



July 19, 2017

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

Re: CHPRC SAF F16-036  
Work Order: 425895  
SDG: GEL425895

Dear Mr. Fitzgerald:

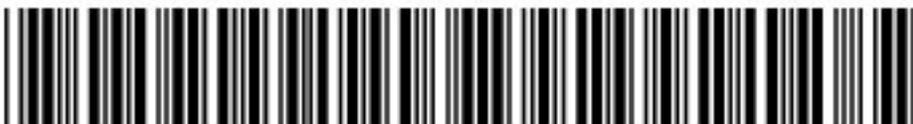
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 21, 2017. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

*B Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Purchase Order: 300085 - 7H  
Chain of Custody: F16-036-087, F16-036-090, F16-036-092 and F16-036-095  
Enclosures



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# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F16-036  
SDG: GEL425895**

**July 19, 2017**

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 21, 2017, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

**Sample Identification**

The laboratory received the following samples:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
425895001	B39J00
425895002	B39J03
425895003	B39J05
425895004	B39J08

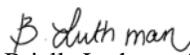
**Case Narrative**

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: Metals and Radiochemistry.

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

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL425895**  
**Work Order #: 425895**

## **Metals**

### **Determination of Metals by ICP**

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

### **Calibration Information**

#### **CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 425895001 (B39J00) and 425895003 (B39J05).

## **Radiochemistry**

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

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

### **Quality Control (QC) Information**

#### **QC Information**

The sample and the duplicate, 1203820137 (B39J03DUP) and 425895002 (B39J03), did not meet the relative percent difference requirement for U-238; however, they do meet the relative error ratio requirement with a value of 1.16.

### **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\_EIE\_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.

#### **Quality Control (QC) Information**

##### **QC Information**

The sample and the duplicate, 1203822883 (B39J03DUP) and 425895002 (B39J03), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with a value of 1.48.

#### **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.

#### **Quality Control (QC) Information**

##### **QC Information**

The Matrix Spike 1203832967 (B39J08MS) did not meet recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

##### **RDL Met**

The blank, 1203832965 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

#### **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**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

CH2M Hill Plateau Remediation Company

COLLECTOR: CHRIS FULTON  
SAMPLING LOCATION: C9711, I-012  
ICE CHEST NO.: GWS-571  
SHIPPED TO: GEL Laboratories, LLC

COMPANY CONTACT: TODAYAK, D  
TELEPHONE NO.: 376-6427  
PROJECT COORDINATOR: TODAYAK, D  
PROJECT DESIGNATION: 100-KR-4 Long Term & Interim Action Monitoring - Water  
FIELD LOGBOOK NO.: HNF-N-645-4  
OFFSITE PROPERTY NO.: 8068

PRICE CODE: 7H  
AIR QUALITY:   
METHOD OF SHIPMENT: FEDERAL EXPRESS

DATE: JUN 19 2017  
TIME: 1415

ACTUAL SAMPLE DEPTH: 96.0  
BILL OF LADING/AIR BILL NO.: 779445285380

PAGE 1 OF 1  
DATA TURNAROUND: 30 Days / 30 Days  
ORIGINAL

425895

MATRIX*	PRESERVATION	HNO3 to pH
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	HOLDING TIME: 6 Months TYPE OF CONTAINER: 2.6 NO. OF CONTAINER(S): 1 VOLUME: 500ml	<2
SPECIAL HANDLING AND/OR STORAGE: NA	SAMPLE ANALYSIS: SEE ITEM (1) IN SPECIAL INSTRUCTIONS	

FILTER

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM: CHRIS FULTON	SSO	SSO	JUN 19 2017 1335	TRVL-17-101 (1) 6010_METALS_ICP: COMMON {Antimony, Calcium, Chromium, Magnesium, Nickel, Potassium, Vanadium, Zinc};  <b>FILTER</b>
RELINQUISHED BY/REMOVED FROM: CHRIS FULTON	SSO	Christina Aguilera	JUN 20 2017 0700	
RELINQUISHED BY/REMOVED FROM: CHRIS FULTON	SSO	PEDEX	JUN 20 2017 1400	
RELINQUISHED BY/REMOVED FROM: CHRIS FULTON	SSO	PEDEX	JUN 20 2017 1400	
RELINQUISHED BY/REMOVED FROM: FLD EX		PEDEX	6/21/17 10:50	
RELINQUISHED BY/REMOVED FROM: FLD EX		PEDEX	6/21/17 10:50	
RELINQUISHED BY/REMOVED FROM: FLD EX		PEDEX	6/21/17 10:50	
RELINQUISHED BY/REMOVED FROM: FLD EX		PEDEX	6/21/17 10:50	

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

CH2MHill Plateau Remediation Company

COLLECTOR: CHRIS FULTON  
CHPRC

SAMPLING LOCATION: C9711, I-012

ICE CHEST NO.: 6WS-571

SHIPPED TO: GEL Laboratories, LLC

COMPANY CONTACT: TODAYAK, D

TELEPHONE NO.: 376-6427

PROJECT COORDINATOR: TODAYAK, D

PROJECT DESIGNATION: 100-KR-4 Long Term & Interim Action Monitoring - Water

FIELD LOGBOOK NO.: HNFN-645-y

ACTUAL SAMPLE DEPTH: 96.0'

OFFSITE PROPERTY NO.: 80CB

PRICE CODE: 7H

AIR QUALITY:

METHOD OF SHIPMENT: FEDERAL EXPRESS

F16-036-090

PAGE 1 OF 1

DATA TURNAROUND: 30 Days / 30 Days

ORIGINAL

779445285380

425895

MATRIX*	None	HN03 to pH
PRESERVATION	6 Months	<2
HOLDING TIME	P	6 Months
TYPE OF CONTAINER	1	G/P
NO. OF CONTAINER(S)	500mL	2
VOLUME	TRITIUM_DIST LSC COMMON;	1L
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	
SPECIAL HANDLING AND/OR STORAGE	NA	
SAMPLE NO.:	B39J03	
MATRIX*:	WATER	
SAMPLE DATE:	JUN 19 2017	
SAMPLE TIME:	1415	

CHAIN OF POSSESSION	SIGN / PRINT NAMES	RECEIVED BY / STORED IN	DATE / TIME	SPECIAL INSTRUCTIONS
RELINQUISHED BY / REMOVED FROM: CHRIS FULTON		SSU-1	JUN 19 2017 1525	TRVL-17-101
RELINQUISHED BY / REMOVED FROM: SSU-1		PEDEX	JUN 20 2017 0700	(1) SRTOT_SEP_PRECIP_GPC: COMMON; TC99_EIE_LSC: COMMON;
RELINQUISHED BY / REMOVED FROM: SSU-1		SSU-1	JUN 20 2017 1400	UIISO_IE_PRECIP_AEA: COMMON;
RELINQUISHED BY / REMOVED FROM: SSU-1		FED EX		
RELINQUISHED BY / REMOVED FROM: SSU-1		SSU-1		
RELINQUISHED BY / REMOVED FROM: SSU-1		SSU-1		
RELINQUISHED BY / REMOVED FROM: SSU-1		SSU-1		
RELINQUISHED BY / REMOVED FROM: SSU-1		SSU-1		
RELINQUISHED BY / REMOVED FROM: SSU-1		SSU-1		
LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME	
PRINTED ON 3/28/2017	FSR ID = FSR43442	TRVL NUM = TRVL-17-101		A-6003-618 (REV 2)

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

CH2M Hill Plateau Remediation Company

COLLECTOR: CHRIS FULTON / CHPRC

SAMPLING LOCATION: C9711, I-012 DUP

ICE CHEST NO.: CWS-571

SHIPPED TO: GEL Laboratories, LLC

COMPANY CONTACT: TODAYK, D

TELEPHONE NO.: 376-6427

PROJECT COORDINATOR: TODAYK, D

PRICE CODE: 7H

DATA TURNAROUND: 30 Days / 30 Days

PROJECT DESIGNATION: 100-KR-4 Long Term & Interim Action Monitoring - Water

SAF NO.: F16-036

AIR QUALITY:

FEDERAL EXPRESS

FIELD LOGBOOK NO.: HNF-N-645-4

ACTUAL SAMPLE DEPTH: 96.0

COA: 300085

METHOD OF SHIPMENT: ORIGINAL

OFFSITE PROPERTY NO.: 8068

BILL OF LADING/AIR BILL NO.: 779445285380

F16-036-092

PAGE 1 OF 1

425895

MATRIX*	PRESERVATION	HNO3 to pH
A=Air		<2
DL=Drum		6 Months
Liquids		96% CA
DS=Drum		2-6
Solids		6.20-17
L=Liquid		1
O=Oil		500ml
S=Soil		SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SE=Sediment		
T=Tissue		
V=Vegetation		
W=Water		
WI=Wipe		
X=Other		

SPECIAL HANDLING AND/OR STORAGE	SAMPLE ANALYSIS
NA	

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B39J05	WATER	JUN 19 2017	1415

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM: CHRIS FULTON / CHPRC		SSU-1	JUN 19 2017 1525
RELINQUISHED BY/REMOVED FROM: CHRIS FULTON / CHPRC		Canada AgriStar / CHPRC	JUN 20 2017 0700
RELINQUISHED BY/REMOVED FROM: CHRIS FULTON / CHPRC		FEDEX	JUN 20 2017 0700
RELINQUISHED BY/REMOVED FROM: CHRIS FULTON / CHPRC		KA - STACY BOONS	6-21-17 8:50

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM			
RELINQUISHED BY/REMOVED FROM			
RELINQUISHED BY/REMOVED FROM			

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM			
RELINQUISHED BY/REMOVED FROM			

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
11			

FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DATE/TIME
18		

SPECIAL INSTRUCTIONS

TRVL-17-101  
 (1) 6010\_METALS\_ICP: COMMON {Antimony, Calcium, Chromium, Magnesium, Nickel, Potassium, Vanadium, Zinc};

FILTER





SAMPLE RECEIPT & REVIEW FORM

Client: <b>CPRC</b>		SDG/AR/COC/Work Order: <b>425895</b>		
Received By: <b>Stacy Boon</b>		Date Received: <b>21-JUNE-17</b>		
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 <b>7794 4528 5380 - 1c</b> <b>7794 4904 4622 - 1c</b> <b>7794 5002 9825 - 1c</b>		
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____	
COC/Samples marked or classified as radioactive?		<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?		<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____	
Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 < 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Wet Ice</u> Ice Packs Dry Ice None Other: _____ *all temperatures are recorded in Celsius TEMP: _____
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <b>183-17</b> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No <input checked="" type="checkbox"/> N/A (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> No ___ N/A Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected: _____
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials DS Date 6/21/17 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 19 July 2017

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

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**CH2M Hill Plateau Remediation Company (CPRC)**  
**SDG #: GEL425895**  
**Work Order #: 425895**

**Product: Determination of Metals by ICP****Analytical Method:** SW846 3005A/6010D**Analytical Procedure:** GL-MA-E-013 REV# 28**Analytical Batch:** 1676133**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batch:** 1676132

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425895001	B39J00
425895003	B39J05
1203816395	Method Blank (MB)ICP
1203816396	Laboratory Control Sample (LCS)
1203816399	425895001(B39J00L) Serial Dilution (SD)
1203816397	425895001(B39J00S) Matrix Spike (MS)
1203816398	425895001(B39J00SD) Matrix Spike Duplicate (MSD)

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.

**Calibration Information****CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 425895001 (B39J00) and 425895003 (B39J05).

**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: GEL425895 GEL Work Order: 425895

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

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

**Review/Validation**

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

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

**Signature:** **Name: Nik-Cole Elmore****Date: 10 JUL 2017****Title: Data Validator**

# Sample Data Summary

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

**SDG No:** GEL425895

**CONTRACT:** CPRC0F16036

**METHOD TYPE:** SW846

**SAMPLE ID:**425895001

**BASIS:** As Received

**DATE COLLECTED** 19-JUN-17

**CLIENT ID:** B39J00

**LEVEL:** Low

**DATE RECEIVED** 21-JUN-17

**MATRIX:** WATER

**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	3.5	ug/L	U	3.5	10	10	1	P	JWJ	06/24/17 00:57	062317A-1	1676133
7440-70-2	Calcium	46100	ug/L		50	200	200	1	P	JWJ	06/24/17 00:57	062317A-1	1676133
7440-47-3	Chromium	4.74	ug/L	B	1	5	5	1	P	JWJ	06/24/17 00:57	062317A-1	1676133
7439-95-4	Magnesium	11400	ug/L		110	300	300	1	P	JWJ	06/24/17 00:57	062317A-1	1676133
7440-02-0	Nickel	1.59	ug/L	B	1.5	5	5	1	P	JWJ	06/24/17 00:57	062317A-1	1676133
7440-09-7	Potassium	6700	ug/L		50	150	150	1	P	JWJ	06/24/17 00:57	062317A-1	1676133
7440-62-2	Vanadium	6.77	ug/L		1	5	5	1	P	JWJ	06/24/17 00:57	062317A-1	1676133
7440-66-6	Zinc	19.7	ug/L		3.3	10	10	1	P	JWJ	06/24/17 00:57	062317A-1	1676133

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1676133	1676132	SW846 3005A	50	mL	50	mL	06/21/17	CXW4

**\*Analytical Methods:**

P SW846 3005A/6010D

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

**SDG No:** GEL425895

**CONTRACT:** CPRC0F16036

**METHOD TYPE:** SW846

**SAMPLE ID:**425895003

**BASIS:** As Received

**DATE COLLECTED** 19-JUN-17

**CLIENT ID:** B39J05

**LEVEL:** Low

**DATE RECEIVED** 21-JUN-17

**MATRIX:** WATER

**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	5.69	ug/L	B	3.5	10	10	1	P	JWJ	06/24/17 01:10	062317A-1	1676133
7440-70-2	Calcium	44100	ug/L		50	200	200	1	P	JWJ	06/24/17 01:10	062317A-1	1676133
7440-47-3	Chromium	3.77	ug/L	B	1	5	5	1	P	JWJ	06/24/17 01:10	062317A-1	1676133
7439-95-4	Magnesium	11000	ug/L		110	300	300	1	P	JWJ	06/24/17 01:10	062317A-1	1676133
7440-02-0	Nickel	1.62	ug/L	B	1.5	5	5	1	P	JWJ	06/24/17 01:10	062317A-1	1676133
7440-09-7	Potassium	6340	ug/L		50	150	150	1	P	JWJ	06/24/17 01:10	062317A-1	1676133
7440-62-2	Vanadium	6.55	ug/L		1	5	5	1	P	JWJ	06/24/17 01:10	062317A-1	1676133
7440-66-6	Zinc	15.4	ug/L		3.3	10	10	1	P	JWJ	06/24/17 01:10	062317A-1	1676133

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1676133	1676132	SW846 3005A	50	mL	50	mL	06/21/17	CXW4

**\*Analytical Methods:**

P SW846 3005A/6010D

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: July 10, 2017

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 425895

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1676133										
QC1203816396	LCS										
Antimony	500			459	ug/L		91.8	(80%-120%)	JWJ	06/24/17	00:54
Calcium	5000			4950	ug/L		99	(80%-120%)			
Chromium	500			461	ug/L		92.2	(80%-120%)			
Magnesium	5000			5020	ug/L		100	(80%-120%)			
Nickel	500			464	ug/L		92.9	(80%-120%)			
Potassium	5000			5110	ug/L		102	(80%-120%)			
Vanadium	500			459	ug/L		91.9	(80%-120%)			
Zinc	500			442	ug/L		88.5	(80%-120%)			
QC1203816395	MB										
Antimony			U	3.50	ug/L					06/24/17	00:51
Calcium			U	50.0	ug/L						
Chromium			U	1.00	ug/L						
Magnesium			U	110	ug/L						
Nickel			U	1.50	ug/L						

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 425895

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1676133										
Potassium			U	50.0	ug/L				JWJ	06/24/17	00:51
Vanadium			U	1.00	ug/L						
Zinc			U	3.30	ug/L						
QC1203816397 425895001 MS											
Antimony	500	U	3.50	479	ug/L		95.9	(75%-125%)		06/24/17	01:00
Calcium	5000		46100	48600	ug/L		N/A	(75%-125%)			
Chromium	500	B	4.74	482	ug/L		95.6	(75%-125%)			
Magnesium	5000		11400	15500	ug/L		82.3	(75%-125%)			
Nickel	500	B	1.59	473	ug/L		94.2	(75%-125%)			
Potassium	5000		6700	10800	ug/L		83	(75%-125%)			
Vanadium	500		6.77	492	ug/L		97	(75%-125%)			
Zinc	500		19.7	475	ug/L		91	(75%-125%)			
QC1203816398 425895001 MSD											
Antimony	500	U	3.50	478	ug/L	0.261	95.6	(0%-20%)		06/24/17	01:03
Calcium	5000		46100	48300	ug/L	0.57	N/A	(0%-20%)			
Chromium	500	B	4.74	481	ug/L	0.399	95.2	(0%-20%)			
Magnesium	5000		11400	15400	ug/L	0.666	80.3	(0%-20%)			

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 425895

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1676133										
Nickel	500	B	1.59	474	ug/L	0.169	94.4	(0%-20%)	JWJ	06/24/17	01:03
Potassium	5000		6700	10900	ug/L	0.0829	83.1	(0%-20%)			
Vanadium	500		6.77	488	ug/L	0.726	96.3	(0%-20%)			
Zinc	500		19.7	476	ug/L	0.273	91.3	(0%-20%)			
QC1203816399	425895001	SDILT									
Antimony		U	0.0173	BD	-3.62	ug/L	N/A	(0%-20%)		06/24/17	01:06
Calcium			46100	D	10300	ug/L	12.3	(0%-20%)			
Chromium		B	4.74	BD	1.19	ug/L	25.5	(0%-20%)			
Magnesium			11400	D	2600	ug/L	13.8	(0%-20%)			
Nickel		B	1.59	DU	7.50	ug/L	N/A	(0%-20%)			
Potassium			6700	D	1520	ug/L	13.5	(0%-20%)			
Vanadium			6.77	BD	1.91	ug/L	41.4	(0%-20%)			
Zinc			19.7	BD	5.75	ug/L	45.7	(0%-20%)			

**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  $\geq$  EQL or is  $>$  5% of the measured concentration and/or decision level for associated samples.

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**QC Summary**

Workorder: 425895

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
D	Results are reported from a diluted aliquot of sample.										
E	Reported value is estimated due to interferences. See comment in narrative.										
M	Duplicate precision not met.										
N	Spike Sample recovery is outside control limits.										
S	Reported value determined by the Method of Standard Additions (MSA)										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

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 #: GEL425895**  
**Work Order #: 425895**

**Product:** UISO\_IE\_PRECIP\_AEA:COMMON  
**Analytical Method:** UISO\_IE\_PRECIP\_AEA  
**Analytical Procedure:** GL-RAD-A-011 REV# 26  
**Analytical Batch:** 1677699

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425895002	B39J03
425895004	B39J08
1203820134	Method Blank (MB)
1203820135	Laboratory Control Sample (LCS)
1203820137	425895002(B39J03) 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**

**QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203820137 (B39J03DUP) and 425895002 (B39J03), did not meet the relative percent difference requirement for U-238; however, they do meet the relative error ratio requirement with a value of 1.16.

**Product:** SRTOT\_SEP\_PRECIP\_GPC: COMMON  
**Analytical Method:** SRTOT\_SEP\_PRECIP\_GPC  
**Analytical Procedure:** GL-RAD-A-004 REV# 18  
**Analytical Batch:** 1677316

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425895002	B39J03
425895004	B39J08
1203819273	Method Blank (MB)
1203819274	425895004(B39J08) Sample Duplicate (DUP)
1203819275	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Product:** TC99\_EIE\_LSC: COMMON

**Analytical Method:** TC99\_EIE\_LSC

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

**Analytical Batch:** 1678894

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425895002	B39J03
425895004	B39J08
1203822882	Method Blank (MB)
1203822883	425895002(B39J03) Sample Duplicate (DUP)
1203822884	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.

**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, 1203822883 (B39J03DUP) and 425895002 (B39J03), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with a value of 1.48.

**Product:** TRITIUM\_DIST\_LSC: COMMON

**Analytical Method:** TRITIUM\_DIST\_LSC

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

**Analytical Batch:** 1683109

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

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

425895002	B39J03
425895004	B39J08
1203832965	Method Blank (MB)
1203832966	425895004(B39J08) Sample Duplicate (DUP)
1203832967	425895004(B39J08) Matrix Spike (MS)
1203832968	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.

#### **Quality Control (QC) Information**

##### **QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The Matrix Spike 1203832967 (B39J08MS) did not meet recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

##### **RDL Met**

The blank, 1203832965 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

#### **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: GEL425895 GEL Work Order: 425895

**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:** Heather McCarty

**Date:** 19 JUL 2017

**Title:** Analyst II

# Sample Data Summary

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

<b>SDG Number:</b> GEL425895	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F16036
<b>Lab Sample ID:</b> 425895002	<b>Date Collected:</b> 06/19/2017 14:15	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/21/2017 08:50	
<b>Client ID:</b> B39J03	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1677699	<b>Analyst:</b> BXA4	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/01/2017 10:12	<b>Aliquot:</b> 0.4 L	<b>Instrument:</b> 1014
<b>Data File:</b> S0425895002_UU.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1677699		
<b>Prep Date:</b> 06/30/2017 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		3.03	pCi/L	+/-0.434	0.590	0.077	1.00
15117-96-1/13982-7	Uranium-235/236		0.134	pCi/L	+/-0.111	0.112	0.0952	1.00
7440-61-1	Uranium-238		2.21	pCi/L	+/-0.372	0.472	0.089	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	4.72	5.21	pCi/L	90.5	(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: GEL425895	Client: CPRC001	Project: CPRC0F16036
Lab Sample ID: 425895002	Date Collected: 06/19/2017 14:15	Matrix: WATER
	Date Received: 06/21/2017 08:50	
Client ID: B39J03	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1677316	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 07/03/2017 09:47	Aliquot: 300 mL	Instrument: PIC13D
Data File: S1677316.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1677316		
Prep Date: 06/28/2017 12:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.505	pCi/L	+/-0.546	0.559	0.904	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.10	7.75	mg	78.7	(40%-110%)

**Comments:**

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

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

SDG Number: GEL425895	Client: CPRC001	Project: CPRC0F16036
Lab Sample ID: 425895002	Date Collected: 06/19/2017 14:15	Matrix: WATER
	Date Received: 06/21/2017 08:50	
Client ID: B39J03	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1678894	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/16/2017 06:40	Aliquot: 100 mL	Instrument: LSCRED
Data File: E1678894.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 15 min
Prep Batch: 1678894		
Prep Date: 07/11/2017 10:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		232	pCi/L	+/-34.8	43.3	45.7	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	37900	41100	CPM	92.2	(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: GEL425895	Client: CPRC001	Project: CPRC0F16036
Lab Sample ID: 425895002	Date Collected: 06/19/2017 14:15	Matrix: WATER
	Date Received: 06/21/2017 08:50	
Client ID: B39J03	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1683109	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 07/19/2017 05:39	Aliquot: 50 mL	Instrument: LSCBLUE
Data File: T1683109.xls	Prep Method: EPA 906.0 Modified	Count Time: 1.10000002384186 min
Prep Batch: 1683109		
Prep Date: 07/18/2017 11:38		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		2.60E+06	pCi/L	+/-50400	5.05E+05	2640	400

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**

<b>SDG Number:</b> GEL425895	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F16036
<b>Lab Sample ID:</b> 425895004	<b>Date Collected:</b> 06/19/2017 14:15	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/21/2017 08:50	
<b>Client ID:</b> B39J08	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1677699	<b>Analyst:</b> BXA4	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 07/01/2017 10:12	<b>Aliquot:</b> 0.4 L	<b>Instrument:</b> 1015
<b>Data File:</b> S0425895004_UU.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1677699		
<b>Prep Date:</b> 06/30/2017 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		3.23	pCi/L	+/-0.447	0.616	0.105	1.00
15117-96-1/13982-7	Uranium-235/236		0.246	pCi/L	+/-0.145	0.149	0.109	1.00
7440-61-1	Uranium-238		3.15	pCi/L	+/-0.441	0.605	0.105	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	4.67	5.21	pCi/L	89.5	(30%-105%)

**Comments:**

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

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

<b>SDG Number:</b> GEL425895	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F16036
<b>Lab Sample ID:</b> 425895004	<b>Date Collected:</b> 06/19/2017 14:15	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/21/2017 08:50	
<b>Client ID:</b> B39J08		<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1677316	<b>Method:</b> SRTOT_SEP_PRECIP_GPC	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 07/03/2017 09:47	<b>Analyst:</b> KSD1	<b>Instrument:</b> PIC13B
<b>Data File:</b> S1677316.xls	<b>Aliquot:</b> 300 mL	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1677316	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	
<b>Prep Date:</b> 06/28/2017 12:09		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.0849	pCi/L	+/-0.480	0.481	0.936	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	4.80	7.75	mg	61.9	(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: GEL425895	Client: CPRC001	Project: CPRC0F16036
Lab Sample ID: 425895004	Date Collected: 06/19/2017 14:15	Matrix: WATER
	Date Received: 06/21/2017 08:50	
Client ID: B39J08	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1678894	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/16/2017 06:57	Aliquot: 100 mL	Instrument: LSCRED
Data File: E1678894.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 15 min
Prep Batch: 1678894		
Prep Date: 07/11/2017 10:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		247	pCi/L	+/-35.5	44.8	46.2	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	37600	41100	CPM	91.5	(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: GEL425895	Client: CPRC001	Project: CPRC0F16036
Lab Sample ID: 425895004	Date Collected: 06/19/2017 14:15	Matrix: WATER
	Date Received: 06/21/2017 08:50	
Client ID: B39J08	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1683109	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 07/19/2017 05:41	Aliquot: 50 mL	Instrument: LSCBLUE
Data File: T1683109.xls	Prep Method: EPA 906.0 Modified	Count Time: 1 min
Prep Batch: 1683109		
Prep Date: 07/18/2017 11:38		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		2.79E+06	pCi/L	+/-54500	5.42E+05	2790	400

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**

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**QC Summary**

Report Date: July 19, 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:** 425895

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1677699								
QC1203820134	MB								
Uranium-233/234			U	0.00902	pCi/L			BXA4	07/01/1710:12
				Uncert: +/-0.0669					
				TPU: +/-0.0669					
Uranium-235/236			U	0.00209	pCi/L				
				Uncert: +/-0.0744					
				TPU: +/-0.0744					
Uranium-238			U	-0.027	pCi/L				
				Uncert: +/-0.0826					
				TPU: +/-0.0827					
**Uranium-232 Tracer	5.21			5.03	pCi/L	REC: 97	(30%-105%)		
				Uncert: +/-0.538					
				TPU: +/-0.850					
QC1203820135	LCS								
Uranium-233/234				7.48	pCi/L				07/01/1710:17
				Uncert: +/-0.866					
				TPU: +/-1.46					
Uranium-235/236				0.320	pCi/L				
				Uncert: +/-0.209					
				TPU: +/-0.215					
Uranium-238	6.75			7.81	pCi/L	REC: 116	(80%-120%)		
				Uncert: +/-0.885					
				TPU: +/-1.51					
**Uranium-232 Tracer	5.21			3.70	pCi/L	REC: 71	(30%-105%)		
				Uncert: +/-0.727					
				TPU: +/-1.10					
QC1203820137	425895002	DUP							
Uranium-233/234		3.03		3.52	pCi/L				07/01/1710:17
				Uncert: +/-0.434		RPD: 15	(0% - 20%)		
				TPU: +/-0.590		RER: 0.92	(0-2)		
Uranium-235/236		0.134		0.253	pCi/L				
				Uncert: +/-0.111		RPD: 62	(0% - 100%)		
				TPU: +/-0.112		RER: 0.996	(0-2)		
Uranium-238		2.21		2.72	pCi/L				
				Uncert: +/-0.372		RPD: 21*	(0% - 20%)		
				TPU: +/-0.472		RER: 1.16	(0-2)		
**Uranium-232 Tracer	5.21	4.72		3.67	pCi/L	REC: 70	(30%-105%)		
				Uncert: +/-0.572					
				TPU: +/-0.894					
<b>Rad Gas Flow</b>									
Batch	1677316								
QC1203819273	MB								
Total Strontium			U	-0.673	pCi/L			KSD1	07/03/1709:47
				Uncert: +/-0.514					

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**QC Summary**

Workorder: 425895

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gas Flow</b>									
Batch	1677316								
		TPU:		+/-0.514					
**Strontium Carrier	7.75			5.50	mg	REC: 71	(40%-110%)		
QC1203819274	425895004	DUP							
Total Strontium		U	0.0849	U	0.065				07/03/1709:47
		Uncert:	+/-0.480	+/-0.442		RPD: 0	N/A		
		TPU:	+/-0.481	+/-0.443		RER: 0.0598	(0-2)		
**Strontium Carrier	7.75		4.80	6.50	mg	REC: 84	(40%-110%)		
QC1203819275	LCS								
Total Strontium	72.8			72.2	pCi/L	REC: 99	(80%-120%)		07/03/1709:48
		Uncert:		+/-3.15					
		TPU:		+/-17.3					
**Strontium Carrier	7.75			7.10	mg	REC: 92	(40%-110%)		
<b>Rad Liquid Scintillation</b>									
Batch	1678894								
QC1203822882	MB								
Technetium-99			U	1.07	pCi/L			CXS7	07/16/1709:58
		Uncert:		+/-27.7					
		TPU:		+/-27.7					
**Technetium-99m Tracer	41100			35500	CPM	REC: 87	(30%-105%)		
QC1203822883	425895002	DUP							
Technetium-99			232	189	pCi/L				07/16/1710:15
		Uncert:	+/-34.8	+/-32.2		RPD: 21*	(0% - 20%)		
		TPU:	+/-43.3	+/-38.4		RER: 1.48	(0-2)		
**Technetium-99m Tracer	41100		37900	40100	CPM	REC: 98	(30%-105%)		
QC1203822884	LCS								
Technetium-99	861			840	pCi/L	REC: 98	(80%-120%)		07/16/1710:31
		Uncert:		+/-53.8					
		TPU:		+/-108					
**Technetium-99m Tracer	41100			34100	CPM	REC: 83	(30%-105%)		
Batch	1683109								
QC1203832965	MB								
Tritium			U	364	pCi/L			BXM4	07/19/1705:44
		Uncert:		+/-259					
		TPU:		+/-269					
QC1203832966	425895004	DUP							
Tritium			2.79E+06	2.76E+06	pCi/L				07/19/1706:30
		Uncert:	+/-54500	+/-53900		RPD: 1	(0% - 20%)		
		TPU:	+/-5.42E+05	+/-5.37E+05		RER: 0.0568	(0-2)		
QC1203832967	425895004	MS							
Tritium	2240		2.79E+06	2.90E+06	pCi/L	REC: N/A			07/19/1706:32
		Uncert:	+/-54500	+/-55800					
		TPU:	+/-5.42E+05	+/-5.63E+05					
QC1203832968	LCS								
Tritium	2230			1880	pCi/L	REC: 85	(80%-120%)		07/19/1706:35
		Uncert:		+/-325					
		TPU:		+/-488					

**Notes:**

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

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 425895

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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The Qualifiers in this report are defined as follows:

- \* Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- B The associated QC sample blank has a result  $\geq 2X$  the MDA and, after corrections, result is  $\geq$  MDA for this sample
- 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.
- 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.