Client Code: CPRC
Batch ID: 1508663	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 381174(GEL381174)			
Application Issues: Other			
Specification and Requirements Exception Description:		DER Disposition:	
1. Sample 1203395865 does not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-236 tracer.		1. The sample does meet the tracer yield requirement, the detection limits, and its tracer peak is within the Pu-236 region of interest. Reporting results.	

Originator's Name:
Melanie Aycock 06-OCT-15

Data Validator/Group Leader:
Jessica Davis 06-OCT-15

Sample Data Summary

October 12, 2015
Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL381174	Client: CPRC001	Project: CPRC0F15053
Lab Sample ID: 381174001	Date Collected: 09/03/2015 13:45	Matrix: OTHERSOLID
	Date Received: 09/15/2015 08:55	%Moisture: 4.8
Client ID: B32KB3		Prep Basis: "Dry Weight Corrected"
Batch ID: 1508074	Method: GAMMA_GS	SOP Ref: GL-RAD-A-013
Run Date: 09/21/2015 12:34	Analyst: JXC5	Instrument: WELL
Data File: G381174001.CNF;1	Aliquot: 125.483 g	Count Time: 120 min
Prep Batch: 1508074	Prep Method: DOE HASL 300, 4.5.2.3/Ga-01	Prep SOP Ref: GL-RAD-A-021
Prep Date: 09/18/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137		7980	pCi/g	+/-9.61	649	1.83	0.100
10198-40-0	Cobalt-60	U	0.0244	pCi/g	+/-0.0828	0.0835	0.142	0.050
14683-23-9	Europium-152	U	-2.41	pCi/g	+/-4.30	4.44	7.39	0.100
15585-10-1	Europium-154	U	-0.126	pCi/g	+/-0.603	0.605	1.02	0.100
14391-16-3	Europium-155	U	-3.95	pCi/g	+/-2.94	3.46	5.03	0.100

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).

October 12, 2015
Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL381174	Client: CPRC001	Project: CPRC0F15053
Lab Sample ID: 381174001	Date Collected: 09/03/2015 13:45	Matrix: OTHERSOLID
	Date Received: 09/15/2015 08:55	%Moisture: 4.8
Client ID: B32KB3		Prep Basis: "Dry Weight Corrected"
Batch ID: 1508663	Method: PUIISO_PLATE_AEA	SOP Ref: GL-RAD-A-011
Run Date: 09/24/2015 11:51	Analyst: BSW1	Instrument: 1087
Data File: S0381174001_PU.1A.gcnf	Aliquot: 0.04862 g	Count Time: 239.9998 min
Prep Batch: 1508663	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 09/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.307	pCi/g	+/-0.737	0.739	1.33	1.00
OER-100-70	Plutonium-239/240	U	0.185	pCi/g	+/-0.510	0.510	0.884	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-236 Tracer	24.3	28.3	pCi/g	85.8	(15%-125%)

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).

October 12, 2015
Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL381174	Client: CPRC001	Project: CPRC0F15053
Lab Sample ID: 381174001	Date Collected: 09/03/2015 13:45	Matrix: OTHERSOLID
	Date Received: 09/15/2015 08:55	%Moisture: 4.8
Client ID: B32KB3		Prep Basis: "Dry Weight Corrected"
Batch ID: 1508667	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 09/23/2015 14:03	Analyst: JXC5	Instrument: 1022
Data File: S0381174001_UU.1A.gcnf	Aliquot: 0.04862 g	Count Time: 505 min
Prep Batch: 1508667	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 09/22/2015 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		332	pCi/g	+/-9.37	47.5	0.206	1.00
15117-96-1/13982-7	Uranium-235/236		28.3	pCi/g	+/-2.74	4.82	0.486	1.00
7440-61-1	Uranium-238		346	pCi/g	+/-9.56	49.4	0.206	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	35.9	44.6	pCi/g	80.6	(15%-125%)

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).

October 12, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL381174	Client: CPRC001	Project: CPRC0F15053
Lab Sample ID: 381174001	Date Collected: 09/03/2015 13:45	Matrix: OTHERSOLID
	Date Received: 09/15/2015 08:55	%Moisture: 4.8
Client ID: B32KB3		Prep Basis: "Dry Weight Corrected"
Batch ID: 1508674	Method: SRISO_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 09/23/2015 13:06	Analyst: TC1	Instrument: LB4100G1
Data File: S1508674.xls	Aliquot: 0.09724 g	Count Time: 60 min
Prep Batch: 1508674	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 09/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		306	pCi/g	+/-16.0	57.9	6.70	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.90	8.10	mg	85.2	(25%-125%)

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).

October 12, 2015

**Certificate of Analysis
Sample Summary**

SDG Number: GEL381174
Lab Sample ID: 381174001

Client: CPRC001
Date Collected: 09/03/2015 13:45
Date Received: 09/15/2015 08:55

Project: CPRC0F15053
Matrix: OTHERSOLID
%Moisture: 4.8

Client ID: B32KB3
Batch ID: 1508676
Run Date: 09/23/2015 16:34
Data File: AB1508676.xls
Prep Batch: 1508676
Prep Date: 09/23/2015 00:00

Method: 9310_ALPHABETA_GPC
Analyst: JXC5
Aliquot: 0.01945 g
Prep Method: EPA 900.0/SW846 9310/SM 71

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-001B
Instrument: LB4100G1
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		707	pCi/g	+/-85.7	162	35.5	5.00
12587-47-2	Beta BETA		5210	pCi/g	+/-133	676	28.3	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).

October 12, 2015
Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL381174	Client: CPRC001	Project: CPRC0F15053
Lab Sample ID: 381174001	Date Collected: 09/03/2015 13:45	Matrix: OTHERSOLID
	Date Received: 09/15/2015 08:55	%Moisture: 4.8
Client ID: B32KB3		Prep Basis: "As Received"
Batch ID: 1508677	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 09/27/2015 22:19	Analyst: JXC5	Instrument: LSCSILVER
Data File: E1508677.xls	Aliquot: 1.1003 g	Count Time: 15 min
Prep Batch: 1508677	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 09/23/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-0.747	pCi/g	+/-2.67	2.67	4.73	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	22900	29400	CPM	77.8	(15%-125%)

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).

Quality Control Data

GEL LABORATORIES LLC

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

QC Summary

Report Date: October 9, 2015
Page 1 of 5

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 381174

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
High Rad Testing									
Batch	1508074								
QC1203394403	MB								
Cesium-137			U	0.0272	pCi/g			JXC5	09/21/1517:02
				Uncert: +/-0.052					
				TPU: +/-0.0534					
Cobalt-60			U	0.0143	pCi/g				
				Uncert: +/-0.0419					
				TPU: +/-0.0424					
Europium-152			U	0.00518	pCi/g				
				Uncert: +/-0.0891					
				TPU: +/-0.0891					
Europium-154			U	-0.0487	pCi/g				
				Uncert: +/-0.0989					
				TPU: +/-0.101					
Europium-155			U	-0.052	pCi/g				
				Uncert: +/-0.0959					
				TPU: +/-0.0989					
QC1203394404	381174001	DUP							
Cesium-137		7980		7920	pCi/g				09/21/1514:54
				Uncert: +/-9.61		RPD: 1	(0% - 20%)		
				TPU: +/-649		RER: 0.124	(0-2)		
Cobalt-60		U 0.0244	U	0.0148	pCi/g				
				Uncert: +/-0.0828		RPD: 0	N/A		
				TPU: +/-0.0835		RER: 0.157	(0-2)		
Europium-152		U -2.41	U	0.321	pCi/g				
				Uncert: +/-4.30		RPD: 0	N/A		
				TPU: +/-4.44		RER: 0.867	(0-2)		
Europium-154		U -0.126	U	0.413	pCi/g				
				Uncert: +/-0.603		RPD: 0	N/A		
				TPU: +/-0.605		RER: 1.24	(0-2)		
Europium-155		U -3.95	U	-1.74	pCi/g				
				Uncert: +/-2.94		RPD: 0	N/A		
				TPU: +/-3.46		RER: 0.939	(0-2)		
QC1203394405	LCS								
Americium-241		534		560	pCi/g	REC: 105	(80%-120%)		09/22/1505:42
				Uncert: +/-5.19					
				TPU: +/-61.8					
Cesium-137		182		176	pCi/g	REC: 97	(80%-120%)		
				Uncert: +/-2.23					
				TPU: +/-14.5					
Cobalt-60		150		140	pCi/g	REC: 93	(80%-120%)		
				Uncert: +/-2.28					
				TPU: +/-13.0					
Europium-152			U	1.56	pCi/g				
				Uncert: +/-1.71					
				TPU: +/-1.85					

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
High Rad Testing									
Batch	1508074								
Europium-154			U	-0.548	pCi/g				
				Uncert: +/-0.893					
				TPU: +/-0.928					
Europium-155			U	0.284	pCi/g				
				Uncert: +/-1.05					
				TPU: +/-1.06					
Batch	1508663								
QC1203395863	MB								
Plutonium-238			U	0.651	pCi/g			BSW1	09/24/1511:51
				Uncert: +/-0.807					
				TPU: +/-0.814					
Plutonium-239/240			U	-0.102	pCi/g				
				Uncert: +/-0.463					
				TPU: +/-0.464					
**Plutonium-236 Tracer		27.9		23.0	pCi/g	REC: 82	(15%-125%)		
				Uncert: +/-4.04					
				TPU: +/-6.03					
QC1203395864	381174001	DUP							
Plutonium-238		U 0.307	U	0.198	pCi/g				09/24/1509:19
				Uncert: +/-0.737		RPD: 0	N/A		
				TPU: +/-0.739		RER: 0.221	(0-2)		
Plutonium-239/240		U 0.185	U	0.456	pCi/g				
				Uncert: +/-0.510		RPD: 0	N/A		
				TPU: +/-0.510		RER: 0.624	(0-2)		
**Plutonium-236 Tracer		28.3	24.3	25.0	pCi/g	REC: 88	(15%-125%)		
				Uncert: +/-4.00					
				TPU: +/-5.98					
QC1203395865	LCS								
Plutonium-238				1.09	pCi/g				
				Uncert: +/-0.859					
				TPU: +/-0.876					
Plutonium-239/240		40.5		44.8	pCi/g	REC: 111	(80%-120%)		
				Uncert: +/-5.00					
				TPU: +/-8.64					
**Plutonium-236 Tracer		27.9		22.4	pCi/g	REC: 80	(15%-125%)		
				Uncert: +/-3.95					
				TPU: +/-5.91					
Batch	1508667								
QC1203395875	MB								
Uranium-233/234				0.982	pCi/g			JXC5	09/23/1514:03
				Uncert: +/-0.542					
				TPU: +/-0.559					
Uranium-235/236				0.797	pCi/g				
				Uncert: +/-0.583					
				TPU: +/-0.593					
Uranium-238			U	0.519	pCi/g				
				Uncert: +/-0.512					
				TPU: +/-0.517					
**Uranium-232 Tracer		44.6		40.2	pCi/g	REC: 90	(15%-125%)		

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
High Rad Testing									
Batch	1508667								
		Uncert:		+/-3.30					
		TPU:		+/-7.04					
QC1203395876	381174001	DUP							
Uranium-233/234		332		335	pCi/g				09/23/1513:51
		Uncert:	+/-9.37	+/-10.7		RPD: 1	(0% - 20%)		
		TPU:	+/-47.5	+/-50.1		RER: 0.0614	(0-2)		
Uranium-235/236		28.3		25.1	pCi/g				
		Uncert:	+/-2.74	+/-2.94		RPD: 12	(0% - 20%)		
		TPU:	+/-4.82	+/-4.70		RER: 0.933	(0-2)		
Uranium-238		346		345	pCi/g				
		Uncert:	+/-9.56	+/-10.8		RPD: 0	(0% - 20%)		
		TPU:	+/-49.4	+/-51.6		RER: 0.0309	(0-2)		
**Uranium-232 Tracer		44.6	35.9	36.1	pCi/g	REC: 81	(15%-125%)		
		Uncert:	+/-3.47	+/-3.93					
		TPU:	+/-7.21	+/-7.67					
QC1203395877	LCS								
Uranium-233/234				57.8	pCi/g				09/23/1513:51
		Uncert:		+/-4.29					
		TPU:		+/-9.38					
Uranium-235/236				3.56	pCi/g				
		Uncert:		+/-1.08					
		TPU:		+/-1.20					
Uranium-238		55.9		60.7	pCi/g	REC: 109	(80%-120%)		
		Uncert:		+/-4.39					
		TPU:		+/-9.81					
**Uranium-232 Tracer		44.6		38.8	pCi/g	REC: 87	(15%-125%)		
		Uncert:		+/-3.79					
		TPU:		+/-7.53					
Batch	1508674								
QC1203395888	MB								
Strontium-90			U	2.29	pCi/g			TC1	09/23/1513:06
		Uncert:		+/-3.61					
		TPU:		+/-3.63					
**Strontium Carrier		8.10		6.90	mg	REC: 85	(25%-125%)		
QC1203395889	381174001	DUP							
Strontium-90		306		304	pCi/g				
		Uncert:	+/-16.0	+/-15.3		RPD: 1	(0% - 20%)		
		TPU:	+/-57.9	+/-56.4		RER: 0.0413	(0-2)		
**Strontium Carrier		8.10	6.90	7.10	mg	REC: 88	(25%-125%)		
QC1203395890	LCS								
Strontium-90		1120		996	pCi/g	REC: 89	(80%-120%)		09/23/1513:03
		Uncert:		+/-27.9					
		TPU:		+/-182					
**Strontium Carrier		8.10		7.20	mg	REC: 89	(25%-125%)		
Batch	1508676								
QC1203395891	MB								
Alpha			U	-1.37	pCi/g			JXC5	09/23/1516:34
		Uncert:		+/-9.59					
		TPU:		+/-9.60					
Beta			U	6.30	pCi/g				

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
High Rad Testing									
Batch	1508676								
		Uncert:		+/-14.7					
		TPU:		+/-14.7					
QC1203395892	381174001	DUP							
Alpha		707		841	pCi/g				09/23/1516:34
		Uncert:	+/-85.7	+/-92.5		RPD: 17	(0% - 20%)		
		TPU:	+/-162	+/-183		RER: 1.08	(0-2)		
Beta		5210		5280	pCi/g				
		Uncert:	+/-133	+/-133		RPD: 1	(0% - 20%)		
		TPU:	+/-676	+/-673		RER: 0.137	(0-2)		
QC1203395893	381174001	MS							
Alpha		616	707	1410	pCi/g	REC: 114	(75%-125%)		09/23/1516:33
		Uncert:	+/-85.7	+/-114					
		TPU:	+/-162	+/-282					
Beta		2230	5210	7640	pCi/g	REC: 109	(75%-125%)		
		Uncert:	+/-133	+/-165					
		TPU:	+/-676	+/-972					
QC1203395894	381174001	MSD							
Alpha		616	707	1450	pCi/g	REC: 121	(75%-125%)		
		Uncert:	+/-85.7	+/-109		RPD: 3	(0%-20%)		
		TPU:	+/-162	+/-287		RER: 0.201	(0-2)		
Beta		2230	5210	7750	pCi/g	REC: 114	(75%-125%)		
		Uncert:	+/-133	+/-162		RPD: 1	(0%-20%)		
		TPU:	+/-676	+/-975		RER: 0.157	(0-2)		
QC1203395895	LCS								
Alpha		616		643	pCi/g	REC: 104	(80%-120%)		09/23/1516:33
		Uncert:		+/-61.2					
		TPU:		+/-132					
Beta		2230		2540	pCi/g	REC: 114	(80%-120%)		
		Uncert:		+/-92.6					
		TPU:		+/-333					
Batch	1508677								
QC1203395896	MB								
Technetium-99			U	-1.29	pCi/g			JXC5	09/27/1522:36
		Uncert:		+/-2.26					
		TPU:		+/-2.26					
**Technetium-99m Tracer		29400		22400	CPM	REC: 76	(15%-125%)		
QC1203395897	381174001	DUP							
Technetium-99		U	-0.747	U	-0.493	pCi/g			09/27/1522:53
		Uncert:	+/-2.67	+/-2.46		RPD: 0	N/A		
		TPU:	+/-2.67	+/-2.46		RER: 0.137	(0-2)		
**Technetium-99m Tracer		29400	22900	20800	CPM	REC: 71	(15%-125%)		
QC1203395898	LCS								
Technetium-99		65.4		60.2	pCi/g	REC: 92	(80%-120%)		09/27/1523:10
		Uncert:		+/-4.11					
		TPU:		+/-8.05					
**Technetium-99m Tracer		29400		23500	CPM	REC: 80	(15%-125%)		

Notes:

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

The Qualifiers in this report are defined as follows:

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
*						Duplicate analysis not within control limits				
+						Correlation coefficient for Method of Standard Additions (MSA) is < 0.995				
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.