

November 01, 2017

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

Re: CHPRC SAF F17-009
Work Order: 434288
SDG: GEL434288

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 05, 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,



Heather Shaffer
Project Manager

Purchase Order: 302632 - 8H
Chain of Custody: F17-009-848, F17-009-849 and F17-009-850
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F17-009
SDG: GEL434288**

November 01, 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 October 05, 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:

Laboratory Identification	Sample Description
434288001	B3F941
434288002	B3F942
434288003	B3F943

Case Narrative

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

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: General Chemistry 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.



Heather Shaffer
Project Manager

**Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL434288
Work Order #: 434288**

General Chemistry

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 1203898867 (B3F943DUP), 1203898868 (Non SDG 434439001DUP) and 434288003 (B3F943) were manually integrated to correctly position the baseline as set in the calibration standards.

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

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

PUISO_PRECIP_AEA:COMMON

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.

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

Sample 1203895074 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Miscellaneous Information

Manual Integration

Manual integration of alpha spectroscopy spectra 1203895074 (MB) was performed to fully separate counts in Regions of Interest which would have been biased.

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.

I129_SEP_LEPS_GS

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.

TC99_SEP_GPC

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

Quality Control (QC) Information

Method Blank Criteria

The blank result (See Below) is greater than the MDC but less than the required detection limit.

Sample	Analyte	Value
1203891331 (MB)	Technetium-99	Result: 4.17 pCi/g > MDA: 1.72 pCi/g < RDL: 5.00 pCi/g

Technical Information

Recounts

Sample 1203891331 (MB) was recounted due to a suspected blank false positive. The recount is reported.
Sample 1203891334 (B3DCJ8DUP) was recounted due to high relative percent difference/relative error ratio. The recount is reported.

C14_LSC: COMMON

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

Technical Information

Recounts

Samples were recounted due to a detector lock out condition. The recounts are reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1203891397 (B3DCJ8MS), aliquot was reduced to conserve sample volume.

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.

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**

Sample 434288001 (B3F941) was recounted due to high MDC. The recount is reported.

Miscellaneous Information**Additional Comments**

The matrix spike, 1203897035 (B3DCJ8MS), 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

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 434228			F17-009-848	PAGE 1 OF 1
COLLECTOR Danielle Saunders (PWW)	COMPANY CONTACT FITZGERALD, SL	TELEPHONE NO. 373-7495	PROJECT COORDINATOR FITZGERALD, SL		PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9513, Core 17-18, SEE NOTE	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites Sampling - Soil 20		SAF NO. F17-009		AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. N/A	FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH 115.6-116.6	COA 302632		METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC		OFFSITE PROPERTY NO. N/A		BILL OF LADING/AIR BILL NO. FedEx Blood#7312		

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.	PRESERVATION	None	
		HOLDING TIME	6 Months	
		TYPE OF CONTAINER	G/P	
		NO. OF CONTAINER(S)	1	
		VOLUME	500mL	
		SPECIAL HANDLING AND/OR STORAGE N/A	SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B3F941	SOIL	10/03/17	15:00	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM Danielle Saunders (PWW)	DATE/TIME 10/31/17	RECEIVED BY/STORED IN PWW 3311 FSA Raiguelos	DATE/TIME 10/31/17 1500	NOTE: PLEASE DOCUMENT ACTUAL CORE AND HEIS # SUBSAMPLE (1) GAMMA_GS: COMMON; AMCMISO_IE_PRECIP_AEA: COMMON; PUIISO_IE_PRECIP_AEA: COMMON; UIISO_IE_PRECIP_AEA: COMMON; C14_LSC: COMMON; I129_SEP_LEPS_GS: COMMON; NI63_LSC: COMMON; NP237_IE_PRECIP_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON {Total beta radiostrontium}; TC99_EIE_LSC: COMMON; TRITIUM_DIST_LSC: COMMON; Sample obtained from B39X10, core 18-E.
RELINQUISHED BY/REMOVED FROM Danielle Saunders (PWW)	DATE/TIME 10/31/17	RECEIVED BY/STORED IN STACY BOONE / 158	DATE/TIME 10/5/17 850	
RELINQUISHED BY/REMOVED FROM FEDEx	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

NOVEMBER 1, 2017 REV.0

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 431200		F17-009-849	PAGE 1 OF 1
COLLECTOR Danielle Saunders	COMPANY CONTACT FITZGERALD, SL	TELEPHONE NO. 373-7495	PROJECT COORDINATOR FITZGERALD, SL	PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9513, Core 17-18, SEE NOTE	PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites Sampling - Soil 20		SAF NO. F17-009	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. NA	FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH 115.6 - 116.0	COA 302632	METHOD OF SHIPMENT FEDERAL EXPRESS ORIGINAL	
SHIPPED TO GEL Laboratories, LLC		OFFSITE PROPERTY NO. NA	BILL OF LADING/AIR BILL NO. FedEx BUD# 7312		

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.	PRESERVATION	Cool <=6C
		HOLDING TIME	30 Days
		TYPE OF CONTAINER	G/P
		NO. OF CONTAINER(S)	1
		VOLUME	60mL
		SPECIAL HANDLING AND/OR STORAGE	N/A
		SAMPLE ANALYSIS	7196_CR6: COMMON;

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B3F942	SOIL	10/03/17	15:00	✓

NOVEMBER 1, 2017

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	NOTE: PLEASE DOCUMENT ACTUAL CORE AND HEIS # SUBSAMPLE Sample obtained from B39X10 Core 18E
Danielle Saunders 10/03/17 15:00	PROWL 331/73A Refregator 10/03/17 15:00	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
Danielle Saunders 10/04/17 10:00	Danielle Saunders	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
FEDEx	STACY BOONE 10/5/17 8:50	
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	

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LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 434288			F17-009-850	PAGE 1 OF 1
COLLECTOR <i>Danielle Saunders</i>		COMPANY CONTACT FITZGERALD, SL	TELEPHONE NO. 373-7495	PROJECT COORDINATOR FITZGERALD, SL	PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION <i>10/3/17</i> C9513, Core 17-18, SEE NOTE		PROJECT DESIGNATION 200-DV-1 Operable Unit Characterization of Waste Sites Sampling - Soil 20		SAF NO. F17-009	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. <i>NA</i>		FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH <i>115.6-116.6</i>	COA 302632	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC		OFFSITE PROPERTY NO. <i>NA</i>	BILL OF LADING/AIR BILL NO. <i>FedEx</i> <i>BIDU#7312</i>			

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.	PRESERVATION	Cool <=6C
		HOLDING TIME	28 Days/48 Hours
		TYPE OF CONTAINER	<i>G/P</i>
		NO. OF CONTAINER(S)	1
		VOLUME	60mL
	SPECIAL HANDLING AND/OR STORAGE	<i>N/A</i>	SAMPLE ANALYSIS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B3F943	SOIL	<i>10/03/17</i>	<i>15:00</i>	<input checked="" type="checkbox"/>

NOVEMBER 1, 2017

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM <i>Danielle Saunders</i>	DATE/TIME <i>10/03/17 1500</i>	RECEIVED BY/STORED IN <i>Stacy Boone</i>
RELINQUISHED BY/REMOVED FROM <i>Danielle Saunders</i>	DATE/TIME <i>10/03/17 1500</i>	RECEIVED BY/STORED IN <i>Stacy Boone</i>
RELINQUISHED BY/REMOVED FROM <i>FedEx</i>	DATE/TIME <i>10/03/17 1500</i>	RECEIVED BY/STORED IN <i>Stacy Boone</i>
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN

NOTE: PLEASE DOCUMENT ACTUAL CORE AND HEIS # SUBSAMPLE (1) 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: COMMON (Add-on) {Bromide, Phosphorus in phosphate};

Sample obtained from B39X10, core 18E.

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

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REV.0



SAMPLE RECEIPT & REVIEW FORM

Client: CPRC		SDG/AR/COC/Work Order: 434288		
Received By: <i>Stacy Boone</i>		Date Received: 5-OCT-17		
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other 6659 7786 7490		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:		
Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice <u>Ice Packs</u> Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 3°c
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: IR3-17 Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials KS Date 10/5/17 Page 1 of 1

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 01 November 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	SC000122018-1
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
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-24
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL434288
Work Order #: 434288**

Product: Ion Chromatography

Analytical Method: 9056_ANIONS_IC

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

Analytical Batches: 1710413 and 1710411

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288003	B3F943
1203898865	Method Blank (MB)
1203898866	Laboratory Control Sample (LCS)
1203898867	434288003(B3F943) Sample Duplicate (DUP)
1203898868	434439001(NonSDG) Sample Duplicate (DUP)
1203898869	434288003(B3F943) Matrix Spike (MS)
1203898870	434439001(NonSDG) 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 1203898867 (B3F943DUP), 1203898868 (Non SDG 434439001DUP) and 434288003 (B3F943) were manually integrated to correctly position the baseline as set in the calibration standards.

Product: Hexavalent Chromium**Analytical Method:** 7196_CR6**Analytical Procedure:** GL-GC-E-044 REV# 22**Analytical Batch:** 1704204**Preparation Method:** SW846 3060A**Preparation Procedure:** GL-GC-E-044 REV# 22**Preparation Batch:** 1704202

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288002	B3F942
1203883634	Method Blank (MB)
1203883635	Laboratory Control Sample (LCS)
1203883636	Insoluble Lab Control Sample (ILCS)
1203891100	434602014(B3DCM4) Sample Duplicate (DUP)
1203891101	434602014(B3DCM4) Matrix Spike (MS)

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.

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: GEL434288 GEL Work Order: 434288

The Qualifiers in this report are defined as follows:

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

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

Review/Validation

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

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

Signature: 

Name: Kristen Mizzell

Date: 31 OCT 2017

Title: Analyst I

Sample Data Summary

Certificate of Analysis

Report Date: October 31, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-009

Client Sample ID: B3F942	Project: CPRC0F17009
Sample ID: 434288002	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 03-OCT-17 15:00	
Receive Date: 05-OCT-17	
Collector: Client	
Moisture: 6.57%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
7196_CR6: COMMON "Dry Weight Corrected"												
Hexavalent Chromium		5890	143	357	ug/Kg	33.4	1	VH1	10/16/17	1225	1704204	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	10/13/17	1128	1704202

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: October 31, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F17-009

Client Sample ID: B3F943	Project: CPRC0F17009
Sample ID: 434288003	Client ID: CPRC001
Matrix: SOIL	
Collect Date: 03-OCT-17 15:00	
Receive Date: 05-OCT-17	
Collector: Client	
Moisture: 5.95%	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"												
Bromide	U	695	695	2070	ug/Kg	9.76	1	JXH5	10/18/17	0611	1710413	1
Chloride	B	1650	747	2070	ug/Kg	9.76	1					
Fluoride	B	402	353	1040	ug/Kg	9.76	1					
Nitrate-N	U	342	342	1040	ug/Kg	9.76	1					
Nitrite-N	U	342	342	1040	ug/Kg	9.76	1					
Phosphorus in phosphate	U	695	695	2070	ug/Kg	9.76	1					
Sulfate		4220	1380	4150	ug/Kg	9.76	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	JXH5	10/17/17	1144	1710411

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9056_ANIONS_IC	

Notes:

Column headers are defined as follows:

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

Quality Control Summary

QC Summary

Report Date: October 31, 2017

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 434288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1710413										
QC1203898867	434288003	DUP									
Bromide	U	695	U	707	ug/Kg	N/A			JXH5	10/18/17	06:40
Chloride	B	1650	B	1630	ug/Kg	1.22	^	(+/-2110)			
Fluoride	B	402	B	424	ug/Kg	5.27	^	(+/-1060)			
Nitrate-N	U	342	U	348	ug/Kg	N/A					
Nitrite-N	U	342	U	348	ug/Kg	N/A					
Phosphorus in phosphate	U	695	U	707	ug/Kg	N/A					
Sulfate		4220		4270	ug/Kg	1.16	^	(+/-4220)			
QC1203898868	434439001	DUP									
Bromide	U	643	U	646	ug/Kg	N/A				10/18/17	08:07
Chloride		3140		3230	ug/Kg	3.08	^	(+/-1930)			
Fluoride	U	326	U	328	ug/Kg	N/A					
Nitrate-N	B	400	B	376	ug/Kg	6.21	^	(+/-964)			
Nitrite-N	U	317	U	318	ug/Kg	N/A					
Phosphorus in phosphate	U	643	U	646	ug/Kg	N/A					

QC Summary

Workorder: 434288

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1710413										
Sulfate		B	2130	B	2170	ug/Kg	1.78 ^	(+/-3860)	JXH5	10/18/17	08:07
QC1203898866	LCS										
Bromide	12400				12100	ug/Kg	97.3	(80%-120%)		10/18/17	05:42
Chloride	49800				46300	ug/Kg	93.1	(80%-120%)			
Fluoride	24900				24200	ug/Kg	97.3	(80%-120%)			
Nitrate-N	24900				23700	ug/Kg	95.1	(80%-120%)			
Nitrite-N	24900				23700	ug/Kg	95.4	(80%-120%)			
Phosphorus in phosphate	12400				12500	ug/Kg	100	(80%-120%)			
Sulfate	99500				96300	ug/Kg	96.8	(80%-120%)			
QC1203898865	MB										
Bromide			U		670	ug/Kg				10/18/17	05:13
Chloride			U		720	ug/Kg					
Fluoride			U		340	ug/Kg					
Nitrate-N			U		330	ug/Kg					
Nitrite-N			U		330	ug/Kg					
Phosphorus in phosphate			U		670	ug/Kg					

QC Summary

Workorder: 434288

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1710413										
Sulfate			U	1330	ug/Kg				JXH5	10/18/17	05:13
QC1203898869 434288003 MS											
Bromide	13200	U	695	12100	ug/Kg		91.6	(75%-125%)		10/18/17	07:09
Chloride	52600	B	1650	47300	ug/Kg		86.8	(75%-125%)			
Fluoride	26300	B	402	24600	ug/Kg		92	(75%-125%)			
Nitrate-N	26300	U	342	23900	ug/Kg		90.8	(75%-125%)			
Nitrite-N	26300	U	342	23800	ug/Kg		90.5	(75%-125%)			
Phosphorus in phosphate	13200	U	695	11200	ug/Kg		84.1	(75%-125%)			
Sulfate	105000		4220	102000	ug/Kg		92.7	(75%-125%)			
QC1203898870 434439001 MS											
Bromide	12000	U	643	11000	ug/Kg		91.1	(75%-125%)		10/18/17	08:35
Chloride	48100		3140	44300	ug/Kg		85.6	(75%-125%)			
Fluoride	24000	U	326	22100	ug/Kg		91.6	(75%-125%)			
Nitrate-N	24000	B	400	21700	ug/Kg		88.7	(75%-125%)			
Nitrite-N	24000	U	317	21600	ug/Kg		88.7	(75%-125%)			
Phosphorus in phosphate	12000	U	643	11600	ug/Kg		94.9	(75%-125%)			

QC Summary

Workorder: 434288

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1710413										
Sulfate	96200	B	2130		89700	ug/Kg	91	(75%-125%)	JXH5	10/18/17	08:35
Spectrometric Analysis											
Batch	1704204										
QC1203891100	434602014	DUP									
Hexavalent Chromium		U	164	U	164	ug/Kg	N/A		VH1	10/16/17	12:28
QC1203883636	ILCS										
Hexavalent Chromium	7390				6520	ug/Kg	88.2	(80%-120%)		10/16/17	12:20
QC1203883635	LCS										
Hexavalent Chromium	3300				3340	ug/Kg	101	(80%-120%)		10/16/17	12:13
QC1203883634	MB										
Hexavalent Chromium			U		110	ug/Kg				10/16/17	12:12
QC1203891101	434602014	MS									
Hexavalent Chromium	3630	U	164		3260	ug/Kg	89.7	(75%-125%)		10/16/17	12:28

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 \geq EQL or is $>$ 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- 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

QC Summary

Workorder: 434288

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

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

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

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

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

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

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL434288
Work Order #: 434288

Product: AMCMISO_EIE_PRECIP_AEA: COMMON

Analytical Method: AMCMISO_EIE_PREC_AEA

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

Analytical Batch: 1708986

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1706808

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203895028	Method Blank (MB)
1203895029	433981001(B3DCJ8) Sample Duplicate (DUP)
1203895030	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: 1708989

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1706808

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203895031	Method Blank (MB)
1203895032	433504001(B3DCF8) Sample Duplicate (DUP)

1203895033

Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: PUIISO_PRECIP_AEA:COMMON

Analytical Method: PUIISO_PRECIP_AEA

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

Analytical Batch: 1708993

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1706808

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203895047	Method Blank (MB)
1203895048	433981001(B3DCJ8) Sample Duplicate (DUP)
1203895049	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: UIISO_IE_PRECIP_AEA:COMMON

Analytical Method: UIISO_IE_PRECIP_AEA

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

Analytical Batch: 1709002

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1706808

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203895074	Method Blank (MB)
1203895075	433981001(B3DCJ8) Sample Duplicate (DUP)
1203895076	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 1203895074 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Miscellaneous Information

Manual Integration

Manual integration of alpha spectroscopy spectra 1203895074 (MB) was performed to fully separate counts in Regions of Interest which would have been biased.

Product: Dry Weight

Analytical Method: ASTM D 2216 (Modified)

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

Analytical Batch: 1706818

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288002	B3F942
434288003	B3F943
1203889649	434288002(B3F942) 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**Preparation Method:** Dry Soil Prep**Preparation Procedure:** GL-RAD-A-021 REV# 21**Preparation Batch:** 1706808

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941

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: I129_SEP_LEPS_GS**Analytical Method:** I129_SEP_LEPS_GS**Analytical Procedure:** GL-RAD-A-006 REV# 21**Analytical Batch:** 1707138

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203890354	Method Blank (MB)
1203890355	433504001(B3DCF8) Sample Duplicate (DUP)
1203890356	433504001(B3DCF8) Matrix Spike (MS)
1203890357	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: GAMMA_GS:COMMON**Analytical Method:** GAMMA_GS**Analytical Procedure:** GL-RAD-A-013 REV# 27**Analytical Batch:** 1707376

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1706808

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203890935	Method Blank (MB)
1203890936	434288001(B3F941) Sample Duplicate (DUP)
1203890937	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 interference.	Europium-155	1203890936	B3F941(434288001DUP)

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 19

Analytical Batch: 1707800

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1706808

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203892088	Method Blank (MB)
1203892089	434288001(B3F941) Sample Duplicate (DUP)
1203892090	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: 1707535

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203891331	Method Blank (MB)
1203891332	Laboratory Control Sample (LCS)
1203891334	433981001(B3DCJ8) Sample Duplicate (DUP)

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

Data Summary:

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

Quality Control (QC) Information

Method Blank Criteria

The blank result (See Below) is greater than the MDC but less than the required detection limit.

Sample	Analyte	Value
1203891331 (MB)	Technetium-99	Result: 4.17 pCi/g > MDA: 1.72 pCi/g < RDL: 5.00 pCi/g

Technical Information

Recounts

Sample 1203891331 (MB) was recounted due to a suspected blank false positive. The recount is reported.
 Sample 1203891334 (B3DCJ8DUP) was recounted due to high relative percent difference/relative error ratio.
 The recount is reported.

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

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

Analytical Batch: 1707552

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203891395	Method Blank (MB)
1203891396	433981001(B3DCJ8) Sample Duplicate (DUP)
1203891397	433981001(B3DCJ8) Matrix Spike (MS)
1203891398	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 a detector lock out condition. The recounts are reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1203891397 (B3DCJ8MS), aliquot was reduced to conserve sample volume.

Product: NI63_LSC

Analytical Method: NI63_LSC

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

Analytical Batch: 1709731

Preparation Method: Dry Soil Prep

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

Preparation Batch: 1706808

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203896893	Method Blank (MB)
1203896894	433981001(B3DCJ8) Sample Duplicate (DUP)
1203896895	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: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1709769

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
434288001	B3F941
1203897033	Method Blank (MB)
1203897034	433981001(B3DCJ8) Sample Duplicate (DUP)
1203897035	433981001(B3DCJ8) Matrix Spike (MS)
1203897036	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**

Sample 434288001 (B3F941) was recounted due to high MDC. The recount is reported.

Miscellaneous Information**Additional Comments**

The matrix spike, 1203897035 (B3DCJ8MS), 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.

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: GEL434288 GEL Work Order: 434288

The Qualifiers in this report are defined as follows:

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample

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: Theresa Austin****Date: 01 NOV 2017****Title: Group Leader**

Sample Data Summary

NOVEMBER 1, 2017

Page 1 of 1
REV 0

Certificate of Analysis
Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "Dry Weight Corrected"
Batch ID: 1708986	Method: AMCMISO_EIE_PREC_AEA	SOP Ref: GL-RAD-A-011
Run Date: 10/16/2017 10:40	Analyst: JXR5	Instrument: 1081
Data File: S0434288001_AM.1A.gcnf	Aliquot: 0.106 g	Count Time: 240 min
Prep Batch: 1708986	Prep Method: DOE EML HASL-300, Am-05	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.396	pCi/g	+/-0.260	0.260	0.973	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	12.0	19.8	pCi/g	60.5	(30%-105%)

Comments:

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
 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.

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Certificate of Analysis
Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "Dry Weight Corrected"
Batch ID: 1708989	Method: ASTM C 1475-00 Modified	SOP Ref: GL-RAD-A-032
Run Date: 10/14/2017 21:34	Analyst: JXR5	Instrument: 1195
Data File: S0434288001_NP.1A.gcnf	Aliquot: 0.106 g	Count Time: 240 min
Prep Batch: 1708989	Prep Method: ASTM C 1475-00 Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	0.0347	pCi/g	+/-0.193	0.193	0.370	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	2040	2020	pCi/g	101	(30%-105%)

Comments:

- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
 - 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.

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Certificate of Analysis
Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "Dry Weight Corrected"
Batch ID: 1708993	Method: PUIISO_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 10/16/2017 10:40	Analyst: HAKB	Instrument: 1070
Data File: S0434288001_PU.1A.gcnf	Aliquot: 0.106 g	Count Time: 239.9998 min
Prep Batch: 1708993	Prep Method: DOE EML HASL-300, Pu-11-	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.00532	pCi/g	+/-0.244	0.244	0.537	1.00
OER-100-70	Plutonium-239/240	U	-0.112	pCi/g	+/-0.157	0.158	0.515	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	15.3	18.6	pCi/g	82.1	(30%-105%)

Comments:

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
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.

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Certificate of Analysis
Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "Dry Weight Corrected"
Batch ID: 1709002	Analyst: JXR5	SOP Ref: GL-RAD-A-011
Run Date: 10/15/2017 20:10	Aliquot: 0.106 g	Instrument: 1011
Data File: S0434288001_UU.1A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 239.9998 min
Prep Batch: 1709002		Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/12/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		2.86	pCi/g	+/-0.845	0.927	0.454	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.267	pCi/g	+/-0.338	0.340	0.420	1.00
7440-61-1	Uranium-238		2.82	pCi/g	+/-0.835	0.916	0.404	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	18.2	19.8	pCi/g	92.1	(30%-105%)

Comments:

- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
 - 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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "Dry Weight Corrected"
Batch ID: 1707800	Method: SRTOT_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 10/19/2017 15:02	Analyst: KSD1	Instrument: PIC12C
Data File: S1707800.xls	Aliquot: 0.297 g	Count Time: 60 min
Prep Batch: 1707800	Prep Method: EPA 905.0 Modified/DOE RP5	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/18/2017 12:17		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.877	pCi/g	+/-0.912	0.940	1.51	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.50	7.85	mg	82.8	(40%-110%)

Comments:

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
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.

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Certificate of Analysis
Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "As Received"
Batch ID: 1707138	Method: I129_SEP_LEPS_GS	SOP Ref: GL-RAD-A-006
Run Date: 10/17/2017 08:31	Analyst: MJH1	Instrument: XRAY6
Data File: I434288001.CNF;1	Aliquot: 1.407 g	Count Time: 60 min
Prep Batch: 1707138	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 10/16/2017 12:36		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.291	pCi/g	+/-0.396	0.418	1.13	2.00

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

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
 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.

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Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "Dry Weight Corrected"
Batch ID: 1707376	Method: GAMMA_GS	SOP Ref: GL-RAD-A-013
Run Date: 10/28/2017 09:21	Analyst: MXR1	Instrument: GAM05
Data File: G434288001.CNF;1	Aliquot: 148.832 g	Count Time: 120 min
Prep Batch: 1707376	Prep Method: DOE HASL 300, 4.5.2.3/Ga-01	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/06/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.00109	pCi/g	+/-0.022	0.022	0.0374	0.100
10198-40-0	Cobalt-60	U	0.00699	pCi/g	+/-0.0214	0.0216	0.0434	0.100
14683-23-9	Europium-152	U	0.00043	pCi/g	+/-0.0539	0.0539	0.0956	0.100
15585-10-1	Europium-154	U	-0.0342	pCi/g	+/-0.0616	0.0636	0.110	0.100
14391-16-3	Europium-155	U	-0.0123	pCi/g	+/-0.0463	0.0467	0.0874	0.100

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

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

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Certificate of Analysis
Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "As Received"
Batch ID: 1707535	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 10/10/2017 23:18	Analyst: CXS7	Instrument: LSCGREEN
Data File: E1707535.xls	Aliquot: 1.275 g	Count Time: 45 min
Prep Batch: 1707535	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 10/10/2017 10:03		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	B	11.4	pCi/g	+/-1.40	1.92	1.96	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	3.90E+05	4.31E+05	CPM	90.6	(30%-105%)

Comments:

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
 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.

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Certificate of Analysis
Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "As Received"
Batch ID: 1707552	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 10/11/2017 18:11	Analyst: BXM4	Instrument: LSCSILVER
Data File: C1707552R.xls	Aliquot: 0.509 g	Count Time: 40 min
Prep Batch: 1707552	Prep Method: EPA EERF C-01 Modified	
Prep Date: 10/09/2017 11:10		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-1.39	pCi/g	+/-2.23	2.23	3.89	5.00

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

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
 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.

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Certificate of Analysis
Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "Dry Weight Corrected"
Batch ID: 1709731	Method: NI63_LSC	SOP Ref: GL-RAD-A-022
Run Date: 10/20/2017 07:40	Analyst: TXJ1	Instrument: LSCBLUE
Data File: N1709731.xls	Aliquot: 0.547 g	Count Time: 30 min
Prep Batch: 1709731	Prep Method: DOE RESL Ni-1, Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 10/17/2017 09:35		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	1.98	pCi/g	+/-3.51	3.53	5.95	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	21.0	25.2	mg	83.3	(40%-110%)

Comments:

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
 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.

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Certificate of Analysis
Sample Summary

SDG Number: GEL434288	Client: CPRC001	Project: CPRC0F17009
Lab Sample ID: 434288001	Date Collected: 10/03/2017 15:00	Matrix: SOIL
	Date Received: 10/05/2017 08:50	%Moisture: 5.1
Client ID: B3F941		Prep Basis: "As Received"
Batch ID: 1709769	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 10/20/2017 18:17	Analyst: BXM4	Instrument: LSCBLUE
Data File: T1709769R.xls	Aliquot: 1.252 g	Count Time: 20 min
Prep Batch: 1709769	Prep Method: EPA 906.0 Modified	
Prep Date: 10/18/2017 11:54		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	6.24	pCi/g	+/-13.7	13.8	23.8	30.0

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

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
 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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL434288
Lab Sample ID: 434288002

Client: CPRC001
Date Collected: 10/03/2017 15:00
Date Received: 10/05/2017 08:50

Project: CPRC0F17009
Matrix: SOIL
%Moisture: 6.6

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL434288
Lab Sample ID: 434288003

Client: CPRC001
Date Collected: 10/03/2017 15:00
Date Received: 10/05/2017 08:50

Project: CPRC0F17009
Matrix: SOIL
%Moisture: 6

Quality Control Summary

QC Summary

Report Date: November 1, 2017
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Client : CH2MHill Plateau Remediation Company
 MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 434288

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1708986								
QC1203895028	MB								
Americium-241			U	0.00217	pCi/g			JXR5	10/16/1710:40
				Uncert: +/-0.161					
				TPU: +/-0.161					
**Americium-243 Tracer	18.4			18.9	pCi/g	REC: 103	(30%-105%)		
				Uncert: +/-1.95					
				TPU: +/-3.03					
QC1203895029	433981001	DUP							
Americium-241		U	0.0027	U	0.0792	pCi/g			
				Uncert: +/-0.200		RPD: 0	N/A		
				TPU: +/-0.200		RER: 0.445	(0-2)		
**Americium-243 Tracer	20.0	15.0		14.4	pCi/g	REC: 72	(30%-105%)		
				Uncert: +/-2.24					
				TPU: +/-3.43					
QC1203895030	LCS								
Americium-241				15.7	pCi/g	REC: 91	(80%-120%)		10/16/1710:40
				Uncert: +/-2.16					
				TPU: +/-3.10					
**Americium-243 Tracer	18.4			14.4	pCi/g	REC: 79	(30%-105%)		
				Uncert: +/-2.31					
				TPU: +/-3.49					
Batch	1708989								
QC1203895031	MB								
Neptunium-237			U	0.0899	pCi/g			JXR5	10/14/1721:29
				Uncert: +/-0.247					
				TPU: +/-0.248					
**Americium-243 Tracer	1980			1920	pCi/g	REC: 97	(30%-105%)		
QC1203895032	433504001	DUP							
Neptunium-237		U	-0.175	U	-0.07	pCi/g			10/14/1721:29
				Uncert: +/-0.200		RPD: 0	N/A		
				TPU: +/-0.200		RER: 1.92	(0-2)		
**Americium-243 Tracer	2060	1900		1890	pCi/g	REC: 92	(30%-105%)		
QC1203895033	LCS								
Neptunium-237				44.9	pCi/g	REC: 109	(80%-120%)		10/14/1721:29
				Uncert: +/-4.10					
				TPU: +/-6.48					
**Americium-243 Tracer	1980			1360	pCi/g	REC: 69	(30%-105%)		
Batch	1708993								
QC1203895047	MB								
Plutonium-238			U	0.0645	pCi/g			HAKB	10/16/1710:40
				Uncert: +/-0.322					
				TPU: +/-0.322					
Plutonium-239/240			U	-0.0338	pCi/g				
				Uncert: +/-0.233					

QC Summary

Workorder: 434288

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1708993								
**Plutonium-242 Tracer	17.3	TPU:		+/-0.234					
		Uncert:		12.2	pCi/g	REC: 70	(30%-105%)		
		TPU:		+/-2.27					
				+/-3.55					
QC1203895048 433981001 DUP									
Plutonium-238		U	-0.157	U	0.0187				
		Uncert:	+/-0.178		+/-0.196	RPD: 0	N/A		
		TPU:	+/-0.179		+/-0.196	RER: 1.29	(0-2)		
Plutonium-239/240		U	-0.154	U	-0.112				
		Uncert:	+/-0.238		+/-0.158	RPD: 0	N/A		
		TPU:	+/-0.238		+/-0.159	RER: 0.282	(0-2)		
**Plutonium-242 Tracer	18.8		13.3		17.5	pCi/g	REC: 93	(30%-105%)	
		Uncert:	+/-2.27		+/-2.21				
		TPU:	+/-3.58		+/-3.54				
QC1203895049 LCS									
Plutonium-238				U	-0.00779				10/16/1710:40
		Uncert:			+/-0.445				
		TPU:			+/-0.445				
Plutonium-239/240	17.3				15.5	pCi/g	REC: 90	(80%-120%)	
		Uncert:			+/-1.99				
		TPU:			+/-3.05				
**Plutonium-242 Tracer	17.3				15.4	pCi/g	REC: 89	(30%-105%)	
		Uncert:			+/-2.09				
		TPU:			+/-3.31				
Batch	1709002								
QC1203895074 MB									
Uranium-233/234				U	0.296	pCi/g		JXR5	10/18/1721:28
		Uncert:			+/-0.319				
		TPU:			+/-0.321				
Uranium-235/236				U	0.165	pCi/g			
		Uncert:			+/-0.328				
		TPU:			+/-0.329				
Uranium-238				U	0.134	pCi/g			
		Uncert:			+/-0.266				
		TPU:			+/-0.266				
**Uranium-232 Tracer	18.4				17.5	pCi/g	REC: 95	(30%-105%)	
		Uncert:			+/-2.18				
		TPU:			+/-3.37				
QC1203895075 433981001 DUP									
Uranium-233/234			8.72		10.4	pCi/g			10/15/1720:10
		Uncert:	+/-1.48		+/-1.67	RPD: 18	(0%-30%)		
		TPU:	+/-1.90		+/-2.20	RER: 1.16	(0-2)		
Uranium-235/236			0.827		0.977	pCi/g			
		Uncert:	+/-0.538		+/-0.603	RPD: 17	(0% - 100%)		
		TPU:	+/-0.550		+/-0.618	RER: 0.354	(0-2)		
Uranium-238			10.7		8.77	pCi/g			
		Uncert:	+/-1.63		+/-1.54	RPD: 20	(0%-30%)		
		TPU:	+/-2.18		+/-1.95	RER: 1.29	(0-2)		
**Uranium-232 Tracer	20.0		17.6		17.3	pCi/g	REC: 87	(30%-105%)	
		Uncert:	+/-2.22		+/-2.30				

QC Summary

Workorder: 434288

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1709002								
QC1203895076	LCS	TPU:	+/-3.45	+/-3.58					
Uranium-233/234				21.7	pCi/g				
		Uncert:		+/-2.30					
		TPU:		+/-3.76					
Uranium-235/236				2.78	pCi/g				
		Uncert:		+/-0.923					
		TPU:		+/-0.999					
Uranium-238	23.7			22.4	pCi/g	REC: 94	(80%-120%)		
		Uncert:		+/-2.32					
		TPU:		+/-3.85					
**Uranium-232 Tracer	18.4			15.8	pCi/g	REC: 86	(30%-105%)		
		Uncert:		+/-2.12					
		TPU:		+/-3.29					
Rad Gamma Spec									
Batch	1707138								
QC1203890354	MB								
Iodine-129			U	-0.166	pCi/g			MJH1	10/17/1711:04
		Uncert:		+/-0.316					
		TPU:		+/-0.325					
QC1203890355	433504001	DUP							
Iodine-129		U	0.811	U	-0.057	pCi/g			10/17/1711:04
		Uncert:	+/-0.615		+/-0.571		RPD: 0	N/A	
		TPU:	+/-0.721		+/-0.572		RER: 1.85	(0-2)	
QC1203890356	433504001	MS							
Iodine-129		U	0.811		42.4	pCi/g	REC: 92	(75%-125%)	10/17/1712:29
		Uncert:	+/-0.615		+/-4.18				
		TPU:	+/-0.721		+/-6.01				
QC1203890357	LCS								
Iodine-129					19.4	pCi/g	REC: 100	(80%-120%)	10/17/1712:30
		Uncert:			+/-2.51				
		TPU:			+/-3.17				
Batch	1707376								
QC1203890935	MB								
Cesium-137			U	-0.00601	pCi/g			MXR1	10/28/1709:21
		Uncert:		+/-0.0149					
		TPU:		+/-0.0151					
Cobalt-60			U	0.00212	pCi/g				
		Uncert:		+/-0.0112					
		TPU:		+/-0.0113					
Europium-152			U	0.0277	pCi/g				
		Uncert:		+/-0.0354					
		TPU:		+/-0.0376					
Europium-154			U	-0.0127	pCi/g				
		Uncert:		+/-0.046					
		TPU:		+/-0.0464					
Europium-155			U	0.0407	pCi/g				
		Uncert:		+/-0.0299					
		TPU:		+/-0.0352					
QC1203890936	434288001	DUP							

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gamma Spec										
Batch	1707376									
Cesium-137		U	0.00109	U	-0.00752	pCi/g				
	Uncert:		+/-0.022		+/-0.0158		RPD: 0		N/A	
	TPU:		+/-0.022		+/-0.0162		RER: 0.617		(0-2)	
Cobalt-60		U	0.00699	U	0.00394	pCi/g				
	Uncert:		+/-0.0214		+/-0.0179		RPD: 0		N/A	
	TPU:		+/-0.0216		+/-0.018		RER: 0.212		(0-2)	
Europium-152		U	0.00043	U	-0.00199	pCi/g				
	Uncert:		+/-0.0539		+/-0.0391		RPD: 0		N/A	
	TPU:		+/-0.0539		+/-0.0391		RER: 0.0712		(0-2)	
Europium-154		U	-0.0342	U	-0.00865	pCi/g				
	Uncert:		+/-0.0616		+/-0.0538		RPD: 0		N/A	
	TPU:		+/-0.0636		+/-0.054		RER: 0.599		(0-2)	
Europium-155		U	-0.0123	UX	0.00	pCi/g				
	Uncert:		+/-0.0463		+/-0.0977		RPD: 0		N/A	
	TPU:		+/-0.0467		+/-0.0983		RER: 2.4		(0-2)	
QC1203890937	LCS									
Americium-241	488				486	pCi/g	REC: 100	(80%-120%)		10/28/1716:48
	Uncert:				+/-6.59					
	TPU:				+/-37.5					
Cesium-137	175				178	pCi/g	REC: 102	(80%-120%)		
	Uncert:				+/-3.04					
	TPU:				+/-15.5					
Cobalt-60	141				139	pCi/g	REC: 99	(80%-120%)		
	Uncert:				+/-3.21					
	TPU:				+/-14.3					
Europium-152				U	-0.698	pCi/g				
	Uncert:				+/-1.31					
	TPU:				+/-1.35					
Europium-154				U	-0.389	pCi/g				
	Uncert:				+/-0.877					
	TPU:				+/-0.895					
Europium-155				U	0.397	pCi/g				
	Uncert:				+/-1.13					
	TPU:				+/-1.15					
Rad Gas Flow										
Batch	1707800									
QC1203892088	MB									
Total Strontium				U	-0.939	pCi/g			KSD1	10/19/1715:01
	Uncert:				+/-0.364					
	TPU:				+/-0.364					
**Strontium Carrier	7.85				8.30	mg	REC: 106	(40%-110%)		
QC1203892089	434288001	DUP								
Total Strontium		U	0.877	U	0.161	pCi/g				10/19/1715:01
	Uncert:		+/-0.912		+/-0.347		RPD: 0		N/A	
	TPU:		+/-0.940		+/-0.349		RER: 1.4		(0-2)	
**Strontium Carrier	7.85		6.50		8.20	mg	REC: 104	(40%-110%)		
QC1203892090	LCS									
Total Strontium	50.1				40.4	pCi/g	REC: 81	(80%-120%)		10/19/1715:02
	Uncert:				+/-2.35					
	TPU:				+/-10.5					

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1707800								
**Strontium Carrier	7.85			8.50	mg	REC: 108	(40%-110%)		
Rad Liquid Scintillation									
Batch	1707535								
QC1203891331 MB									
Technetium-99			B	4.17	pCi/g			CXS7	10/11/1707:25
	Uncert:			+/-1.11					
	TPU:			+/-1.21					
**Technetium-99m Tracer	4.31E+05			3.98E+05	CPM	REC: 92	(30%-105%)		
QC1203891332 LCS									
Technetium-99	65.4		B	64.4	pCi/g	REC: 98	(80%-120%)		10/11/1701:41
	Uncert:			+/-2.22					
	TPU:			+/-7.70					
**Technetium-99m Tracer	4.31E+05			3.78E+05	CPM	REC: 88	(30%-105%)		
QC1203891334 433981001 DUP									
Technetium-99		B	2.90 U	1.64	pCi/g				10/11/1708:13
	Uncert:		+/-1.18	+/-1.07		RPD: 56	(0% - 100%)		
	TPU:		+/-1.22	+/-1.09		RER: 1.51	(0-2)		
**Technetium-99m Tracer	4.31E+05	3.67E+05		3.92E+05	CPM	REC: 91	(30%-105%)		
Batch	1707552								
QC1203891395 MB									
Carbon-14			U	-0.457	pCi/g			BXM4	10/11/1718:53
	Uncert:			+/-2.25					
	TPU:			+/-2.25					
QC1203891396 433981001 DUP									
Carbon-14		U	-1.4 U	0.286	pCi/g				10/11/1719:35
	Uncert:		+/-2.27	+/-2.30		RPD: 0	N/A		
	TPU:		+/-2.27	+/-2.30		RER: 1.02	(0-2)		
QC1203891397 433981001 MS									
Carbon-14	315	U	-1.4	288	pCi/g	REC: 91	(75%-125%)		10/11/1720:17
	Uncert:		+/-2.27	+/-9.73					
	TPU:		+/-2.27	+/-24.4					
QC1203891398 LCS									
Carbon-14	147			141	pCi/g	REC: 96	(80%-120%)		10/11/1720:59
	Uncert:			+/-4.63					
	TPU:			+/-11.4					
Batch	1709731								
QC1203896893 MB									
Nickel-63			U	2.00	pCi/g			TXJ1	10/20/1710:50
	Uncert:			+/-3.13					
	TPU:			+/-3.16					
**Nickel Carrier	25.2			20.8	mg	REC: 83	(40%-110%)		
QC1203896894 433981001 DUP									
Nickel-63		U	2.00 U	1.36	pCi/g				10/20/1711:22
	Uncert:		+/-3.07	+/-3.75		RPD: 0	N/A		
	TPU:		+/-3.09	+/-3.76		RER: 0.258	(0-2)		
**Nickel Carrier	25.2	24.2		21.1	mg	REC: 84	(40%-110%)		
QC1203896895 LCS									
Nickel-63	216			233	pCi/g	REC: 108	(80%-120%)		10/20/1711:53
	Uncert:			+/-7.65					

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1709731								
		TPU:		+/-43.6					
**Nickel Carrier	25.2			19.2	mg	REC: 76	(40%-110%)		
Batch	1709769								
QC1203897033	MB								
Tritium			U	-2.68	pCi/g			BXM4	10/20/1703:17
		Uncert:		+/-15.1					
		TPU:		+/-15.1					
QC1203897034	433981001	DUP							
Tritium		U	-11.4	U	7.57	pCi/g			10/20/1703:33
		Uncert:	+/-14.7		+/-16.4		RPD: 0	N/A	
		TPU:	+/-14.7		+/-16.4		RER: 1.69	(0-2)	
QC1203897035	433981001	MS							
Tritium	204	U	-11.4		218	pCi/g	REC: 107	(75%-125%)	10/20/1703:50
		Uncert:	+/-14.7		+/-51.4				
		TPU:	+/-14.7		+/-71.4				
QC1203897036	LCS								
Tritium	86.7				77.2	pCi/g	REC: 89	(80%-120%)	10/20/1704:06
		Uncert:			+/-20.4				
		TPU:			+/-26.9				

Notes:

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

The Qualifiers in this report are defined as follows:

- < 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.
- 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.
- UX Gamma Spectroscopy--Uncertain identification
- 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

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	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.

** 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.