



June 28, 2017

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

Re: CHPRC SAF FRC16-09  
Work Order: 425386  
SDG: GEL425386

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 14, 2017. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

*B Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Purchase Order: 304291 - 8C  
Chain of Custody: FRC16-09-061, FRC16-09-062, FRC16-09-063 and FRC16-09-064  
Enclosures

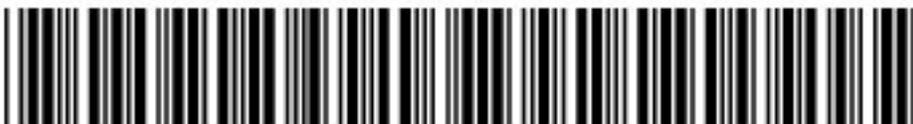


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# Case Narrative

June 28, 2017

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF FRC16-09  
SDG: GEL425386

June 28, 2017

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 14, 2017, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

**Sample Identification**

The laboratory received the following samples:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7

**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.

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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, Metals and Radiochemistry.

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

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

June 28, 2017

Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL425386  
Work Order #: 425386

**GC/MS Semivolatile**

**Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry**

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

**Diesel Range Organics**

**Analysis of Diesel Range Organics by Flame Ionization Detector**

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

**Quality Control (QC) Information**

**Surrogate Recoveries**

Samples (See Below) did not meet the client specified limits; however, the recoveries were within the lab's statistically derived limits. Outliers were expected and the data were reported.

Sample	Analyte	Value
1203811208 (MB)	o-Terphenyl	41* (60.0%-140.0%)
1203811214 (LCS)	o-Terphenyl	54* (60%-140%)
425386002 (B38JM5)	o-Terphenyl	53* (60%-140%)
425386003 (B38JM6)	o-Terphenyl	59* (60%-140%)

**Laboratory Control Sample (LCS/LCSD) Recovery**

LCS (See Below) did not meet the client specified limits; however, the recoveries were within the lab's statistically derived limits. Outliers were expected and the data were reported.

Sample	Analyte	Value
1203811209 (LCS)	Diesel Range Organics	69* (70%-130%)
1203811214 (LCS)	Kerosene	47* (70.0%-130.0%)
1203811215 (LCSD)	Kerosene	58* (70.0%-130.0%)

**Matrix Spike (MS/MSD) Recovery Statement**

The MS and/or MSD (See Below) did not meet spike recovery acceptance limits. The associated MS or MSD did not confirm. The LCS passed spike recovery limits. The poor extraction appeared to be isolated to the MS or MSD only and the data were reported.

Sample	Analyte	Value
1203811211 (B38JM4MSD)	Diesel Range Organics	67* (70%-130%)

**Miscellaneous Information**

**Manual Integrations**

Samples 1203811209 (LCS), 1203811210 (B38JM4MS) and 1203811211 (B38JM4MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

**Metals**

**Determination of Metals by ICP-MS**

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

**Quality Control (QC) Information**

**Duplicate Relative Percent Difference (RPD) Statement**

Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203811444 (B38JM4DUP)	Uranium	32.5* (0%-20%)

**Technical Information**

**Sample Dilutions**

The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	425386			
	001	002	003	004
Uranium	2X	2X	2X	2X

**Radiochemistry**

**AMCMISO\_EIE\_PRECIP\_AEA: COMMON**

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

**PUISO\_PRECIP\_AEA:COMMON**

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

**Miscellaneous Information**

**UIISO\_IE\_PRECIP\_AEA:COMMON**

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

**Dry Weight**

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

**GAMMA\_GS:COMMON**

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

**SRTOT\_SEP\_PRECIP\_GPC: COMMON**

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

**Technical Information**

**Recounts**

Sample 1203814268 (B38JM4DUP) was recounted due to results more negative than the three sigma TPU. The

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second count is reported. Sample 425386004 (B38JM7) was recounted due to a suspected false positive. The recount is reported. Sample 425386003 (B38JM6) was recounted to confirm sample result. The recount is reported.

**Certification Statement**

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

# **Chain of Custody and Supporting Documentation**

June 28, 2017

425386

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

CH2M Hill Plateau Remediation Company  
**COLLECTOR** D. CLEGG  
**SAMPLING LOCATION** 316-4 Overburden Row 6 Section A Composite 1  
**ICE CHEST NO.** WCH-11-059  
**SHIPPED TO** GEL Laboratories, LLC

**COMPANY CONTACT** NAGEL, SE  
**TELEPHONE NO.** 373-5869  
**PROJECT COORDINATOR** NAGEL, SE  
**SAF NO.** FRC16-09  
**PRICE CODE** 8C  
**AIR QUALITY**   
**METHOD OF SHIPMENT** FEDERAL EXPRESS  
**PAGE 1 OF 1**

**PROJECT DESIGNATION** 316-4 Overburden/Layback Sampling - Soil  
**FIELD LOGBOOK NO.** HNF-N-880  
**ACTUAL SAMPLE DEPTH** N/A  
**COA** 7446 613-17  
**304291-304285**  
**BILL OF LADING/AIR BILL NO.** Fed Ex 7793 9291 2548

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	Cool <=6C	Cool <=6C	None	None	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME	DATE/TIME	DATE/TIME
B38JM4	SOIL	NA	1	125mL	125mL	60mL	14/40 Days	G	1	125mL	6020_METALS_ICPMS_COMMON (Add-on) (Uranium);	6/13/17	0930	6/13/17	6/13/17

**SPECIAL INSTRUCTIONS**

(1) WTPH\_DIESEL: COMMON {Total petroleum hydrocarbons - diesel range}; WTPH\_KEROSENE: COMMON {Total petroleum hydrocarbons - kerosene range}; WTPH\_MOTOR OIL: COMMON {Total petroleum hydrocarbons - motor oil (high boiling)};

(2) 8270\_SVOA\_GCMS: COMMON (Add-on) {Tributyl phosphate};

(3) GAMMA\_GS: COMMON {Cesium-137}; AMCMISO\_IE\_PRECIP\_AEA: COMMON {Americium-241}; PUIISO\_IE\_PRECIP\_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UIISO\_IE\_PRECIP\_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};

SRROT\_SEP\_PRECIP\_GPC: COMMON {Total beta radiostrontium};

**CHAIN OF POSSESSION**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Steve Clegg	6-13-17 0930	RT Coffey/Jan/RT Clegg	6/13/17 1030
RT Coffey/Jan/RT Clegg	6/13/17 1120	J.P. Williamson	6-13-17 1120
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
J.P. Williamson	6-13-17 1500	Fed Ex	6-13-17
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
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  
**FINAL SAMPLE DISPOSITION** DISPOSAL METHOD  
**PRINTED ON** 1/4/2017  
**FSR ID = FSR40865**  
**TRVL NUM = TRVL-17-057**  
**A-6003-618 (REV 2)**

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**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

CH2M Hill Plateau Remediation Company  
**COLLECTOR** D. CLEGG  
**SAMPLING LOCATION** 316-4 Overburden Row 6 Section A Composite 2  
**ICE CHEST NO.** WCH-11-059

**COMPANY CONTACT** NAGEL, SE  
**TELEPHONE NO.** 373-5869  
**PROJECT COORDINATOR** NAGEL, SE  
**PRICE CODE** 8C  
**DATA TURNAROUND** 15 Days / 15 Days

**PROJECT DESIGNATION** 316-4 Overburden/Layback Sampling - Soil  
**FIELD LOGBOOK NO.** HNF-N-880  
**ACTUAL SAMPLE DEPTH** N/A  
**SAF NO.** FRC16-09  
**AIR QUALITY**   
**METHOD OF SHIPMENT** FEDERAL EXPRESS

**OFFSITE PROPERTY NO.** PTR# 8035  
**COA** TR# 6-13-17  
**30429#** 304285  
**BILL OF LADING/AIR BILL NO.** Fed Ex 7793 9291 2548

**ORIGINAL**

MATRIX*	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE TIME	
							DATE	TIME
None	Cool <=6C	None	G	1	125mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS (Uranium);	6/13/17	0950
6 Months	Cool <=6C	14/40 Days	ag	1	125mL	SEE ITEM (2) IN SPECIAL INSTRUCTIONS (Uranium);		
G/P	Cool <=6C	6 Months	G	1	60mL	SEE ITEM (3) IN SPECIAL INSTRUCTIONS (Uranium);		

**SPECIAL INSTRUCTIONS**

(1) WTPH\_DIESEL: COMMON {Total petroleum hydrocarbons - diesel range}; WTPH\_KEROSENE: COMMON {Total petroleum hydrocarbons - kerosene range}; WTPH\_MOTOR OIL: COMMON {Total petroleum hydrocarbons - motor oil (high boiling)};

(2) 8270\_SVOA\_GCMS: COMMON (Add-on) {Tributyl phosphate};

(3) GAMMA\_GS: COMMON {Cesium-137}; AMCMISO\_IE\_PRECIP\_AEA: COMMON {Americium-241}; PUIISO\_IE\_PRECIP\_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UIISO\_IE\_PRECIP\_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};

SRTOT\_SEP\_PRECIP\_GPC: COMMON {Total beta radiostrontium};

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	RT COFFMAN/RT COFFMAN	RECEIVED BY/STORED IN	6/13/17 1030
RELINQUISHED BY/REMOVED FROM	T.R. Edmondson	RECEIVED BY/STORED IN	6-13-17 1120
RELINQUISHED BY/REMOVED FROM	Fed Ex	RECEIVED BY/STORED IN	6-13-17
RELINQUISHED BY/REMOVED FROM	ATTN: STACY BOONE	RECEIVED BY/STORED IN	6/14/17 9:20

LABORATORY SECTION	RECEIVED BY	DATE/TIME
B38JM5 <td>SOIL <td></td> </td>	SOIL <td></td>	



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CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		FRC16-09-064	PAGE 1 OF 1
COLLECTOR <b>D. CLEGG</b>	COMPANY CONTACT NAGEL, SE	TELEPHONE NO. 373-5869	PROJECT COORDINATOR NAGEL, SE	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION 316-4 Overburden Row 6 Section A Grab 2	PROJECT DESIGNATION 316-4 Overburden/Layback Sampling - Soil	ACTUAL SAMPLE DEPTH N/A	SAF NO. FRC16-09	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. WCH-16-059	FIELD LOGBOOK NO. HNF-N-880	OFFSITE PROPERTY NO. PTR# 8035	COA FRC16-09-17 304285	BILL OF LADING/AIR BILL NO. FedEx 7793 9291 2548	
SHIPPED TO GEL Laboratories, LLC					

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME
A=Air DL=Drum L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	*Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. TR# 6-13-17	None	1	125mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	6/13/17	1015
		Cool <=6C	1	125mL	SEE ITEM (2) IN SPECIAL INSTRUCTIONS		
		14/40 Days	1	60mL	6020 .METALS. ICPMS: COMMON (Add-on) (Uranium);		
		6 Months	1		SEE ITEM (3) IN SPECIAL INSTRUCTIONS		
		G/P	1				
		6 Months	1				
		G/P	1				
B38JM7	SOIL						

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM Diana Clegg DeCh		RECEIVED BY/STORED IN R. COFFMAN/R. COFFMAN	DATE/TIME 6-13-17 1030
RELINQUISHED BY/REMOVED FROM R. COFFMAN/R. COFFMAN		RECEIVED BY/STORED IN T.R. Edmondson	DATE/TIME 6-13-17 1120
RELINQUISHED BY/REMOVED FROM T.R. Edmondson		RECEIVED BY/STORED IN Fed Ex	DATE/TIME 6-13-17 1500
RELINQUISHED BY/REMOVED FROM Fed Ex		RECEIVED BY/STORED IN M. B. STACY BOON	DATE/TIME 6-14-17 9:20
RELINQUISHED BY/REMOVED FROM M. B. STACY BOON		RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME

**SPECIAL INSTRUCTIONS**  
 (1) WTPH\_DIESEL: COMMON {Total petroleum hydrocarbons - diesel range}; WTPH\_KEROSENE: COMMON {Total petroleum hydrocarbons - kerosene range}; WTPH\_MOTOR OIL: COMMON {Total petroleum hydrocarbons - motor oil (high boiling)};  
 (2) 8270\_SVOA\_GCMS: COMMON (Add-on) {Tributyl phosphate};  
 (3) GAMMA\_GS: COMMON {Cesium-137}; AMCMISO\_IE\_PRECIP\_AEA: COMMON {Americium-241}; PUISO\_IE\_PRECIP\_AEA: COMMON {Plutonium-238, Plutonium-239/240}; UIISO\_IE\_PRECIP\_AEA: COMMON {Uranium-233/234, Uranium-235, Uranium-238};  
 SRTOT\_SEP\_PRECIP\_GPC: COMMON {Total beta radiostrontium};

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME
PRINTED ON 1/4/2017	FSR ID = FSR40868	TRVL NUM = TRVL-17-057	A-6003-618 (REV 2)



# Data Review Qualifier Definitions

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

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

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# Laboratory Certifications

## List of current GEL Certifications as of 28 June 2017

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

# Semi-Volatile Analysis

# Case Narrative

June 28, 2017

GC/MS Semivolatile  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL425386  
Work Order #: 425386

**Product:** Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry  
**Analytical Method:** 8270\_SVOA\_GCMS  
**Analytical Procedure:** GL-OA-E-009 REV# 39  
**Analytical Batch:** 1673965

**Preparation Method:** SW846 3541  
**Preparation Procedure:** GL-OA-E-066 REV# 8  
**Preparation Batch:** 1673964

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7
1203811291	Method Blank (MB)
1203811292	Laboratory Control Sample (LCS)
1203811293	425386001(B38JM4) Matrix Spike (MS)
1203811294	425386001(B38JM4) Matrix Spike Duplicate (MSD)

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

**Data Summary:**

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

**Certification Statement**

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

June 28, 2017

**GEL LABORATORIES LLC**

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

**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL425386 GEL Work Order: 425386

**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.

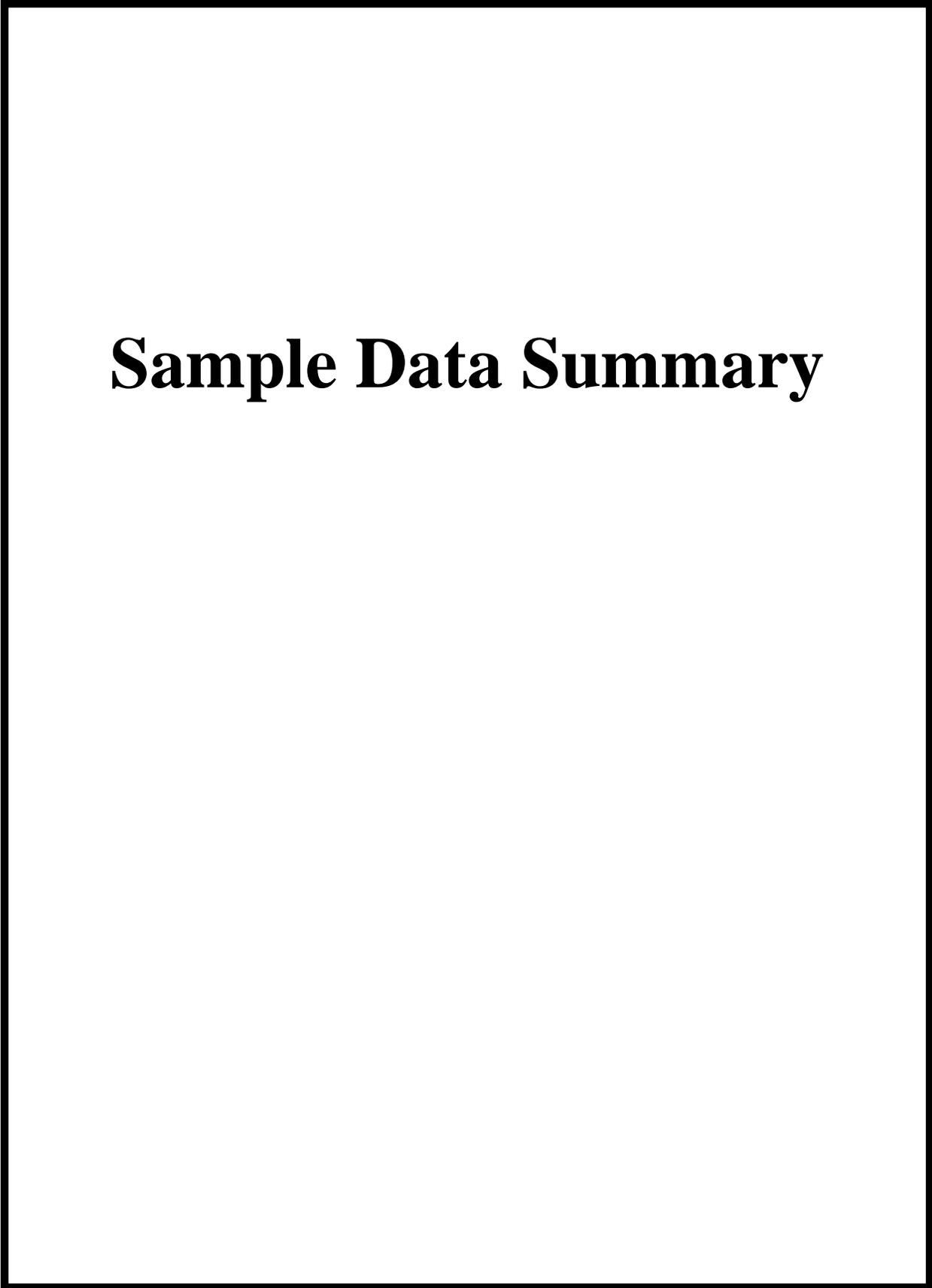
The following data validator verified the information presented in this data report:

Signature: 

Name: **Barbara Bailey**

Date: **26 JUN 2017**

Title: **Data Validator**



# Sample Data Summary

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Semi-Volatile

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Date Collected:</b> 06/13/2017 09:30	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 425386001	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.5
<b>Client ID:</b> B38JM4	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Batch ID:</b> 1673965	<b>Method:</b> 8270_SVOA_GCMS	<b>SOP Ref:</b> GL-OA-E-009
<b>Run Date:</b> 06/15/2017 18:38	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 06/15/2017 10:59	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> s061517.B\s1f1511.D	<b>Aliquot:</b> 30 g	<b>Final Volume:</b> 1 mL
	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
126-73-8	Tributylphosphate	U	102	ug/kg	102	339

June 28, 2017

Semi-Volatile

Certificate of Analysis

Sample Summary

<b>SDG Number:</b> GEL425386	<b>Date Collected:</b> 06/13/2017 09:50	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 425386002	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.5
<b>Client ID:</b> B38JM5	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Batch ID:</b> 1673965	<b>Method:</b> 8270_SVOA_GCMS	<b>SOP Ref:</b> GL-OA-E-009
<b>Run Date:</b> 06/15/2017 22:30	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 06/15/2017 10:59	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> s061517.B\s1f1517.D	<b>Aliquot:</b> 30.02 g	<b>Final Volume:</b> 1 mL
	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
126-73-8	Tributylphosphate	U	101	ug/kg	101	338

June 28, 2017

Semi-Volatile

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**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Date Collected:</b> 06/13/2017 10:05	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 425386003	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.3
<b>Client ID:</b> B38JM6	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Batch ID:</b> 1673965	<b>Method:</b> 8270_SVOA_GCMS	<b>SOP Ref:</b> GL-OA-E-009
<b>Run Date:</b> 06/15/2017 23:01	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 06/15/2017 10:59	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> s061517.B\s1f1518.D	<b>Aliquot:</b> 30.14 g	<b>Final Volume:</b> 1 mL
	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
126-73-8	Tributylphosphate	U	101	ug/kg	101	336

June 28, 2017

Semi-Volatile

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Date Collected:</b> 06/13/2017 10:15	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 425386004	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 2.1
<b>Client ID:</b> B38JM7	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Batch ID:</b> 1673965	<b>Method:</b> 8270_SVOA_GCMS	<b>SOP Ref:</b> GL-OA-E-009
<b>Run Date:</b> 06/15/2017 21:10	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 06/15/2017 10:59	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> s061517.B\s1f1516.D	<b>Aliquot:</b> 30.03 g	<b>Final Volume:</b> 1 mL
	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
126-73-8	Tributylphosphate	U	102	ug/kg	102	340

# Quality Control Summary

# June 28, 2017

## GEL LABORATORIES LLC

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

### QC Summary

Report Date: June 23, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 425386

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1673965										
QC1203811292	LCS										
Tributylphosphate	1660			1400	ug/kg		84	(70%-130%)	JMB3	06/15/17	18:07
**2,4,6-Tribromophenol	3330			2300	ug/kg		69	(12%-129%)			
**2-Fluorobiphenyl	1660			1200	ug/kg		72	(15%-110%)			
**2-Fluorophenol	3330			1990	ug/kg		60	(10%-115%)			
**Nitrobenzene-d5	1660			1200	ug/kg		72	(13%-112%)			
**Phenol-d5	3330			1960	ug/kg		59	(15%-117%)			
**p-Terphenyl-d14	1660			1250	ug/kg		75	(24%-141%)			
QC1203811291	MB										
Tributylphosphate			U	99.8	ug/kg					06/15/17	17:37
**2,4,6-Tribromophenol	3330			2840	ug/kg		85	(12%-129%)			
**2-Fluorobiphenyl	1660			1560	ug/kg		94	(15%-110%)			
**2-Fluorophenol	3330			2150	ug/kg		65	(10%-115%)			
**Nitrobenzene-d5	1660			1480	ug/kg		89	(13%-112%)			
**Phenol-d5	3330			2210	ug/kg		66	(15%-117%)			

June 28, 2017

GEL LABORATORIES LLC

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QC Summary

Workorder: 425386

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1673965										
**p-Terphenyl-d14	1660			1640	ug/kg		98	(24%-141%)	JMB3	06/15/17	17:37
QC1203811293 425386001 MS											
Tributylphosphate	1690	U	102	1500	ug/kg		89	(25%-131%)		06/15/17	19:08
**2,4,6-Tribromophenol	3380		2240	2640	ug/kg		78	(12%-129%)			
**2-Fluorobiphenyl	1690		1340	1240	ug/kg		74	(15%-110%)			
**2-Fluorophenol	3380		1910	2280	ug/kg		68	(10%-115%)			
**Nitrobenzene-d5	1690		1270	1320	ug/kg		78	(13%-112%)			
**Phenol-d5	3380		1970	2320	ug/kg		69	(15%-117%)			
**p-Terphenyl-d14	1690		1300	1060	ug/kg		63	(24%-141%)			
QC1203811294 425386001 MSD											
Tributylphosphate	1690	U	102	1490	ug/kg	1	88	(0%-30%)		06/15/17	19:39
**2,4,6-Tribromophenol	3380		2240	2580	ug/kg		76	(12%-129%)			
**2-Fluorobiphenyl	1690		1340	1240	ug/kg		73	(15%-110%)			
**2-Fluorophenol	3380		1910	2280	ug/kg		67	(10%-115%)			
**Nitrobenzene-d5	1690		1270	1310	ug/kg		77	(13%-112%)			
**Phenol-d5	3380		1970	2290	ug/kg		68	(15%-117%)			

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QC Summary

Workorder: 425386

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch 1673965											
**p-Terphenyl-d14	1690	1300		1330	ug/kg		79	(24%-141%)	JMB3	06/15/17	19:39

Notes:

The Qualifiers in this report are defined as follows:

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

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

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

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

June 28, 2017  
Semi-Volatile

Surrogate Recovery Report

SDG Number: GEL425386

Matrix Type: SOLID

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203811291	MB for batch 1673964	65	66	89	94	85	98
1203811292	LCS for batch 1673964	60	59	72	72	69	75
425386001	B38JM4	56	58	75	79	66	77
1203811293	B38JM4MS	68	69	78	74	78	63
1203811294	B38JM4MSD	67	68	77	73	76	79
425386004	B38JM7	62	64	83	82	75	82
425386002	B38JM5	55	56	71	73	67	75
425386003	B38JM6	55	57	74	75	71	78

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

June 28, 2017

Diesel Range Organics  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL425386  
Work Order #: 425386

**Product:** Analysis of Diesel Range Organics by Flame Ionization Detector

**Analytical Method:** WTPH\_DIESEL

**Analytical Procedure:** GL-OA-E-003 REV# 29

**Analytical Batch:** 1673925

**Preparation Method:** SW846 3541

**Preparation Procedure:** GL-OA-E-010 REV# 26

**Preparation Batch:** 1673924

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7
1203811208	Method Blank (MB)
1203811209	Laboratory Control Sample (LCS)
1203811210	425386001(B38JM4) Matrix Spike (MS)
1203811211	425386001(B38JM4) Matrix Spike Duplicate (MSD)
1203811214	Laboratory Control Sample (LCS)
1203811215	Laboratory Control Sample Duplicate (LCSD)

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

**Data Summary:**

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

**Quality Control (QC) Information**

**Surrogate Recoveries**

Samples (See Below) did not meet the client specified limits; however, the recoveries were within the lab's statistically derived limits. Outliers were expected and the data were reported.

Sample	Analyte	Value
1203811208 (MB)	o-Terphenyl	41* (60.0%-140.0%)
1203811214 (LCS)	o-Terphenyl	54* (60%-140%)
425386002 (B38JM5)	o-Terphenyl	53* (60%-140%)
425386003 (B38JM6)	o-Terphenyl	59* (60%-140%)

**Laboratory Control Sample (LCS/LCSD) Recovery**

LCS (See Below) did not meet the client specified limits; however, the recoveries were within the lab's statistically derived limits. Outliers were expected and the data were reported.

Sample	Analyte	Value
1203811209 (LCS)	Diesel Range Organics	69* (70%-130%)
1203811214 (LCS)	Kerosene	47* (70.0%-130.0%)
1203811215 (LCSD)	Kerosene	58* (70.0%-130.0%)

**Matrix Spike (MS/MSD) Recovery Statement**

The MS and/or MSD (See Below) did not meet spike recovery acceptance limits. The associated MS or MSD did not confirm. The LCS passed spike recovery limits. The poor extraction appeared to be isolated to the MS or MSD only and the data were reported.

Sample	Analyte	Value
1203811211 (B38JM4MSD)	Diesel Range Organics	67* (70%-130%)

**Miscellaneous Information**

**Manual Integrations**

Samples 1203811209 (LCS), 1203811210 (B38JM4MS) and 1203811211 (B38JM4MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

**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.

June 28, 2017

**GEL LABORATORIES LLC**

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL425386 GEL Work Order: 425386

**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

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.

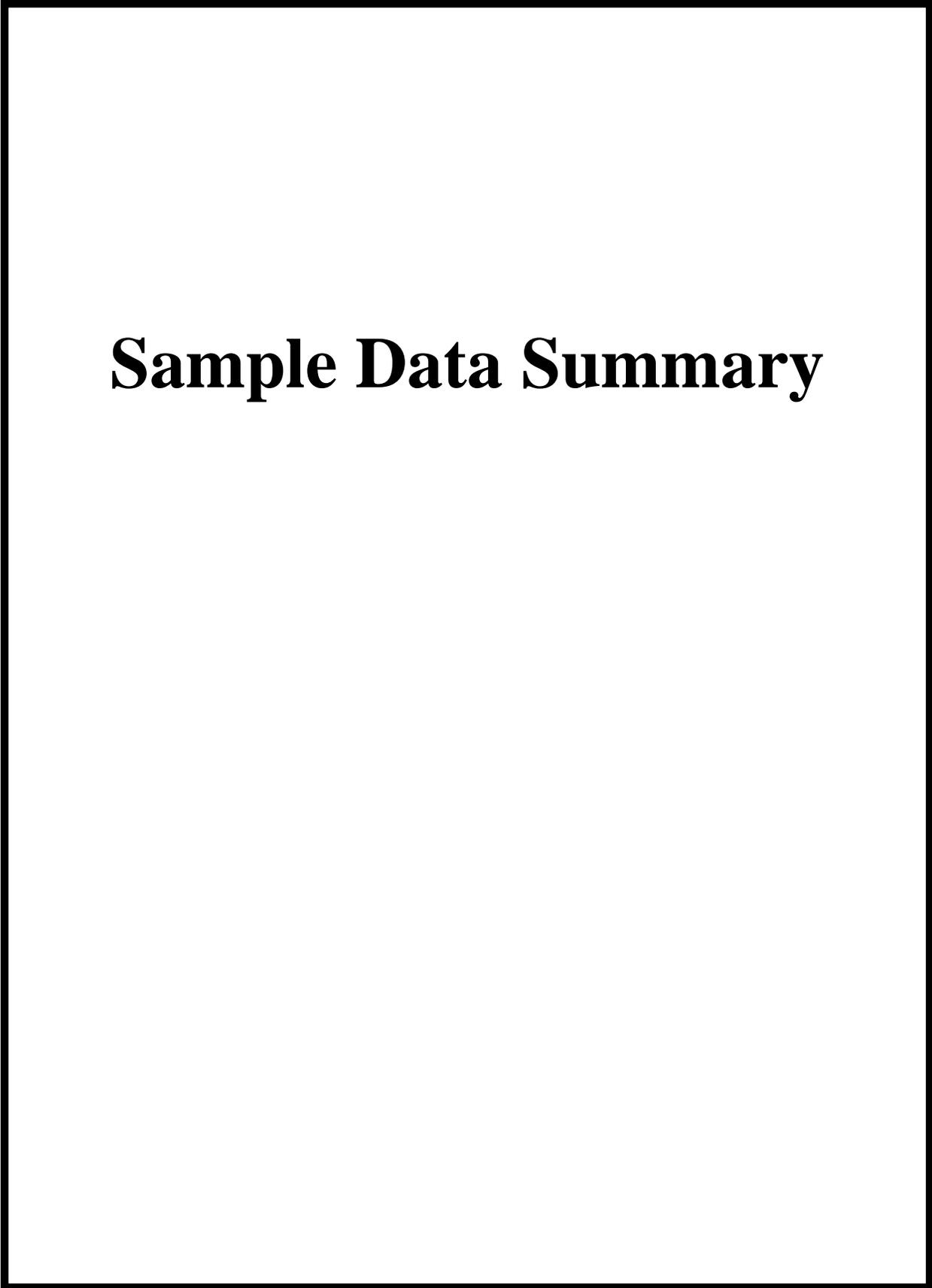
The following data validator verified the information presented in this data report:

Signature: 

Name: Cameron Bearden

Date: 28 JUN 2017

Title: Group Leader



# Sample Data Summary

June 28, 2017

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

<b>SDG Number:</b> GEL425386	<b>Date Collected:</b> 06/13/2017 09:30	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 425386001	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.5
	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Client ID:</b> B38JM4	<b>Method:</b> WTPH_DIESEL	<b>SOP Ref:</b> GL-OA-E-003
<b>Batch ID:</b> 1673925	<b>Inst:</b> FID7.I	<b>Dilution:</b> 1
<b>Run Date:</b> 06/20/2017 03:32	<b>Analyst:</b> LXA1	<b>Inj. Vol:</b> 1 uL
<b>Prep Date:</b> 06/19/2017 10:42	<b>Aliquot:</b> 30.01 g	<b>Final Volume:</b> 1 mL
<b>Data File:</b> 061917-KERO-MO\F7F1924.D	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	TU	2200	UG/KG	2200	6770
8008-20-6	Kerosene	U	1130	UG/KG	1130	6770
	Motor Oil	J	3300	UG/KG	2200	6770

June 28, 2017

FID Diesel Range Organics

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

SDG Number: GEL425386	Date Collected: 06/13/2017 09:50	Matrix: SOIL
Lab Sample ID: 425386002	Date Received: 06/14/2017 09:00	%Moisture: 1.5
Client ID: B38JM5	Client: CPRC001	Project: CPRC0FRC1609
Batch ID: 1673925	Method: WTPH_DIESEL	SOP Ref: GL-OA-E-003
Run Date: 06/20/2017 05:29	Inst: FID7.I	Dilution: 1
Prep Date: 06/19/2017 10:42	Analyst: LXA1	Inj. Vol: 1 uL
Data File: 061917-KERO-MO\F7F1927.D	Aliquot: 30.16 g	Final Volume: 1 mL
	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	JT	2310	UG/KG	2190	6730
8008-20-6	Kerosene	J	2220	UG/KG	1120	6730
	Motor Oil	U	2190	UG/KG	2190	6730

June 28, 2017

~~FID Diesel Range Organics~~

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## Certificate of Analysis

## Sample Summary

<b>SDG Number:</b> GEL425386	<b>Date Collected:</b> 06/13/2017 10:05	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 425386003	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.3
<b>Client ID:</b> B38JM6	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Batch ID:</b> 1673925	<b>Method:</b> WTPH_DIESEL	<b>SOP Ref:</b> GL-OA-E-003
<b>Run Date:</b> 06/20/2017 08:05	<b>Inst:</b> FID7.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 06/19/2017 10:42	<b>Analyst:</b> LXA1	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> 061917-KERO-MO\F7F1931.D	<b>Aliquot:</b> 30.03 g	<b>Final Volume:</b> 1 mL
	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	TU	2190	UG/KG	2190	6750
8008-20-6	Kerosene	U	1120	UG/KG	1120	6750
	Motor Oil	U	2190	UG/KG	2190	6750

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FID Diesel Range Organics

## Certificate of Analysis

## Sample Summary

<b>SDG Number:</b> GEL425386	<b>Date Collected:</b> 06/13/2017 10:15	<b>Matrix:</b> SOIL
<b>Lab Sample ID:</b> 425386004	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 2.1
<b>Client ID:</b> B38JM7	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Batch ID:</b> 1673925	<b>Method:</b> WTPH_DIESEL	<b>SOP Ref:</b> GL-OA-E-003
<b>Run Date:</b> 06/20/2017 08:44	<b>Inst:</b> FID7.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 06/19/2017 10:42	<b>Analyst:</b> LXA1	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> 061917-KERO-MO\F7F1932.D	<b>Aliquot:</b> 30.1 g	<b>Final Volume:</b> 1 mL
	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	TU	2210	UG/KG	2210	6790
8008-20-6	Kerosene	U	1130	UG/KG	1130	6790
	Motor Oil	U	2210	UG/KG	2210	6790

# Quality Control Summary

# June 28, 2017

## GEL LABORATORIES LLC

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### QC Summary

Report Date: June 23, 2017

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CH2MHill Plateau Remediation Company  
 MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 425386

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Diesel Range Organics</b>											
Batch	1673925										
QC1203811209	LCS										
Diesel Range Organics	66600			45800	UG/KG		69 *	(70%-130%)	LXA1	06/20/17	00:17
Motor Oil	66600			51600	UG/KG		77	(70%-130%)			
**o-Terphenyl	666			443	UG/KG		67	(60%-140%)			
QC1203811214	LCS										
Kerosene	33300			15700	UG/KG		47 *	(70%-130%)		06/20/17	00:56
**o-Terphenyl	666			360	UG/KG		54 *	(60%-140%)			
QC1203811215	LCSD										
Kerosene	33300			19300	UG/KG	21	58 *	(0%-30%)		06/20/17	01:35
**o-Terphenyl	666			415	UG/KG		62	(60%-140%)			
QC1203811208	MB										
Diesel Range Organics			U	2160	UG/KG					06/19/17	23:38
Kerosene			U	1110	UG/KG						
Motor Oil			U	2160	UG/KG						
**o-Terphenyl	666			273	UG/KG		41 *	(60%-140%)			
QC1203811210	425386001 MS										
Diesel Range Organics	67700	TU	2200	57100	UG/KG		84	(70%-130%)		06/20/17	04:11

**June 28, 2017**  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 425386

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Diesel Range Organics</b>											
Batch	1673925										
Motor Oil	67700	J	3300	65200	UG/KG		91	(70%-130%)	LXA1	06/20/17	04:11
**o-Terphenyl	677		426	513	UG/KG		76	(60%-140%)			
QC1203811211 425386001 MSD											
Diesel Range Organics	67500	TU	2200	T	45100	UG/KG	23	67*	(0%-30%)		06/20/17 04:50
Motor Oil	67500	J	3300	52000	UG/KG	22	72	(0%-30%)			
**o-Terphenyl	675		426	431	UG/KG		64	(60%-140%)			

**Notes:**

The Qualifiers in this report are defined as follows:

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

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

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

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

June 28, 2017  
FID Diesel Range Organics

## Surrogate Recovery Report

SDG Number: GEL425386

Matrix Type: SOLID

---

Sample ID	Client ID	OTP %REC
1203811208	MB for batch 1673924	41 *
1203811209	LCS for batch 1673924	67
1203811214	LCS for batch 1673924	54 *
1203811215	LCSD for batch 1673924	62
425386001	B38JM4	63
1203811210	B38JM4MS	76
1203811211	B38JM4MSD	64
425386002	B38JM5	53 *
425386003	B38JM6	59 *
425386004	B38JM7	61

**Surrogate**

OTP = o-Terphenyl

**Acceptance Limits**

(60%-140%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

# Metals Analysis

# Case Narrative

June 28, 2017

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL425386

Work Order #: 425386

**Product:** Determination of Metals by ICP-MS

**Analytical Method:** SW846 3050B/6020B

**Analytical Procedure:** GL-MA-E-014 REV# 29

**Analytical Batch:** 1674043

**Preparation Method:** SW846 3050B

**Preparation Procedure:** GL-MA-E-009 REV# 26

**Preparation Batch:** 1674042

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7
1203811442	Method Blank (MB)ICP-MS
1203811443	Laboratory Control Sample (LCS)
1203811446	425386001(B38JM4L) Serial Dilution (SD)
1203811444	425386001(B38JM4D) Sample Duplicate (DUP)
1203811445	425386001(B38JM4S) Matrix Spike (MS)

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

**Data Summary:**

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

**Calibration Information**

**ICSA/ICSAB Statement**

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

**Quality Control (QC) Information**

**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
--------	---------	-------

1203811444 (B38JM4DUP)	Uranium	32.5* (0%-20%)
------------------------	---------	----------------

**Technical Information**

**Preparation/Analytical Method Verification**

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 may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	425386			
	001	002	003	004
Uranium	2X	2X	2X	2X

**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.

June 28, 2017

**GEL LABORATORIES LLC**

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

**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL425386 GEL Work Order: 425386

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

\* Duplicate analysis not within control limits

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

D Results are reported from a diluted aliquot of sample.

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

**Review/Validation**

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

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

**Signature:**



**Name: Nik-Cole Elmore**

**Date: 21 JUN 2017**

**Title: Data Validator**

# Sample Data Summary

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

**SDG No:** GEL425386

**CONTRACT:** CPRC0FRC1609

**METHOD TYPE:** SW846

**SAMPLE ID:**425386001

**BASIS:** Dry Weight

**DATE COLLECTED** 13-JUN-17

**CLIENT ID:** B38JM4

**LEVEL:** Low

**DATE RECEIVED** 14-JUN-17

**MATRIX:** SOIL

**%SOLIDS:** 98.5

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	340	ug/kg	D*	13.1	39.8	39.8	2	MS	SKJ	06/19/17 22:01	170619-1	1674043

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1674043	1674042	SW846 3050B	0.51	g	50	mL	06/16/17	SXW1

**\*Analytical Methods:**

MS SW846 3050B/6020B

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

**SDG No:** GEL425386

**CONTRACT:** CPRC0FRC1609

**METHOD TYPE:** SW846

**SAMPLE ID:**425386002

**BASIS:** Dry Weight

**DATE COLLECTED** 13-JUN-17

**CLIENT ID:** B38JM5

**LEVEL:** Low

**DATE RECEIVED** 14-JUN-17

**MATRIX:** SOIL

**%SOLIDS:** 98.5

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	420	ug/kg	D*	12.9	39.2	39.2	2	MS	SKJ	06/19/17 22:28	170619-1	1674043

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1674043	1674042	SW846 3050B	0.518	g	50	mL	06/16/17	SXW1

**\*Analytical Methods:**

MS SW846 3050B/6020B

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

**SDG No:** GEL425386

**CONTRACT:** CPRC0FRC1609

**METHOD TYPE:** SW846

**SAMPLE ID:**425386003

**BASIS:** Dry Weight

**DATE COLLECTED** 13-JUN-17

**CLIENT ID:** B38JM6

**LEVEL:** Low

**DATE RECEIVED** 14-JUN-17

**MATRIX:** SOIL

**%SOLIDS:** 98.7

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	453	ug/kg	D*	12.8	38.7	38.7	2	MS	SKJ	06/19/17 22:32	170619-1	1674043

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1674043	1674042	SW846 3050B	0.524	g	50	mL	06/16/17	SXW1

**\*Analytical Methods:**

MS SW846 3050B/6020B

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

**SDG No:** GEL425386

**CONTRACT:** CPRC0FRC1609

**METHOD TYPE:** SW846

**SAMPLE ID:**425386004

**BASIS:** Dry Weight

**DATE COLLECTED** 13-JUN-17

**CLIENT ID:** B38JM7

**LEVEL:** Low

**DATE RECEIVED** 14-JUN-17

**MATRIX:** SOIL

**%SOLIDS:** 97.9

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	426	ug/kg	D*	12.5	37.9	37.9	2	MS	SKJ	06/19/17 22:36	170619-1	1674043

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1674043	1674042	SW846 3050B	0.539	g	50	mL	06/16/17	SXW1

**\*Analytical Methods:**

MS SW846 3050B/6020B

# Quality Control Summary

# June 28, 2017 GEL LABORATORIES LLC

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

## QC Summary

Report Date: June 21, 2017

Page 1 of 2

**CH2M Hill Plateau Remediation Company**  
**MSIN R3-50 CHPRC**  
**PO Box 1600**  
**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 425386**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1674043										
QC1203811444	425386001	DUP									
Uranium		*D	340	*D	472	ug/kg	32.5*	(0%-20%)	SKJ	06/19/17	22:05
QC1203811443	LCS										
Uranium	4900			D	5450	ug/kg		111 (80%-120%)		06/19/17	21:57
QC1203811442	MB										
Uranium				DU	12.7	ug/kg				06/19/17	21:53
QC1203811445	425386001	MS									
Uranium	4690	*D	340	D	5250	ug/kg		105 (75%-125%)		06/19/17	22:09
QC1203811446	425386001	SDILT									
Uranium		*D	1.71	D	0.349	ug/L	2.17	(0%-20%)		06/19/17	22:17

**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

June 28, 2017

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 425386

Page 2 of 2

<b>Parmname</b>	<b>NOM</b>	<b>Sample</b>	<b>Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD/D%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
-----------------	------------	---------------	-------------	-----------	--------------	---------------	-------------	--------------	--------------	-------------	-------------

Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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

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

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

# Radiological Analysis

# Case Narrative

June 28, 2017

Radiochemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL425386  
Work Order #: 425386

**Product:** AMCMISO\_EIE\_PRECIP\_AEA: COMMON  
**Analytical Method:** AMCMISO\_EIE\_PREC\_AEA  
**Analytical Procedure:** GL-RAD-A-011 REV# 26  
**Analytical Batch:** 1674448

**Preparation Method:** Dry Soil Prep  
**Preparation Procedure:** GL-RAD-A-021 REV# 21  
**Preparation Batch:** 1673905

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7
1203812393	Method Blank (MB)
1203812394	425386001(B38JM4) Sample Duplicate (DUP)
1203812395	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Product:** PUIISO\_PRECIP\_AEA:COMMON  
**Analytical Method:** PUIISO\_PRECIP\_AEA  
**Analytical Procedure:** GL-RAD-A-011 REV# 26  
**Analytical Batch:** 1674454

**Preparation Method:** Dry Soil Prep  
**Preparation Procedure:** GL-RAD-A-021 REV# 21  
**Preparation Batch:** 1673905

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
------------------------------	--

June 28, 2017

425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7
1203812407	Method Blank (MB)
1203812408	425386001(B38JM4) Sample Duplicate (DUP)
1203812409	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Miscellaneous Information**

1. Samples 425386002, 425501004, 425501006, 425501008, and 1203812407 do not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer. 2. The Pu-242 tracer peak centroid for sample 425501007 is greater than 50 keV from the expected energy value of 4890 keV. 1. The samples do meet the tracer yield requirement, the detection limits, and their tracer peaks are within the Pu-242 region of interest. Reporting results. 2. The sample does meet the tracer yield requirement, the detection limits, and its tracer peak is within the Pu-242 region of interest. Reporting results.

**Product:** UISO\_IE\_PRECIP\_AEA:COMMON

**Analytical Method:** UISO\_IE\_PRECIP\_AEA

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

**Analytical Batch:** 1674457

**Preparation Method:** Dry Soil Prep

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

**Preparation Batch:** 1673905

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7
1203812415	Method Blank (MB)
1203812416	425386001(B38JM4) Sample Duplicate (DUP)
1203812417	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Product:** Dry Weight

**Preparation Method:** Dry Soil Prep

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

**Preparation Batch:** 1673905

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7
1203811167	425386001(B38JM4) Sample Duplicate (DUP)

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

**Data Summary:**

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

**Product:** GAMMA\_GS:COMMON

**Analytical Method:** GAMMA\_GS

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1674055

**Preparation Method:** Dry Soil Prep

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

**Preparation Batch:** 1673905

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7
1203811473	Method Blank (MB)
1203811474	425386001(B38JM4) Sample Duplicate (DUP)
1203811475	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Product:** SRTOT\_SEP\_PRECIP\_GPC: COMMON

**Analytical Method:** SRTOT\_SEP\_PRECIP\_GPC

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

**Analytical Batch:** 1675233

**Preparation Method:** Dry Soil Prep

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

**Preparation Batch:** 1673905

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425386001	B38JM4
425386002	B38JM5
425386003	B38JM6
425386004	B38JM7
1203814267	Method Blank (MB)
1203814268	425386001(B38JM4) Sample Duplicate (DUP)
1203814269	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Technical Information**

**Recounts**

Sample 1203814268 (B38JM4DUP) was recounted due to results more negative than the three sigma TPU. The second count is reported. Sample 425386004 (B38JM7) was recounted due to a suspected false positive. The recount is reported. Sample 425386003 (B38JM6) was recounted to confirm sample result. The recount is reported.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the

**June 28, 2017**

requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

June 28, 2017

**GEL LABORATORIES LLC**

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

**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL425386 GEL Work Order: 425386

**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.

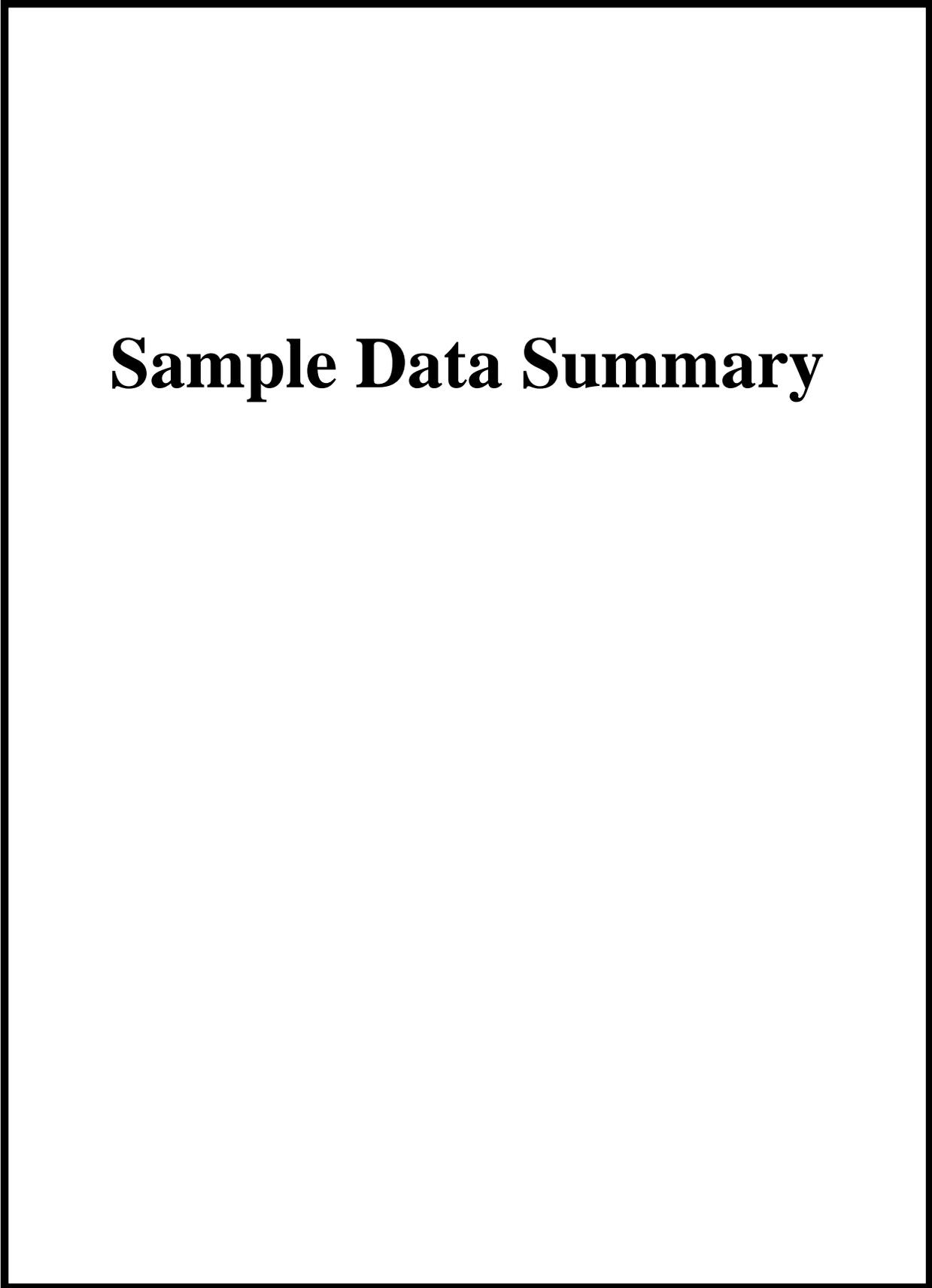
The following data validator verified the information presented in this data report:

**Signature:** 

**Name:** Kate Gellatly

**Date:** 28 JUN 2017

**Title:** Analyst I



# Sample Data Summary

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386001	<b>Date Collected:</b> 06/13/2017 09:30	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.5
<b>Client ID:</b> B38JM4		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1674448	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 06/21/2017 09:08	<b>Analyst:</b> BXA4	<b>Instrument:</b> 1095
<b>Data File:</b> S0425386001_AM.1A.gcnf	<b>Aliquot:</b> 0.101 g	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1674448	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.00235	pCi/g	+/-0.174	0.174	0.387	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	21.5	20.8	pCi/g	104	(30%-105%)

**Comments:**

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

June 28, 2017

Certificate of Analysis  
Sample Summary

SDG Number: GEL425386	Client: CPRC001	Project: CPRC0FRC1609
Lab Sample ID: 425386001	Date Collected: 06/13/2017 09:30	Matrix: SOIL
	Date Received: 06/14/2017 09:00	%Moisture: 1.5
Client ID: B38JM4	Method: PUIISO_PRECIP_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1674454	Analyst: BXA4	SOP Ref: GL-RAD-A-011
Run Date: 06/20/2017 16:28	Aliquot: 0.101 g	Instrument: 1104
Data File: S0425386001_PU.1A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 240 min
Prep Batch: 1674454		Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0695	pCi/g	+/-0.195	0.195	0.208	1.00
OER-100-70	Plutonium-239/240	U	0.114	pCi/g	+/-0.357	0.357	0.675	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	16.0	19.5	pCi/g	82.2	(30%-105%)

Comments:

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

June 28, 2017

Certificate of Analysis  
Sample Summary

SDG Number: GEL425386	Client: CPRC001	Project: CPRC0FRC1609
Lab Sample ID: 425386001	Date Collected: 06/13/2017 09:30	Matrix: SOIL
	Date Received: 06/14/2017 09:00	%Moisture: 1.5
Client ID: B38JM4	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1674457	Analyst: BXA4	SOP Ref: GL-RAD-A-011
Run Date: 06/21/2017 08:43	Aliquot: 0.101 g	Instrument: 1013
Data File: S0425386001_UU.1A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 240 min
Prep Batch: 1674457		Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234	U	0.411	pCi/g	+/-0.383	0.387	0.504	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.0476	pCi/g	+/-0.353	0.353	0.722	1.00
7440-61-1	Uranium-238	U	0.308	pCi/g	+/-0.488	0.490	0.837	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	18.5	20.7	pCi/g	89.5	(30%-105%)

Comments:

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

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386001	<b>Date Collected:</b> 06/13/2017 09:30	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.5
<b>Client ID:</b> B38JM4		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1675233	<b>Method:</b> SRTOT_SEP_PRECIP_GPC	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 06/26/2017 14:50	<b>Analyst:</b> JXB7	<b>Instrument:</b> PIC13D
<b>Data File:</b> S1675233r.xls	<b>Aliquot:</b> 0.33 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1675233	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/22/2017 09:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.522	pCi/g	+/-0.655	0.669	1.11	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.60	7.75	mg	98.1	(40%-110%)

**Comments:**

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

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386001	<b>Date Collected:</b> 06/13/2017 09:30	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.5
<b>Client ID:</b> B38JM4		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1674055	<b>Method:</b> GAMMA_GS	<b>SOP Ref:</b> GL-RAD-A-013
<b>Run Date:</b> 06/20/2017 08:41	<b>Analyst:</b> MXR1	<b>Instrument:</b> GAM25
<b>Data File:</b> G425386001.CNF;1	<b>Aliquot:</b> 161.213 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1674055	<b>Prep Method:</b> DOE HASL 300, 4.5.2.3/Ga-01	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/15/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.00112	pCi/g	+/-0.0321	0.0321	0.0609	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).  
 The MDC is a sample specific MDC.

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386002	<b>Date Collected:</b> 06/13/2017 09:50	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.5
<b>Client ID:</b> B38JM5		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1674448	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 06/21/2017 09:08	<b>Analyst:</b> BXA4	<b>Instrument:</b> 1096
<b>Data File:</b> S0425386002_AM.1A.gcnf	<b>Aliquot:</b> 0.105 g	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1674448	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.0617	pCi/g	+/-0.211	0.211	0.391	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	18.8	20.0	pCi/g	94	(30%-105%)

**Comments:**

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

June 28, 2017

Certificate of Analysis  
Sample Summary

SDG Number: GEL425386	Client: CPRC001	Project: CPRC0FRC1609
Lab Sample ID: 425386002	Date Collected: 06/13/2017 09:50	Matrix: SOIL
	Date Received: 06/14/2017 09:00	%Moisture: 1.5
Client ID: B38JM5		Prep Basis: "Dry Weight Corrected"
Batch ID: 1674454	Method: PUIISO_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 06/20/2017 16:28	Analyst: BXA4	Instrument: 1105
Data File: S0425386002_PU.1A.gcnf	Aliquot: 0.105 g	Count Time: 240 min
Prep Batch: 1674454	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.189	pCi/g	+/-0.335	0.336	0.507	1.00
OER-100-70	Plutonium-239/240	U	0.0465	pCi/g	+/-0.300	0.300	0.614	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	11.9	18.7	pCi/g	63.7	(30%-105%)

Comments:

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

June 28, 2017

Certificate of Analysis  
Sample Summary

SDG Number: GEL425386	Client: CPRC001	Project: CPRC0FRC1609
Lab Sample ID: 425386002	Date Collected: 06/13/2017 09:50	Matrix: SOIL
	Date Received: 06/14/2017 09:00	%Moisture: 1.5
Client ID: B38JM5	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1674457	Analyst: BXA4	SOP Ref: GL-RAD-A-011
Run Date: 06/21/2017 08:43	Aliquot: 0.105 g	Instrument: 1015
Data File: S0425386002_UU.1A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 240 min
Prep Batch: 1674457		Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234	U	0.583	pCi/g	+/-0.505	0.512	0.617	1.00
15117-96-1/13982-7	Uranium-235/236	U	-0.0236	pCi/g	+/-0.204	0.204	0.472	1.00
7440-61-1	Uranium-238	U	0.182	pCi/g	+/-0.321	0.322	0.487	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	13.5	19.9	pCi/g	68	(30%-105%)

Comments:

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

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386002	<b>Date Collected:</b> 06/13/2017 09:50	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.5
<b>Client ID:</b> B38JM5		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1675233	<b>Method:</b> SRTOT_SEP_PRECIP_GPC	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 06/26/2017 14:51	<b>Analyst:</b> JXB7	<b>Instrument:</b> PIC14A
<b>Data File:</b> S1675233r.xls	<b>Aliquot:</b> 0.315 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1675233	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/22/2017 09:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.630	pCi/g	+/-0.841	0.857	1.44	2.00

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

**Comments:**

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

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386002	<b>Date Collected:</b> 06/13/2017 09:50	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.5
<b>Client ID:</b> B38JM5		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1674055	<b>Method:</b> GAMMA_GS	<b>SOP Ref:</b> GL-RAD-A-013
<b>Run Date:</b> 06/20/2017 08:42	<b>Analyst:</b> MXR1	<b>Instrument:</b> GAM27
<b>Data File:</b> G425386002.CNF;1	<b>Aliquot:</b> 163.1 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1674055	<b>Prep Method:</b> DOE HASL 300, 4.5.2.3/Ga-01	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/15/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.0161	pCi/g	+/-0.0261	0.0271	0.0451	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).  
 The MDC is a sample specific MDC.

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386003	<b>Date Collected:</b> 06/13/2017 10:05	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.3
<b>Client ID:</b> B38JM6		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1674448	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 06/21/2017 09:08	<b>Analyst:</b> BXA4	<b>Instrument:</b> 1097
<b>Data File:</b> S0425386003_AM.1A.gcnf	<b>Aliquot:</b> 0.106 g	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1674448	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0218	pCi/g	+/-0.150	0.151	0.366	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	20.4	19.8	pCi/g	103	(30%-105%)

**Comments:**

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

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386003	<b>Date Collected:</b> 06/13/2017 10:05	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.3
<b>Client ID:</b> B38JM6		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1674454	<b>Method:</b> PUIISO_PRECIP_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 06/20/2017 16:28	<b>Analyst:</b> BXA4	<b>Instrument:</b> 1106
<b>Data File:</b> S0425386003_PU.1A.gcnf	<b>Aliquot:</b> 0.106 g	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1674454	<b>Prep Method:</b> DOE EML HASL-300, Pu-11-	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.133	pCi/g	+/-0.366	0.367	0.635	1.00
OER-100-70	Plutonium-239/240	U	0.158	pCi/g	+/-0.363	0.364	0.576	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	9.82	18.6	pCi/g	52.9	(30%-105%)

**Comments:**

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

June 28, 2017

Certificate of Analysis  
Sample Summary

SDG Number: GEL425386	Client: CPRC001	Project: CPRC0FRC1609
Lab Sample ID: 425386003	Date Collected: 06/13/2017 10:05	Matrix: SOIL
	Date Received: 06/14/2017 09:00	%Moisture: 1.3
Client ID: B38JM6	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1674457	Analyst: BXA4	SOP Ref: GL-RAD-A-011
Run Date: 06/21/2017 08:43	Aliquot: 0.106 g	Instrument: 1016
Data File: S0425386003_UU.1A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 240 min
Prep Batch: 1674457		Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234	U	0.244	pCi/g	+/-0.279	0.281	0.349	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.0734	pCi/g	+/-0.251	0.251	0.465	1.00
7440-61-1	Uranium-238		0.473	pCi/g	+/-0.358	0.363	0.349	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	18.2	19.7	pCi/g	92.4	(30%-105%)

Comments:

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

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386003	<b>Date Collected:</b> 06/13/2017 10:05	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.3
<b>Client ID:</b> B38JM6	<b>Method:</b> SRTOT_SEP_PRECIP_GPC	<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1675233	<b>Analyst:</b> JXB7	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 06/27/2017 14:50	<b>Aliquot:</b> 0.306 g	<b>Instrument:</b> PIC9D
<b>Data File:</b> S1675233r.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1675233		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/22/2017 09:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		1.62	pCi/g	+/-0.888	0.985	1.33	2.00

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

**Comments:**

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

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386003	<b>Date Collected:</b> 06/13/2017 10:05	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 1.3
<b>Client ID:</b> B38JM6		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1674055	<b>Method:</b> GAMMA_GS	<b>SOP Ref:</b> GL-RAD-A-013
<b>Run Date:</b> 06/20/2017 08:42	<b>Analyst:</b> MXR1	<b>Instrument:</b> GAM40
<b>Data File:</b> G425386003.CNF;1	<b>Aliquot:</b> 163.508 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1674055	<b>Prep Method:</b> DOE HASL 300, 4.5.2.3/Ga-01	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/15/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.015	pCi/g	+/-0.0264	0.0273	0.0469	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).  
 The MDC is a sample specific MDC.

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386004	<b>Date Collected:</b> 06/13/2017 10:15	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 2.1
<b>Client ID:</b> B38JM7		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1674448	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 06/21/2017 09:08	<b>Analyst:</b> BXA4	<b>Instrument:</b> 1098
<b>Data File:</b> S0425386004_AM.1A.gcnf	<b>Aliquot:</b> 0.102 g	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1674448	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.352	pCi/g	+/-0.334	0.337	0.353	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	20.3	20.6	pCi/g	98.5	(30%-105%)

**Comments:**

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

June 28, 2017

Certificate of Analysis  
Sample Summary

SDG Number: GEL425386	Client: CPRC001	Project: CPRC0FRC1609
Lab Sample ID: 425386004	Date Collected: 06/13/2017 10:15	Matrix: SOIL
	Date Received: 06/14/2017 09:00	%Moisture: 2.1
Client ID: B38JM7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1674454	Method: PUIISO_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 06/20/2017 16:28	Analyst: BXA4	Instrument: 1107
Data File: S0425386004_PU.1A.gcnf	Aliquot: 0.102 g	Count Time: 239.9998 min
Prep Batch: 1674454	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0893	pCi/g	+/-0.305	0.305	0.566	1.00
OER-100-70	Plutonium-239/240	U	-0.0618	pCi/g	+/-0.187	0.187	0.524	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	13.4	19.3	pCi/g	69.6	(30%-105%)

Comments:

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

June 28, 2017

Certificate of Analysis  
Sample Summary

SDG Number: GEL425386	Client: CPRC001	Project: CPRC0FRC1609
Lab Sample ID: 425386004	Date Collected: 06/13/2017 10:15	Matrix: SOIL
	Date Received: 06/14/2017 09:00	%Moisture: 2.1
Client ID: B38JM7	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1674457	Analyst: BXA4	SOP Ref: GL-RAD-A-011
Run Date: 06/21/2017 08:43	Aliquot: 0.102 g	Instrument: 1018
Data File: S0425386004_UU.1A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 240 min
Prep Batch: 1674457		Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/19/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		0.545	pCi/g	+/-0.488	0.495	0.530	1.00
15117-96-1/13982-7	Uranium-235/236	U	-0.0515	pCi/g	+/-0.228	0.228	0.594	1.00
7440-61-1	Uranium-238	U	0.479	pCi/g	+/-0.456	0.461	0.481	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	13.9	20.5	pCi/g	67.8	(30%-105%)

Comments:

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

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386004	<b>Date Collected:</b> 06/13/2017 10:15	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 2.1
<b>Client ID:</b> B38JM7	<b>Method:</b> SRTOT_SEP_PRECIP_GPC	<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1675233	<b>Analyst:</b> JXB7	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 06/27/2017 13:12	<b>Aliquot:</b> 0.31 g	<b>Instrument:</b> PIC1B
<b>Data File:</b> S1675233r.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 70 min
<b>Prep Batch:</b> 1675233		<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/22/2017 09:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.316	pCi/g	+/-0.849	0.852	1.49	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.40	7.75	mg	95.5	(40%-110%)

**Comments:**

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

June 28, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425386	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0FRC1609
<b>Lab Sample ID:</b> 425386004	<b>Date Collected:</b> 06/13/2017 10:15	<b>Matrix:</b> SOIL
	<b>Date Received:</b> 06/14/2017 09:00	<b>%Moisture:</b> 2.1
<b>Client ID:</b> B38JM7		<b>Prep Basis:</b> "Dry Weight Corrected"
<b>Batch ID:</b> 1674055	<b>Method:</b> GAMMA_GS	<b>SOP Ref:</b> GL-RAD-A-013
<b>Run Date:</b> 06/20/2017 09:13	<b>Analyst:</b> MXR1	<b>Instrument:</b> GAM36
<b>Data File:</b> G425386004.CNF;1	<b>Aliquot:</b> 163.964 g	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1674055	<b>Prep Method:</b> DOE HASL 300, 4.5.2.3/Ga-01	<b>Prep SOP Ref:</b> GL-RAD-A-021
<b>Prep Date:</b> 06/15/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.0406	pCi/g	+/-0.0356	0.0402	0.0549	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).  
 The MDC is a sample specific MDC.

# Quality Control Summary

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: June 28, 2017  
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**Client :** CH2MHill Plateau Remediation Company  
**MSIN R3-50 CHPRC**  
**PO Box 1600**  
**Richland, Washington 99352**  
**Contact: Mr. Scot Fitzgerald**  
**Workorder: 425386**

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1674448								
QC1203812393	MB								
Americium-241			U	0.226	pCi/g			BXA4	06/21/1709:08
				Uncert: +/-0.266					
				TPU: +/-0.268					
**Americium-243 Tracer	19.8			17.5	pCi/g	REC: 88	(30%-105%)		
				Uncert: +/-2.13					
				TPU: +/-3.29					
QC1203812394	425386001	DUP							
Americium-241		U	0.00235	U	0.040	pCi/g			06/21/1709:08
				Uncert: +/-0.174	+/-0.150	RPD: 0	N/A		
				TPU: +/-0.174	+/-0.150	RER: 0.321	(0-2)		
**Americium-243 Tracer	20.2		21.5		20.3	pCi/g	REC: 101	(30%-105%)	
				Uncert: +/-2.15	+/-2.01				
				TPU: +/-3.36	+/-3.15				
QC1203812395	LCS								
Americium-241					18.3	pCi/g	REC: 99	(80%-120%)	
				Uncert: +/-1.88					
				TPU: +/-2.87					
**Americium-243 Tracer	19.8				19.9	pCi/g	REC: 101	(30%-105%)	
				Uncert: +/-1.93					
				TPU: +/-3.04					
Batch	1674454								
QC1203812407	MB								
Plutonium-238			U	0.0717	pCi/g			BXA4	06/20/1716:28
				Uncert: +/-0.269					
				TPU: +/-0.269					
Plutonium-239/240			U	0.0491	pCi/g				
				Uncert: +/-0.273					
				TPU: +/-0.273					
**Plutonium-242 Tracer	18.6				10.5	pCi/g	REC: 57	(30%-105%)	
				Uncert: +/-2.61					
				TPU: +/-3.84					
QC1203812408	425386001	DUP							
Plutonium-238		U	0.0695	U	-0.0538	pCi/g			06/20/1716:30
				Uncert: +/-0.195	+/-0.238	RPD: 0	N/A		
				TPU: +/-0.195	+/-0.239	RER: 0.783	(0-2)		
Plutonium-239/240		U	0.114	U	-0.161	pCi/g			
				Uncert: +/-0.357	+/-0.260	RPD: 0	N/A		
				TPU: +/-0.357	+/-0.261	RER: 1.22	(0-2)		
**Plutonium-242 Tracer	18.9		16.0		12.1	pCi/g	REC: 64	(30%-105%)	
				Uncert: +/-2.30	+/-2.88				
				TPU: +/-3.45	+/-4.22				
QC1203812409	LCS								
Plutonium-238			U	0.270	pCi/g				06/20/1716:30
				Uncert: +/-0.355					

**QC Summary**

Workorder: 425386

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1674454								
Plutonium-239/240	18.6	TPU:		+/-0.357					
		Uncert:		20.4	pCi/g	REC: 109	(80%-120%)		
		TPU:		+/-2.66					
		TPU:		+/-4.03					
*Plutonium-242 Tracer	18.6	TPU:		16.2	pCi/g	REC: 88	(30%-105%)		
		Uncert:		+/-2.54					
		TPU:		+/-3.75					
Batch	1674457								
QC1203812415	MB								
Uranium-233/234			U	0.0332	pCi/g			BXA4	06/21/1708:43
		Uncert:		+/-0.214					
		TPU:		+/-0.214					
Uranium-235/236			U	-0.0528	pCi/g				
		Uncert:		+/-0.159					
		TPU:		+/-0.160					
Uranium-238			U	0.209	pCi/g				
		Uncert:		+/-0.264					
		TPU:		+/-0.266					
*Uranium-232 Tracer	19.7			18.2	pCi/g	REC: 93	(30%-105%)		
		Uncert:		+/-2.14					
		TPU:		+/-3.36					
QC1203812416	425386001	DUP							
Uranium-233/234		U	0.411	U	0.394	pCi/g			06/21/1708:44
		Uncert:	+/-0.383		+/-0.461		RPD: 0	N/A	
		TPU:	+/-0.387		+/-0.465		RER: 0.0554	(0-2)	
Uranium-235/236		U	0.0476	U	-0.0256	pCi/g			
		Uncert:	+/-0.353		+/-0.221		RPD: 0	N/A	
		TPU:	+/-0.353		+/-0.222		RER: 0.344	(0-2)	
Uranium-238		U	0.308	U	0.411	pCi/g			
		Uncert:	+/-0.488		+/-0.419		RPD: 0	N/A	
		TPU:	+/-0.490		+/-0.423		RER: 0.313	(0-2)	
*Uranium-232 Tracer	20.1		18.5		16.6	pCi/g	REC: 83	(30%-105%)	
		Uncert:	+/-2.22		+/-2.60				
		TPU:	+/-3.49		+/-3.97				
QC1203812417	LCS								
Uranium-233/234				22.4	pCi/g				06/21/1708:44
		Uncert:		+/-2.51					
		TPU:		+/-4.03					
Uranium-235/236				1.32	pCi/g				
		Uncert:		+/-0.704					
		TPU:		+/-0.728					
Uranium-238	25.5			25.5	pCi/g	REC: 100	(80%-120%)		
		Uncert:		+/-2.67					
		TPU:		+/-4.48					
*Uranium-232 Tracer	19.7			18.8	pCi/g	REC: 96	(30%-105%)		
		Uncert:		+/-2.35					
		TPU:		+/-3.63					
<b>Rad Gamma Spec</b>									
Batch	1674055								

### QC Summary

Workorder: 425386

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1674055								
QC1203811473	MB								
Cesium-137			U	-0.0079	pCi/g			MXR1	06/20/1709:03
				Uncert: +/-0.0143					
				TPU: +/-0.0147					
QC1203811474	425386001	DUP							
Cesium-137		U	-0.00112	U	0.0186				06/20/1711:23
			Uncert: +/-0.0321		+/-0.0382	RPD: 0	N/A		
			TPU: +/-0.0321		+/-0.0382	RER: 0.773	(0-2)		
QC1203811475	LCS								
Americium-241		489			549	pCi/g	REC: 112 (80%-120%)		06/20/1709:17
				Uncert: +/-11.3					
				TPU: +/-42.1					
Cobalt-60		146			138	pCi/g	REC: 94 (80%-120%)		
				Uncert: +/-3.25					
				TPU: +/-6.04					
Cesium-137		176			183	pCi/g	REC: 104 (80%-120%)		
				Uncert: +/-3.27					
				TPU: +/-8.53					
<b>Rad Gas Flow</b>									
Batch	1675233								
QC1203814267	MB								
Total Strontium			U	0.646	pCi/g			JXB7	06/26/1715:48
				Uncert: +/-0.897					
				TPU: +/-0.913					
**Strontium Carrier		7.75			6.70	mg	REC: 87 (40%-110%)		
QC1203814268	425386001	DUP							
Total Strontium		U	0.522	U	-0.0995	pCi/g			06/27/1713:12
			Uncert: +/-0.655		+/-0.563	RPD: 0	N/A		
			TPU: +/-0.669		+/-0.564	RER: 1.39	(0-2)		
**Strontium Carrier		7.75	7.60		7.10	mg	REC: 92 (40%-110%)		
QC1203814269	LCS								
Total Strontium		65.3			65.1	pCi/g	REC: 100 (80%-120%)		06/26/1715:49
				Uncert: +/-3.85					
				TPU: +/-16.9					
**Strontium Carrier		7.75			6.90	mg	REC: 89 (40%-110%)		

**Notes:**

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

The Qualifiers in this report are defined as follows:

- \* Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- 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 >= 2X the MDA and, after corrections, result is >= 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 >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.

## QC Summary

Workorder: 425386

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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.