

MARCH 6, 2017

REV 0



a member of **The GEL Group** INC



PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

March 06, 2017

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

Re: CHPRC SAF F16-028
Work Order: 415810
SDG: GEL415810

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 07, 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: 300192 - 8H
Chain of Custody: F16-028-069
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F16-028
SDG: GEL415810**

March 06, 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 February 07, 2017, for analysis. The sample was 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 sample:

Laboratory Identification	Sample Description
415810001	B36M14

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, 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.

MARCH 6, 2017

REV 0

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL415810
Work Order #: 415810

Metals

Determination of Metals by ICP-MS

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

Quality Control (QC) Information

Duplicate Relative Percent Difference (RPD) Statement

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

Sample	Analyte	Value
1203723524 (B36M14DUP)	Uranium	21.9* (0%-20%)

Technical Information

Sample Dilutions

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

Analyte	415810
	001
Uranium	2X

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.

Quality Control (QC) Information

Method Blank (MB) Statement

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

Sample	Analyte	Value
1203722539 (MB)	Chloride	.764 betw (.72 - 2)

pH

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

Holding Times

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203728196 (B36M12DUP)	pH	Received 03-FEB-17, out of holding 01-FEB-17
415810001 (B36M14)	pH	Received 07-FEB-17, out of holding 02-FEB-17

Radiochemistry

AMCMISO_EIE_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 1203732360 (LCS) was recounted due to high carrier/tracer yield. The recount is 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 1203732365 (B36M14DUP) was recounted due to a peak shift. The recount is reported.

THISO_IE_PLATE_AEA: COMMON

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

Miscellaneous Information**Manual Integration**

Manual integration of alpha spectroscopy spectra 1203732367 (MB) was performed to fully separate counts in Regions of Interest which would have been biased.

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**

The batch was recounted due to a blank result greater than the MDA. The recounts are reported with the exception of sample 1203732371(B36M14) which was recounted again due to a peak shift. The third count of 1203732371(B36M14) is being reported.

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**Sample Re-prep/Re-analysis**

Samples were reprepared due to high recovery. The re-analysis is being 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.

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 + (Add-on)

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

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**QC Information**

The sample and the duplicate, 1203727698 (B36M10DUP), relative error ratio is greater than 2; however, both results are less than their respective MDCs.

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

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.

C14_LSC: COMMON

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

Certification Statement

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

Chain of Custody and Supporting Documentation

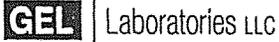
CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST		PAGE 1 OF 2	
COLLECTOR Jeff Tuckers CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9567, I-007	PROJECT DESIGNATION 200-WA-1 Opportunistic sampling - soil		SAF NO. F16-028	AIR QUALITY	
ICE CHEST NO. 6005-430	FIELD LOGBOOK NO. HNF-N-645 4-44	ACTUAL SAMPLE DEPTH 254.72' - 267.22'	COA 300192	METHOD OF SHIPMENT FEDERAL EXPRESS ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 7500		BILL OF LADING / AIR BILL NO. 770835932 6667		
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	None	None	None
		HOLDING TIME 6 Months	6 Months	None	ASAP
		TYPE OF CONTAINER G/P	G/P	Moisture Resistant Cont.	G/P
		NO. OF CONTAINER(S) 1	1	1	1
		VOLUME 250mL	250mL	200g	60mL
		SAMPLE ANALYSIS NA	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	SEE ITEM (3) IN SPECIAL INSTRUCTIONS
			SEE ITEM (4) IN SPECIAL INSTRUCTIONS	SEE ITEM (5) IN SPECIAL INSTRUCTIONS	
SAMPLE NO. B36M14	MATRIX* SOIL	SAMPLE DATE FEB 02 2017	SAMPLE TIME 1204		

415810

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM Jeff Tuckers CHPRC	DATE/TIME FEB 02 2017 1515	RECEIVED BY/STORED IN SSU-1	DATE/TIME FEB 02 2017 1515	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM SSU-1	DATE/TIME FEB 06 2017 0830	RECEIVED BY/STORED IN Lesty What CHPRC Xinyi Wald	DATE/TIME FEB 06 2017 0830		
RELINQUISHED BY/REMOVED FROM Lesty What CHPRC Xinyi Wald	DATE/TIME FEB 06 2017 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME FEB 06 2017 1400		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN Bshley Goodman Muxan 2/7/17 0800	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 2/7/17 0900	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY			
PRINTED ON 8/11/2016	FSR ID = FSR33063	TRVL NUM = TRVL-16-060		A-6003-618 (REV 2)	

20972

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-028-069	PAGE 2 OF 2
COLLECTOR	Jeff Tuckesen CHPRC	COMPANY CONTACT	TODAK, D	TELEPHONE NO.	376-6427
SAMPLING LOCATION	C9567, I-007	PROJECT DESIGNATION	200-WA-1 Opportunistic sampling - soil		
ICE CHEST NO.	6005-430	FIELD LOGBOOK NO.	HNF-N-645	ACTUAL SAMPLE DEPTH	264.73' - 267.22'
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	1520	BILL OF LADING/AIR BILL NO.	7983 5932 6667
SPECIAL INSTRUCTIONS TRVL-16-060 (1) 6020_METALS_ICPMS: COMMON (Add-on) {Uranium}; 9056_ANIONS_IC: COMMON {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Sulfate}; 9056_ANIONS_IC: COMMON (Add-on) {Phosphorus in phosphate}; (2) GAMMA_GS: COMMON; GAMMA_GS: COMMON (Add-on) {Radium-226, Radium-228}; (3) AMCMISO_IE_PRECIP_AEA: COMMON {Americium-241}; C14_LSC: COMMON; I129_SEP_LEPS_GS: COMMON; NI63_LSC: COMMON; PUISO_PLATE_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON; TC99_EIE_LSC: COMMON; THISO_IE_PLATE_AEA: COMMON {Thorium-232}; UIISO_IE_PRECIP_AEA: COMMON; NP237_IE_PRECIP_AEA: COMMON; TRITIUM_DIST_LSC: COMMON; (4) Moisture Content - D2216 {Percent moisture (wet sample)}; (5) 9045_pH (Non-Aqueous): COMMON {pH Measurement};					
METHOD OF SHIPMENT		FEDERAL EXPRESS			
PRICE CODE		8H			
AIR QUALITY		<input type="checkbox"/>			
DATA TURNAROUND		30 Days / 30 Days			
ORIGINAL					



SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>410810</u>
Received By: <u>AG</u>		Date Received: <u>2/7/17</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0cpm</u>
Classified Radioactive II or III by RSO?	<input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) <u>1°C</u> *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR2-17</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: <u>B38CPD 3 of 5 B38CR3 1 of 5</u>
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7783 4236 6930</u> <u>7783 6310 8919</u> <u>7783 85932 6667</u>

Comments (Use Continuation Form if needed):

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 06 March 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	SC000122016-1
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	SC000122016-21
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL415810
Work Order #: 415810

Product: Determination of Metals by ICP-MS
Analytical Method: SW846 3050B/6020B
Analytical Procedure: GL-MA-E-014 REV# 28
Analytical Batch: 1637427

Preparation Method: SW846 3050B
Preparation Procedure: GL-MA-E-009 REV# 26
Preparation Batch: 1637426

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203723522	Method Blank (MB)ICP-MS
1203723523	Laboratory Control Sample (LCS)
1203723526	415810001(B36M14L) Serial Dilution (SD)
1203723524	415810001(B36M14D) Sample Duplicate (DUP)
1203723525	415810001(B36M14S) 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 RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203723524 (B36M14DUP)	Uranium	21.9* (0%-20%)

Technical Information

Sample Dilutions

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

Analyte	415810
	001
Uranium	2X

Certification Statement

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

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: GEL415810 GEL Work Order: 415810

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- D Results are reported from a diluted aliquot of sample.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Review/Validation

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

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

Signature:**Name: Nik-Cole Elmore****Date: 24 FEB 2017****Title: Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL415810

CONTRACT: CPRC0F16028

METHOD TYPE: SW846

SAMPLE ID: 415810001

BASIS: Dry Weight

DATE COLLECTED 02-FEB-17

CLIENT ID: B36M14

LEVEL: Low

DATE RECEIVED 07-FEB-17

MATRIX: SOIL

%SOLIDS: 96.4

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	1270	ug/kg	D*	13.4	40.5	40.5	2	MS	SKJ	02/21/17 12:47	170221-1	1637427

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1637427	1637426	SW846 3050B	0.512	g	50	mL	02/08/17	SXW1

***Analytical Methods:**

MS SW846 3050B/6020B

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: February 24, 2017

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 415810

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1637427										
QC1203723524	415810001	DUP									
Uranium		*D	1270	*D	1020	ug/kg	21.9*	(0%-20%)	SKJ	02/21/17	12:49
QC1203723523	LCS										
Uranium	4930		D	4940	ug/kg		100	(80%-120%)		02/21/17	12:46
QC1203723522	MB										
Uranium			DU	12.1	ug/kg					02/21/17	12:45
QC1203723525	415810001	MS									
Uranium	5110	*D	1270	D	6120	ug/kg	94.9	(75%-125%)		02/21/17	12:50
QC1203723526	415810001	SDILT									
Uranium		*D	6.26	D	1.28	ug/L	1.85	(0%-20%)		02/21/17	12:52

Notes:

The Qualifiers in this report are defined as follows:

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

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QC Summary

Workorder: 415810

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

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL415810
Work Order #: 415810**

Product: Ion Chromatography**Analytical Method:** 9056_ANIONS_IC**Analytical Procedure:** GL-GC-E-086 REV# 25**Analytical Batches:** 1636984 and 1636983

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203722539	Method Blank (MB)
1203722540	Laboratory Control Sample (LCS)
1203722541	415663001(B36M12) Sample Duplicate (DUP)
1203722542	415663001(B36M12) 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**Method Blank (MB) Statement**

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

Sample	Analyte	Value
1203722539 (MB)	Chloride	.764 betw (.72 - 2)

Product: pH**Analytical Method:** SW846 9045D**Analytical Procedure:** GL-GC-E-008 REV# 22**Analytical Batch:** 1639305

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203728194	Laboratory Control Sample (LCS)
1203728196	415663001(B36M12) 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.

Technical Information**Holding Times**

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203728196 (B36M12DUP)	pH	Received 03-FEB-17, out of holding 01-FEB-17
415810001 (B36M14)	pH	Received 07-FEB-17, out of holding 02-FEB-17

Certification Statement

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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL415810 GEL Work Order: 415810

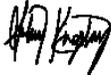
The Qualifiers in this report are defined as follows:

- 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).
- 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.
- 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:** Aubrey Kingsbury**Date:** 21 FEB 2017**Title:** Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 21, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F16-028

Client Sample ID: B36M14 Project: CPRC0F16028
 Sample ID: 415810001 Client ID: CPRC001
 Matrix: SOIL
 Collect Date: 02-FEB-17 12:04
 Receive Date: 07-FEB-17
 Collector: Client
 Moisture: 3.56%

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC:COMMON + (Add-on) "Dry Weight Corrected"												
Chloride	C	2290	743	2060	ug/Kg	9.95	1	MAR1	02/16/17	2307	1636984	1
Fluoride	B	640	351	1030	ug/Kg	9.95	1					
Nitrate-N	B	675	340	1030	ug/Kg	9.95	1					
Nitrite-N	U	340	340	1030	ug/Kg	9.95	1					
Phosphorus in phosphate	U	691	691	2060	ug/Kg	9.95	1					
Sulfate		7080	1370	4130	ug/Kg	9.95	1					

Titration and Ion Analysis

9045_pH (Non-Aqueous):COMMON "As Received"

pH at Temp 19.5C	X	8.66	0.010	0.100	SU		1	RXB5	02/15/17	1706	1639305	2
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The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9056A	SW846 9056A Total Anions in Soil	MAR1	02/16/17	1239	1636983

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9056_ANIONS_IC	
2	SW846 9045D	

Notes:

Column headers are defined as follows:

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

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: February 21, 2017

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 415810

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1636984										
QC1203722541	415663001	DUP									
Chloride	C	3140		2690	ug/Kg	15.5 ^		(+/-2130)	MAR1	02/16/17	22:03
Fluoride	B	770	B	740	ug/Kg	3.93 ^		(+/-1070)			
Nitrate-N	U	353	U	352	ug/Kg	N/A					
Nitrite-N	U	353	U	352	ug/Kg	N/A					
Phosphorus in phosphate	U	716	U	715	ug/Kg	N/A					
Sulfate		4770		4310	ug/Kg	10 ^		(+/-4270)			
QC1203722540	LCS										
Chloride	50000			49800	ug/Kg		99.6	(80%-120%)		02/16/17	21:00
Fluoride	25000			25200	ug/Kg		101	(80%-120%)			
Nitrate-N	25000			25000	ug/Kg		99.9	(80%-120%)			
Nitrite-N	25000			25000	ug/Kg		100	(80%-120%)			
Phosphorus in phosphate	12500			12800	ug/Kg		102	(80%-120%)			
Sulfate	100000			100000	ug/Kg		100	(80%-120%)			
QC1203722539	MB										
Chloride			B	764	ug/Kg					02/16/17	20:28

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QC Summary

Workorder: 415810

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1636984										
Fluoride			U	340	ug/Kg				MAR1	02/16/17	20:28
Nitrate-N			U	330	ug/Kg						
Nitrite-N			U	330	ug/Kg						
Phosphorus in phosphate			U	670	ug/Kg						
Sulfate			U	1330	ug/Kg						
QC1203722542 415663001 MS											
Chloride	53500	C	3140	53100	ug/Kg		93.5	(48%-145%)		02/16/17	22:35
Fluoride	26700	B	770	25000	ug/Kg		90.7	(30%-135%)			
Nitrate-N	26700	U	353	25200	ug/Kg		94.2	(70%-125%)			
Nitrite-N	26700	U	353	26500	ug/Kg		99	(70%-120%)			
Phosphorus in phosphate	13400	U	716	10600	ug/Kg		79.2	(35%-134%)			
Sulfate	107000		4770	107000	ug/Kg		95.7	(45%-162%)			
Titration and Ion Analysis											
Batch	1639305										
QC1203728196 415663001 DUP											
pH		X	8.81	X	8.80	SU	0.114	(0%-30%)	RXB5	02/15/17	17:02
QC1203728194 LCS											
pH	7.00				6.98	SU	99.7	(70%-130%)		02/15/17	16:58

Notes:

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QC Summary

Workorder: 415810

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

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 #: GEL415810
Work Order #: 415810

Product: AMCMISO_EIE_PRECIP_AEA: COMMON

Analytical Method: AMCMISO_EIE_PREC_AEA

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

Analytical Batch: 1640969

Preparation Method: ASTM D 2216 (Modified)

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1637299

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203732358	Method Blank (MB)
1203732359	415810001(B36M14) Sample Duplicate (DUP)
1203732360	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 1203732360 (LCS) was recounted due to high carrier/tracer yield. The recount is reported.

Product: PUIISO_PRECIP_AEA:COMMON

Analytical Method: PUIISO_PRECIP_AEA

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

Analytical Batch: 1640971

Preparation Method: ASTM D 2216 (Modified)

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1637299

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203732364	Method Blank (MB)
1203732365	415810001(B36M14) Sample Duplicate (DUP)
1203732366	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 1203732365 (B36M14DUP) was recounted due to a peak shift. The recount is reported.

Product: THISO_IE_PLATE_AEA: COMMON

Analytical Method: THISO_IE_PRECIP_AEA

Analytical Procedure: GL-RAD-A-038 REV# 17

Analytical Batch: 1640972

Preparation Method: ASTM D 2216 (Modified)

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1637299

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203732367	Method Blank (MB)
1203732368	415810001(B36M14) Sample Duplicate (DUP)
1203732369	Laboratory Control Sample (LCS)

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

Data Summary:

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

Miscellaneous Information

Manual Integration

Manual integration of alpha spectroscopy spectra 1203732367 (MB) was performed to fully separate counts in

Regions of Interest which would have been biased.

Product: UISO_IE_PRECIP_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

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

Analytical Batch: 1640974

Preparation Method: ASTM D 2216 (Modified)

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1637299

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203732370	Method Blank (MB)
1203732371	415810001(B36M14) Sample Duplicate (DUP)
1203732372	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

The batch was recounted due to a blank result greater than the MDA. The recounts are reported with the exception of sample 1203732371(B36M14) which was recounted again due to a peak shift. The third count of 1203732371(B36M14) is being reported.

Product: NP237_IE_PRECIP_AEA: COMMON

Analytical Method: ASTM C 1475-00 Modified

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

Analytical Batch: 1644037

Preparation Method: ASTM D 2216 (Modified)

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1637299

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203739279	Method Blank (MB)
1203739280	415810001(B36M14) Sample Duplicate (DUP)
1203739281	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

Sample Re-prep/Re-analysis

Samples were re-prepped due to high recovery. The re-analysis is being reported.

Product: Dry Weight

Preparation Method: ASTM D 2216 (Modified)

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1637299

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203723209	415810001(B36M14) 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: I129_SEP_LEPS_GS

Analytical Method: I129_SEP_LEPS_GS

Analytical Procedure: GL-RAD-A-006 REV# 21

Analytical Batch: 1636672

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203721629	Method Blank (MB)
1203721630	415663001(B36M12) Sample Duplicate (DUP)
1203721631	415663001(B36M12) Matrix Spike (MS)
1203721632	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 + (Add-on)

Analytical Method: GAMMA_GS

Analytical Procedure: GL-RAD-A-013 REV# 26

Analytical Batch: 1637462

Preparation Method: ASTM D 2216 (Modified)

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1637299

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203723610	Method Blank (MB)
1203723611	415810001(B36M14) Sample Duplicate (DUP)
1203723612	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

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

Analytical Batch: 1639101

Preparation Method: ASTM D 2216 (Modified)

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1637299

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203727726	Method Blank (MB)
1203727727	415663001(B36M12) Sample Duplicate (DUP)
1203727728	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: NI63_LSC

Analytical Method: NI63_LSC

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

Analytical Batch: 1639089

Preparation Method: ASTM D 2216 (Modified)

Preparation Procedure: GL-RAD-A-021 REV# 20

Preparation Batch: 1637299

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203727697	Method Blank (MB)
1203727698	415150001(B36M10) Sample Duplicate (DUP)
1203727699	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.

Quality Control (QC) Information

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203727698 (B36M10DUP), relative error ratio is greater than 2; however, both results are less than their respective MDCs.

Product: TC99_SEP_GPC

Analytical Method: TC99_EIE_LSC

Analytical Procedure: GL-RAD-A-059 REV# 4

Analytical Batch: 1639836

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203729384	Method Blank (MB)
1203729385	415810001(B36M14) Sample Duplicate (DUP)
1203729386	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# 21

Analytical Batch: 1639848

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203729421	Method Blank (MB)
1203729422	415810001(B36M14) Sample Duplicate (DUP)
1203729423	415810001(B36M14) Matrix Spike (MS)
1203729424	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: C14_LSC: COMMON

Analytical Method: C14_LSC

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

Analytical Batch: 1640471

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
415810001	B36M14
1203731057	Method Blank (MB)
1203731058	416919002(NonSDG) Sample Duplicate (DUP)
1203731059	416919002(NonSDG) Matrix Spike (MS)
1203731060	Laboratory Control Sample (LCS)

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

Data Summary:

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

Certification Statement

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

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: GEL415810 GEL Work Order: 415810

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature:**Name: Theresa Austin****Date: 06 MAR 2017****Title: Group Leader**

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL415810	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 415810001	Date Collected: 02/02/2017 12:04	Matrix: SOIL
	Date Received: 02/07/2017 09:00	%Moisture: 3.6
Client ID: B36M14		Prep Basis: "Dry Weight Corrected"
Batch ID: 1640969	Method: AMCMISO_EIE_PREC_AEA	SOP Ref: GL-RAD-A-011
Run Date: 02/23/2017 10:05	Analyst: MXS2	Instrument: 1095
Data File: S0415810001_AM.1A.gcnf	Aliquot: 0.115 g	Count Time: 240 min
Prep Batch: 1640969	Prep Method: DOE EML HASL-300, Am-05	Prep SOP Ref: GL-RAD-A-021
Prep Date: 02/22/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.00228	pCi/g	+/-0.169	0.169	0.375	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	17.3	18.2	pCi/g	95.1	(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.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL415810
 Lab Sample ID: 415810001

Client: CPRC001
 Date Collected: 02/02/2017 12:04
 Date Received: 02/07/2017 09:00

Project: CPRC0F16028
 Matrix: SOIL
 %Moisture: 3.6

Client ID: B36M14
 Batch ID: 1640971
 Run Date: 02/23/2017 10:05
 Data File: S0415810001_PU.1A.gcnf
 Prep Batch: 1640971
 Prep Date: 02/22/2017 00:00

Method: PUIISO_PRECIP_AEA
 Analyst: MXS2
 Aliquot: 0.115 g
 Prep Method: DOE EML HASL-300, Pu-11-

Prep Basis: "Dry Weight Corrected"
 SOP Ref: GL-RAD-A-011
 Instrument: 1099
 Count Time: 240 min
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	-0.0754	pCi/g	+/-0.143	0.143	0.441	1.00
OER-100-70	Plutonium-239/240	U	-0.0578	pCi/g	+/-0.195	0.196	0.507	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	12.6	17.2	pCi/g	73.5	(30%-105%)

Comments:

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

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL415810
Lab Sample ID: 415810001

Client: CPRC001
Date Collected: 02/02/2017 12:04
Date Received: 02/07/2017 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 3.6

Client ID: B36M14
Batch ID: 1640972
Run Date: 02/23/2017 10:06
Data File: S0415810001_TH.1A.gcnf
Prep Batch: 1640972
Prep Date: 02/22/2017 00:00

Method: THISO_IE_PRECIP_AEA
Analyst: MXS2
Aliquot: 0.111 g
Prep Method: DOE EML HASL-300, Th-01-

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-038
Instrument: 1166
Count Time: 240 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
TH-232 <small>7440-29-1</small>	Thorium-232		0.426	pCi/g	+/-0.418	0.424	0.342	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Thorium-229 Tracer	13.5	18.6	pCi/g	72.5	(30%-105%)

Comments:

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

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL415810	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 415810001	Date Collected: 02/02/2017 12:04	Matrix: SOIL
	Date Received: 02/07/2017 09:00	%Moisture: 3.6
Client ID: B36M14		Prep Basis: "Dry Weight Corrected"
Batch ID: 1640974	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 03/02/2017 09:50	Analyst: MXS2	Instrument: 1133
Data File: S0415810001_UU.2A.gcnf	Aliquot: 0.115 g	Count Time: 240 min
Prep Batch: 1640974	Prep Method: DOE EML HASL-300, U-02-R	Prep SOP Ref: GL-RAD-A-021
Prep Date: 02/22/2017 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		1.49	pCi/g	+/-0.719	0.753	0.557	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.173	pCi/g	+/-0.340	0.341	0.471	1.00
7440-61-1	Uranium-238		0.997	pCi/g	+/-0.611	0.629	0.587	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	14.7	18.2	pCi/g	81	(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.

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL415810	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 415810001	Date Collected: 02/02/2017 12:04	Matrix: SOIL
	Date Received: 02/07/2017 09:00	%Moisture: 3.6
Client ID: B36M14		Prep Basis: "Dry Weight Corrected"
Batch ID: 1644037	Method: ASTM C 1475-00 Modified	SOP Ref: GL-RAD-A-032
Run Date: 03/03/2017 09:15	Analyst: MXS2	Instrument: 1103
Data File: S0415810001_NP.3A.gcnf	Aliquot: 0.103 g	Count Time: 239.9998 min
Prep Batch: 1644037	Prep Method: ASTM C 1475-00 Modified	Prep SOP Ref: GL-RAD-A-021
Prep Date: 03/02/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13994-20-2	Neptunium-237	U	0.0327	pCi/g	+/-0.182	0.182	0.349	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	1810	2080	pCi/g	87.2	(30%-105%)

Comments:

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

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL415810	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 415810001	Date Collected: 02/02/2017 12:04	Matrix: SOIL
	Date Received: 02/07/2017 09:00	%Moisture: 3.6
Client ID: B36M14	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "Dry Weight Corrected"
Batch ID: 1639101	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 02/21/2017 15:29	Aliquot: 0.313 g	Instrument: PIC5A
Data File: S1639101.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 90 min
Prep Batch: 1639101		Prep SOP Ref: GL-RAD-A-021
Prep Date: 02/20/2017 11:30		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	1.52	pCi/g	+/-1.17	1.23	1.90	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	5.80	7.75	mg	74.8	(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.

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL415810	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 415810001	Date Collected: 02/02/2017 12:04	Matrix: SOIL
	Date Received: 02/07/2017 09:00	%Moisture: 3.6
Client ID: B36M14		Prep Basis: "As Received"
Batch ID: 1636672	Method: I129_SEP_LEPS_GS	SOP Ref: GL-RAD-A-006
Run Date: 02/15/2017 11:10	Analyst: MJH1	Instrument: GAM21
Data File: I415810001.CNF;1	Aliquot: 0.999 g	Count Time: 120 min
Prep Batch: 1636672	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 02/14/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	-0.0403	pCi/g	+/-0.417	0.418	0.765	2.00

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.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL415810
 Lab Sample ID: 415810001
 Client ID: B36M14
 Batch ID: 1637462
 Run Date: 03/01/2017 06:20
 Data File: G415810001.CNF;1
 Prep Batch: 1637462
 Prep Date: 02/08/2017 00:00

Client: CPRC001
 Date Collected: 02/02/2017 12:04
 Date Received: 02/07/2017 09:00
 Method: GAMMA_GS
 Analyst: RXF2
 Aliquot: 122.304 g
 Prep Method: DOE HASL 300, 4.5.2.3/Ga-01

Project: CPRC0F16028
 Matrix: SOIL
 %Moisture: 3.6
 Prep Basis: "Dry Weight Corrected"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM18
 Count Time: 240 min
 Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.00902	pCi/g	+/-0.0178	0.0178	0.0283	0.100
10198-40-0	Cobalt-60	U	-0.00839	pCi/g	+/-0.0164	0.0168	0.0279	0.100
14683-23-9	Europium-152	U	0.0185	pCi/g	+/-0.0431	0.0439	0.0703	0.100
15585-10-1	Europium-154	U	0.0419	pCi/g	+/-0.0467	0.0504	0.0892	0.100
14391-16-3	Europium-155	U	0.0525	pCi/g	+/-0.0865	0.0866	0.0755	0.100
13982-63-3	Radium-226		0.404	pCi/g	+/-0.0802	0.0821	0.0551	1.00
15262-20-1	Radium-228		0.768	pCi/g	+/-0.127	0.133	0.105	3.00

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.

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL415810
Lab Sample ID: 415810001

Client: CPRC001
Date Collected: 02/02/2017 12:04
Date Received: 02/07/2017 09:00

Project: CPRC0F16028
Matrix: SOIL
%Moisture: 3.6

Client ID: B36M14
Batch ID: 1639089
Run Date: 02/15/2017 18:00
Data File: N1639089.xls
Prep Batch: 1639089
Prep Date: 02/14/2017 10:35

Method: NI63_LSC
Analyst: CXS7
Aliquot: 0.529 g
Prep Method: DOE RESL Ni-1, Modified

Prep Basis: "Dry Weight Corrected"
SOP Ref: GL-RAD-A-022
Instrument: LSCBLUE
Count Time: 30 min
Prep SOP Ref: GL-RAD-A-021

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
NI-63	Nickel-63	U	-1.58	pCi/g	+/-4.65	4.65	8.11	10.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Nickel Carrier	16.8	24.6	mg	68.3	(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.

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL415810	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 415810001	Date Collected: 02/02/2017 12:04	Matrix: SOIL
	Date Received: 02/07/2017 09:00	%Moisture: 3.6
Client ID: B36M14		Prep Basis: "As Received"
Batch ID: 1639836	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 02/21/2017 04:38	Analyst: LXT2	Instrument: LSCBROWN
Data File: E1639836.xls	Aliquot: 1.217 g	Count Time: 15 min
Prep Batch: 1639836	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 02/17/2017 11:17		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-0.818	pCi/g	+/-2.20	2.20	3.91	5.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	42900	45000	CPM	95.3	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL415810	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 415810001	Date Collected: 02/02/2017 12:04	Matrix: SOIL
	Date Received: 02/07/2017 09:00	%Moisture: 3.6
Client ID: B36M14		Prep Basis: "As Received"
Batch ID: 1639848	Method: TRITIUM_DIST_LSC	SOP Ref: GL-RAD-A-002
Run Date: 02/21/2017 15:19	Analyst: TXJ1	Instrument: LSCGOLD
Data File: T1639848.xls	Aliquot: 1.268 g	Count Time: 20 min
Prep Batch: 1639848	Prep Method: EPA 906.0 Modified	
Prep Date: 02/21/2017 11:22		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	6.01	pCi/g	+/-12.6	12.7	22.0	30.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

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.

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL415810	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 415810001	Date Collected: 02/02/2017 12:04	Matrix: SOIL
	Date Received: 02/07/2017 09:00	%Moisture: 3.6
Client ID: B36M14		Prep Basis: "As Received"
Batch ID: 1640471	Method: C14_LSC	SOP Ref: GL-RAD-A-003
Run Date: 02/20/2017 11:51	Analyst: TXJ1	Instrument: LSCBROWN
Data File: C1640471.xls	Aliquot: 0.52 g	Count Time: 40 min
Prep Batch: 1640471	Prep Method: EPA EERF C-01 Modified	
Prep Date: 02/20/2017 11:12		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	0.579	pCi/g	+/-2.35	2.35	4.00	5.00

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.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL415810	Client: CPRC001	Project: CPRC0F16028
Lab Sample ID: 415810001	Date Collected: 02/02/2017 12:04	Matrix: SOIL
	Date Received: 02/07/2017 09:00	%Moisture: 3.6
Client ID: B36M14		Prep Basis: "As Received"
Batch ID: 1637299	Method: ASTM D 2216 (Modified)	SOP Ref: GL-OA-E-020
Run Date: 02/07/2017 15:40	Analyst: CXC1	Instrument: SP-39020004
Data File:		Count Time:
Prep Batch: 1637299		
Prep Date: 02/07/2017 15:40		

CAS No.	Parmname	Qual	Result	Units	MDC	
%MOISTURE	Moisture		3.56	percent +/-		
Surrogate/Tracer recovery		Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: March 6, 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: 415810

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1640969								
QC1203732358	MB								
Americium-241			U	0.147	pCi/g			MXS2	02/23/1710:05
				Uncert: +/-0.292					
				TPU: +/-0.293					
**Americium-243 Tracer	18.2			12.8	pCi/g	REC: 70	(30%-105%)		
				Uncert: +/-2.24					
				TPU: +/-3.40					
QC1203732359	415810001	DUP							
Americium-241		U	0.00228	U	0.117	pCi/g			
				Uncert: +/-0.169		RPD: 0	N/A		
				TPU: +/-0.169		RER: 0.781	(0-2)		
**Americium-243 Tracer	20.0		17.3	17.8	pCi/g	REC: 89	(30%-105%)		
				Uncert: +/-1.99					
				TPU: +/-3.07					
QC1203732360	LCS								
Americium-241				17.1	pCi/g	REC: 105	(80%-120%)		03/02/1716:12
				Uncert: +/-2.10					
				TPU: +/-3.18					
**Americium-243 Tracer	18.2			15.2	pCi/g	REC: 83	(30%-105%)		
				Uncert: +/-2.10					
				TPU: +/-3.21					
Batch	1640971								
QC1203732364	MB								
Plutonium-238			U	0.00244	pCi/g			MXS2	02/23/1710:05
				Uncert: +/-0.181					
				TPU: +/-0.181					
Plutonium-239/240			U	0.066	pCi/g				
				Uncert: +/-0.254					
				TPU: +/-0.255					
**Plutonium-242 Tracer	17.2			16.3	pCi/g	REC: 95	(30%-105%)		
				Uncert: +/-2.02					
				TPU: +/-3.02					
QC1203732365	415810001	DUP							
Plutonium-238		U	-0.0754	U	-0.126	pCi/g			03/02/1716:12
				Uncert: +/-0.143		RPD: 0	N/A		
				TPU: +/-0.143		RER: 0.431	(0-2)		
Plutonium-239/240		U	-0.0578	U	-0.0538	pCi/g			
				Uncert: +/-0.195		RPD: 0	N/A		
				TPU: +/-0.196		RER: 0.0309	(0-2)		
**Plutonium-242 Tracer	18.8		12.6	13.9	pCi/g	REC: 74	(30%-105%)		
				Uncert: +/-2.05					
				TPU: +/-3.06					
QC1203732366	LCS								
Plutonium-238			U	-0.0167	pCi/g				02/23/1710:05
				Uncert: +/-0.144					

GEL LABORATORIES LLC

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QC Summary

Workorder: 415810

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch		1640971							
Plutonium-239/240	17.2	TPU:		+/-0.144					
		Uncert:		19.8	pCi/g	REC: 115	(80%-120%)		
		TPU:		+/-2.31					
**Plutonium-242 Tracer	17.2	TPU:		+/-3.57					
		Uncert:		12.5	pCi/g	REC: 73	(30%-105%)		
		TPU:		+/-2.15					
		TPU:		+/-3.19					
Batch		1640972							
QC1203732367	MB								
Thorium-232			U	0.324	pCi/g			MXS2	02/23/1710:06
		Uncert:		+/-0.390					
		TPU:		+/-0.394					
**Thorium-229 Tracer	18.6			14.0	pCi/g	REC: 75	(30%-105%)		
		Uncert:		+/-2.53					
		TPU:		+/-3.95					
QC1203732368	415810001	DUP							
Thorium-232		0.426		0.563	pCi/g				02/23/1710:06
		Uncert:	+/-0.418	+/-0.495		RPD: 28	(0% - 100%)		
		TPU:	+/-0.424	+/-0.504		RER: 0.409	(0-2)		
**Thorium-229 Tracer	19.0	13.5		14.1	pCi/g	REC: 75	(30%-105%)		
		Uncert:	+/-2.51	+/-2.65					
		TPU:	+/-3.92	+/-4.11					
QC1203732369	LCS								
Thorium-232		17.9		17.6	pCi/g	REC: 99	(80%-120%)		02/23/1710:06
		Uncert:		+/-2.21					
		TPU:		+/-3.47					
**Thorium-229 Tracer	18.6			17.0	pCi/g	REC: 91	(30%-105%)		
		Uncert:		+/-2.28					
		TPU:		+/-3.63					
Batch		1640974							
QC1203732370	MB								
Uranium-233/234			U	0.369	pCi/g			MXS2	03/02/1709:50
		Uncert:		+/-0.351					
		TPU:		+/-0.355					
Uranium-235/236			U	0.126	pCi/g				
		Uncert:		+/-0.288					
		TPU:		+/-0.289					
Uranium-238			U	0.168	pCi/g				
		Uncert:		+/-0.268					
		TPU:		+/-0.269					
**Uranium-232 Tracer	18.2			17.2	pCi/g	REC: 94	(30%-105%)		
		Uncert:		+/-2.17					
		TPU:		+/-3.35					
QC1203732371	415810001	DUP							
Uranium-233/234		1.49		0.896	pCi/g				03/02/1714:34
		Uncert:	+/-0.719	+/-0.594		RPD: 50	(0% - 100%)		
		TPU:	+/-0.753	+/-0.609		RER: 1.21	(0-2)		
Uranium-235/236		U	0.173	U	0.078	pCi/g			
		Uncert:	+/-0.340	+/-0.292		RPD: 0	N/A		
		TPU:	+/-0.341	+/-0.293		RER: 0.414	(0-2)		

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1640974								
Uranium-238		0.997		1.37	pCi/g				
		Uncert:	+/-0.611	+/-0.717		RPD:	32 (0% - 100%)		
		TPU:	+/-0.629	+/-0.745		RER:	0.758 (0-2)		
**Uranium-232 Tracer	19.9	14.7		16.9	pCi/g	REC:	85 (30%-105%)		
		Uncert:	+/-2.38	+/-2.54					
		TPU:	+/-3.62	+/-3.89					
QC1203732372	LCS								
Uranium-233/234				22.6	pCi/g				03/02/1709:50
		Uncert:		+/-2.65					
		TPU:		+/-4.32					
Uranium-235/236				2.59	pCi/g				
		Uncert:		+/-1.02					
		TPU:		+/-1.09					
Uranium-238	23.4			21.8	pCi/g	REC:	93 (80%-120%)		
		Uncert:		+/-2.60					
		TPU:		+/-4.20					
**Uranium-232 Tracer	18.2			14.7	pCi/g	REC:	81 (30%-105%)		
		Uncert:		+/-2.39					
		TPU:		+/-3.64					
Batch	1644037								
QC1203739279	MB								
Neptunium-237			U	0.0221	pCi/g			MXS2	03/03/1709:15
		Uncert:		+/-0.260					
		TPU:		+/-0.260					
**Americium-243 Tracer	2040			1800	pCi/g	REC:	89 (30%-105%)		
QC1203739280	415810001	DUP							
Neptunium-237		U	0.0327	U	-0.00851	pCi/g			
		Uncert:	+/-0.182	+/-0.197		RPD:	0 N/A		
		TPU:	+/-0.182	+/-0.197		RER:	0.301 (0-2)		
**Americium-243 Tracer	2040		1810		1990	pCi/g	REC:	98 (30%-105%)	
QC1203739281	LCS								
Neptunium-237					48.0	pCi/g	REC:	113 (80%-120%)	
		Uncert:		+/-3.27					
		TPU:		+/-6.15					
**Americium-243 Tracer	2040				1960	pCi/g	REC:	96 (30%-105%)	
Rad Gamma Spec									
Batch	1636672								
QC1203721629	MB								
Iodine-129			U	-0.28	pCi/g			MJH1	02/15/1714:04
		Uncert:		+/-0.501					
		TPU:		+/-0.517					
QC1203721630	415663001	DUP							
Iodine-129		U	-0.275	U	0.190	pCi/g			02/15/1714:05
		Uncert:	+/-0.362	+/-0.484		RPD:	0 N/A		
		TPU:	+/-0.383	+/-0.492		RER:	1.46 (0-2)		
QC1203721631	415663001	MS							
Iodine-129		41.2	U	-0.275		31.5	pCi/g	REC:	77 (75%-125%)
		Uncert:		+/-0.362		+/-2.36			
		TPU:		+/-0.383		+/-3.93			
QC1203721632	LCS								

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1636672								
Iodine-129	41.2			41.7	pCi/g	REC: 101	(80%-120%)		
	Uncert:			+/-2.51					
	TPU:			+/-4.83					
Batch	1637462								
QC1203723610	MB								
Cesium-137			U	-0.0151	pCi/g			RXF2	03/01/1706:21
	Uncert:			+/-0.0165					
	TPU:			+/-0.0178					
Cobalt-60			U	-0.00696	pCi/g				
	Uncert:			+/-0.0151					
	TPU:			+/-0.0154					
Europium-152			U	-0.00419	pCi/g				
	Uncert:			+/-0.0295					
	TPU:			+/-0.0296					
Europium-154			U	-0.0104	pCi/g				
	Uncert:			+/-0.0258					
	TPU:			+/-0.0262					
Europium-155			U	0.0161	pCi/g				
	Uncert:			+/-0.0245					
	TPU:			+/-0.0256					
Radium-226			U	-0.0474	pCi/g				
	Uncert:			+/-0.0348					
	TPU:			+/-0.0409					
Radium-228			U	-0.0177	pCi/g				
	Uncert:			+/-0.0621					
	TPU:			+/-0.0626					
QC1203723611	415810001	DUP							
Cesium-137		U 0.00902	U	0.00328	pCi/g				03/01/1710:43
	Uncert:	+/-0.0178		+/-0.0194		RPD: 0	N/A		
	TPU:	+/-0.0178		+/-0.0195		RER: 0.426	(0-2)		
Cobalt-60		U -0.00839	U	-0.0111	pCi/g				
	Uncert:	+/-0.0164		+/-0.0185		RPD: 0	N/A		
	TPU:	+/-0.0168		+/-0.0192		RER: 0.207	(0-2)		
Europium-152		U 0.0185	U	-0.0418	pCi/g				
	Uncert:	+/-0.0431		+/-0.0401		RPD: 0	N/A		
	TPU:	+/-0.0439		+/-0.0443		RER: 1.9	(0-2)		
Europium-154		U 0.0419	U	-0.0142	pCi/g				
	Uncert:	+/-0.0467		+/-0.0499		RPD: 0	N/A		
	TPU:	+/-0.0504		+/-0.0503		RER: 1.54	(0-2)		
Europium-155		U 0.0525	U	0.0289	pCi/g				
	Uncert:	+/-0.0865		+/-0.0408		RPD: 0	N/A		
	TPU:	+/-0.0866		+/-0.0429		RER: 0.478	(0-2)		
Radium-226		0.404		0.433	pCi/g				
	Uncert:	+/-0.0802		+/-0.0812		RPD: 7	(0% - 20%)		
	TPU:	+/-0.0821		+/-0.0833		RER: 0.484	(0-2)		
Radium-228		0.768		0.673	pCi/g				
	Uncert:	+/-0.127		+/-0.159		RPD: 13	(0% - 20%)		
	TPU:	+/-0.133		+/-0.163		RER: 0.888	(0-2)		
QC1203723612	LCS								
Americium-241	489			577	pCi/g	REC: 118	(80%-120%)		03/01/1707:22

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1637462								
				Uncert:					
				TPU:					
Cesium-137	178			178	pCi/g	REC: 100	(80%-120%)		
				Uncert:					
				TPU:					
Cobalt-60	153			156	pCi/g	REC: 102	(80%-120%)		
				Uncert:					
				TPU:					
Europium-152			U	-0.168	pCi/g				
				Uncert:					
				TPU:					
Europium-154			U	-0.289	pCi/g				
				Uncert:					
				TPU:					
Europium-155			U	-0.50	pCi/g				
				Uncert:					
				TPU:					
Radium-226			U	-0.777	pCi/g				
				Uncert:					
				TPU:					
Radium-228			U	-2.64	pCi/g				
				Uncert:					
				TPU:					
Rad Gas Flow									
Batch	1639101								
QC1203727726	MB								
Total Strontium			U	-4.37	pCi/g			KSD1	02/21/1715:28
				Uncert:					
				TPU:					
**Strontium Carrier	7.75			6.40	mg	REC: 83	(40%-110%)		
QC1203727727	415663001	DUP							
Total Strontium		U	0.571	U	0.763				02/21/1715:29
			Uncert:	+/-1.12		RPD: 0	N/A		
			TPU:	+/-1.13		RER: 0.232	(0-2)		
**Strontium Carrier	7.75	5.50		5.00	mg	REC: 65	(40%-110%)		
QC1203727728	LCS								
Total Strontium	68.6			65.3	pCi/g	REC: 95	(80%-120%)		02/21/1715:29
				Uncert:					
				TPU:					
**Strontium Carrier	7.75			6.40	mg	REC: 83	(40%-110%)		
Rad Liquid Scintillation									
Batch	1639089								
QC1203727697	MB								
Nickel-63			U	-4.29	pCi/g			CXS7	02/15/1718:32
				Uncert:					
				TPU:					
**Nickel Carrier	24.6			15.3	mg	REC: 62	(40%-110%)		
QC1203727698	415150001	DUP							
Nickel-63		U	-5.83	U	3.15				02/15/1719:04

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1639089								
		Uncert:	+/-4.70	+/-4.72					
		TPU:	+/-4.70	+/-4.76		RPD: 0	N/A		
						RER: 2.63	(0-2)		
**Nickel Carrier	24.6	15.7		17.2	mg	REC: 70	(40%-110%)		
QC1203727699	LCS								
Nickel-63	204			198	pCi/g	REC: 97	(80%-120%)		02/15/1719:37
		Uncert:		+/-8.03					
		TPU:		+/-37.4					
**Nickel Carrier	24.6			16.1	mg	REC: 66	(40%-110%)		
Batch	1639836								
QC1203729384	MB								
Technetium-99			U	-0.318	pCi/g			LXT2	02/21/1704:54
		Uncert:		+/-2.19					
		TPU:		+/-2.19					
**Technetium-99m Tracer	45000			42800	CPM	REC: 95	(30%-105%)		
QC1203729385	415810001	DUP							
Technetium-99		U	-0.818	U	-0.539	pCi/g			02/21/1705:10
		Uncert:	+/-2.20	+/-2.18		RPD: 0	N/A		
		TPU:	+/-2.20	+/-2.18		RER: 0.176	(0-2)		
**Technetium-99m Tracer	45000	42900		43000	CPM	REC: 95	(30%-105%)		
QC1203729386	LCS								
Technetium-99	69.9			67.3	pCi/g	REC: 96	(80%-120%)		02/21/1705:27
		Uncert:		+/-4.15					
		TPU:		+/-8.78					
**Technetium-99m Tracer	45000			43400	CPM	REC: 96	(30%-105%)		
Batch	1639848								
QC1203729421	MB								
Tritium			U	0.460	pCi/g			TXJ1	02/21/1715:40
		Uncert:		+/-11.6					
		TPU:		+/-11.6					
QC1203729422	415810001	DUP							
Tritium		U	6.01	U	3.80	pCi/g			02/21/1716:02
		Uncert:	+/-12.6	+/-13.4		RPD: 0	N/A		
		TPU:	+/-12.7	+/-13.4		RER: 0.235	(0-2)		
QC1203729423	415810001	MS							
Tritium	90.4	U	6.01		75.6	pCi/g	REC: 84	(75%-125%)	02/21/1716:23
		Uncert:	+/-12.6	+/-17.7					
		TPU:	+/-12.7	+/-24.7					
QC1203729424	LCS								
Tritium	89.8			76.3	pCi/g	REC: 85	(80%-120%)		02/21/1716:45
		Uncert:		+/-17.8					
		TPU:		+/-24.9					
Batch	1640471								
QC1203731057	MB								
Carbon-14			U	-1.3	pCi/g			TXJ1	02/20/1713:57
		Uncert:		+/-2.27					
		TPU:		+/-2.27					
QC1203731058	416919002	DUP							
Carbon-14		U	0.831	U	1.72	pCi/g			02/20/1714:39

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1640471									
		Uncert:	+/-2.32	+/-2.38						
		TPU:	+/-2.32	+/-2.39		RPD: 0	N/A			
						RER: 0.523	(0-2)			
QC1203731059	416919002	MS								
Carbon-14	144	U	0.831	141	pCi/g	REC: 98	(75%-125%)		02/20/1715:21	
		Uncert:	+/-2.32	+/-4.55						
		TPU:	+/-2.32	+/-11.3						
QC1203731060	LCS									
Carbon-14	142			136	pCi/g	REC: 96	(80%-120%)		02/20/1716:02	
		Uncert:		+/-4.46						
		TPU:		+/-11.0						

Notes:

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

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- < 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.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- UX Gamma Spectroscopy--Uncertain identification
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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

** Indicates analyte is a surrogate compound.

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

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

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