

July 3, 2017



PO Box 30712 Charleston, SC 29417
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July 03, 2017

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

Re: CHPRC SAF F16-037
Work Order: 425896
SDG: GEL425896

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 21, 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: 300085 - 8C
Chain of Custody: F16-037-087, F16-037-090 and F16-037-164
Enclosures



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Case Narrative

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General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F16-037
SDG: GEL425896

July 03, 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 21, 2017, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

Sample Identification

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
425896001	B39HX9
425896002	B39HY2
425896003	B3BJR8

Case Narrative

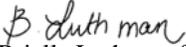
Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

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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: General Chemistry, Metals and Radiochemistry.

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


Brielle Luthman for
Heather Shaffer
Project Manager

**Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL425896
Work Order #: 425896**

Metals

Determination of Metals by ICP

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

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1203816255 (MB)	Antimony	435 betw (325 - 492)

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

Matrix Spike (MS/MSD) Recovery Statement

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203816278 (B39HX9MS)	Lead	170* (75%-125%)
	Nickel	-28.8* (75%-125%)

Duplicate Relative Percent Difference (RPD) Statement

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

Sample	Analyte	Value
--------	---------	-------

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1203816277 (B39HX9DUP)	Chromium	97* (0%-20%)
	Lead	35.4* (0%-20%)
	Nickel	40.6* (0%-20%)

Technical Information

Sample Dilutions

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

	425896		
Analyte	001	002	003
All	2X	2X	2X

General Chemistry

Hexavalent Chromium

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.

Radiochemistry

UIISO_IE_PRECIP_AEA:COMMON

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

Technical Information

Recounts

Samples were recounted due to a suspected blank false positive. The recounts are reported.

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.

Dry Weight

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

SRTOT_SEP_PRECIP_GPC: COMMON

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

Technical Information

Recounts

Sample 425896003 (B3BJR8) was recounted due to results more negative than the three sigma TPU. The second count is reported.

SRTOT_SEP_PRECIP_GPC: 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.

TC99_SEP_GPC

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.

TC99_SEP_GPC

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this

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report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

TRITIUM_DIST_LSC: COMMON

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

Technical Information

Recounts

Samples were recounted to verify sample results. Recounts are reported.

TRITIUM_DIST_LSC: COMMON

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

Certification Statement

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

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Chain of Custody and Supporting Documentation

July 3, 2017

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F16-037-164	PAGE 1 OF 1
COLLECTOR CHRIS FULTON CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR LYNCH, SA		PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days	
SAMPLING LOCATION C9711, Optional Soil Grab 2	PROJECT DESIGNATION 100-KR-4 Long Term & Interim Action Monitoring - Soil	ACTUAL SAMPLE DEPTH 81'		SAF NO. F16-037	AIR QUALITY		
ICE CHEST NO. GWS-571	FIELD LOGBOOK NO. HNF-N-645-4	FIELD LOGBOOK NO.		COA 300085	METHOD OF SHIPMENT FEDERAL EXPRESS		
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 8068	BILL OF LADING/AIR BILL NO. 779445285380					
MATRIX* A=Air DL=Drum L=Liquid DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WT=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *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.	PRESERVATION None	None	None	None	None	
	HOLDING TIME 30 Days	6 Months	6 Months	6 Months	6 Months	6 Months	
	TYPE OF CONTAINER G/P	G/P	G	G/P	G/P	G/P	
	NO. OF CONTAINER(S) 1	1	1	1	1	1	
	VOLUME 250mL	125mL	125mL	60mL	60mL	60mL	
	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS	7196 CR6; COMMON;	TRITIUM_DIST LSC; COMMON;	SKT0P_SEP_PR ECP GPC; COMMON;	TC99 EIE LSC; COMMON;	UISO IE_PRECI P AEA; COMMON;	
SPECIAL HANDLING AND/OR STORAGE -RADIOACTIVE-IE-TO-BBBR9- JF 6/15/10							
SAMPLE NO. B3BJR8	MATRIX* SOIL	SAMPLE DATE JUN 19 2017	SAMPLE TIME 1250				

425896

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM CHRIS FULTON CHPRC	DATE/TIME JUN 19 2017 1535	RECEIVED BY/STORED IN SSU-1	DATE/TIME JUN 19 2017 1535	TRVL-17-101	
RELINQUISHED BY/REMOVED FROM SSU-1	DATE/TIME JUN 20 2017 0700	RECEIVED BY/STORED IN Christina Aguilera Corp	DATE/TIME JUN 20 2017 0700	(1) 6020_METALS_ICPMS: COMMON {Chromium, Lead}; 6020_METALS_ICPMS: COMMON (Add-on) {Nickel, Vanadium, Zinc}; 6010_METALS_ICP: COMMON {Antimony};	
RELINQUISHED BY/REMOVED FROM CHRIS FULTON	DATE/TIME JUN 20 2017 1400	RECEIVED BY/STORED IN PEDEX	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME FED EV	RECEIVED BY/STORED IN K.A. STACY BOONE	DATE/TIME 6/21/17 8:10		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	
PRINTED ON 6/14/2017	FSR ID = FSR46356	TRVL NUM = TRVL-17-101		A-6003-618 (REV 2)	

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SAMPLE RECEIPT & REVIEW FORM

Client: CPRC		SDG/AR/COC/Work Order: 925894		
Received By: Stacy Boone		Date Received: 21-JUNE-17		
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other 7794 4528 5380 - 1c 7794 4904 4622 - 1c 7794 5002 9825 - 1c		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____		
Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe): _____
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Wet Ice</u> Ice Packs Dry Ice None Other: _____ *All temperatures are recorded in Celsius TEMPERATURE: _____
4 Daily check performed and passed on LR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>1R3-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe): _____
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes _____ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials, contain acid preservation? Yes _____ No <input checked="" type="checkbox"/> N/A (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No _____ N/A Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials DS Date 6/21/17 Page 1 of 1

Hammons, Jennifer L

Subject: FW: Sample Shipping Authorization - C9711 - Radscreen B39KJ8

From: Baechler, Michael A
Sent: Tuesday, June 20, 2017 9:09 AM
To: Hammons, Jennifer L <Jennifer_L_Hammons@ri.gov>; Hinojosa, Pedro <Pedro_Hinojosa@ri.gov>; Stiles, Kyle K <Kyle_K_Stiles@ri.gov>
Cc: Baechler, Michael A <Michael_A_Baechler@ri.gov>; Lynch, Sherry A <Sherry_A_Lynch@ri.gov>
Subject: Sample Shipping Authorization - C9711 - Radscreen B39KJ8

All,

The following samples, associated with the subject radscreen, are authorized for transport as non-regulated material.

LOCATION	EST_INT	MATRIX	METHOD	GEL	FIELD	CRCF	ALS	COC
C9711, Optional Soil Grab		SOIL	GRAB	B39HY2	---	B39KJ8(RS)	---	F16-037-090(GEL) F16-037-146(CRCF)

Thanks,

Michael A. Baechler

*Scientist, CHPRC, Contractor to the Department of Energy
Soil & Groundwater Remediation Project,
CHPRC Sample Management Office
(509) 373-4452 Office
(509) 539-3117 Cellular*



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 03 July 2017

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

July 3, 2017

Metals Analysis

Case Narrative

July 3, 2017

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL425896

Work Order #: 425896

Product: Determination of Metals by ICP

Analytical Method: SW846 3050B/6010D

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

Analytical Batch: 1676081

Product: Determination of Metals by ICP-MS

Analytical Method: SW846 3050B/6020B

Analytical Procedure: GL-MA-E-014 REV# 30

Analytical Batch: 1676090

Preparation Method: SW846 3050B

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

Preparation Batches: 1676080 and 1676089

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896001	B39HX9
425896002	B39HY2
425896003	B3BJR8
1203816255	Method Blank (MB) ICP
1203816256	Laboratory Control Sample (LCS)
1203816259	425896001(B39HX9L) Serial Dilution (SD)
1203816257	425896001(B39HX9D) Sample Duplicate (DUP)
1203816258	425896001(B39HX9S) Matrix Spike (MS)
1203816275	Method Blank (MB) ICP-MS
1203816276	Laboratory Control Sample (LCS)
1203816279	425896001(B39HX9L) Serial Dilution (SD)
1203816277	425896001(B39HX9D) Sample Duplicate (DUP)
1203816278	425896001(B39HX9S) Matrix Spike (MS)
1203821217	425896001(B39HX9PS) Post Spike (PS)

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

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the acceptance criteria. However, where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Sample	Analyte	Value
1203816255 (MB)	Antimony	435 betw (325 - 492)

Matrix Spike (MS/MSD) Recovery Statement

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

Sample	Analyte	Value
1203816278 (B39HX9MS)	Lead	170* (75%-125%)
	Nickel	-28.8* (75%-125%)

Duplicate Relative Percent Difference (RPD) Statement

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

Sample	Analyte	Value
1203816277 (B39HX9DUP)	Chromium	97* (0%-20%)
	Lead	35.4* (0%-20%)
	Nickel	40.6* (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. ICP-MS.

Analyte	425896		
	001	002	003

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All	2X 1X	2X 1X	2X 1X
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Certification Statement

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

July 3, 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: GEL425896 GEL Work Order: 425896

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Review/Validation

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

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

Signature: 

Name: Nik-Cole Elmore

Date: 30 JUN 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL425896

CONTRACT: CPRC0F16037

METHOD TYPE: SW846

SAMPLE ID:425896001

BASIS: Dry Weight

DATE COLLECTED 19-JUN-17

CLIENT ID: B39HX9

LEVEL: Low

DATE RECEIVED 21-JUN-17

MATRIX: SOIL

%SOLIDS: 90

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	364	ug/kg	U	364	1100	1100	1	P	HSC	06/23/17 08:07	062317-1	1676081
7440-47-3	Chromium	27400	ug/kg	D*	217	650	650	2	MS	BAJ	06/28/17 19:09	170628-2	1676090
7439-92-1	Lead	2820	ug/kg	D*N	108	433	433	2	MS	BAJ	06/28/17 19:09	170628-2	1676090
7440-02-0	Nickel	13100	ug/kg	D*N	108	433	433	2	MS	BAJ	06/28/17 19:09	170628-2	1676090
7440-62-2	Vanadium	23800	ug/kg	D	325	1080	1080	2	MS	BAJ	06/28/17 19:09	170628-2	1676090
7440-66-6	Zinc	27000	ug/kg	D	866	2170	2170	2	MS	BAJ	06/29/17 18:14	170629-3	1676090

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1676081	1676080	SW846 3050B	0.503	g	50	mL	06/21/17	CXW4
1676090	1676089	SW846 3050B	0.513	g	50	mL	06/21/17	CXW4

***Analytical Methods:**

P SW846 3050B/6010D

MS SW846 3050B/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL425896

CONTRACT: CPRC0F16037

METHOD TYPE: SW846

SAMPLE ID:425896002

BASIS: Dry Weight

DATE COLLECTED 19-JUN-17

CLIENT ID: B39HY2

LEVEL: Low

DATE RECEIVED 21-JUN-17

MATRIX: SOIL

%SOLIDS: 91.9

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	355	ug/kg	U	355	1080	1080	1	P	HSC	06/23/17 08:21	062317-1	1676081
7440-47-3	Chromium	9350	ug/kg	D*	215	644	644	2	MS	BAJ	06/28/17 19:25	170628-2	1676090
7439-92-1	Lead	1930	ug/kg	D*N	107	429	429	2	MS	BAJ	06/28/17 19:25	170628-2	1676090
7440-02-0	Nickel	6600	ug/kg	D*N	107	429	429	2	MS	BAJ	06/28/17 19:25	170628-2	1676090
7440-62-2	Vanadium	26500	ug/kg	D	322	1070	1070	2	MS	BAJ	06/28/17 19:25	170628-2	1676090
7440-66-6	Zinc	20200	ug/kg	D	859	2150	2150	2	MS	BAJ	06/29/17 18:23	170629-3	1676090

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1676081	1676080	SW846 3050B	0.506	g	50	mL	06/21/17	CXW4
1676090	1676089	SW846 3050B	0.507	g	50	mL	06/21/17	CXW4

***Analytical Methods:**

P SW846 3050B/6010D

MS SW846 3050B/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL425896

CONTRACT: CPRC0F16037

METHOD TYPE: SW846

SAMPLE ID:425896003

BASIS: Dry Weight

DATE COLLECTED 19-JUN-17

CLIENT ID: B3BJR8

LEVEL: Low

DATE RECEIVED 21-JUN-17

MATRIX: SOIL

%SOLIDS: 80

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	395	ug/kg	U	395	1200	1200	1	P	HSC	06/23/17 08:24	062317-1	1676081
7440-47-3	Chromium	13200	ug/kg	D*	243	730	730	2	MS	BAJ	06/28/17 19:28	170628-2	1676090
7439-92-1	Lead	2090	ug/kg	D*N	122	487	487	2	MS	BAJ	06/28/17 19:28	170628-2	1676090
7440-02-0	Nickel	9490	ug/kg	D*N	122	487	487	2	MS	BAJ	06/28/17 19:28	170628-2	1676090
7440-62-2	Vanadium	22300	ug/kg	D	365	1220	1220	2	MS	BAJ	06/28/17 19:28	170628-2	1676090
7440-66-6	Zinc	20700	ug/kg	D	974	2430	2430	2	MS	BAJ	06/29/17 18:25	170629-3	1676090

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1676081	1676080	SW846 3050B	0.523	g	50	mL	06/21/17	CXW4
1676090	1676089	SW846 3050B	0.514	g	50	mL	06/21/17	CXW4

***Analytical Methods:**

P SW846 3050B/6010D

MS SW846 3050B/6020B

July 3, 2017

Quality Control Summary

July 3, 2017

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 30, 2017

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 425896

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1676090										
QC1203816277 425896001 DUP											
Chromium	*D	27400	*D	9500	ug/kg	97*		(0%-20%)	BAJ	06/28/17	19:12
Lead	*DN	2820	*D	4040	ug/kg	35.4*		(0%-20%)			
Nickel	*DN	13100	*D	8710	ug/kg	40.6*		(0%-20%)			
Vanadium	D	23800	D	25900	ug/kg	8.79		(0%-20%)			
Zinc	D	27000	D	24800	ug/kg	8.37		(0%-20%)		06/29/17	18:16
QC1203816276 LCS											
Chromium		4620	D	4650	ug/kg		101	(80%-120%)		06/28/17	19:06
Lead		4620	D	4710	ug/kg		102	(80%-120%)			
Nickel		4620	D	4600	ug/kg		99.5	(80%-120%)			
Vanadium		4620	D	4640	ug/kg		100	(80%-120%)			
Zinc		4620	D	4880	ug/kg		106	(80%-120%)		06/29/17	18:12
QC1203816275 MB											
Chromium			DU	196	ug/kg					06/28/17	19:02
Lead			DU	98.0	ug/kg						
Nickel			DU	98.0	ug/kg						

July 3, 2017

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QC Summary

Workorder: 425896

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1676090										
Vanadium			DU	294	ug/kg				BAJ	06/28/17	19:02
Zinc			DU	784	ug/kg					06/29/17	18:11
QC1203816278 425896001 MS											
Chromium	5460	*D	27400	D	24100	ug/kg	N/A	(75%-125%)		06/28/17	19:15
Lead	5460	*DN	2820	DN	12100	ug/kg	170*	(75%-125%)			
Nickel	5460	*DN	13100	DN	11600	ug/kg	0*	(75%-125%)			
Vanadium	5460	D	23800	D	41400	ug/kg	N/A	(75%-125%)			
Zinc	5460	D	27000	D	47800	ug/kg	N/A	(75%-125%)		06/29/17	18:18
QC1203821217 425896001 PS											
Lead	25.0	*DN	13.0	D	37.8	ug/L	98.8	(75%-125%)		06/28/17	19:19
Nickel	25.0	*DN	60.7	D	83.1	ug/L	89.7	(75%-125%)			
QC1203816279 425896001 SDILT											
Chromium		*D	127	D	24.1	ug/L	4.72	(0%-20%)		06/28/17	19:22
Lead		*DN	13.0	D	2.48	ug/L	4.85	(0%-20%)			
Nickel		*DN	60.7	D	12.3	ug/L	1.52	(0%-20%)			
Vanadium		D	110	D	21.6	ug/L	1.46	(0%-20%)			
Zinc		D	124	D	27.5	ug/L	10.4	(0%-20%)		06/29/17	18:21

July 3, 2017

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QC Summary

Workorder: 425896

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Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD/D%, REC%, Range, Anlst, Date, Time. Rows include Metals Analysis-ICP, Antimony, and various QC samples with their respective values and dates.

Notes:

The Qualifiers in this report are defined as follows:

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

July 3, 2017

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QC Summary

Workorder: 425896

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

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

July 3, 2017

General Chem Analysis

July 3, 2017

Case Narrative

July 3, 2017

General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL425896
Work Order #: 425896

Product: Hexavalent Chromium

Analytical Method: 7196_CR6

Analytical Procedure: GL-GC-E-044 REV# 22

Analytical Batch: 1676565

Preparation Method: SW846 3060A

Preparation Procedure: GL-GC-E-044 REV# 22

Preparation Batch: 1676564

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896001	B39HX9
425896002	B39HY2
425896003	B3BJR8
1203817304	Method Blank (MB)
1203817305	Laboratory Control Sample (LCS)
1203817306	Insoluble Lab Control Sample (ILCS)
1203817308	425896001(B39HX9) Sample Duplicate (DUP)
1203817310	425896001(B39HX9) Matrix Spike (MS)
1203817314	425896001(B39HX9) 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.

July 3, 2017

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL425896 GEL Work Order: 425896

The Qualifiers in this report are defined as follows:

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

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

Review/Validation

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

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

Signature: 

Name: Kristen Mizzell

Date: 26 JUN 2017

Title: Analyst I

Sample Data Summary

July 3, 2017

Certificate of Analysis

Report Date: June 26, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F16-037

Client Sample ID: B39HX9	Project: CPRC0F16037
Sample ID: 425896001	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 19-JUN-17 11:35	
Receive Date: 21-JUN-17	
Collector: Client	
Moisture: 10%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
7196_CR6: COMMON "Dry Weight Corrected"												
Hexavalent Chromium	U	96.3	96.3	241	ug/Kg	21.7	1	VH1	06/23/17	1524	1676565	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	06/22/17	1318	1676564

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	7196_CR6	

Notes:

Column headers are defined as follows:

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

Certificate of Analysis

Report Date: June 26, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F16-037

Client Sample ID: B39HY2	Project: CPRC0F16037
Sample ID: 425896002	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 19-JUN-17 12:30	
Receive Date: 21-JUN-17	
Collector: Client	
Moisture: 8.13%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
7196_CR6: COMMON "Dry Weight Corrected"												
Hexavalent Chromium	B	164	116	289	ug/Kg	26.6	1	VH1	06/23/17	1528	1676565	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	06/22/17	1318	1676564

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	7196_CR6	

Notes:

Column headers are defined as follows:

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

Certificate of Analysis

Report Date: June 26, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F16-037

Client Sample ID: B3BJR8	Project: CPRC0F16037
Sample ID: 425896003	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 19-JUN-17 12:50	
Receive Date: 21-JUN-17	
Collector: Client	
Moisture: 20.1%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
7196_CR6: COMMON "Dry Weight Corrected"												
Hexavalent Chromium	U	175	175	439	ug/Kg	35.1	1	VH1	06/23/17	1529	1676565	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	06/22/17	1318	1676564

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	7196_CR6	

Notes:

Column headers are defined as follows:

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

Quality Control Summary

July 3, 2017

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 26, 2017

Page 1 of 1

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 425896

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Spectrometric Analysis											
Batch	1676565										
QC1203817308	425896001	DUP									
Hexavalent Chromium		U	96.3	U	96.3	ug/Kg	N/A		VH1	06/23/17	15:25
QC1203817306	ILCS										
Hexavalent Chromium	7880				8220	ug/Kg	104	(80%-120%)		06/23/17	15:24
QC1203817305	LCS										
Hexavalent Chromium	3820				3700	ug/Kg	96.8	(80%-120%)		06/23/17	15:24
QC1203817304	MB										
Hexavalent Chromium			U		135	ug/Kg				06/23/17	15:24
QC1203817310	425896001	MS									
Hexavalent Chromium	4190	U	96.3		3920	ug/Kg	93.4	(75%-125%)		06/23/17	15:25
QC1203817314	425896001	MSD									
Hexavalent Chromium	4190	U	96.3		3960	ug/Kg	1.14	94.5	(0%-35%)	06/23/17	15:28

Notes:

The Qualifiers in this report are defined as follows:

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

July 3, 2017

Case Narrative

July 3, 2017

Radiochemistry

Technical Case Narrative

CH2M Hill Plateau Remediation Company (CPRC)

SDG #: GEL425896

Work Order #: 425896

Product: UISO_IE_PRECIP_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

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

Analytical Batch: 1677478

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1676042

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896001	B39HX9
425896003	B3BJR8
1203819595	Method Blank (MB)
1203819596	425896001(B39HX9) Sample Duplicate (DUP)
1203819597	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

Samples were recounted due to a suspected blank false positive. The recounts are reported.

Product: UISO_IE_PRECIP_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

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

Analytical Batch: 1677480

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1676059

July 3, 2017

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896002	B39HY2
1203819606	Method Blank (MB)
1203819607	425896002(B39HY2) Sample Duplicate (DUP)
1203819608	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

Analytical Method: Dry Soil Prep

Analytical Procedure: GL-OA-E-020 REV# 11

Analytical Batch: 1676042

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896001	B39HX9
425896003	B3BJR8
1203816144	425896001(B39HX9) 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: Dry Weight

Analytical Method: Dry Soil Prep

Analytical Procedure: GL-OA-E-020 REV# 11

Analytical Batch: 1676059

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896002	B39HY2
1203816205	425896002(B39HY2) 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: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

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

Analytical Batch: 1676655

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1676042

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896001	B39HX9
425896003	B3BJR8
1203817562	Method Blank (MB)
1203817563	425896001(B39HX9) Sample Duplicate (DUP)
1203817564	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 425896003 (B3BJR8) was recounted due to results more negative than the three sigma TPU. The second count is reported.

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

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

July 3, 2017

Analytical Batch: 1676670

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1676059

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896002	B39HY2
1203817601	Method Blank (MB)
1203817602	425896002(B39HY2) Sample Duplicate (DUP)
1203817603	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: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

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

Analytical Batch: 1677039

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896001	B39HX9
425896003	B3BJR8
1203818491	Method Blank (MB)
1203818492	425896001(B39HX9) Sample Duplicate (DUP)
1203818493	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

July 3, 2017

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

Analytical Batch: 1677040

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896002	B39HY2
1203818495	Method Blank (MB)
1203818496	425896002(B39HY2) Sample Duplicate (DUP)
1203818497	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1677059

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896001	B39HX9
425896003	B3BJR8
1203818581	Method Blank (MB)
1203818582	425896001(B39HX9) Sample Duplicate (DUP)
1203818583	425896001(B39HX9) Matrix Spike (MS)
1203818584	Laboratory Control Sample (LCS)

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

Data Summary:

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

Technical Information

Recounts

Samples were recounted to verify sample results. Recounts are reported.

July 3, 2017

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1677060

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425896002	B39HY2
1203818585	Method Blank (MB)
1203818586	425896002(B39HY2) Sample Duplicate (DUP)
1203818587	425896002(B39HY2) Matrix Spike (MS)
1203818588	Laboratory Control Sample (LCS)

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

Data Summary:

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

Certification Statement

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

July 3, 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: GEL425896 GEL Work Order: 425896

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: Theresa Austin

Date: 03 JUL 2017

Title: Group Leader

Sample Data Summary

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896
Lab Sample ID: 425896001

Client: CPRC001
Date Collected: 06/19/2017 11:35
Date Received: 06/21/2017 08:50

Project: CPRC0F16037
Matrix: SOIL
%Moisture: 10

Client ID: B39HX9
Batch ID: 1677478
Run Date: 06/30/2017 10:55
Data File: S0425896001_UU.2A.gcnf
Prep Batch: 1677478
Prep Date: 06/28/2017 00:00

Method: UIISO_IE_PRECIP_AEA
Analyst: BXA4
Aliquot: 0.11 g
Prep Method: DOE EML HASL-300, U-02-R

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-011
Instrument: 1115
Count Time: 118.7333 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		1.03	pCi/g	+/-0.861	0.883	0.785	1.00
15117-96-1/13982-7	Uranium-235/236	U	-0.0227	pCi/g	+/-0.380	0.382	0.803	1.00
7440-61-1	Uranium-238	U	0.136	pCi/g	+/-0.432	0.433	0.650	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	16.9	19.0	pCi/g	88.9	(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.

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896001	Date Collected: 06/19/2017 11:35	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 10
Client ID: B39HX9	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "Dry Weight Corrected"
Batch ID: 1676655	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 06/28/2017 11:52	Aliquot: 0.372 g	Instrument: PIC11A
Data File: S1676655r1.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1676655		Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/26/2017 10:24		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.445	pCi/g	+/-0.404	0.405	0.942	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.70	7.75	mg	86.5	(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.

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896001	Date Collected: 06/19/2017 11:35	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 10
Client ID: B39HX9		Prep Basis: "As Received"
Batch ID: 1677039	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/02/2017 06:43	Analyst: CXS7	Instrument: LSCBLUE
Data File: E1677039.xls	Aliquot: 1.238 g	Count Time: 15 min
Prep Batch: 1677039	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 06/28/2017 09:34		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	0.227	pCi/g	+/-1.90	1.90	3.30	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	44200	45000	CPM	98.2	(30%-105%)

Comments:

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

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896001	Date Collected: 06/19/2017 11:35	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 10
Client ID: B39HX9		Prep Basis: "As Received"
Batch ID: 1677059	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 06/29/2017 08:08	Analyst: JXB7	Instrument: LSCBLUE
Data File: T1677059R.xls	Aliquot: 1.341 g	Count Time: 20 min
Prep Batch: 1677059	Prep Method: EPA 906.0 Modified	
Prep Date: 06/28/2017 09:19		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		304	pCi/g	+/-27.4	74.3	22.2	30.0

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

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

July 3, 2017

Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896
Lab Sample ID: 425896001

Client: CPRC001
Date Collected: 06/19/2017 11:35
Date Received: 06/21/2017 08:50

Project: CPRC0F16037
Matrix: SOIL
%Moisture: 10

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896002	Date Collected: 06/19/2017 12:30	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 8.1
Client ID: B39HY2		Prep Basis: "Dry Weight Corrected"
Batch ID: 1677480	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 06/29/2017 09:03	Analyst: HAKB	Instrument: 1002
Data File: S0425896002_UU.1A.gcnf	Aliquot: 0.107 g	Count Time: 215.1283 min
Prep Batch: 1677480	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/27/2017 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		0.997	pCi/g	+/-0.607	0.625	0.523	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.406	pCi/g	+/-0.447	0.451	0.305	1.00
7440-61-1	Uranium-238	U	0.329	pCi/g	+/-0.362	0.365	0.246	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	17.1	19.5	pCi/g	87.6	(30%-105%)

Comments:

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

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896002	Date Collected: 06/19/2017 12:30	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 8.1
Client ID: B39HY2	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "Dry Weight Corrected"
Batch ID: 1676670	Analyst: JXB7	SOP Ref: GL-RAD-A-004
Run Date: 06/26/2017 14:43	Aliquot: 0.31 g	Instrument: PIC10B
Data File: S1676670.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1676670		Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/23/2017 09:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.877	pCi/g	+/-0.822	0.851	1.34	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.80	7.75	mg	101	(40%-110%)

Comments:

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

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896002	Date Collected: 06/19/2017 12:30	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 8.1
Client ID: B39HY2		Prep Basis: "As Received"
Batch ID: 1677040	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/02/2017 06:07	Analyst: CXS7	Instrument: LSCGOLD
Data File: E1677040.xls	Aliquot: 1.274 g	Count Time: 15 min
Prep Batch: 1677040	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 06/28/2017 09:33		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-0.556	pCi/g	+/-1.97	1.97	3.48	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	44100	45100	CPM	97.7	(30%-105%)

Comments:

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

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896002	Date Collected: 06/19/2017 12:30	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 8.1
Client ID: B39HY2		Prep Basis: "As Received"
Batch ID: 1677060	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 06/30/2017 05:36	Analyst: JXB7	Instrument: LSCGOLD
Data File: T1677060.xls	Aliquot: 1.284 g	Count Time: 20 min
Prep Batch: 1677060	Prep Method: EPA 906.0 Modified	
Prep Date: 06/27/2017 11:02		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	8.51	pCi/g	+/-14.7	14.9	25.4	30.0

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

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

July 3, 2017

Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896
Lab Sample ID: 425896002

Client: CPRC001
Date Collected: 06/19/2017 12:30
Date Received: 06/21/2017 08:50

Project: CPRC0F16037
Matrix: SOIL
%Moisture: 8.1

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896003	Date Collected: 06/19/2017 12:50	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 20.1
Client ID: B3BJR8		Prep Basis: "Dry Weight Corrected"
Batch ID: 1677478	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 06/30/2017 10:55	Analyst: BXA4	Instrument: 1116
Data File: S0425896003_UU.2A.gcnf	Aliquot: 0.103 g	Count Time: 118.7928 min
Prep Batch: 1677478	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/28/2017 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	0.672	pCi/g	+/-0.680	0.690	0.662	1.00
15117-96-1/13982-7	Uranium-235/236	U	-0.0207	pCi/g	+/-0.347	0.348	0.732	1.00
7440-61-1	Uranium-238	U	0.141	pCi/g	+/-0.392	0.393	0.423	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	20.7	20.3	pCi/g	102	(30%-105%)

Comments:

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

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896003	Date Collected: 06/19/2017 12:50	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 20.1
Client ID: B3BJR8	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "Dry Weight Corrected"
Batch ID: 1676655	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 06/28/2017 13:58	Aliquot: 0.342 g	Instrument: PIC2C
Data File: S1676655r1.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1676655		Prep SOP Ref: GL-RAD-A-021
Prep Date: 06/26/2017 10:24		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.219	pCi/g	+/-0.512	0.515	0.935	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.40	7.75	mg	82.6	(40%-110%)

Comments:

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

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896003	Date Collected: 06/19/2017 12:50	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 20.1
Client ID: B3BJR8		Prep Basis: "As Received"
Batch ID: 1677039	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/02/2017 06:59	Analyst: CXS7	Instrument: LSCBLUE
Data File: E1677039.xls	Aliquot: 1.211 g	Count Time: 15 min
Prep Batch: 1677039	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 06/28/2017 09:34		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	1.09	pCi/g	+/-2.03	2.03	3.46	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	44200	45000	CPM	98.3	(30%-105%)

Comments:

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

July 3, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896	Client: CPRC001	Project: CPRC0F16037
Lab Sample ID: 425896003	Date Collected: 06/19/2017 12:50	Matrix: SOIL
	Date Received: 06/21/2017 08:50	%Moisture: 20.1
Client ID: B3BJR8		Prep Basis: "As Received"
Batch ID: 1677059	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 06/29/2017 08:29	Analyst: JXB7	Instrument: LSCBLUE
Data File: T1677059R.xls	Aliquot: 1.289 g	Count Time: 20 min
Prep Batch: 1677059	Prep Method: EPA 906.0 Modified	
Prep Date: 06/28/2017 09:19		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		284	pCi/g	+/-26.7	69.7	22.3	30.0

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

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

July 3, 2017

Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425896
Lab Sample ID: 425896003

Client: CPRC001
Date Collected: 06/19/2017 12:50
Date Received: 06/21/2017 08:50

Project: CPRC0F16037
Matrix: SOIL
%Moisture: 20.1

July 3, 2017

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 3, 2017

Page 1 of 5

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 425896

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1677478								
QC1203819595	MB								
Uranium-233/234			U	0.611	pCi/g			BXA4	06/30/1710:55
				Uncert: +/-0.765					
				TPU: +/-0.775					
Uranium-235/236			U	0.163	pCi/g				
				Uncert: +/-0.600					
				TPU: +/-0.601					
Uranium-238			U	0.652	pCi/g				
				Uncert: +/-0.763					
				TPU: +/-0.774					
**Uranium-232 Tracer	19.0			14.9	pCi/g	REC: 78	(30%-105%)		
				Uncert: +/-3.58					
				TPU: +/-5.26					
QC1203819596	425896001	DUP							
Uranium-233/234		1.03	U	0.295	pCi/g				06/30/1710:55
				Uncert: +/-0.861		RPD: 44	(0% - 100%)		
				TPU: +/-0.883		RER: 1.39	(0-2)		
Uranium-235/236		U -0.0227	U	-0.0229	pCi/g				
				Uncert: +/-0.380		RPD: 0	N/A		
				TPU: +/-0.382		RER: 0.000798	(0-2)		
Uranium-238		U 0.136	U	0.120	pCi/g				
				Uncert: +/-0.432		RPD: 0	N/A		
				TPU: +/-0.433		RER: 0.0521	(0-2)		
**Uranium-232 Tracer	20.3	16.9		20.3	pCi/g	REC: 100	(30%-105%)		
				Uncert: +/-3.38					
				TPU: +/-4.98					
QC1203819597	LCS								
Uranium-233/234				22.4	pCi/g				06/30/1710:55
				Uncert: +/-3.59					
				TPU: +/-5.56					
Uranium-235/236				0.919	pCi/g				
				Uncert: +/-0.883					
				TPU: +/-0.900					
Uranium-238	24.6			24.7	pCi/g	REC: 100	(80%-120%)		
				Uncert: +/-3.77					
				TPU: +/-6.01					
**Uranium-232 Tracer	19.0			17.6	pCi/g	REC: 93	(30%-105%)		
				Uncert: +/-3.31					
				TPU: +/-4.89					
Batch	1677480								
QC1203819606	MB								
Uranium-233/234			U	0.157	pCi/g			HAKB	06/29/1709:03
				Uncert: +/-0.514					
				TPU: +/-0.514					

QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1677480								
Uranium-235/236			U	0.107	pCi/g				
	Uncert:			+/-0.388					
	TPU:			+/-0.389					
Uranium-238			U	0.0154	pCi/g				
	Uncert:			+/-0.324					
	TPU:			+/-0.325					
**Uranium-232 Tracer	19.5			12.5	pCi/g	REC:	64 (30%-105%)		
	Uncert:			+/-2.92					
	TPU:			+/-4.37					
QC1203819607 425896002 DUP									
Uranium-233/234		0.997	U	0.569	pCi/g				
	Uncert:	+/-0.607		+/-0.508		RPD:	49 (0% - 100%)		
	TPU:	+/-0.625		+/-0.515		RER:	1.04 (0-2)		
Uranium-235/236	U	0.406	U	0.397	pCi/g				
	Uncert:	+/-0.447		+/-0.464		RPD:	19 (0% - 100%)		
	TPU:	+/-0.451		+/-0.468		RER:	0.0276 (0-2)		
Uranium-238	U	0.329	U	0.303	pCi/g				
	Uncert:	+/-0.362		+/-0.377		RPD:	33 (0% - 100%)		
	TPU:	+/-0.365		+/-0.380		RER:	0.0955 (0-2)		
**Uranium-232 Tracer	19.7	17.1		15.7	pCi/g	REC:	80 (30%-105%)		
	Uncert:	+/-2.50		+/-2.55					
	TPU:	+/-3.82		+/-3.90					
QC1203819608 LCS									
Uranium-233/234				27.3	pCi/g				
	Uncert:			+/-3.05					
	TPU:			+/-5.17					
Uranium-235/236				2.08	pCi/g				
	Uncert:			+/-0.960					
	TPU:			+/-1.01					
Uranium-238	25.2			28.1	pCi/g	REC:	111 (80%-120%)		
	Uncert:			+/-3.10					
	TPU:			+/-5.29					
**Uranium-232 Tracer	19.5			14.4	pCi/g	REC:	74 (30%-105%)		
	Uncert:			+/-2.59					
	TPU:			+/-3.94					
Rad Gas Flow									
Batch	1676655								
QC1203817562 MB									
Total Strontium			U	-0.434	pCi/g			KSD1	06/28/1711:52
	Uncert:			+/-0.546					
	TPU:			+/-0.546					
**Strontium Carrier	7.75			6.30	mg	REC:	81 (40%-110%)		
QC1203817563 425896001 DUP									
Total Strontium	U	-0.445	U	-0.57	pCi/g				06/28/1711:52
	Uncert:	+/-0.404		+/-0.550		RPD:	0 N/A		
	TPU:	+/-0.405		+/-0.550		RER:	0.359 (0-2)		
**Strontium Carrier	7.75	6.70		6.50	mg	REC:	84 (40%-110%)		
QC1203817564 LCS									
Total Strontium	53.4			60.2	pCi/g	REC:	113 (80%-120%)		06/28/1711:52
	Uncert:			+/-3.01					

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1676655								
		TPU:		+/-15.8					
**Strontium Carrier	7.75			6.80	mg	REC:	88 (40%-110%)		
Batch	1676670								
QC1203817601	MB								
Total Strontium			U	0.330	pCi/g			JXB7	06/26/1714:43
		Uncert:		+/-0.577					
		TPU:		+/-0.583					
**Strontium Carrier	7.75			7.60	mg	REC:	98 (40%-110%)		
QC1203817602	425896002	DUP							
Total Strontium		U	0.877	U	0.215				06/26/1714:43
		Uncert:	+/-0.822		+/-0.742	RPD:	0 N/A		
		TPU:	+/-0.851		+/-0.744	RER:	1.15 (0-2)		
**Strontium Carrier	7.75		7.80		7.30	mg	REC:	94 (40%-110%)	
QC1203817603	LCS								
Total Strontium			63.2		62.5	pCi/g	REC:	99 (80%-120%)	06/26/1714:44
		Uncert:			+/-3.54				
		TPU:			+/-16.4				
**Strontium Carrier	7.75				7.40	mg	REC:	96 (40%-110%)	
Rad Liquid Scintillation									
Batch	1677039								
QC1203818491	MB								
Technetium-99			U	0.523	pCi/g			CXS7	07/02/1707:32
		Uncert:		+/-1.76					
		TPU:		+/-1.76					
**Technetium-99m Tracer	45000			44700	CPM	REC:	99 (30%-105%)		
QC1203818492	425896001	DUP							
Technetium-99		U	0.227	U	-0.772				07/02/1707:49
		Uncert:	+/-1.90		+/-1.63	RPD:	0 N/A		
		TPU:	+/-1.90		+/-1.63	RER:	0.782 (0-2)		
**Technetium-99m Tracer	45000		44200		45800	CPM	REC:	102 (30%-105%)	
QC1203818493	LCS								
Technetium-99			65.0		53.4	pCi/g	REC:	82 (80%-120%)	07/02/1708:05
		Uncert:			+/-3.37				
		TPU:			+/-7.00				
**Technetium-99m Tracer	45000			44100	CPM	REC:	98 (30%-105%)		
Batch	1677040								
QC1203818495	MB								
Technetium-99			U	-0.701	pCi/g			CXS7	07/02/1706:24
		Uncert:		+/-1.98					
		TPU:		+/-1.98					
**Technetium-99m Tracer	45100			44000	CPM	REC:	98 (30%-105%)		
QC1203818496	425896002	DUP							
Technetium-99		U	-0.556	U	-0.00959				07/02/1706:40
		Uncert:	+/-1.97		+/-2.07	RPD:	0 N/A		
		TPU:	+/-1.97		+/-2.07	RER:	0.375 (0-2)		
**Technetium-99m Tracer	45100		44100		44900	CPM	REC:	100 (30%-105%)	
QC1203818497	LCS								
Technetium-99			67.6		55.2	pCi/g	REC:	82 (80%-120%)	07/02/1706:57
		Uncert:			+/-3.59				

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1677040									
		TPU:		+/-7.28						
**Technetium-99m Tracer	45100			44700	CPM	REC:	99 (30%-105%)			
Batch	1677059									
QC1203818581	MB									
Tritium			U	2.98	pCi/g			JXB7	06/29/1709:12	
		Uncert:		+/-12.1						
		TPU:		+/-12.1						
QC1203818582	425896001	DUP								
Tritium		304		309	pCi/g				06/29/1709:34	
		Uncert:	+/-27.4	+/-28.3		RPD:	2 (0% - 20%)			
		TPU:	+/-74.3	+/-75.6		RER:	0.0916 (0-2)			
QC1203818583	425896001	MS								
Tritium	80.0	304		377	pCi/g	REC:	92 (75%-125%)		06/29/1709:55	
		Uncert:	+/-27.4	+/-29.2						
		TPU:	+/-74.3	+/-90.5						
QC1203818584	LCS									
Tritium	79.9			66.9	pCi/g	REC:	84 (80%-120%)		06/29/1710:17	
		Uncert:		+/-16.3						
		TPU:		+/-22.3						
Batch	1677060									
QC1203818585	MB									
Tritium			U	-2.35	pCi/g			JXB7	06/30/1705:57	
		Uncert:		+/-12.5						
		TPU:		+/-12.5						
QC1203818586	425896002	DUP								
Tritium		U	8.51	U	5.33	pCi/g			06/30/1706:19	
		Uncert:	+/-14.7	+/-15.1		RPD:	0 N/A			
		TPU:	+/-14.9	+/-15.2		RER:	0.294 (0-2)			
QC1203818587	425896002	MS								
Tritium	76.9	U	8.51	85.6	pCi/g	REC:	111 (75%-125%)		06/30/1706:40	
		Uncert:	+/-14.7	+/-18.9						
		TPU:	+/-14.9	+/-27.1						
QC1203818588	LCS									
Tritium	76.8			65.7	pCi/g	REC:	86 (80%-120%)		06/30/1707:01	
		Uncert:		+/-17.5						
		TPU:		+/-23.0						

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
- 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 associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample
- 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.

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

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.