

July 26, 2017



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July 26, 2017

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

Re: CHPRC SAF F17-038
Work Order: 427585
SDG: GEL427585

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 12, 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: 304528 - 8C
Chain of Custody: F17-038-007, F17-038-008, F17-038-011, F17-038-012, F17-038-015 and F17-038-016
Enclosures

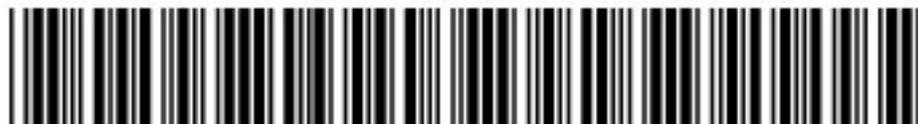


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Case Narrative

July 26, 2017

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F17-038
SDG: GEL427585

July 26, 2017

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on July 12, 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>
427585001	B3BBC7
427585002	B3BBC8
427585003	B3BBD1
427585004	B3BBD2
427585005	B3BBD5
427585006	B3BBD6

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 #: GEL427585
 Work Order #: 427585

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
1203829203 (MB)	Calcium	8540 betw (7520 - 11700)
	Sodium	8400 betw (6580 - 11700)

Technical Information

Sample Dilutions

Samples were diluted for titanium in order to bring raw values within the linear range of the instrument, and for the analytes interfered with, in order to ensure that the inter-element correction factors were valid. 427585002 (B3BBC8), 427585004 (B3BBD2) and 427585006 (B3BBD6).

Analyte	427585		
	002	004	006
Several	5X 1X	5X 1X	5X 1X

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

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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
1203829247 (B3BBC8MS)	Selenium	69.8* (75%-125%)

Technical Information

Sample Dilutions

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

Analyte	427585		
	002	004	006
Arsenic	2X	2X	2X
Molybdenum	2X	2X	2X
Selenium	2X	2X	2X

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

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.

General Chemistry

Cyanide, Total

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

Technical Information

Sample Dilutions

The following samples 1203828403 (LCS) and 1203832026 (LCSD) were diluted because target analyte concentrations exceeded the calibration range.

Miscellaneous Information

Additional Comments

The following sample was accidentally double spiked during prep: 1203829118 (B3BBC8MS).

Ion Chromatography

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

Miscellaneous Information

Manual Integrations

Samples 1203832121 (B3BBC8DUP), 427585002 (B3BBC8), 427585004 (B3BBD2) and 427585006 (B3BBD6) were manually integrated to correctly position the baseline as set in the calibration standards.

Ammonia Nitrogen

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

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

Analyte	Sample	Value
Nitrogen, Ammonia	1203829642 (B3BBC8DUP)	abs(14.7 - 3.98)* (+/-2.37 mg/kg)

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

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.

NP237_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

Sample 1203829539 (LCS) was recounted due to high carrier/tracer yield. The recount is reported. Samples 1203829537 (MB) and 427585005 (B3BBD5) were recounted due to detector error. The recounts are reported.

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.

Technical Information

Recounts

Sample 1203829545 (LCS) was recounted due to high recovery. The recount is reported.

Miscellaneous Information

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 1203829546 (MB) and 1203829547 (B3BBC7DUP) were recounted twice due to peak shifts. The third counts are reported.

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.

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

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.

NI63_LSC

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.

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

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Samples were recounted due to high MDCs and low recovery. Recounts are reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1203830528 (B3BBC7MS), aliquot was reduced to conserve sample volume.

Certification Statement

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

Chain of Custody and Supporting Documentation

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427585

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F17-038-008	PAGE 1 OF 1
COLLECTOR G.C. HOFFMAN/GHPRC	COMPANY CONTACT LYNCH, SA	TELEPHONE NO. 373-5586	PROJECT COORDINATOR LYNCH, SA	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9617, I-002	PROJECT DESIGNATION 200-EA-1 OPPORTUNISTIC SAMPLING AT C9617 - SOIL	FIELD LOGBOOK NO. HNF-N-645-4	SAF NO. F17-038	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. 605-602	ACTUAL SAMPLE DEPTH 42.3-44.8'	OFFSITE PROPERTY NO. 8166	COA 304528	BILL OF LADING/AIR BILL NO. 7796 0583 2487	
<p>SHIPPED TO GEL Laboratories, LLC</p> <p>MATRIX* A=Air DL=Drum L=Liquid DS=Drum S=Soil O=Oil SE=Sediment T=Tissue V=Vegetation W=Water WT=Wipe X=Other</p> <p>POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.</p> <p>SPECIAL HANDLING AND/OR STORAGE N/A</p>					
SAMPLE NO. B3B8C8	MATRIX*	SOIL	SAMPLE DATE 7-11-17	SAMPLE TIME 0745	
	PRESCRIPTION	COOL <=6C	None		
	HOLDING TIME	28 Days/48 Hours	28 Days		
	TYPE OF CONTAINER	G/P	G/P		
	NO. OF CONTAINER(S)	1	1		
	VOLUME	125mL	125mL		
	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS		

CHAIN OF POSSESSION		SIGN / PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM G.C. HOFFMAN/GHPRC	DATE/TIME JUL 11 2017 1400	RECEIVED BY/STORED IN Lashy Wain CHPRC	DATE/TIME JUL 11 2017	TRVL-17-159:** Analyses are listed in order of priority if reduced sample volume is collected (1) 300.0_ANIONS_IC: COMMON; 300.0_ANIONS_IC: COMMON (Add-on); 9012_CYANIDE (TOTAL): COMMON; 350.1_AMMONIA: COMMON; 6010_METALS_ICPMS: COMMON (SOLIDS); 6010_METALS_ICP: COMMON {Antimony, Barium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Magnesium, Manganese, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}; 6020_METALS_ICPMS: COMMON {Molybdenum, Beryllium, Lead}; 6020_METALS_ICPMS: COMMON (Add-on) {Arsenic}; Selenium};	
RELINQUISHED BY/REMOVED FROM G.C. HOFFMAN/GHPRC	DATE/TIME JUL 11 2017 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME JUL 11 2017		
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	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	
PRINTED ON 6/29/2017	FSR ID = FSR46064	TRVL NUM = TRVL-17-159		A-6003-618 (REV 2)	

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CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F17-038-011	PAGE 1 OF 1
COLLECTOR G.C. HOFFMAN/CHPRC	COMPANY CONTACT LYNCH, SA	TELEPHONE NO. 373-5586	PROJECT COORDINATOR LYNCH, SA	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days		
SAMPLING LOCATION C9617, I-003	PROJECT DESIGNATION 200-EA-1 OPPORTUNISTIC SAMPLING AT C9617 - SOIL	FIELD LOGBOOK NO. HNF-N-645-4	ACTUAL SAMPLE DEPTH 65.6-68.1'	SAF NO. F17-038	AIR QUALITY <input type="checkbox"/>		
ICE CHEST NO. GWS-602	OFFSITE PROPERTY NO. 8166	BILL OF LADING/AIR BILL NO. 7796 0583 2487		COA 304528	METHOD OF SHIPMENT FEDERAL EXPRESS		
SHIPPED TO GEL Laboratories, LLC	ORIGINAL						

MATRIX*	PRESERVATION	None	None	None	None	None
A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	Cool <=6C	6 Months	6 Months	6 Months	6 Months	6 Months
POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	HOLDING TIME	G/P	G/P	G/P	G/P	G/P
SPECIAL HANDLING AND/OR STORAGE N/A	TYPE OF CONTAINER	1	1	1	1	1
	NO. OF CONTAINER(S)	125mL	60mL	60mL	60mL	60mL
	VOLUME	GAMMA.GS: COMMON;	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	7196.CRG: COMMON;	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B3BBD1	SOIL	7-11-17	0920	✓	✓	✓

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CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM G.C. HOFFMAN/CHPRC	RECEIVED BY/STORED IN Ledy Wall RECEIVED BY/STORED IN FEDEX	TRVL-17-159:** Analyses are listed in order of priority if reduced sample volume is collected (1) AMCMISO_IE_PRECIP_AEA: COMMON; NP237_IE_PRECIP_AEA: COMMON; PUISO_IE_PRECIP_AEA: COMMON; TRITIUM_DIST_LSC: COMMON; TC99_SEP_GPC: COMMON; NI63_LSC: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON;
RELINQUISHED BY/REMOVED FROM Ledy Wall G.C. HOFFMAN/CHPRC	RECEIVED BY/STORED IN Fed Ex	
RELINQUISHED BY/REMOVED FROM Fed Ex	RECEIVED BY/STORED IN Christie Ganes	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
LABORATORY SECTION	RECEIVED BY	TITLE
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY
PRINTED ON 6/29/2017	FSR ID = FSR46065	TRVL NUM = TRVL-17-159

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CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F17-038-012	PAGE 1 OF 1
COLLECTOR G.C. HOFFMAN/CHPRC	COMPANY CONTACT LYNCH, SA	TELEPHONE NO. 373-5586	PROJECT COORDINATOR LYNCH, SA	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9617, I-003	PROJECT DESIGNATION 200-EA-1 OPPORTUNISTIC SAMPLING AT C9617 - SOIL	FIELD LOGBOOK NO. HNF-N-645-4	SAF NO. F17-038	AIR QUALITY	
ICE CHEST NO. GWS-602	ACTUAL SAMPLE DEPTH 65.6-68.1'	OFFSITE PROPERTY NO. 8166	COA 304528	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC					
BILL OF LADING/AIR BILL NO. 7796 0583 2487					

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	COOL <=6C None	PRESERVATION 28 Days/48 Hours	HOLDING TIME 28 Days	TYPE OF CONTAINER G/P	NO. OF CONTAINER(S) 1	VOLUME 125mL	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS
SPECIAL HANDLING AND/OR STORAGE N/A									
SAMPLE NO. B3BBD2	MATRIX* SOIL	SAMPLE DATE 7-11-17	SAMPLE TIME 0900						

427585

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM G.C. HOFFMAN/CHPRC	DATE/TIME JUL 11 2017 1300	RECEIVED BY/STORED IN Lesly Wall / CHPRC	DATE/TIME JUL 11 2017	TRVL-17-159:** Analyses are listed in order of priority if reduced sample volume is collected	
RELINQUISHED BY/REMOVED FROM CHPRC	DATE/TIME JUL 11 2017 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME	(1) 300.0_ANIONS_IC: COMMON; 300.0_ANIONS_IC: COMMON (Add-on); 9012_CYANIDE (TOTAL): COMMON; 350.1_AMMONIA: COMMON;	
RELINQUISHED BY/REMOVED FROM Red GPC	DATE/TIME	RECEIVED BY/STORED IN Christie Gaines	DATE/TIME	6010_METALS_ICP: COMMON; 6010_METALS_ICP: COMMON {Antimony, Barium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Magnesium, Manganese, Nickel, Potassium, Silver, Sodium, Vanadium, Zinc}; 6010_METALS_ICP: COMMON (Add-on) {Beryllium, Lead}; 6020_METALS_ICPMS: COMMON {Molybdenum, Selenium}; 6020_METALS_ICPMS: COMMON (Add-on) {Arsenic};	
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	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	
PRINTED ON 6/29/2017		FSR ID = FSR46065		TRVL NUM = TRVL-17-159	
				A-6003-618 (REV 2)	

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SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>427586</u>		
Received By: <u>Chester Gaines</u>		Date Received: <u>July 12, 2017</u>		
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 <u>7796 0518 4316</u> <u>796 0518 3971</u> <u>7796 0518 3993</u> <u>7796 0583 2487</u> <u>7796 0518 4113</u>		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	Yes <input 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"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None <input type="checkbox"/> Other: *all temperatures are recorded in Celsius TEMP: <u>4°C</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR1-17</u> Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No ___ N/A Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials CS Date 7/12/17 Page 1 of 1

GL-CHL-SR-001 Rev 5

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 26 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	SC000122017-23
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

July 26, 2017

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL427585

Work Order #: 427585

Product: Determination of Metals by ICP

Analytical Method: SW846 3050B/6010D

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

Analytical Batch: 1681607

Product: Determination of Metals by ICP-MS

Analytical Method: SW846 3050B/6020B

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

Analytical Batch: 1681620

Product: Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

Analytical Method: 7471_HG_CVAA

Analytical Procedure: GL-MA-E-010 REV# 34

Analytical Batch: 1681565

Preparation Method: SW846 7471B Prep

Preparation Procedure: GL-MA-E-010 REV# 34

Preparation Batch: 1681564

Preparation Method: SW846 3050B

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

Preparation Batches: 1681606 and 1681619

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585002	B3BBC8
427585004	B3BBD2
427585006	B3BBD6
1203829203	Method Blank (MB) ICP
1203829204	Laboratory Control Sample (LCS)
1203829207	427585002(B3BBC8L) Serial Dilution (SD)
1203829205	427585002(B3BBC8D) Sample Duplicate (DUP)
1203829206	427585002(B3BBC8S) Matrix Spike (MS)
1203829244	Method Blank (MB) ICP-MS
1203829245	Laboratory Control Sample (LCS)
1203829248	427585002(B3BBC8L) Serial Dilution (SD)
1203829246	427585002(B3BBC8D) Sample Duplicate (DUP)
1203829247	427585002(B3BBC8S) Matrix Spike (MS)
1203834556	427585002(B3BBC8PS) Post Spike (PS)
1203829067	Method Blank (MB) CVAA
1203829068	Laboratory Control Sample (LCS)
1203829075	427585002(B3BBC8L) Serial Dilution (SD)
1203829073	427585002(B3BBC8D) Sample Duplicate (DUP)
1203829074	427585002(B3BBC8S) 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

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
1203829203 (MB)	Calcium	8540 betw (7520 - 11700)
	Sodium	8400 betw (6580 - 11700)

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 analytes. The post spike recoveries were within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recoveries may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203829247 (B3BBC8MS)	Selenium	69.8* (75%-125%)

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. Samples were diluted for titanium in order to bring raw values within the linear range of the instrument, and for the analytes interfered with, in order to ensure that the inter-element correction factors were valid. 427585002 (B3BBC8), 427585004 (B3BBD2) and 427585006 (B3BBD6)-ICP. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

July 26, 2017

Analyte	427585		
	002	004	006
Several	5X 2X 1X	5X 2X 1X	5X 2X 1X

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 26, 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: GEL427585 GEL Work Order: 427585

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: 26 JUL 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL427585

CONTRACT: CPRC0F17038

METHOD TYPE: SW846

SAMPLE ID: 427585002

BASIS: Dry Weight

DATE COLLECTED 11-JUL-17

CLIENT ID: B3BBC8

LEVEL: Low

DATE RECEIVED 12-JUL-17

MATRIX: SOIL

%SOLIDS: 95.8

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	1590	ug/kg	UD	1590	4820	4820	5	P	HSC	07/20/17 18:38	072017-1	1681607
7440-38-2	Arsenic	1700	ug/kg	D	348	1030	1030	2	MS	BAJ	07/19/17 20:04	170719-4	1681620
7440-39-3	Barium	72100	ug/kg		96.3	482	482	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7440-41-7	Beryllium	1380	ug/kg		96.3	482	482	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7440-43-9	Cadmium	482	ug/kg	UD	482	2410	2410	5	P	HSC	07/20/17 18:38	072017-1	1681607
7440-70-2	Calcium	10500000	ug/kg		7710	24100	24100	1	P	TXT1	07/20/17 12:36	072017-3	1681607
7440-47-3	Chromium	5340	ug/kg		145	482	482	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7440-48-4	Cobalt	11600	ug/kg	D	723	2410	2410	5	P	HSC	07/20/17 18:38	072017-1	1681607
7440-50-8	Copper	14400	ug/kg		289	963	963	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7439-89-6	Iron	32700000	ug/kg		7710	24100	24100	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7439-92-1	Lead	1590	ug/kg	UD	1590	4820	4820	5	P	HSC	07/20/17 18:38	072017-1	1681607
7439-95-4	Magnesium	4120000	ug/kg		8190	28900	28900	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7439-96-5	Manganese	413000	ug/kg		193	963	963	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7439-97-6	Mercury	3.63	ug/kg	B	3.63	10.8	10.8	1	AV	MTM1	07/13/17 10:54	071317S1-5	1681565
7439-98-7	Molybdenum	351	ug/kg	D	82.4	206	206	2	MS	BAJ	07/19/17 20:04	170719-4	1681620
7440-02-0	Nickel	6640	ug/kg		145	482	482	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7440-09-7	Potassium	719000	ug/kg		6170	24100	24100	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7782-49-2	Selenium	766	ug/kg	BDN	371	1030	1030	2	MS	BAJ	07/19/17 20:04	170719-4	1681620
7440-22-4	Silver	634	ug/kg		96.3	482	482	1	P	HSC	07/17/17 14:06	071717A-2	1681607
7440-23-5	Sodium	390000	ug/kg		6740	24100	24100	1	P	TXT1	07/20/17 12:36	072017-3	1681607
7440-62-2	Vanadium	109000	ug/kg	D	482	2410	2410	5	P	HSC	07/20/17 18:38	072017-1	1681607
7440-66-6	Zinc	51000	ug/kg	D	1930	4820	4820	5	P	HSC	07/20/17 18:38	072017-1	1681607

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1681565	1681564	SW846 7471B Prep	0.578	g	30	mL	07/12/17	AXS5
1681607	1681606	SW846 3050B	0.542	g	50	mL	07/12/17	CXW4
1681620	1681619	SW846 3050B	0.507	g	50	mL	07/12/17	CXW4

***Analytical Methods:**

AV SW846 7471B
P SW846 3050B/6010D
MS SW846 3050B/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL427585

CONTRACT: CPRC0F17038

METHOD TYPE: SW846

SAMPLE ID: 427585004

BASIS: Dry Weight

DATE COLLECTED 11-JUL-17

CLIENT ID: B3BBD2

LEVEL: Low

DATE RECEIVED 12-JUL-17

MATRIX: SOIL

%SOLIDS: 90.5

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	1810	ug/kg	UD	1810	5480	5480	5	P	HSC	07/20/17 18:55	072017-1	1681607
7440-38-2	Arsenic	2010	ug/kg	D	341	1010	1010	2	MS	BAJ	07/19/17 20:20	170719-4	1681620
7440-39-3	Barium	96600	ug/kg		110	548	548	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7440-41-7	Beryllium	1260	ug/kg		110	548	548	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7440-43-9	Cadmium	548	ug/kg	UD	548	2740	2740	5	P	HSC	07/20/17 18:55	072017-1	1681607
7440-70-2	Calcium	10700000	ug/kg		8770	27400	27400	1	P	TXT1	07/20/17 12:45	072017-3	1681607
7440-47-3	Chromium	7400	ug/kg		164	548	548	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7440-48-4	Cobalt	11800	ug/kg	D	822	2740	2740	5	P	HSC	07/20/17 18:55	072017-1	1681607
7440-50-8	Copper	16600	ug/kg		329	1100	1100	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7439-89-6	Iron	32200000	ug/kg		8770	27400	27400	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7439-92-1	Lead	1810	ug/kg	UD	1810	5480	5480	5	P	HSC	07/20/17 18:55	072017-1	1681607
7439-95-4	Magnesium	5030000	ug/kg		9320	32900	32900	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7439-96-5	Manganese	491000	ug/kg		219	1100	1100	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7439-97-6	Mercury	7.08	ug/kg	B	4.31	12.9	12.9	1	AV	MTM1	07/13/17 11:06	071317S1-5	1681565
7439-98-7	Molybdenum	254	ug/kg	D	80.8	202	202	2	MS	BAJ	07/19/17 20:20	170719-4	1681620
7440-02-0	Nickel	8490	ug/kg		164	548	548	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7440-09-7	Potassium	1130000	ug/kg		7020	27400	27400	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7782-49-2	Selenium	616	ug/kg	BDN	364	1010	1010	2	MS	BAJ	07/19/17 20:20	170719-4	1681620
7440-22-4	Silver	763	ug/kg		110	548	548	1	P	HSC	07/17/17 14:24	071717A-2	1681607
7440-23-5	Sodium	293000	ug/kg		7670	27400	27400	1	P	TXT1	07/20/17 12:45	072017-3	1681607
7440-62-2	Vanadium	92800	ug/kg	D	548	2740	2740	5	P	HSC	07/20/17 18:55	072017-1	1681607
7440-66-6	Zinc	49200	ug/kg	D	2190	5480	5480	5	P	HSC	07/20/17 18:55	072017-1	1681607

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1681565	1681564	SW846 7471B Prep	0.515	g	30	mL	07/12/17	AXS5
1681607	1681606	SW846 3050B	0.504	g	50	mL	07/12/17	CXW4
1681620	1681619	SW846 3050B	0.547	g	50	mL	07/12/17	CXW4

***Analytical Methods:**

AV SW846 7471B
P SW846 3050B/6010D
MS SW846 3050B/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL427585

CONTRACT: CPRC0F17038

METHOD TYPE: SW846

SAMPLE ID: 427585006

BASIS: Dry Weight

DATE COLLECTED 11-JUL-17

CLIENT ID: B3BBD6

LEVEL: Low

DATE RECEIVED 12-JUL-17

MATRIX: SOIL

%SOLIDS: 94.3

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	1710	ug/kg	BD	1670	5060	5060	5	P	HSC	07/20/17 18:58	072017-1	1681607
7440-38-2	Arsenic	2560	ug/kg	D	354	1050	1050	2	MS	BAJ	07/19/17 20:23	170719-4	1681620
7440-39-3	Barium	111000	ug/kg		101	506	506	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7440-41-7	Beryllium	821	ug/kg		101	506	506	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7440-43-9	Cadmium	506	ug/kg	UD	506	2530	2530	5	P	HSC	07/20/17 18:58	072017-1	1681607
7440-70-2	Calcium	10100000	ug/kg		8100	25300	25300	1	P	TXT1	07/20/17 12:47	072017-3	1681607
7440-47-3	Chromium	8850	ug/kg		152	506	506	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7440-48-4	Cobalt	8760	ug/kg	D	759	2530	2530	5	P	HSC	07/20/17 18:58	072017-1	1681607
7440-50-8	Copper	12600	ug/kg		304	1010	1010	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7439-89-6	Iron	23000000	ug/kg		8100	25300	25300	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7439-92-1	Lead	1670	ug/kg	UD	1670	5060	5060	5	P	HSC	07/20/17 18:58	072017-1	1681607
7439-95-4	Magnesium	4960000	ug/kg		8600	30400	30400	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7439-96-5	Manganese	434000	ug/kg		202	1010	1010	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7439-97-6	Mercury	5.19	ug/kg	B	4	11.9	11.9	1	AV	MTM1	07/13/17 11:08	071317S1-5	1681565
7439-98-7	Molybdenum	233	ug/kg	D	83.9	210	210	2	MS	BAJ	07/19/17 20:23	170719-4	1681620
7440-02-0	Nickel	9130	ug/kg		152	506	506	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7440-09-7	Potassium	1380000	ug/kg		6480	25300	25300	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7782-49-2	Selenium	547	ug/kg	BDN	377	1050	1050	2	MS	BAJ	07/19/17 20:23	170719-4	1681620
7440-22-4	Silver	364	ug/kg	B	101	506	506	1	P	HSC	07/17/17 14:27	071717A-2	1681607
7440-23-5	Sodium	181000	ug/kg		7080	25300	25300	1	P	TXT1	07/20/17 12:47	072017-3	1681607
7440-62-2	Vanadium	56700	ug/kg	D	506	2530	2530	5	P	HSC	07/20/17 18:58	072017-1	1681607
7440-66-6	Zinc	41700	ug/kg	D	2020	5060	5060	5	P	HSC	07/20/17 18:58	072017-1	1681607

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1681565	1681564	SW846 7471B Prep	0.533	g	30	mL	07/12/17	AXS5
1681607	1681606	SW846 3050B	0.524	g	50	mL	07/12/17	CXW4
1681620	1681619	SW846 3050B	0.506	g	50	mL	07/12/17	CXW4

***Analytical Methods:**

AV SW846 7471B
P SW846 3050B/6010D
MS SW846 3050B/6020B

Quality Control Summary

July 26, 2017

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 26, 2017

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 427585

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1681620										
QC1203829246	427585002 DUP										
Arsenic	D	1700	D	1670	ug/kg	2.1 ^		(+/-1010)	BAJ	07/19/17	20:07
Molybdenum	D	351	D	342	ug/kg	2.6 ^		(+/-202)			
Selenium	BDN	766	BD	777	ug/kg	1.51 ^		(+/-1010)			
QC1203829245	LCS										
Arsenic	4750		D	4360	ug/kg		91.8	(80%-120%)		07/19/17	20:00
Molybdenum	4750		D	4680	ug/kg		98.5	(80%-120%)			
Selenium	4750		D	4150	ug/kg		87.2	(80%-120%)			
QC1203829244	MB										
Arsenic			DU	337	ug/kg					07/19/17	19:57
Molybdenum			DU	79.7	ug/kg						
Selenium			DU	359	ug/kg						
QC1203829247	427585002 MS										
Arsenic	4820	D	1700	D	7110	ug/kg		112	(75%-125%)	07/19/17	20:10
Molybdenum	4820	D	351	D	4750	ug/kg		91.4	(75%-125%)		
Selenium	4820	BDN	766	DN	4130	ug/kg		69.8*	(75%-125%)		

July 26, 2017

GEL LABORATORIES LLC

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QC Summary

Workorder: 427585

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1681620										
QC1203834556	427585002	PS									
Selenium	25.0	BDN	3.72	D	26.4	ug/L	90.6	(75%-125%)	BAJ	07/19/17	20:14
QC1203829248	427585002	SDILT									
Arsenic		D	8.26	BD	1.69	ug/L	2.43	(0%-10%)		07/19/17	20:17
Molybdenum		D	1.70	DU	412	ug/L	N/A	(0%-10%)			
Selenium		BDN	3.72	DU	1850	ug/L	N/A	(0%-10%)			
Metals Analysis-ICP											
Batch	1681607										
QC1203829205	427585002	DUP									
Antimony		DU	1590	BD	1790	ug/kg	251 ^	(+/-4910)	HSC	07/20/17	18:42
Barium			72100		86600	ug/kg	18.2	(0%-35%)		07/17/17	14:10
Beryllium			1380		1420	ug/kg	2.46 ^	(+/-491)			
Cadmium		DU	482	DU	491	ug/kg	N/A			07/20/17	18:42
Calcium			10500000		11300000	ug/kg	6.98	(0%-35%)	TXT1	07/20/17	12:38
Chromium			5340		4920	ug/kg	8.11	(0%-35%)	HSC	07/17/17	14:10
Cobalt		D	11600	D	11800	ug/kg	1.33 ^	(+/-2450)		07/20/17	18:42
Copper			14400		14500	ug/kg	0.833	(0%-35%)		07/17/17	14:10
Iron			32700000		33100000	ug/kg	1.05	(0%-35%)			
Lead		BD	-4620	BD	-4860	ug/kg	5.06 ^	(+/-4910)		07/20/17	18:42

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QC Summary

Workorder: 427585

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1681607										
Magnesium		4120000		3780000	ug/kg	8.64		(0%-35%)	HSC	07/17/17	14:10
Manganese	*	413000	*	546000	ug/kg	27.7		(0%-35%)			
Nickel		6640		6960	ug/kg	4.7		(0%-35%)			
Potassium		719000		682000	ug/kg	5.34		(0%-35%)			
Silver		634		632	ug/kg	0.374	^	(+/-491)			
Sodium		390000		355000	ug/kg	9.53		(0%-35%)	TXT1	07/20/17	12:38
Vanadium	D	109000	D	111000	ug/kg	1.59		(0%-35%)	HSC	07/20/17	18:42
Zinc	D	51000	D	48700	ug/kg	4.63		(0%-35%)			
QC1203829204	LCS										
Antimony	48900			50200	ug/kg		103	(80%-120%)		07/17/17	14:03
Barium	48900			50300	ug/kg		103	(80%-120%)			
Beryllium	48900			50800	ug/kg		104	(80%-120%)			
Cadmium	48900			46200	ug/kg		94.5	(80%-120%)		07/20/17	18:35
Calcium	489000			505000	ug/kg		103	(80%-120%)	TXT1	07/20/17	12:34
Chromium	48900			50100	ug/kg		102	(80%-120%)	HSC	07/17/17	14:03
Cobalt	48900			50700	ug/kg		104	(80%-120%)			

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QC Summary

Workorder: 427585

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1681607										
Iron	489000			506000	ug/kg		103	(80%-120%)	HSC	07/17/17	14:03
Lead	48900			46100	ug/kg		94.3	(80%-120%)		07/20/17	18:35
Magnesium	489000			521000	ug/kg		107	(80%-120%)		07/17/17	14:03
Manganese	48900			50500	ug/kg		103	(80%-120%)			
Nickel	48900			51100	ug/kg		104	(80%-120%)			
Potassium	489000			515000	ug/kg		105	(80%-120%)			
Silver	48900			49000	ug/kg		100	(80%-120%)			
Sodium	489000			498000	ug/kg		102	(80%-120%)	TXT1	07/20/17	12:34
Vanadium	48900			47000	ug/kg		96.2	(80%-120%)	HSC	07/20/17	18:35
Zinc	48900			46100	ug/kg		94.3	(80%-120%)			
QC1203829203	MB										
Antimony			U	310	ug/kg					07/20/17	18:32
Barium			U	94.0	ug/kg					07/17/17	14:00
Beryllium			U	94.0	ug/kg						
Cadmium			U	94.0	ug/kg					07/20/17	18:32
Calcium			B	8540	ug/kg				TXT1	07/20/17	12:31

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QC Summary

Workorder: 427585

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1681607										
Chromium			U	141	ug/kg				HSC	07/17/17	14:00
Cobalt			U	141	ug/kg					07/20/17	18:32
Copper			U	282	ug/kg					07/17/17	14:00
Iron			U	7520	ug/kg						
Lead			U	310	ug/kg					07/20/17	18:32
Magnesium			U	7990	ug/kg					07/17/17	14:00
Manganese			U	188	ug/kg						
Nickel			U	141	ug/kg						
Potassium			U	6020	ug/kg						
Silver			U	94.0	ug/kg						
Sodium			B	8400	ug/kg				TXT1	07/20/17	12:31
Vanadium			U	94.0	ug/kg				HSC	07/20/17	18:32
Zinc			U	376	ug/kg						
QC1203829206 427585002 MS											
Antimony	50400	DU	1590	D	42700	ug/kg	84.7	(75%-125%)		07/20/17	18:45
Barium	50400		72100		126000	ug/kg	107	(75%-125%)		07/17/17	14:13

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GEL LABORATORIES LLC

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1681607										
Beryllium	50400	1380		51000	ug/kg		98.4	(75%-125%)	HSC	07/17/17	14:13
Cadmium	50400	DU	482 D	46600	ug/kg		91.5	(75%-125%)		07/20/17	18:45
Calcium	504000	10500000		11400000	ug/kg		N/A	(75%-125%)	TXT1	07/20/17	12:40
Chromium	50400	5340		52200	ug/kg		93	(75%-125%)	HSC	07/17/17	14:13
Cobalt	50400	D	11600 D	60700	ug/kg		97.4	(75%-125%)		07/20/17	18:45
Copper	50400	14400		66500	ug/kg		103	(75%-125%)		07/17/17	14:13
Iron	504000	32700000		33600000	ug/kg		N/A	(75%-125%)			
Lead	50400	BD	-4620 D	43700	ug/kg		86.8	(75%-125%)		07/20/17	18:45
Magnesium	504000	4120000		4470000	ug/kg		N/A	(75%-125%)		07/17/17	14:13
Manganese	50400	*	413000	443000	ug/kg		N/A	(75%-125%)			
Nickel	50400	6640		54000	ug/kg		93.9	(75%-125%)			
Potassium	504000	719000		1270000	ug/kg		109	(75%-125%)			
Silver	50400	634		49700	ug/kg		97.3	(75%-125%)			
Sodium	504000	390000		1020000	ug/kg		124	(75%-125%)	TXT1	07/20/17	12:40
Vanadium	50400	D	109000 D	161000	ug/kg		104	(75%-125%)	HSC	07/20/17	18:45

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QC Summary

Workorder: 427585

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1681607										
Zinc	50400	D	51000	D	100000	ug/kg	97.3	(75%-125%)	HSC	07/20/17	18:45
QC1203829207 427585002 SDILT											
Antimony		DU	-0.42	DU	7950	ug/L	N/A	(0%-10%)		07/20/17	18:52
Barium			748	D	160	ug/L	6.64	(0%-10%)		07/17/17	14:20
Beryllium			14.3	BD	3.17	ug/L	10.6	(0%-10%)			
Cadmium		DU	0.867	DU	2410	ug/L	N/A	(0%-10%)		07/20/17	18:52
Calcium			109000	D	23000	ug/L	5.37	(0%-10%)	TXT1	07/20/17	12:43
Chromium			55.4	D	11.4	ug/L	2.76	(0%-10%)	HSC	07/17/17	14:20
Cobalt		D	24.2	BD	4.94	ug/L	2.21	(0%-10%)		07/20/17	18:52
Copper			149	D	30.3	ug/L	1.34	(0%-10%)		07/17/17	14:20
Iron			340000	D	73400	ug/L	8.09	(0%-10%)			
Lead		BD	-9.59	DU	7950	ug/L	N/A	(0%-10%)		07/20/17	18:52
Magnesium			42800	D	9180	ug/L	7.29	(0%-10%)		07/17/17	14:20
Manganese		*	4290	D	943	ug/L	10	(0%-10%)			
Nickel			68.9	D	15.3	ug/L	10.9	(0%-10%)			
Potassium			7460	D	1570	ug/L	5.41	(0%-10%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1681607										
Silver		6.58	BD	2.03	ug/L	54.3		(0%-10%)	HSC	07/17/17	14:20
Sodium		4050	D	631	ug/L	22		(0%-10%)	TXT1	07/20/17	12:43
Vanadium	D	226	D	44.9	ug/L	.775		(0%-10%)	HSC	07/20/17	18:52
Zinc	D	106	D	25.9	ug/L	22.2		(0%-10%)			
Metals Analysis-Mercury											
Batch	1681565										
QC1203829073	427585002	DUP									
Mercury	B	3.63	U	3.91	ug/kg	2.02	^	(+/-11.7)	MTM1	07/13/17	10:56
QC1203829068	LCS										
Mercury	111			115	ug/kg			(80%-120%)		07/13/17	10:28
QC1203829067	MB										
Mercury			U	3.51	ug/kg					07/13/17	10:26
QC1203829074	427585002	MS									
Mercury	112	B	3.63	115	ug/kg			(75%-125%)		07/13/17	10:58
QC1203829075	427585002	SDILT									
Mercury	B	0.067	DU	18.2	ug/L	N/A		(0%-10%)		07/13/17	10:59

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.

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
M											
N											
S											
U											
W											
X											
Y											
Z											

M Duplicate precision not met.

N Spike Sample recovery is outside control limits.

S Reported value determined by the Method of Standard Additions (MSA)

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

W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.

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

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

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

General Chem Analysis

Case Narrative

July 26, 2017

General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL427585
Work Order #: 427585

Product: Cyanide, Total

Analytical Method: 9012_CYANIDE

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

Analytical Batches: 1681303 and 1681302

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585002	B3BBC8
427585004	B3BBD2
427585006	B3BBD6
1203828402	Method Blank (MB)
1203828403	Laboratory Control Sample (LCS)
1203829117	427585002(B3BBC8) Sample Duplicate (DUP)
1203829118	427585002(B3BBC8) Matrix Spike (MS)
1203832026	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.

Technical Information

Sample Dilutions

The following samples 1203828403 (LCS) and 1203832026 (LCSD) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Miscellaneous Information

Additional Comments

The following sample was accidentally double spiked during prep: 1203829118 (B3BBC8MS).

Product: Ion Chromatography

Analytical Method: 300.0_ANIONS_IC

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

Analytical Batch: 1682800

Preparation Method: EPA 300.0 PREP

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

Preparation Batch: 1682799

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585002	B3BBC8
427585004	B3BBD2
427585006	B3BBD6
1203832119	Method Blank (MB)
1203832120	Laboratory Control Sample (LCS)
1203832121	427585002(B3BBC8) Sample Duplicate (DUP)
1203832122	427585002(B3BBC8) 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.

Miscellaneous Information

Manual Integrations

Samples 1203832121 (B3BBC8DUP), 427585002 (B3BBC8), 427585004 (B3BBD2) and 427585006 (B3BBD6) were manually integrated to correctly position the baseline as set in the calibration standards.

Product: Ammonia Nitrogen

Preparation Method: 350.1_AMMONIA

Preparation Procedure: GL-GC-E-106 REV# 9

Preparation Batch: 1681793

Preparation Method: EPA 350.2 Modified Prep

Preparation Procedure: GL-GC-E-072 REV# 17

Preparation Batch: 1681792

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

GEL Sample ID#	Client Sample Identification
427585002	B3BBC8
427585004	B3BBD2
427585006	B3BBD6
1203829640	Method Blank (MB)
1203829641	Laboratory Control Sample (LCS)
1203829642	427585002(B3BBC8) Sample Duplicate (DUP)
1203829643	427585002(B3BBC8) 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.

Quality Control (QC) Information

Duplicate Relative Percent Difference (RPD) Statement

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

Analyte	Sample	Value
Nitrogen, Ammonia	1203829642 (B3BBC8DUP)	abs(14.7 - 3.98)* (+/-2.37 mg/kg)

Product: Hexavalent Chromium

Analytical Method: 7196_CR6

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

Analytical Batch: 1683182

Preparation Method: SW846 3060A

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

Preparation Batch: 1683176

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203833176	Method Blank (MB)
1203833177	Laboratory Control Sample (LCS)
1203833178	Insoluble Lab Control Sample (ILCS)
1203833180	428015006(B3BBF7) Sample Duplicate (DUP)
1203833182	428015006(B3BBF7) Matrix Spike (MS)
1203833186	428015006(B3BBF7) 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 26, 2017

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL427585 GEL Work Order: 427585

The Qualifiers in this report are defined as follows:

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

D Results are reported from a diluted aliquot of sample.

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

Review/Validation

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

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

Signature: 

Name: Kristen Mizzell

Date: 24 JUL 2017

Title: Analyst I

Sample Data Summary

Certificate of Analysis

Report Date: July 24, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-038

Client Sample ID: B3BBC7	Project: CPRC0F17038
Sample ID: 427585001	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 11-JUL-17 07:45	
Receive Date: 12-JUL-17	
Collector: Client	
Moisture: 4.36%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
7196_CR6: COMMON "Dry Weight Corrected"												
Hexavalent Chromium	U	132	132	330	ug/Kg	31.6	1	VH1	07/24/17	1055	1683182	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	07/20/17	1208	1683176

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: July 24, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-038

Client Sample ID: B3BBC8	Project: CPRC0F17038
Sample ID: 427585002	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 11-JUL-17 07:45	
Receive Date: 12-JUL-17	
Collector: Client	
Moisture: 4.25%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "Dry Weight Corrected"												
Cyanide, Total	U	82.3	82.3	246	ug/kg	47.2	1	AXH3	07/17/17	1411	1681303	1
Ion Chromatography												
EPA 300.0 Anions, Solid (Br, Cl, F, SO4) "Dry Weight Corrected"												
Bromide	U	662	662	1980	ug/kg	9.46	1	MXL2	07/17/17	2027	1682800	2
Chloride		2060	711	1980	ug/kg	9.46	1					
Fluoride	B	603	336	988	ug/kg	9.46	1					
Nitrate-N	B	484	326	988	ug/kg	9.46	1					
Nitrite-N	U	326	326	988	ug/kg	9.46	1					
Phosphorus in phosphate	U	662	662	1980	ug/kg	9.46	1					
Sulfate	B	3920	1310	3950	ug/kg	9.46	1					
Nutrient Analysis												
350.1_AMMONIA: COMMON "Dry Weight Corrected"												
Nitrogen in Ammonia		3980	904	2510	ug/Kg	48.1	1	KLP1	07/14/17	1210	1681793	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 300.0 PREP	EPA 300.0 Total Anions in Soil	MXL2	07/17/17	1149	1682799
EPA 350.2 Modified Prep	EPA 350.1 Mod. Ammonia Nitrogen Prep	AXH3	07/13/17	1340	1681792
SW846 9010C Distillation	SW846 9010C Prep	AXH3	07/13/17	1508	1681302

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	300.0_ANIONS_IC	
3	350.1_AMMONIA	

Notes:

Column headers are defined as follows:

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

Certificate of Analysis

Report Date: July 24, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-038

Client Sample ID: B3BBD1	Project: CPRC0F17038
Sample ID: 427585003	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 11-JUL-17 09:20	
Receive Date: 12-JUL-17	
Collector: Client	
Moisture: 9.72%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
7196_CR6: COMMON "Dry Weight Corrected"												
Hexavalent Chromium	U	173	173	431	ug/Kg	38.9	1	VH1	07/24/17	1056	1683182	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	07/20/17	1208	1683176

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: July 24, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-038

Client Sample ID: B3BBD2	Project: CPRC0F17038
Sample ID: 427585004	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 11-JUL-17 09:20	
Receive Date: 12-JUL-17	
Collector: Client	
Moisture: 9.51%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "Dry Weight Corrected"												
Cyanide, Total	U	90.5	90.5	271	ug/kg	49.0	1	AXH3	07/17/17	1414	1681303	1
Ion Chromatography												
EPA 300.0 Anions, Solid (Br, Cl, F, SO4) "Dry Weight Corrected"												
Bromide	U	722	722	2160	ug/kg	9.76	1	MXL2	07/17/17	2155	1682800	2
Chloride	B	1320	776	2160	ug/kg	9.76	1					
Fluoride	B	785	367	1080	ug/kg	9.76	1					
Nitrate-N	B	536	356	1080	ug/kg	9.76	1					
Nitrite-N	U	356	356	1080	ug/kg	9.76	1					
Phosphorus in phosphate	U	722	722	2160	ug/kg	9.76	1					
Sulfate	B	3830	1430	4310	ug/kg	9.76	1					
Nutrient Analysis												
350.1_AMMONIA: COMMON "Dry Weight Corrected"												
Nitrogen in Ammonia		3640	815	2260	ug/Kg	41.0	1	KLP1	07/14/17	1213	1681793	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 300.0 PREP	EPA 300.0 Total Anions in Soil	MXL2	07/17/17	1149	1682799
EPA 350.2 Modified Prep	EPA 350.1 Mod. Ammonia Nitrogen Prep	AXH3	07/13/17	1340	1681792
SW846 9010C Distillation	SW846 9010C Prep	AXH3	07/13/17	1508	1681302

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	300.0_ANIONS_IC	
3	350.1_AMMONIA	

Notes:

Column headers are defined as follows:

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

Certificate of Analysis

Report Date: July 24, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-038

Client Sample ID: B3BBD5	Project: CPRC0F17038
Sample ID: 427585005	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 11-JUL-17 10:55	
Receive Date: 12-JUL-17	
Collector: Client	
Moisture: 6.52%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
7196_CR6: COMMON "Dry Weight Corrected"												
Hexavalent Chromium	U	99.8	99.8	250	ug/Kg	23.3	1	VH1	07/24/17	1056	1683182	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	07/20/17	1208	1683176

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: July 24, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-038

Client Sample ID: B3BBD6	Project: CPRC0F17038
Sample ID: 427585006	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 11-JUL-17 10:55	
Receive Date: 12-JUL-17	
Collector: Client	
Moisture: 5.72%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Flow Injection Analysis												
9012_CYANIDE (TOTAL): COMMON "Dry Weight Corrected"												
Cyanide, Total	U	77.7	77.7	233	ug/kg	43.9	1	AXH3	07/17/17	1415	1681303	1
Ion Chromatography												
EPA 300.0 Anions, Solid (Br, Cl, F, SO4) "Dry Weight Corrected"												
Bromide	U	666	666	1990	ug/kg	9.37	1	MXL2	07/17/17	2224	1682800	2
Chloride	B	1350	715	1990	ug/kg	9.37	1					
Fluoride	B	614	338	994	ug/kg	9.37	1					
Nitrate-N	B	683	328	994	ug/kg	9.37	1					
Nitrite-N	U	328	328	994	ug/kg	9.37	1					
Phosphorus in phosphate	U	666	666	1990	ug/kg	9.37	1					
Sulfate	B	3450	1320	3970	ug/kg	9.37	1					
Nutrient Analysis												
350.1_AMMONIA: COMMON "Dry Weight Corrected"												
Nitrogen in Ammonia		3720	918	2550	ug/Kg	48.1	1	KLP1	07/14/17	1214	1681793	3

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 300.0 PREP	EPA 300.0 Total Anions in Soil	MXL2	07/17/17	1149	1682799
EPA 350.2 Modified Prep	EPA 350.1 Mod. Ammonia Nitrogen Prep	AXH3	07/13/17	1340	1681792
SW846 9010C Distillation	SW846 9010C Prep	AXH3	07/13/17	1508	1681302

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9012_CYANIDE	
2	300.0_ANIONS_IC	
3	350.1_AMMONIA	

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 26, 2017

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 24, 2017

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 427585

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Flow Injection Analysis											
Batch	1681303										
QC1203829117	427585002	DUP									
Cyanide, Total		U	82.3	U	80.7	ug/kg	N/A		AXH3	07/17/17	14:12
QC1203828403	LCS										
Cyanide, Total	108000		D	103000	ug/kg		95.4	(80%-120%)		07/17/17	13:50
QC1203832026	LCSD										
Cyanide, Total	108000		D	106000	ug/kg	2.87	98.1	(0%-35%)		07/17/17	13:51
QC1203828402	MB										
Cyanide, Total			U	83.5	ug/kg					07/17/17	13:49
QC1203829118	427585002	MS									
Cyanide, Total	7250	U	82.3	8200	ug/kg		113	(75%-125%)		07/17/17	14:13

Ion Chromatography

Batch 1682800

QC1203832121	427585002	DUP									
Bromide		U	662	U	665	ug/kg	N/A		MXL2	07/17/17	20:56
Chloride			2060		2020	ug/kg	1.86	^	(+/-1980)		
Fluoride		B	603	B	602	ug/kg	0.183	^	(+/-992)		
Nitrate-N		B	484	B	452	ug/kg	6.71	^	(+/-992)		
Nitrite-N		U	326	U	327	ug/kg	N/A				
Phosphorus in phosphate		U	662	U	665	ug/kg	N/A				

July 26, 2017

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QC Summary

Workorder: 427585

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1682800										
Sulfate		B	3920	B	3580	ug/kg	9.14	^	(+/-3970)	MXL2	07/17/17 20:56
QC1203832120	LCS										
Bromide	12500				12000	ug/kg	95.8	(80%-120%)			07/17/17 19:57
Chloride	50000				45100	ug/kg	90.1	(80%-120%)			
Fluoride	25000				23500	ug/kg	94.1	(80%-120%)			
Nitrate-N	25000				23000	ug/kg	92	(80%-120%)			
Nitrite-N	25000				23400	ug/kg	93.5	(80%-120%)			
Phosphorus in phosphate	12500				11800	ug/kg	94.4	(80%-120%)			
Sulfate	100000				93500	ug/kg	93.5	(80%-120%)			
QC1203832119	MB										
Bromide			U		665	ug/kg					07/17/17 19:28
Chloride			U		715	ug/kg					
Fluoride			U		337	ug/kg					
Nitrate-N			U		328	ug/kg					
Nitrite-N			U		328	ug/kg					
Phosphorus in phosphate			U		665	ug/kg					

July 26, 2017

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QC Summary

Workorder: 427585

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1682800										
Sulfate			U	1320	ug/kg				MXL2	07/17/17	19:28
QC1203832122 427585002 MS											
Bromide	12200	U	662	11800	ug/kg		96.9	(75%-125%)		07/17/17	21:25
Chloride	48700		2060	46200	ug/kg		90.7	(75%-125%)			
Fluoride	24300	B	603	22400	ug/kg		89.4	(75%-125%)			
Nitrate-N	24300	B	484	22600	ug/kg		90.7	(75%-125%)			
Nitrite-N	24300	U	326	23000	ug/kg		94.6	(75%-125%)			
Phosphorus in phosphate	12200	U	662	10700	ug/kg		84.2	(75%-125%)			
Sulfate	97400	B	3920	98200	ug/kg		96.9	(75%-125%)			
Nutrient Analysis											
Batch	1681793										
QC1203829642 427585002 DUP											
Nitrogen in Ammonia			3980	14700	ug/Kg	115*^		(+/-2370)	KLP1	07/14/17	12:11
QC1203829641 LCS											
Nitrogen in Ammonia	50000			49900	ug/Kg		99.8	(80%-120%)		07/14/17	12:04
QC1203829640 MB											
Nitrogen in Ammonia			U	900	ug/Kg					07/14/17	12:03
QC1203829643 427585002 MS											
Nitrogen in Ammonia	42800		3980	45400	ug/Kg		96.7	(75%-125%)		07/14/17	12:12

July 26, 2017

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QC Summary

Workorder: 427585

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Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD%, REC%, Range, Anlst, Date, Time. Contains data for Spectrometric Analysis of Hexavalent Chromium across multiple batches and samples.

Notes:

The Qualifiers in this report are defined as follows:

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

July 26, 2017

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QC Summary

Workorder: 427585

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

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

Radiological Analysis

Case Narrative

July 26, 2017

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL427585

Work Order #: 427585

Product: AMCMISO_EIE_PRECIP_AEA: COMMON

Analytical Method: AMCMISO_EIE_PREC_AEA

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

Analytical Batch: 1681761

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1681582

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203829534	Method Blank (MB)
1203829535	427585001(B3BBC7) Sample Duplicate (DUP)
1203829536	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: NP237_IE_PRECIP_AEA: COMMON

Analytical Method: ASTM C 1475-00 Modified

Analytical Procedure: GL-RAD-A-032 REV# 21

Analytical Batch: 1681762

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1681582

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7

July 26, 2017

427585003	B3BBD1
427585005	B3BBD5
1203829537	Method Blank (MB)
1203829538	427585001(B3BBC7) Sample Duplicate (DUP)
1203829539	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 1203829539 (LCS) was recounted due to high carrier/tracer yield. The recount is reported. Samples 1203829537 (MB) and 427585005 (B3BBD5) were recounted due to detector error. The recounts are reported.

Product: PUIISO_PRECIP_AEA:COMMON

Analytical Method: PUIISO_PRECIP_AEA

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

Analytical Batch: 1681763

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1681582

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203829543	Method Blank (MB)
1203829544	427585001(B3BBC7) Sample Duplicate (DUP)
1203829545	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

July 26, 2017

Sample 1203829545 (LCS) was recounted due to high recovery. The recount is reported.

Miscellaneous Information

1. Sample 427585005 does not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer. 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.

Product: UISO_IE_PRECIP_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

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

Analytical Batch: 1681764

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1681582

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203829546	Method Blank (MB)
1203829547	427585001(B3BBC7) Sample Duplicate (DUP)
1203829548	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 1203829546 (MB) and 1203829547 (B3BBC7DUP) were recounted twice due to peak shifts. The third counts are reported.

Product: Dry Weight

Analytical Method: Dry Soil Prep

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

Analytical Batch: 1681582

July 26, 2017

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203829127	427585001(B3BBC7) 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: ASTM D 2216 (Modified)

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

Analytical Batch: 1681722

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585002	B3BBC8
427585004	B3BBD2
427585006	B3BBD6
1203829495	427669001(NonSDG) 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: 1681640

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1681582

July 26, 2017

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203829297	Method Blank (MB)
1203829298	427585001(B3BBC7) Sample Duplicate (DUP)
1203829299	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.

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
X	Results are considered a false positive due to high counting uncertainty.	Europium-155	427585005	B3BBD5

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

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

Analytical Batch: 1681608

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1681582

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203829209	Method Blank (MB)
1203829210	427585005(B3BBD5) Sample Duplicate (DUP)
1203829211	Laboratory Control Sample (LCS)

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

July 26, 2017

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: NI63_LSC

Analytical Method: NI63_LSC

Analytical Procedure: GL-RAD-A-022 REV# 18

Analytical Batch: 1682150

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1681582

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203830476	Method Blank (MB)
1203830477	427585001(B3BBC7) Sample Duplicate (DUP)
1203830478	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: 1682162

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203830520	Method Blank (MB)

July 26, 2017

1203830521 427585001(B3BBC7) Sample Duplicate (DUP)
1203830522 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: 1682166

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
427585001	B3BBC7
427585003	B3BBD1
427585005	B3BBD5
1203830526	Method Blank (MB)
1203830527	427585001(B3BBC7) Sample Duplicate (DUP)
1203830528	427585001(B3BBC7) Matrix Spike (MS)
1203830529	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 due to high MDCs and low recovery. Recounts are reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1203830528 (B3BBC7MS), aliquot was reduced to conserve sample volume.

Certification Statement

July 26, 2017

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 26, 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: GEL427585 GEL Work Order: 427585

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.

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

Review/Validation

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

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

Signature: 

Name: Heather McCarty

Date: 25 JUL 2017

Title: Analyst II

Sample Data Summary

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585001	Date Collected: 07/11/2017 07:45	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 4.4
Client ID: B3BBC7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681761	Method: AMCMISO_EIE_PREC_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/15/2017 10:41	Analyst: HAKB	Instrument: 1090
Data File: S0427585001_AM.1A.gcnf	Aliquot: 0.11 g	Count Time: 240 min
Prep Batch: 1681761	Prep Method: DOE EML HASL-300, Am-05	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.134	pCi/g	+/-0.263	0.264	0.365	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	13.2	19.1	pCi/g	69	(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 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585001	Date Collected: 07/11/2017 07:45	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 4.4
Client ID: B3BBC7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681762	Method: ASTM C 1475-00 Modified	SOP Ref: GL-RAD-A-032
Run Date: 07/15/2017 10:20	Analyst: HAKB	Instrument: 1179
Data File: S0427585001_NP.1A.gcnf	Aliquot: 0.107 g	Count Time: 240 min
Prep Batch: 1681762	Prep Method: ASTM C 1475-00 Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	0.0186	pCi/g	+/-0.194	0.194	0.405	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	2030	2000	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.
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 The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585001	Date Collected: 07/11/2017 07:45	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 4.4
Client ID: B3BBC7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681763	Method: PUIISO_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/15/2017 10:41	Analyst: HAKB	Instrument: 1097
Data File: S0427585001_PU.1A.gcnf	Aliquot: 0.11 g	Count Time: 239.9998 min
Prep Batch: 1681763	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0519	pCi/g	+/-0.195	0.195	0.328	1.00
OER-100-70	Plutonium-239/240	U	0.0547	pCi/g	+/-0.245	0.245	0.479	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	12.6	17.9	pCi/g	70.6	(30%-105%)

Comments:

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 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585001	Date Collected: 07/11/2017 07:45	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 4.4
Client ID: B3BBC7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681764	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/15/2017 10:08	Analyst: HAKB	Instrument: 1121
Data File: S0427585001_UU.1A.gcnf	Aliquot: 0.11 g	Count Time: 240 min
Prep Batch: 1681764	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 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		0.669	pCi/g	+/-0.488	0.497	0.488	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.00	pCi/g	+/-0.184	0.185	0.275	1.00
7440-61-1	Uranium-238	U	0.296	pCi/g	+/-0.326	0.329	0.222	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	16.7	19.1	pCi/g	87.4	(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.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585001	Date Collected: 07/11/2017 07:45	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 4.4
Client ID: B3BBC7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681608	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 07/14/2017 15:27	Analyst: KSD1	Instrument: PIC5A
Data File: S1681608.xls	Aliquot: 0.401 g	Count Time: 60 min
Prep Batch: 1681608	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 09:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.834	pCi/g	+/-0.687	0.719	1.10	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.
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 The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585001	Date Collected: 07/11/2017 07:45	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 4.4
Client ID: B3BBC7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681640	Method: GAMMA_GS	SOP Ref: GL-RAD-A-013
Run Date: 07/13/2017 15:46	Analyst: MXR1	Instrument: GAM05
Data File: G427585001.CNF;1	Aliquot: 168.026 g	Count Time: 120 min
Prep Batch: 1681640	Prep Method: DOE HASL 300, 4.5.2.3/Ga-01	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/13/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.0184	pCi/g	+/-0.0162	0.0182	0.0266	0.100
10198-40-0	Cobalt-60	U	-0.003	pCi/g	+/-0.0176	0.0177	0.0337	
14683-23-9	Europium-152	U	0.0198	pCi/g	+/-0.0381	0.0392	0.0798	
15585-10-1	Europium-154	U	0.0365	pCi/g	+/-0.0495	0.0522	0.108	
14391-16-3	Europium-155	U	-0.00119	pCi/g	+/-0.0363	0.0363	0.0691	

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 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585001	Date Collected: 07/11/2017 07:45	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 4.4
Client ID: B3BBC7		Prep Basis: "Dry Weight Corrected"
Batch ID: 1682150	Method: NI63_LSC	SOP Ref: GL-RAD-A-022
Run Date: 07/20/2017 06:06	Analyst: TXJ1	Instrument: LSCGOLD
Data File: N1682150.xls	Aliquot: 0.516 g	Count Time: 30 min
Prep Batch: 1682150	Prep Method: DOE RESL Ni-1, Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/17/2017 12:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	-0.0606	pCi/g	+/-4.19	4.19	7.24	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	19.3	25.2	mg	76.6	(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 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585001	Date Collected: 07/11/2017 07:45	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 4.4
Client ID: B3BBC7		Prep Basis: "As Received"
Batch ID: 1682162	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/23/2017 09:14	Analyst: CXS7	Instrument: LSCGREEN
Data File: E1682162.xls	Aliquot: 1.303 g	Count Time: 15 min
Prep Batch: 1682162	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 07/17/2017 15:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	2.02	pCi/g	+/-2.19	2.20	3.67	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.96E+05	4.55E+05	CPM	87	(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 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585001	Date Collected: 07/11/2017 07:45	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 4.4
Client ID: B3BBC7		Prep Basis: "As Received"
Batch ID: 1682166	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 07/20/2017 15:48	Analyst: BXM4	Instrument: LSCRED
Data File: T1682166R.xls	Aliquot: 1.254 g	Count Time: 30 min
Prep Batch: 1682166	Prep Method: EPA 906.0 Modified	
Prep Date: 07/18/2017 08:55		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	0.113	pCi/g	+/-10.2	10.2	18.3	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 26, 2017

Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585
Lab Sample ID: 427585001

Client: CPRC001
Date Collected: 07/11/2017 07:45
Date Received: 07/12/2017 09:15

Project: CPRC0F17038
Matrix: SOIL
%Moisture: 4.4

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585
Lab Sample ID: 427585002

Client: CPRC001
Date Collected: 07/11/2017 07:45
Date Received: 07/12/2017 09:15

Project: CPRC0F17038
Matrix: SOIL
%Moisture: 4.2

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585003	Date Collected: 07/11/2017 09:20	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 9.7
Client ID: B3BBD1	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1681761	Analyst: HAKB	SOP Ref: GL-RAD-A-011
Run Date: 07/15/2017 10:41	Aliquot: 0.104 g	Instrument: 1091
Data File: S0427585003_AM.1A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 240 min
Prep Batch: 1681761		Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.00	pCi/g	+/-0.216	0.217	0.321	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	10.1	20.2	pCi/g	50.3	(30%-105%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
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 The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585003	Date Collected: 07/11/2017 09:20	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 9.7
Client ID: B3BBD1		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681762	Method: ASTM C 1475-00 Modified	SOP Ref: GL-RAD-A-032
Run Date: 07/15/2017 10:20	Analyst: HAKB	Instrument: 1180
Data File: S0427585003_NP.1A.gcnf	Aliquot: 0.102 g	Count Time: 240 min
Prep Batch: 1681762	Prep Method: ASTM C 1475-00 Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	0.00286	pCi/g	+/-0.212	0.212	0.471	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	2070	2100	pCi/g	98.9	(30%-105%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
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 The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585003	Date Collected: 07/11/2017 09:20	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 9.7
Client ID: B3BBD1		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681763	Method: PUIISO_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/15/2017 10:41	Analyst: HAKB	Instrument: 1098
Data File: S0427585003_PU.1A.gcnf	Aliquot: 0.104 g	Count Time: 239.9998 min
Prep Batch: 1681763	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0213	pCi/g	+/-0.222	0.223	0.464	1.00
OER-100-70	Plutonium-239/240	U	0.0395	pCi/g	+/-0.219	0.220	0.420	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	15.1	18.9	pCi/g	79.7	(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 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585003	Date Collected: 07/11/2017 09:20	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 9.7
Client ID: B3BBD1	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1681764	Analyst: HAKB	SOP Ref: GL-RAD-A-011
Run Date: 07/15/2017 10:08	Aliquot: 0.104 g	Instrument: 1123
Data File: S0427585003_UU.1A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 240 min
Prep Batch: 1681764		Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 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		0.663	pCi/g	+/-0.502	0.511	0.489	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.249	pCi/g	+/-0.396	0.398	0.548	1.00
7440-61-1	Uranium-238	U	0.442	pCi/g	+/-0.420	0.425	0.443	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	20.2	20.2	pCi/g	99.7	(30%-105%)

Comments:

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July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585003	Date Collected: 07/11/2017 09:20	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 9.7
Client ID: B3BBD1		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681608	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 07/14/2017 15:27	Analyst: KSD1	Instrument: PIC5B
Data File: S1681608.xls	Aliquot: 0.362 g	Count Time: 60 min
Prep Batch: 1681608	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 09:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.485	pCi/g	+/-0.604	0.604	1.35	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	5.90	7.75	mg	76.1	(40%-110%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
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 The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585003	Date Collected: 07/11/2017 09:20	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 9.7
Client ID: B3BBD1		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681640	Method: GAMMA_GS	SOP Ref: GL-RAD-A-013
Run Date: 07/13/2017 15:46	Analyst: MXR1	Instrument: GAM18
Data File: G427585003.CNF;1	Aliquot: 36.067 g	Count Time: 120 min
Prep Batch: 1681640	Prep Method: DOE HASL 300, 4.5.2.3/Ga-01	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/13/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.0061	pCi/g	+/-0.0395	0.0396	0.0699	0.100
10198-40-0	Cobalt-60	U	-0.0203	pCi/g	+/-0.0399	0.041	0.072	
14683-23-9	Europium-152	U	-0.0327	pCi/g	+/-0.118	0.119	0.176	
15585-10-1	Europium-154	U	0.0657	pCi/g	+/-0.125	0.128	0.248	
14391-16-3	Europium-155	U	0.040	pCi/g	+/-0.0915	0.0933	0.163	

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 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585003	Date Collected: 07/11/2017 09:20	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 9.7
Client ID: B3BBD1		Prep Basis: "Dry Weight Corrected"
Batch ID: 1682150	Method: NI63_LSC	SOP Ref: GL-RAD-A-022
Run Date: 07/20/2017 06:38	Analyst: TXJ1	Instrument: LSCGOLD
Data File: N1682150.xls	Aliquot: 0.517 g	Count Time: 30 min
Prep Batch: 1682150	Prep Method: DOE RESL Ni-1, Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/17/2017 12:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	-0.861	pCi/g	+/-3.39	3.39	5.91	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	23.6	25.2	mg	93.7	(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 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585003	Date Collected: 07/11/2017 09:20	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 9.7
Client ID: B3BBD1		Prep Basis: "As Received"
Batch ID: 1682162	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/23/2017 09:30	Analyst: CXS7	Instrument: LSCGREEN
Data File: E1682162.xls	Aliquot: 1.384 g	Count Time: 15 min
Prep Batch: 1682162	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 07/17/2017 15:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	0.950	pCi/g	+/-1.99	1.99	3.41	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.94E+05	4.55E+05	CPM	86.6	(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 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585003	Date Collected: 07/11/2017 09:20	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 9.7
Client ID: B3BBD1		Prep Basis: "As Received"
Batch ID: 1682166	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 07/20/2017 16:20	Analyst: BXM4	Instrument: LSCRED
Data File: T1682166R.xls	Aliquot: 1.255 g	Count Time: 30 min
Prep Batch: 1682166	Prep Method: EPA 906.0 Modified	
Prep Date: 07/18/2017 08:55		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	6.84	pCi/g	+/-10.7	10.8	18.2	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 26, 2017

Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585
Lab Sample ID: 427585003

Client: CPRC001
Date Collected: 07/11/2017 09:20
Date Received: 07/12/2017 09:15

Project: CPRC0F17038
Matrix: SOIL
%Moisture: 9.7

July 26, 2017

Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585
Lab Sample ID: 427585004

Client: CPRC001
Date Collected: 07/11/2017 09:20
Date Received: 07/12/2017 09:15

Project: CPRC0F17038
Matrix: SOIL
%Moisture: 9.5

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585005	Date Collected: 07/11/2017 10:55	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 6.5
Client ID: B3BBD5		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681761	Method: AMCMISO_EIE_PREC_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/15/2017 10:41	Analyst: HAKB	Instrument: 1092
Data File: S0427585005_AM.1A.gcnf	Aliquot: 0.104 g	Count Time: 240 min
Prep Batch: 1681761	Prep Method: DOE EML HASL-300, Am-05	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0461	pCi/g	+/-0.204	0.204	0.531	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	13.0	20.2	pCi/g	64.2	(30%-105%)

Comments:

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 - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
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The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585005	Date Collected: 07/11/2017 10:55	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 6.5
Client ID: B3BBDS		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681762	Method: ASTM C 1475-00 Modified	SOP Ref: GL-RAD-A-032
Run Date: 07/18/2017 10:10	Analyst: HAKB	Instrument: 1027
Data File: S0427585005_NP.1B.gcnf	Aliquot: 0.105 g	Count Time: 239.9998 min
Prep Batch: 1681762	Prep Method: ASTM C 1475-00 Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	-0.0602	pCi/g	+/-0.163	0.163	0.435	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	2070	2040	pCi/g	102	(30%-105%)

Comments:

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July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585005	Date Collected: 07/11/2017 10:55	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 6.5
Client ID: B3BBD5		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681763	Method: PUIISO_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/15/2017 10:41	Analyst: HAKB	Instrument: 1099
Data File: S0427585005_PU.1A.gcnf	Aliquot: 0.104 g	Count Time: 239.9998 min
Prep Batch: 1681763	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13981-16-3	Plutonium-238	U	0.169	pCi/g	+/-0.301	0.301	0.488	1.00
OER-100-70	Plutonium-239/240	U	-0.0264	pCi/g	+/-0.247	0.247	0.573	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	15.0	18.9	pCi/g	79.5	(30%-105%)

Comments:

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 - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585005	Date Collected: 07/11/2017 10:55	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 6.5
Client ID: B3BBDS		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681764	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/15/2017 10:09	Analyst: HAKB	Instrument: 1125
Data File: S0427585005_UU.1A.gcnf	Aliquot: 0.104 g	Count Time: 240 min
Prep Batch: 1681764	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 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	0.393	pCi/g	+/-0.449	0.453	0.560	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.00	pCi/g	+/-0.229	0.229	0.340	1.00
7440-61-1	Uranium-238	U	0.462	pCi/g	+/-0.485	0.491	0.605	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	18.1	20.2	pCi/g	89.7	(30%-105%)

Comments:

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The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585005	Date Collected: 07/11/2017 10:55	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 6.5
Client ID: B3BBD5		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681608	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 07/14/2017 15:27	Analyst: KSD1	Instrument: PIC5C
Data File: S1681608.xls	Aliquot: 0.358 g	Count Time: 60 min
Prep Batch: 1681608	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/14/2017 09:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	-0.351	pCi/g	+/-0.678	0.678	1.44	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	5.80	7.75	mg	74.8	(40%-110%)

Comments:

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The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585005	Date Collected: 07/11/2017 10:55	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 6.5
Client ID: B3BBDS		Prep Basis: "Dry Weight Corrected"
Batch ID: 1681640	Method: GAMMA_GS	SOP Ref: GL-RAD-A-013
Run Date: 07/13/2017 15:46	Analyst: MXR1	Instrument: GAM23
Data File: G427585005.CNF;1	Aliquot: 144.725 g	Count Time: 120 min
Prep Batch: 1681640	Prep Method: DOE HASL 300, 4.5.2.3/Ga-01	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/13/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-0.00606	pCi/g	+/-0.0237	0.0239	0.0379	0.100
10198-40-0	Cobalt-60	U	0.00361	pCi/g	+/-0.029	0.0291	0.0561	
14683-23-9	Europium-152	U	0.0094	pCi/g	+/-0.0527	0.0529	0.105	
15585-10-1	Europium-154	U	0.0243	pCi/g	+/-0.0903	0.091	0.165	
14391-16-3	Europium-155	UX	0.00	pCi/g	+/-0.116	0.116	0.0967	

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

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The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585005	Date Collected: 07/11/2017 10:55	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 6.5
Client ID: B3BBD5		Prep Basis: "Dry Weight Corrected"
Batch ID: 1682150	Method: NI63_LSC	SOP Ref: GL-RAD-A-022
Run Date: 07/20/2017 07:09	Analyst: TXJ1	Instrument: LSCGOLD
Data File: N1682150.xls	Aliquot: 0.518 g	Count Time: 30 min
Prep Batch: 1682150	Prep Method: DOE RESL Ni-1, Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 07/17/2017 12:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	-1.13	pCi/g	+/-3.42	3.42	5.98	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	23.3	25.2	mg	92.5	(40%-110%)

Comments:

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The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585005	Date Collected: 07/11/2017 10:55	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 6.5
Client ID: B3BBDS		Prep Basis: "As Received"
Batch ID: 1682162	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 07/23/2017 09:46	Analyst: CXS7	Instrument: LSCGREEN
Data File: E1682162.xls	Aliquot: 1.294 g	Count Time: 15 min
Prep Batch: 1682162	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 07/17/2017 15:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	0.729	pCi/g	+/-2.27	2.27	3.91	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.70E+05	4.55E+05	CPM	81.2	(30%-105%)

Comments:

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- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
The MDC is a sample specific MDC.

July 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585	Client: CPRC001	Project: CPRC0F17038
Lab Sample ID: 427585005	Date Collected: 07/11/2017 10:55	Matrix: SOIL
	Date Received: 07/12/2017 09:15	%Moisture: 6.5
Client ID: B3BBD5		Prep Basis: "As Received"
Batch ID: 1682166	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 07/20/2017 16:51	Analyst: BXM4	Instrument: LSCRED
Data File: T1682166R.xls	Aliquot: 1.251 g	Count Time: 30 min
Prep Batch: 1682166	Prep Method: EPA 906.0 Modified	
Prep Date: 07/18/2017 08:55		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-6.74	pCi/g	+/-9.74	9.74	18.3	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.
 - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
The MDC is a sample specific MDC.

July 26, 2017

Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585
Lab Sample ID: 427585005

Client: CPRC001
Date Collected: 07/11/2017 10:55
Date Received: 07/12/2017 09:15

Project: CPRC0F17038
Matrix: SOIL
%Moisture: 6.5

July 26, 2017

Rad

**Certificate of Analysis
Sample Summary**

SDG Number: GEL427585
Lab Sample ID: 427585006

Client: CPRC001
Date Collected: 07/11/2017 10:55
Date Received: 07/12/2017 09:15

Project: CPRC0F17038
Matrix: SOIL
%Moisture: 5.7

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 25, 2017
Page 1 of 6

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

Contact: Mr. Scot Fitzgerald

Workorder: 427585

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1681761								
QC1203829534	MB								
Americium-241			U	0.0368	pCi/g			HAKB	07/15/1710:41
				Uncert: +/-0.237					
				TPU: +/-0.238					
**Americium-243 Tracer	19.1			17.0	pCi/g	REC: 89	(30%-105%)		
				Uncert: +/-2.19					
				TPU: +/-3.36					
QC1203829535	427585001	DUP							
Americium-241		U	0.134	U	0.0719	pCi/g			
				Uncert: +/-0.263		RPD: 0	N/A		
				TPU: +/-0.264		RER: 0.322	(0-2)		
**Americium-243 Tracer	20.4		13.2		11.7	pCi/g	REC: 58	(30%-105%)	
				Uncert: +/-2.36					
				TPU: +/-3.58					
QC1203829536	LCS								
Americium-241					17.9	pCi/g	REC: 92	(80%-120%)	07/15/1710:41
					Uncert: +/-2.07				
					TPU: +/-3.03				
**Americium-243 Tracer	19.1				15.9	pCi/g	REC: 83	(30%-105%)	
					Uncert: +/-2.22				
					TPU: +/-3.39				
Batch	1681762								
QC1203829537	MB								
Neptunium-237			U	0.240	pCi/g			HAKB	07/17/1715:28
				Uncert: +/-0.328					
				TPU: +/-0.329					
**Americium-243 Tracer	2000				1850	pCi/g	REC: 92	(30%-105%)	
QC1203829538	427585001	DUP							
Neptunium-237		U	0.0186	U	0.0576	pCi/g			07/15/1710:20
				Uncert: +/-0.194		RPD: 0	N/A		
				TPU: +/-0.194		RER: 0.17	(0-2)		
**Americium-243 Tracer	2120		2030		1940	pCi/g	REC: 92	(30%-105%)	
QC1203829539	LCS								
Neptunium-237					41.7	pCi/g	REC: 112	(80%-120%)	07/17/1715:33
					Uncert: +/-3.83				
					TPU: +/-6.64				
**Americium-243 Tracer	2000				1930	pCi/g	REC: 96	(30%-105%)	
Batch	1681763								
QC1203829543	MB								
Plutonium-238			U	-0.0158	pCi/g			HAKB	07/15/1710:41
				Uncert: +/-0.137					
				TPU: +/-0.137					
Plutonium-239/240			U	0.00264	pCi/g				
				Uncert: +/-0.196					

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QC Summary

Workorder: 427585

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1681763								
**Plutonium-242 Tracer	TPU:			+/-0.196					
	17.9			14.2	pCi/g	REC: 80	(30%-105%)		
	Uncert:			+/-2.14					
	TPU:			+/-3.19					
QC1203829544 427585001 DUP									
Plutonium-238		U 0.0519	U	-0.0105	pCi/g				
	Uncert:	+/-0.195		+/-0.376		RPD: 0	N/A		
	TPU:	+/-0.195		+/-0.376		RER: 0.289	(0-2)		
Plutonium-239/240		U 0.0547	U	-0.252	pCi/g				
	Uncert:	+/-0.245		+/-0.227		RPD: 0	N/A		
	TPU:	+/-0.245		+/-0.227		RER: 1.8	(0-2)		
**Plutonium-242 Tracer	19.1	12.6		14.2	pCi/g	REC: 74	(30%-105%)		
	Uncert:	+/-2.18		+/-2.56					
	TPU:	+/-3.25		+/-3.78					
QC1203829545 LCS									
Plutonium-238			U	0.0831	pCi/g				07/18/1710:32
	Uncert:			+/-0.229					
	TPU:			+/-0.229					
Plutonium-239/240	18.0			19.4	pCi/g	REC: 108	(80%-120%)		
	Uncert:			+/-2.20					
	TPU:			+/-3.36					
**Plutonium-242 Tracer	17.9			14.4	pCi/g	REC: 81	(30%-105%)		
	Uncert:			+/-2.12					
	TPU:			+/-3.16					
Batch	1681764								
QC1203829546 MB									
Uranium-233/234			U	-0.101	pCi/g			HAKB	07/19/1709:44
	Uncert:			+/-0.127					
	TPU:			+/-0.127					
Uranium-235/236			U	-0.0311	pCi/g				
	Uncert:			+/-0.138					
	TPU:			+/-0.138					
Uranium-238			U	0.0273	pCi/g				
	Uncert:			+/-0.151					
	TPU:			+/-0.152					
**Uranium-232 Tracer	19.1			19.0	pCi/g	REC: 100	(30%-105%)		
	Uncert:			+/-1.98					
	TPU:			+/-3.14					
QC1203829547 427585001 DUP									
Uranium-233/234		0.669		0.794	pCi/g				
	Uncert:	+/-0.488		+/-0.486		RPD: 17	(0% - 100%)		
	TPU:	+/-0.497		+/-0.498		RER: 0.347	(0-2)		
Uranium-235/236		U 0.00	U	0.137	pCi/g				
	Uncert:	+/-0.184		+/-0.270		RPD: 0	N/A		
	TPU:	+/-0.185		+/-0.271		RER: 0.822	(0-2)		
Uranium-238		U 0.296		0.713	pCi/g				
	Uncert:	+/-0.326		+/-0.451		RPD: 83	(0% - 100%)		
	TPU:	+/-0.329		+/-0.461		RER: 1.44	(0-2)		
**Uranium-232 Tracer	20.4	16.7		17.5	pCi/g	REC: 86	(30%-105%)		
	Uncert:	+/-2.34		+/-2.26					

QC Summary

Workorder: 427585

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1681764								
QC1203829548	LCS	TPU:	+/-3.60	+/-3.55					
Uranium-233/234				23.6	pCi/g				07/15/1710:09
		Uncert:		+/-2.54					
		TPU:		+/-4.18					
Uranium-235/236				0.610	pCi/g				
		Uncert:		+/-0.485					
		TPU:		+/-0.492					
Uranium-238	24.6			28.3	pCi/g	REC: 115	(80%-120%)		
		Uncert:		+/-2.77					
		TPU:		+/-4.85					
**Uranium-232 Tracer	19.1			17.8	pCi/g	REC: 93	(30%-105%)		
		Uncert:		+/-2.28					
		TPU:		+/-3.53					
Rad Gamma Spec									
Batch	1681640								
QC1203829297	MB								
Cesium-137			U	-0.0067	pCi/g			MXR1	07/13/1715:47
		Uncert:		+/-0.0234					
		TPU:		+/-0.0236					
Cobalt-60			U	0.00606	pCi/g				
		Uncert:		+/-0.0166					
		TPU:		+/-0.0168					
Europium-152			U	0.0765	pCi/g				
		Uncert:		+/-0.0807					
		TPU:		+/-0.0881					
Europium-154			U	-0.0486	pCi/g				
		Uncert:		+/-0.0504					
		TPU:		+/-0.0551					
Europium-155			U	0.0177	pCi/g				
		Uncert:		+/-0.0368					
		TPU:		+/-0.0377					
QC1203829298	427585001	DUP							
Cesium-137		U	-0.0184	U	0.00343	pCi/g			07/14/1707:12
		Uncert:	+/-0.0162		+/-0.0209		RPD: 0	N/A	
		TPU:	+/-0.0182		+/-0.021		RER: 1.54	(0-2)	
Cobalt-60		U	-0.003	U	0.00118	pCi/g			
		Uncert:	+/-0.0176		+/-0.0242		RPD: 0	N/A	
		TPU:	+/-0.0177		+/-0.0242		RER: 0.274	(0-2)	
Europium-152		U	0.0198	U	0.0281	pCi/g			
		Uncert:	+/-0.0381		+/-0.0515		RPD: 0	N/A	
		TPU:	+/-0.0392		+/-0.0531		RER: 0.247	(0-2)	
Europium-154		U	0.0365	U	-0.00403	pCi/g			
		Uncert:	+/-0.0495		+/-0.0718		RPD: 0	N/A	
		TPU:	+/-0.0522		+/-0.0718		RER: 0.894	(0-2)	
Europium-155		U	-0.00119	U	0.0168	pCi/g			
		Uncert:	+/-0.0363		+/-0.0564		RPD: 0	N/A	
		TPU:	+/-0.0363		+/-0.0569		RER: 0.522	(0-2)	
QC1203829299	LCS								
Americium-241	489			542	pCi/g	REC: 111	(80%-120%)		07/14/1707:12

QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1681640								
				Uncert:					
				TPU:					
Cesium-137	176			187	pCi/g	REC: 106	(80%-120%)		
				Uncert:					
				TPU:					
Cobalt-60	145			140	pCi/g	REC: 97	(80%-120%)		
				Uncert:					
				TPU:					
Europium-152			U	-0.119	pCi/g				
				Uncert:					
				TPU:					
Europium-154			U	-0.381	pCi/g				
				Uncert:					
				TPU:					
Europium-155			U	0.256	pCi/g				
				Uncert:					
				TPU:					
Rad Gas Flow									
Batch	1681608								
QC1203829209	MB								
Total Strontium			U	0.191	pCi/g			KSD1	07/14/1715:27
				Uncert:					
				TPU:					
**Strontium Carrier		7.75		4.90	mg	REC: 63	(40%-110%)		
QC1203829210	427585005	DUP							
Total Strontium			U	-0.351	pCi/g				07/14/1715:32
				Uncert:					
				TPU:					
**Strontium Carrier		7.75	5.80	6.20	mg	REC: 80	(40%-110%)		
QC1203829211	LCS								
Total Strontium		54.4		55.1	pCi/g	REC: 101	(80%-120%)		07/14/1715:32
				Uncert:					
				TPU:					
**Strontium Carrier		7.75		6.20	mg	REC: 80	(40%-110%)		
Rad Liquid Scintillation									
Batch	1682150								
QC1203830476	MB								
Nickel-63			U	1.90	pCi/g			TXJ1	07/20/1707:41
				Uncert:					
				TPU:					
**Nickel Carrier		25.2		22.2	mg	REC: 88	(40%-110%)		
QC1203830477	427585001	DUP							
Nickel-63			U	-0.0606	pCi/g				07/20/1708:13
				Uncert:					
				TPU:					
**Nickel Carrier		25.2	19.3	21.7	mg	REC: 86	(40%-110%)		
QC1203830478	LCS								
Nickel-63		259		297	pCi/g	REC: 115	(80%-120%)		07/20/1708:44
				Uncert:					
				TPU:					

QC Summary

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1682150								
		TPU:		+/-55.8					
**Nickel Carrier	25.2			18.5	mg	REC: 73	(40%-110%)		
Batch	1682162								
QC1203830520	MB								
Technetium-99			U	0.959	pCi/g			CXS7	07/23/1710:03
		Uncert:		+/-1.86					
		TPU:		+/-1.86					
**Technetium-99m Tracer	4.55E+05			4.13E+05	CPM	REC: 91	(30%-105%)		
QC1203830521	427585001	DUP							
Technetium-99		U	2.02	U	0.899				07/23/1710:19
		Uncert:	+/-2.19	+/-2.31		RPD: 0	N/A		
		TPU:	+/-2.20	+/-2.32		RER: 0.687	(0-2)		
**Technetium-99m Tracer	4.55E+05	3.96E+05		3.68E+05	CPM	REC: 81	(30%-105%)		
QC1203830522	LCS								
Technetium-99	62.2			57.2	pCi/g	REC: 92	(80%-120%)		07/23/1708:41
		Uncert:		+/-3.73					
		TPU:		+/-7.54					
**Technetium-99m Tracer	4.55E+05			3.84E+05	CPM	REC: 84	(30%-105%)		
Batch	1682166								
QC1203830526	MB								
Tritium			U	5.03	pCi/g			BXM4	07/20/1717:23
		Uncert:		+/-10.6					
		TPU:		+/-10.6					
QC1203830527	427585001	DUP							
Tritium		U	0.113	U	2.42				07/20/1717:55
		Uncert:	+/-10.2	+/-10.4		RPD: 0	N/A		
		TPU:	+/-10.2	+/-10.5		RER: 0.309	(0-2)		
QC1203830528	427585001	MS							
Tritium	148	U	0.113	131	pCi/g	REC: 89	(75%-125%)		07/20/1714:45
		Uncert:	+/-10.2	+/-24.3					
		TPU:	+/-10.2	+/-38.4					
QC1203830529	LCS								
Tritium	88.7			76.8	pCi/g	REC: 87	(80%-120%)		07/20/1718:26
		Uncert:		+/-14.8					
		TPU:		+/-22.9					

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
- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- 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.

QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
D										
E										
M										
N										
S										
U										
UX										
W										
X										
Y										
Z										

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.