



October 20, 2017

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

Re: CHPRC SAF S17-009  
Work Order: 433405  
SDG: GEL433405

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 22, 2017. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

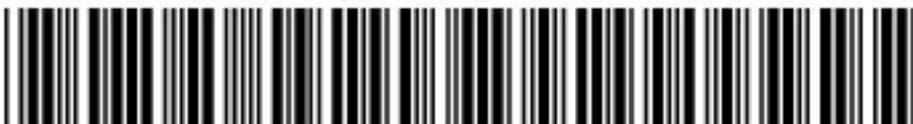
Sincerely,

Heather Shaffer  
Project Manager

Purchase Order: 300071 - 7H

Chain of Custody: S17-009-209, S17-009-211, S17-009-213, S17-009-214, S17-009-215, S17-009-216,  
S17-009-250, S17-009-273, S17-009-274, S17-009-509, S17-009-511, S17-009-512 and S17-009-526

Enclosures



## Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	10
Data Review Qualifier Definitions.....	25
Laboratory Certifications.....	27
Semi-Volatile Analysis.....	29
Case Narrative.....	30
Sample Data Summary.....	34
Quality Control Summary.....	36
Metals Analysis.....	41
Case Narrative.....	42
Sample Data Summary.....	45
Quality Control Summary.....	48
General Chem Analysis.....	56
Case Narrative.....	57
Sample Data Summary.....	61
Quality Control Summary.....	69
Radiological Analysis.....	73
Case Narrative.....	74
Sample Data Summary.....	84
Quality Control Summary.....	108

# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF S17-009  
SDG: GEL433405**

**October 20, 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 September 22, 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>
433405001	B3BVP0
433405002	B3BVP1
433405003	B3BVM0
433405004	B3BVN1
433405005	B3BVN6
433405006	B3BWP8
433405007	B3BWP4
433405008	B3BVL9
433405009	B3BVN0
433405010	B3BVN5
433405011	B3BVP3
433405012	B3BW79
433405013	B3BWP5
433405014	B3BWP2

**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: GC/MS Semivolatile, 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.



Heather Shaffer  
Project Manager

**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL433405**  
**Work Order #: 433405**

## GC/MS Semivolatile

### **Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry**

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

#### **Surrogate Recoveries**

Samples (See Below) did not meet surrogate recovery acceptance criteria. The client established the limits of 70%-130%. Failures are expected. The data were reported per client request.

Sample	Analyte	Value
1203881636 (MB)	2,4,6-Tribromophenol	67* (70%-130%)
	2-Fluorophenol	39* (70%-130%)
	Phenol-d5	24* (70%-130%)
1203881637 (LCS)	2-Fluorophenol	39* (70%-130%)
	Phenol-d5	22* (70%-130%)
1203881640 (B3BWP2MS)	2-Fluorophenol	57* (70%-130%)
	Phenol-d5	38* (70%-130%)
1203881641 (B3BWP2MSD)	2-Fluorophenol	62* (70%-130%)
	Phenol-d5	45* (70%-130%)
433405014 (B3BWP2)	2,4,6-Tribromophenol	63* (70%-130%)
	2-Fluorophenol	36* (70%-130%)
	Phenol-d5	22* (70%-130%)

#### **Laboratory Control Sample (LCS) Recovery**

The LCS and/or LCSD (See Below) spike recoveries were not within the acceptance limits. The client established the limits of 70%-130%. Failures are expected. The data were reported per client request.

Sample	Analyte	Value
1203881637 (LCS)	Several	See applicable report

### Miscellaneous Information

#### **Manual Integrations**

Sample 1203881637 (LCS) required manual integration in order to properly identify one or more peaks and/or to

correctly position the baseline as set in the calibration standard injections.

## 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 sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 433405013 (B3BWP5) and 433405014 (B3BWP2).

## 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.

### **Technical Information**

#### **Sample Dilutions**

The following samples 1203880826 (B3BVN6DUP), 1203880827 (B3BVN6PS), 433405002 (B3BVP1), 433405003 (B3BVM0), 433405004 (B3BVN1), 433405005 (B3BVN6), 433405006 (B3BWP8) and 433405007 (B3BWP4) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	433405					
	002	003	004	005	006	007
Several	10X 1X	5X 1X	5X 1X	10X 1X	5X 1X	10X 1X

### **Miscellaneous Information**

#### **Manual Integrations**

Samples 433405001 (B3BVP0), 433405003 (B3BVM0), 433405004 (B3BVN1), 433405006 (B3BWP8) and 433405007 (B3BWP4) were manually integrated to correctly position the baseline as set in the calibration standards.

## **Radiochemistry**

### **AMCMISO\_EIE\_PRECIP\_AEA: COMMON**

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

### **PUISO\_PRECIP\_AEA:COMMON**

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

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

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

#### **Technical Information**

##### **Recounts**

Sample 1203887941 (B3BVF4DUP) recounted due to high relative percent difference/relative error ratio. Sample was then recounted due to detector error. Sample was then recounted again due to high relative percent difference/relative error ratio. The fourth count is reported.

### **GAMMA\_GS:COMMON + GW 01**

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.

### **I129LL\_SEP\_LEPS\_GS: COMMON (low level)**

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.

**9310\_ALPHABETA\_GPC: COMMON**

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

**Technical Information****Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

**Recounts**

Samples 1203881077 (Non SDG 433452003DUP) and 433405012 (B3BW79) were recounted to verify sample results. The second counts are reported.

**Miscellaneous Information****Additional Comments**

The matrix spike and matrix spike duplicate, 1203881078 (Non SDG 433452003MS) and 1203881079 (Non SDG 433452003MSD), aliquots were reduced to conserve sample volume.

**SRISO\_SEP\_PRECIP\_GPC: COMMON**

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

**Technical Information****Sample Re-prep/Re-analysis**

Samples were reprepared to verify the results. The re-analysis is being reported.

**Recounts**

Sample 1203894171 (LCS) was recounted due to low recovery. The recount is reported.

**PU241\_IE\_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.

**SE79\_SEP\_IE\_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.

#### **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.

##### **Technical Information**

###### **Recounts**

Samples 433405012 (B3BW79) and 433405014 (B3BWP2) were recounted to verify sample results. Recounts are reported.

#### **C14\_LSC: COMMON**

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

##### **Miscellaneous Information**

###### **Additional Comments**

The matrix spike, 1203886027 (Non SDG 433280008MS), aliquot was reduced to conserve sample volume.

#### **TRITIUM\_DIST\_LSC: COMMON**

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

##### **Technical Information**

###### **Recounts**

Sample 1203886146 (LCS) was recounted due to low recovery. The recount is reported.

##### **Miscellaneous Information**

###### **Additional Comments**

The matrix spike, 1203886145 (Non SDG 433182001MS), aliquot was reduced to conserve sample volume.

##### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the

requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# **Chain of Custody and Supporting Documentation**

CH2M Hill Plateau Remediation Company		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>		C.O.C.# <b>S17-009-209</b>	
433405		Telephone No.: 509-376-4650		Page 1 of 1	
Collector: Dan Woehle CHPRC	Contact/Requester: Karen Waters-Husted	SAF No.: S17-009	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071	
Project Title: SURV, SEP 2017	Logbook No.: HNF-N-506 94	Ice Chest No.: 6WS-567	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 170318568819	
Shipped To (Lab): GEL Laboratories, LLC	Priority: 30 Days	Offsite Property No.: 8468 8463	SPECIAL INSTRUCTIONS N/A		
Protocol: SURV	POSSIBLE SAMPLE HAZARDS/REMARK ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1				
Sample No. B3BVL9	Filter N	* W	Date SEP 21 2017 1010	Time 1400	No/Type Container 1x250-mL P
Sample Analysis			Holding Time 6 Months	Preservative None	
TRITIUM_DIST_LSC: COMMON					

Relinquished By: Dan Woehle CHPRC	Signature <i>Dan Woehle</i>	Date SEP 21 2017	Time 1132	Signature <i>Curt Hoffman</i>	Date SEP 21 2017	Time 1132
Print First and Last Name	Signature	Date/Time		Signature	Date/Time	
Relinquished By: Curt Hoffman CHPRC	Signature <i>Curt Hoffman</i>	Date SEP 21 2017	Time 1400	Signature <i>Stacy Boone</i>	Date 9/22/17	Time 9:20
Print First and Last Name	Signature	Date/Time		Signature	Date/Time	
Relinquished By:	Signature	Date/Time		Signature	Date/Time	
Print First and Last Name	Signature	Date/Time		Signature	Date/Time	
Relinquished By:	Signature	Date/Time		Signature	Date/Time	
Print First and Last Name	Signature	Date/Time		Signature	Date/Time	
Received By: Curt Hoffman CHPRC	Signature <i>Curt Hoffman</i>	Date SEP 21 2017	Time 1132	Signature <i>Stacy Boone</i>	Date 9/22/17	Time 9:20
Print First and Last Name	Signature	Date/Time		Signature	Date/Time	
Received By: FEDEX	Signature	Date/Time		Signature	Date/Time	
Print First and Last Name	Signature	Date/Time		Signature	Date/Time	
Received By: STACY BOONE	Signature <i>Stacy Boone</i>	Date 9/22/17	Time 9:20	Signature	Date/Time	
Print First and Last Name	Signature	Date/Time		Signature	Date/Time	
Received By:	Signature	Date/Time		Signature	Date/Time	
Print First and Last Name	Signature	Date/Time		Signature	Date/Time	
Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:					Date/Time:
FINAL SAMPLE DISPOSITION						

Matrix \*  
 S = Soil  
 SE = Sediment  
 SO = Solid  
 SL = Sludge  
 W = Water  
 O = Oil  
 A = Air  
 DS = Drum Solids  
 DL = Drum Liquid  
 T = Tissue  
 WI = Wipe  
 L = Liquid  
 V = Vegetation  
 X = Other

<b>CH2M Hill Plateau Remediation Company</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> 433405		C.O.C.# <b>S17-009-211</b> Page 1 of 1			
Collector: Dan Woehle CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650					
SAF No.: S17-009	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071					
Project Title: SURV, SEP 2017	Logbook No.: HNF-N-506 94	Ice Chest No.: 645-567					
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 1770319568819					
Protocol: SURV	Priority: 30 Days	Offsite Property No.: 8464-8463 dlo.9/21/17					
<b>POSSIBLE SAMPLE HAZARDS/REMARK</b> ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1							
<b>SPECIAL INSTRUCTIONS</b> N/A							
Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3BVN0	N	W	SEP 21 2017 1045	1x1-L G/P	AMCMISO_EIE_PRECIP_AEA: COMMON	180 Days	HNO3 to pH <2
B3BVN0	N	W		1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B3BVN0	N	W		4x1-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B3BVN0	N	W		1x1-L G/P	PU241_IE_LSC: COMMON; PUISO_IE_PRECIP_AEA: COMMON	6 Months	HNO3 to pH <2
B3BVN0	N	W		1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B3BVN0	N	W		1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B3BVN0	N	W		1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2
B3BVN0	N	W		1x250-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	HNO3 to pH <2
B3BVN0	N	W		1x1-L G/P	UIISO_IE_PRECIP_AEA: COMMON	6 Months	None
B3BVN0	N	W		1x1-L G/P		6 Months	HNO3 to pH <2

Relinquished By: Dan Woehle CHPRC	Signature 	Date/Time SEP 21 2017 1130	Received By: Curt Hoffman CHPRC	Signature 	Date/Time SEP 21 2017 1130
Relinquished By: Curt Hoffman CHPRC	Signature 	Date/Time SEP 21 2017 1400	Received By: FEDEX	Signature FEDEX	Date/Time SEP 21 2017 1400
Relinquished By:	Signature FedEx	Date/Time SEP 21 2017	Received By: STACY BOONE Signature 	Date/Time 9/22/17 9:20	Date/Time 9/22/17 9:20
Relinquished By:	Signature	Date/Time	Received By:	Signature	Date/Time
Relinquished By:	Signature	Date/Time	Received By:	Signature	Date/Time
Relinquished By:	Signature	Date/Time	Received By:	Signature	Date/Time
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process):				Disposed By:

Matrix \*  
 S = Soil DS = Drum Solids  
 SE = Sediment DL = Drum Liquid  
 SO = Solid T = Tissue  
 SL = Sludge WI = Wipe  
 W = Water L = Liquid  
 O = Oil V = Vegetation  
 A = Air X = Other











**CH2M Hill Plateau Remediation Company**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

C.O.C.# **S17-009-273**  
Page 1 of 1

**Collector:** Barb Briggs /CHPRC  
**SAF No.:** S17-009  
**Project Title:** SURV, SEP 2017  
**Shipped To (Lab):** GEL Laboratories, LLC  
**Protocol:** SURV

**Contact/Requester:** Karen Waters-Husted  
**Telephone No.:** 509-376-4650  
**Sampling Origin:** Hanford Site  
**Purchase Order/Charge Code:** 300071  
**Logbook No.:** HNF-N-506 94  
**Ice Chest No.:** GWS-518  
**Method of Shipment:** Commercial Carrier  
**Bill of Lading/Air Bill No.:** 170313755081  
**Priority:** 30 Days  
**Offsite Property No.:** 8459

**POSSIBLE SAMPLE HAZARDS/REMARK**  
\*\* \*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

**SPECIAL INSTRUCTIONS**  
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3BWP5	Y	W	SEP 20 2017	1400	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B3BWP2	N	W			1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B3BWP2	N	W			4x1-L ag	8270_SVOA_GCMS: 1,4 Dioxane (1)	7/40 Days	Cool <=6C
B3BWP2	N	W			4x1-L G/P	I129LL_SEP_LEPS_GS_LL: COMMON	6 Months	None
B3BWP2	N	W			1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2
B3BWP2	N	W			1x250-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Relinquished By: Barb Briggs /CHPRC	Received By: SSU-1	SEP 20 2017 1500	SEP 20 2017 1500
Print First and Last Name	Print First and Last Name	Signature	Date/Time
Relinquished By: SSU-1	Received By: Troy Bacon /CHPRC	SEP 21 2017 0800	SEP 21 2017 0800
Print First and Last Name	Print First and Last Name	Signature	Date/Time
Relinquished By: Troy Bacon /CHPRC	Received By: FEDEX	SEP 21 2017 1400	SEP 21 2017 1400
Print First and Last Name	Print First and Last Name	Signature	Date/Time
Relinquished By: fidbp	Received By: STACY BOONE	SEP 22 2017 9:20	SEP 22 2017 9:20
Print First and Last Name	Print First and Last Name	Signature	Date/Time

**FINAL SAMPLE DISPOSITION**

Disposal Method (e.g., Return to customer, per lab procedure, used in process):

Disposed By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Matrix \*  
S = Soil  
SE = Sediment  
SO = Solid  
SL = Sludge  
W = Water  
O = Oil  
A = Air  
DS = Drum Solids  
DL = Drum Liquid  
T = Tissue  
WI = Wipe  
L = Liquid  
V = Vegetation  
X = Other

Printed On 7/21/2017 FSR ID = FSR48567 A-6004-842 (REV 3)

CH2M Hill Plateau Remediation Company		C.O.C.# S17-009-274	
433405		Page 1 of 1	
Collector: Barb Briggs /CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.:	509-376-4650
SAF No.:	S17-009	Purchase Order/Charge Code:	300071
Project Title:	SURV, SEP 2017	Ice Chest No.:	GWS-578
Shipped To (Lab):	GEL Laboratories, LLC	Bill of Lading/Air Bill No.:	770313755087
Protocol:	SURV	Offsite Property No.:	8459
<b>POSSIBLE SAMPLE HAZARDS/REMARK</b> ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1		<b>SPECIAL INSTRUCTIONS</b> N/A	
Sample No.:	Filter	No/Type Container	Sample Analysis
B3BWP8	N W	1X125-mL G/P	9056_ANIONS_IC: COMMON
	Date	Time	Holding Time
	SEP 20 2017	12:00	48 Hours
			Preservative
			Cool <=6C

Relinquished By:	Barb Briggs /CHPRC	SEP 20 2017	SEP 20 2017	SEP 20 2017
Print First and Last Name	Signature	Date/Time	Signature	Date/Time
Relinquished By:	SSU-1	SEP 21 2017	SEP 21 2017	SEP 21 2017
Print First and Last Name	Signature	Date/Time	Signature	Date/Time
Relinquished By:	Troy Bacon /CHPRC	SEP 21 2017	SEP 21 2017	SEP 21 2017
Print First and Last Name	Signature	Date/Time	Signature	Date/Time
Relinquished By:	fed	SEP 21 2017	SEP 21 2017	SEP 21 2017
Print First and Last Name	Signature	Date/Time	Signature	Date/Time
Received By:	SSU-1	SEP 20 2017	SEP 20 2017	SEP 20 2017
Print First and Last Name	Signature	Date/Time	Signature	Date/Time
Received By:	Troy Bacon /CHPRC	SEP 21 2017	SEP 21 2017	SEP 21 2017
Print First and Last Name	Signature	Date/Time	Signature	Date/Time
Received By:	EDEX	SEP 21 2017	SEP 21 2017	SEP 21 2017
Print First and Last Name	Signature	Date/Time	Signature	Date/Time
Received By:	STACY BOONE	SEP 21 2017	SEP 21 2017	SEP 21 2017
Print First and Last Name	Signature	Date/Time	Signature	Date/Time
Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:			
FINAL SAMPLE DISPOSITION	Date/Time:			

Matrix \*

S = Soil DS = Drum Solids  
 SE = Sediment DL = Drum Liquid  
 SO = Solid T = Tissue  
 SL = Sludge WI = Wipe  
 W = Water L = Liquid  
 O = Oil V = Vegetation  
 A = Air X = Other

CH2M Hill Plateau Remediation Company		C.O.C.# S17-009-509 Page 1 of 1	
Collector: Dan Woehle CHPRC		Telephone No.: 509-376-4650	
SAF No.: S17-009		Purchase Order/Charge Code: 300071	
Project Title: SURV, SEP 2017		Ice Chest No.: 645-567	
Shipped To (Lab): GEL Laboratories, LLC		Bill of Lading/Air Bill No.: 170318568814	
Protocol: SURV		Offsite Property No.: 8467 8463 Date: 9/21/17	
<b>POSSIBLE SAMPLE HAZARDS/REMARK</b> ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1		<b>SPECIAL INSTRUCTIONS</b> N/A	
Sample No. B3BVM0	Filter * N	Date SEP 21 2017	Time 10:16
No/Type Container 1x125-mL G/P	Sample Analysis 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 02		Preservative Cool <=6C
Holding Time 48 Hours		Preservative Cool <=6C	

<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> 433400	
Contact/Requester: Karen Waters-Husted Sampling Origin: Hanford Site Logbook No.: HNF-N-506 94 Method of Shipment Commercial Carrier Priority: 30 Days	Telephone No.: 509-376-4650 Purchase Order/Charge Code: 300071 Ice Chest No.: 645-567 Bill of Lading/Air Bill No.: 170318568814 Offsite Property No.: 8467 8463 Date: 9/21/17
<b>POSSIBLE SAMPLE HAZARDS/REMARK</b> ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1	<b>SPECIAL INSTRUCTIONS</b> N/A
Sample No. B3BVM0 Filter * N Date SEP 21 2017 Time 10:16	No/Type Container 1x125-mL G/P Sample Analysis 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 02
Holding Time 48 Hours Preservative Cool <=6C	Holding Time 48 Hours Preservative Cool <=6C
Relinquished By: Dan Woehle CHPRC Print First and Last Name Dan Woehle Signature [Signature] Date/Time SEP 21 2017 1:30	Received By: Curt Hoffman CHPRC Print First and Last Name Curt Hoffman Signature [Signature] Date/Time SEP 21 2017 1:30
Relinquished By: Curt Hoffman CHPRC Print First and Last Name Curt Hoffman Signature [Signature] Date/Time SEP 21 2017 1:40	Received By: FEDEX Print First and Last Name FEDEX Signature [Signature] Date/Time SEP 21 2017 1:40
Relinquished By: [Signature] Print First and Last Name [Name] Signature [Signature] Date/Time SEP 21 2017	Received By: STACY BOONE Print First and Last Name Stacy Boone Signature [Signature] Date/Time 9/22/17 9:20
Relinquished By: [Signature] Print First and Last Name [Name] Signature [Signature] Date/Time SEP 21 2017	Received By: [Signature] Print First and Last Name [Name] Signature [Signature] Date/Time SEP 21 2017
<b>FINAL SAMPLE DISPOSITION</b> Disposal Method (e.g., Return to customer, per lab procedure, used in process): Disposed By:	Date/Time:
Printed On 7/21/2017 FSR ID = FSR48522	A-6004-842 (REV 3)



CH2MHill Plateau Remediation Company		C.O.C.# S17-009-512 Page 1 of 1	
433406		Telephone No.: 509-376-4650	
Collector: Dan Woehle CHPRC	Contact/Requester: Karen Waters-Husted	Purchase Order/Charge Code: 300071	
SAF No.: S17-009	Sampling Origin: Hanford Site	Ice Chest No.: 645-567	
Project Title: SURV, SEP 2017	Logbook No.: HNF-N-50694	Bill of Lading/Air Bill No.: 170318568819	
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Offsite Property No.: 844018403	
Protocol: SURV	Priority: 30 Days	KW 9/21/17	
<b>POSSIBLE SAMPLE HAZARDS/REMARK</b> ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1		<b>SPECIAL INSTRUCTIONS</b> N/A	
Sample No. B3BVN6	Filter N	* W	Time SEP 21 2017 09:53
No/Type Container 1x125-mL G/P	Sample Analysis 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 02		Holding Time 48 Hours
			Preservative Cool <=6C

Relinquished By: Dan Woehle CHPRC	Signature <i>Dan Woehle</i>	SEP 21 2017 1130 Date/Time	Received By: Curt Hoffman CHPRC	Signature <i>Curt Hoffman</i>	SEP 21 2017 1130 Date/Time
Relinquished By: Curt Hoffman CHPRC	Signature <i>Curt Hoffman</i>	SEP 21 2017 1400 Date/Time	Received By: STACY BOONT	Signature <i>Stacy Boont</i>	SEP 21 2017 9:20 Date/Time
Relinquished By:	Signature	FedEx Date/Time	Received By:	Signature	
Relinquished By:	Signature		Received By:	Signature	
Relinquished By:	Signature		Received By:	Signature	
Relinquished By:	Signature		Received By:	Signature	

Matrix \*  
 S = Soil  
 SE = Sediment  
 SO = Solid  
 SL = Sludge  
 W = Water  
 O = Oil  
 A = Air  
 DS = Drum Solids  
 DL = Drum Liquid  
 T = Tissue  
 WI = Wipe  
 L = Liquid  
 V = Vegetation  
 X = Other

Printed On 7/21/2017  
 Disposed By:  
 Disposal Method (e.g., Return to customer, per lab procedure, used in process):  
 FSR ID = FSR48525  
 A-6004-842 (REV 3)

CH2M Hill Plateau Remediation Company		C.O.C.# S17-009-526 Page 1 of 1	
433405		Telephone No.: 509-376-4650	
Collector: Barb Briggs /CHPRC	Contact/Requester: Karen Waters-Husted	Purchase Order/Charge Code: 300071	
SAF No.: S17-009	Sampling Origin: Hanford Site	Ice Chest No.: GWS-518	
Project Title: SURV, SEP 2017	Logbook No.: HNF-N-506 94	Bill of Lading/Air Bill No.: 7703 1375 5081	
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Offsite Property No.: 8459	
Protocol: SURV	Priority: 30 Days		
<b>POSSIBLE SAMPLE HAZARDS/REMARK</b> ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1		<b>SPECIAL INSTRUCTIONS</b> N/A	
Sample No. B3BWP4	Filter N	* Time W SEP 20 2017 1400	No/Type Container 1x125-mL G/P
Sample Analysis		Holding Time 48 Hours	Preservative Cool <=6C

Relinquished By: Barb Briggs /CHPRC	Signature	SEP 20 2017 1500	Date/Time	Received By: SSU-1	Signature	SEP 20 2017 1500	Date/Time
Relinquished By: SSU-1	Signature	SEP 21 2017 800	Date/Time	Received By: Troy Bacon /CHPRC	Signature	SEP 21 2017 0800	Date/Time
Relinquished By: Troy Bacon /CHPRC	Signature	SEP 21 2017 1400	Date/Time	Received By: FEDEX	Signature		Date/Time
Relinquished By: Fed Ex	Signature		Date/Time	Received By: STACY BOONIC	Signature	9/22/17	Date/Time
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):		Disposed By:		Date/Time:	

Matrix \*

S = Soil  
SE = Sediment  
SO = Solid  
SL = Sludge  
WV = Water  
O = Oil  
A = Air

DS = Drum Solids  
DL = Drum Liquid  
T = Tissue  
WI = Wipe  
L = Liquid  
V = Vegetation  
X = Other



**SAMPLE RECEIPT & REVIEW FORM**

Client: <b>CPRC</b>		SDG/AR/COC/Work Order: <b>433405</b>			
Received By: <b>STACY BOONE</b>		Date Received: <b>9-22-17</b>			
Carrier and Tracking Number		Circle Applicable: FedEx Express    FedEx Ground    UPS    Field Services    Courier    Other			
		<b>7703 1375 5087-1c</b> <b>7703 1856 8587-21c</b>			
		<b>7703 1856 8819-1c</b>			
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.			
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____			
COC/Samples marked or classified as radioactive?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1    Rad 2    Rad 3			
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's    Flammable    Foreign Soil    RCRA    Asbestos    Beryllium    Other:			
Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Wet Ice</u> Ice Packs    Dry ice    None    Other: *all temperatures are recorded in Celsius <u>See above</u> TEMP: _____
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR3-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7	Do any samples require Volatile Analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Cores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A Sample ID's and containers affected: _____
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12	Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Comments (Use Continuation Form if needed):					

PM (or PMA) review: Initials KS      Date 9.22.17      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 20 October 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-23
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# **Semi-Volatile Analysis**

# Case Narrative

**GC/MS Semivolatile  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL433405  
Work Order #: 433405**

**Product:** Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry

**Analytical Method:** SW846 3510C/8270D

**Analytical Procedure:** GL-OA-E-009 REV# 39

**Analytical Batch:** 1703331

**Preparation Method:** SW846 3510C

**Preparation Procedure:** GL-OA-E-013 REV# 32

**Preparation Batch:** 1703327

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>
433405014	B3BWP2
1203881636	Method Blank (MB)
1203881637	Laboratory Control Sample (LCS)
1203881640	433405014(B3BWP2) Matrix Spike (MS)
1203881641	433405014(B3BWP2) 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.

**Quality Control (QC) Information**

**Surrogate Recoveries**

Samples (See Below) did not meet surrogate recovery acceptance criteria. The client established the limits of 70%-130%. Failures are expected. The data were reported per client request.

<b>Sample</b>	<b>Analyte</b>	<b>Value</b>
1203881636 (MB)	2,4,6-Tribromophenol	67* (70%-130%)
	2-Fluorophenol	39* (70%-130%)
	Phenol-d5	24* (70%-130%)
1203881637 (LCS)	2-Fluorophenol	39* (70%-130%)
	Phenol-d5	22* (70%-130%)
1203881640 (B3BWP2MS)	2-Fluorophenol	57* (70%-130%)
	Phenol-d5	38* (70%-130%)
1203881641 (B3BWP2MSD)	2-Fluorophenol	62* (70%-130%)
	Phenol-d5	45* (70%-130%)

433405014 (B3BWP2)	2,4,6-Tribromophenol	63* (70%-130%)
	2-Fluorophenol	36* (70%-130%)
	Phenol-d5	22* (70%-130%)

#### **Laboratory Control Sample (LCS) Recovery**

The LCS and/or LCSD (See Below) spike recoveries were not within the acceptance limits. The client established the limits of 70%-130%. Failures are expected. The data were reported per client request.

<b>Sample</b>	<b>Analyte</b>	<b>Value</b>
1203881637 (LCS)	Several	See applicable report

#### **Miscellaneous Information**

##### **Manual Integrations**

Sample 1203881637 (LCS) required manual integration in order to properly identify one or more peaks and/or to correctly position the baseline as set in the calibration standard injections.

##### **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: GEL433405 GEL Work Order: 433405

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

T Spike and/or spike duplicate 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.

DL Indicates that sample is diluted.

RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

**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: **Barbara Bailey**Date: **17 OCT 2017**Title: **Data Validator**

# Sample Data Summary

**Semi-Volatile  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL433405	<b>Date Collected:</b> 09/20/2017 14:20	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 433405014	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BWP2	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Batch ID:</b> 1703331	<b>Method:</b> SW846 3510C/8270D	<b>SOP Ref:</b> GL-OA-E-009
<b>Run Date:</b> 09/26/2017 23:37	<b>Inst:</b> MSD1.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 09/26/2017 04:45	<b>Analyst:</b> JLD1	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> s092617a.B\s1i2630.D	<b>Aliquot:</b> 1000 mL	<b>Final Volume:</b> 1 mL
	<b>Column:</b> 25x.20x.33	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
123-91-1	1,4-Dioxane	U	3.00	ug/L	3.00	10.0

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: September 28, 2017

Page 1 of 3

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 433405

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1703331										
QC1203881637	LCS										
1,4-Dioxane	50.0			26.5	ug/L		53 *	(70%-130%)	JLD1	09/26/17	18:58
**2,4,6-Tribromophenol	100			77.4	ug/L		77	(70%-130%)			
**2-Fluorobiphenyl	50.0			36.9	ug/L		74	(70%-130%)			
**2-Fluorophenol	100			38.5	ug/L		39 *	(70%-130%)			
**Nitrobenzene-d5	50.0			40.6	ug/L		81	(70%-130%)			
**Phenol-d5	100			22.3	ug/L		22 *	(70%-130%)			
**p-Terphenyl-d14	50.0			46.0	ug/L		92	(70%-130%)			
QC1203881636	MB										
1,4-Dioxane			U	3.00	ug/L					09/26/17	18:27
**2,4,6-Tribromophenol	100			67.4	ug/L		67 *	(70%-130%)			
**2-Fluorobiphenyl	50.0			39.9	ug/L		80	(70%-130%)			
**2-Fluorophenol	100			39.2	ug/L		39 *	(70%-130%)			
**Nitrobenzene-d5	50.0			41.6	ug/L		83	(70%-130%)			
**Phenol-d5	100			23.8	ug/L		24 *	(70%-130%)			

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 433405

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Semi-Volatile-GC/MS</b>											
Batch	1703331										
**p-Terphenyl-d14	50.0			44.8	ug/L		90	(70%-130%)	JLD1	09/26/17	18:27
QC1203881640 433405014 MS											
1,4-Dioxane	100	U	3.00	77.3	ug/L		77	(25%-103%)		09/27/17	00:08
**2,4,6-Tribromophenol	200		63.0	162	ug/L		81	(70%-130%)			
**2-Fluorobiphenyl	100		35.3	77.2	ug/L		77	(70%-130%)			
**2-Fluorophenol	200		36.3	113	ug/L		57 *	(70%-130%)			
**Nitrobenzene-d5	100		39.7	84.0	ug/L		84	(70%-130%)			
**Phenol-d5	200		22.4	75.9	ug/L		38 *	(70%-130%)			
**p-Terphenyl-d14	100		41.8	90.6	ug/L		91	(70%-130%)			
QC1203881641 433405014 MSD											
1,4-Dioxane	100	U	3.00	80.1	ug/L	4	80	(0%-20%)		09/27/17	00:39
**2,4,6-Tribromophenol	200		63.0	157	ug/L		78	(70%-130%)			
**2-Fluorobiphenyl	100		35.3	75.6	ug/L		76	(70%-130%)			
**2-Fluorophenol	200		36.3	124	ug/L		62 *	(70%-130%)			
**Nitrobenzene-d5	100		39.7	83.1	ug/L		83	(70%-130%)			
**Phenol-d5	200		22.4	89.2	ug/L		45 *	(70%-130%)			

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 433405

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatile-GC/MS											
Batch	1703331										
**p-Terphenyl-d14	100	41.8		88.2	ug/L		88	(70%-130%)	JLD1	09/27/17	00:39

**Notes:**

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- 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
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate 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
- o Analyte failed to recover within LCS limits (Organics only)

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.

**Surrogate Recovery Report****SDG Number: GEL433405****Matrix Type: LIQUID**

Sample ID	Client ID	2FP %REC	PHL %REC	NBZ %REC	FBP %REC	TBP %REC	TPH %REC
1203881636	MB for batch 1703327	39 *	24 *	83	80	67 *	90
1203881637	LCS for batch 1703327	39 *	22 *	81	74	77	92
433405014	B3BWP2	36 *	22 *	79	71	63 *	84
1203881640	B3BWP2MS	57 *	38 *	84	77	81	91
1203881641	B3BWP2MSD	62 *	45 *	83	76	78	88

**Surrogate****Acceptance Limits**

2FP	= 2-Fluorophenol	(70%-130%)
PHL	= Phenol-d5	(70%-130%)
NBZ	= Nitrobenzene-d5	(70%-130%)
FBP	= 2-Fluorobiphenyl	(70%-130%)
TBP	= 2,4,6-Tribromophenol	(70%-130%)
TPH	= p-Terphenyl-d14	(70%-130%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL433405**  
**Work Order #: 433405**

**Product: Determination of Metals by ICP****Analytical Method:** SW846 3005A/6010D**Analytical Procedure:** GL-MA-E-013 REV# 29**Analytical Batch:** 1703116**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batch:** 1703115

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>
433405013	B3BWP5
433405014	B3BWP2
1203881095	Method Blank (MB)ICP
1203881096	Laboratory Control Sample (LCS)
1203881099	433405013(B3BWP5L) Serial Dilution (SD)
1203881097	433405013(B3BWP5S) Matrix Spike (MS)
1203881098	433405013(B3BWP5SD) 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 sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 433405013 (B3BWP5) and 433405014 (B3BWP2).

**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**

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL433405 GEL Work Order: 433405

**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: 19 OCT 2017****Title: Data Validator**

# Sample Data Summary

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

SDG No: GEL433405

CONTRACT: CPRC0S17009

METHOD TYPE: SW846

SAMPLE ID:433405013

BASIS: As Received

DATE COLLECTED 20-SEP-17

CLIENT ID: B3BWP5

LEVEL: Low

DATE RECEIVED 22-SEP-17

MATRIX: WATER

%SOLIDS: 0

CAS	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	HSC	09/26/17 15:07	092617A-1	1703116
7440-38-2	Arsenic	5	ug/L	U	5	30	30	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7440-39-3	Barium	58.9	ug/L		1	5	5	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7440-70-2	Calcium	56400	ug/L		50	200	200	1	P	HSC	09/27/17 11:24	092717A-2	1703116
7440-47-3	Chromium	1.22	ug/L	B	1	5	5	1	P	HSC	09/27/17 11:24	092717A-2	1703116
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7439-95-4	Magnesium	17800	ug/L		110	300	300	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7440-02-0	Nickel	1.5	ug/L	U	1.5	5	5	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7440-09-7	Potassium	5770	ug/L		50	150	150	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7440-23-5	Sodium	27800	ug/L		100	300	300	1	P	HSC	09/27/17 11:24	092717A-2	1703116
7440-62-2	Vanadium	16.2	ug/L		1	5	5	1	P	HSC	09/26/17 15:07	092617A-1	1703116
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	09/27/17 11:24	092717A-2	1703116

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1703116	1703115	SW846 3005A	50	mL	50	mL	09/22/17	JXM8

**\*Analytical Methods:**

P SW846 3005A/6010D

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

SDG No: GEL433405

CONTRACT: CPRC0S17009

METHOD TYPE: SW846

SAMPLE ID: 433405014

BASIS: As Received

DATE COLLECTED 20-SEP-17

CLIENT ID: B3BWP2

LEVEL: Low

DATE RECEIVED 22-SEP-17

MATRIX: WATER

%SOLIDS: 0

CAS	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	HSC	09/26/17 15:19	092617A-1	1703116
7440-38-2	Arsenic	5	ug/L	U	5	30	30	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7440-39-3	Barium	58.7	ug/L		1	5	5	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7440-70-2	Calcium	56000	ug/L		50	200	200	1	P	HSC	09/27/17 11:37	092717A-2	1703116
7440-47-3	Chromium	1.67	ug/L	B	1	5	5	1	P	HSC	09/27/17 11:37	092717A-2	1703116
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7439-89-6	Iron	186	ug/L		30	100	100	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7439-95-4	Magnesium	17600	ug/L		110	300	300	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7439-96-5	Manganese	5.12	ug/L	B	2	10	10	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7440-02-0	Nickel	1.5	ug/L	U	1.5	5	5	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7440-09-7	Potassium	5770	ug/L		50	150	150	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7440-23-5	Sodium	27900	ug/L		100	300	300	1	P	HSC	09/27/17 11:37	092717A-2	1703116
7440-62-2	Vanadium	16.3	ug/L		1	5	5	1	P	HSC	09/26/17 15:19	092617A-1	1703116
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	09/27/17 11:37	092717A-2	1703116

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1703116	1703115	SW846 3005A	50	mL	50	mL	09/22/17	JXM8

**\*Analytical Methods:**

P SW846 3005A/6010D

# Quality Control Summary

**GEL LABORATORIES LLC**

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**QC Summary**

Report Date: October 19, 2017

Page 1 of 7

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 433405

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1703116										
QC1203881096	LCS										
Antimony	500			474	ug/L		94.9	(80%-120%)	HSC	09/26/17	15:03
Arsenic	500			468	ug/L		93.7	(80%-120%)			
Barium	500			487	ug/L		97.4	(80%-120%)			
Cadmium	500			477	ug/L		95.5	(80%-120%)			
Calcium	5000			4890	ug/L		97.7	(80%-120%)		09/27/17	11:21
Chromium	500			484	ug/L		96.8	(80%-120%)			
Cobalt	500			498	ug/L		99.6	(80%-120%)		09/26/17	15:03
Copper	500			498	ug/L		99.5	(80%-120%)			
Iron	5000			5190	ug/L		104	(80%-120%)			
Magnesium	5000			5190	ug/L		104	(80%-120%)			
Manganese	500			490	ug/L		98.1	(80%-120%)			
Nickel	500			476	ug/L		95.3	(80%-120%)			
Potassium	5000			4690	ug/L		93.7	(80%-120%)			

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**QC Summary**

Workorder: 433405

Page 2 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1703116										
Silver	500			476	ug/L		95.2	(80%-120%)	HSC	09/26/17	15:03
Sodium	5000			4990	ug/L		99.8	(80%-120%)		09/27/17	11:21
Vanadium	500			488	ug/L		97.5	(80%-120%)		09/26/17	15:03
Zinc	500			466	ug/L		93.3	(80%-120%)		09/27/17	11:21
QC1203881095	MB										
Antimony			U	3.50	ug/L					09/26/17	15:00
Arsenic			U	5.00	ug/L						
Barium			U	1.00	ug/L						
Cadmium			U	1.00	ug/L						
Calcium			U	50.0	ug/L					09/27/17	11:18
Chromium			U	1.00	ug/L						
Cobalt			U	1.00	ug/L					09/26/17	15:00
Copper			U	3.00	ug/L						
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Manganese			U	2.00	ug/L						

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**QC Summary**

Workorder: 433405

Page 3 of 7

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1703116										
Nickel			U	1.50	ug/L				HSC	09/26/17	15:00
Potassium			U	50.0	ug/L						
Silver			U	1.00	ug/L						
Sodium			U	100	ug/L					09/27/17	11:18
Vanadium			U	1.00	ug/L					09/26/17	15:00
Zinc			U	3.30	ug/L					09/27/17	11:18
QC1203881097 433405013 MS											
Antimony	500	U	3.50	480	ug/L		96	(75%-125%)		09/26/17	15:10
Arsenic	500	B	-5.68	482	ug/L		96.5	(75%-125%)			
Barium	500		58.9	537	ug/L		95.5	(75%-125%)			
Cadmium	500	U	1.00	468	ug/L		93.7	(75%-125%)			
Calcium	5000		56400	61800	ug/L		N/A	(75%-125%)		09/27/17	11:28
Chromium	500	B	1.22	478	ug/L		95.4	(75%-125%)			
Cobalt	500	U	1.00	467	ug/L		93.4	(75%-125%)		09/26/17	15:10
Copper	500	U	3.00	492	ug/L		98.5	(75%-125%)			
Iron	5000	U	30.0	5070	ug/L		101	(75%-125%)			

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**QC Summary**

Workorder: 433405

Page 4 of 7

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>												
Batch	1703116											
Magnesium	5000		17800		23000	ug/L		103	(75%-125%)	HSC	09/26/17	15:10
Manganese	500	U	2.00		470	ug/L		94.1	(75%-125%)			
Nickel	500	U	1.50		447	ug/L		89.4	(75%-125%)			
Potassium	5000		5770		10300	ug/L		90.1	(75%-125%)			
Silver	500	U	1.00		471	ug/L		94.2	(75%-125%)			
Sodium	5000		27800		33800	ug/L		N/A	(75%-125%)		09/27/17	11:28
Vanadium	500		16.2		509	ug/L		98.6	(75%-125%)		09/26/17	15:10
Zinc	500	U	3.30		459	ug/L		91.1	(75%-125%)		09/27/17	11:28
QC1203881098	433405013 MSD											
Antimony	500	U	3.50		491	ug/L	2.17	98.1	(0%-20%)		09/26/17	15:13
Arsenic	500	B	-5.68		491	ug/L	1.81	98.2	(0%-20%)			
Barium	500		58.9		543	ug/L	1.24	96.9	(0%-20%)			
Cadmium	500	U	1.00		476	ug/L	1.61	95.2	(0%-20%)			
Calcium	5000		56400		62400	ug/L	0.91	N/A	(0%-20%)		09/27/17	11:31
Chromium	500	B	1.22		482	ug/L	0.742	96.1	(0%-20%)			
Cobalt	500	U	1.00		475	ug/L	1.68	95	(0%-20%)		09/26/17	15:13

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**QC Summary**

Workorder: 433405

Page 5 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1703116										
Copper	500	U	3.00	502	ug/L	2	100	(0%-20%)	HSC	09/26/17	15:13
Iron	5000	U	30.0	5160	ug/L	1.74	103	(0%-20%)			
Magnesium	5000		17800	23300	ug/L	1.3	109	(0%-20%)			
Manganese	500	U	2.00	480	ug/L	2	96	(0%-20%)			
Nickel	500	U	1.50	457	ug/L	2.28	91.5	(0%-20%)			
Potassium	5000		5770	10400	ug/L	1.33	92.9	(0%-20%)			
Silver	500	U	1.00	479	ug/L	1.66	95.7	(0%-20%)			
Sodium	5000		27800	32800	ug/L	2.9	N/A	(0%-20%)		09/27/17	11:31
Vanadium	500		16.2	520	ug/L	2	101	(0%-20%)		09/26/17	15:13
Zinc	500	U	3.30	470	ug/L	2.46	93.3	(0%-20%)		09/27/17	11:31
QC1203881099 433405013 SDILT											
Antimony		U	0.481	DU	17.5	ug/L	N/A	(0%-20%)		09/26/17	15:16
Arsenic		B	-5.68	DU	25.0	ug/L	N/A	(0%-20%)			
Barium			58.9	D	12.1	ug/L	2.85	(0%-20%)			
Cadmium		U	0.0828	DU	5.00	ug/L	N/A	(0%-20%)			
Calcium			56400	D	11500	ug/L	1.51	(0%-20%)		09/27/17	11:34

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**QC Summary**

Workorder: 433405

Page 6 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1703116										
Chromium	B	1.22	DU	5.00	ug/L	N/A		(0%-20%)	HSC	09/27/17	11:34
Cobalt	U	-0.536	DU	5.00	ug/L	N/A		(0%-20%)		09/26/17	15:16
Copper	U	-0.0021	DU	15.0	ug/L	N/A		(0%-20%)			
Iron	U	25.7	DU	150	ug/L	N/A		(0%-20%)			
Magnesium		17800	D	3670	ug/L	2.98		(0%-20%)			
Manganese	U	-0.0085	DU	10.0	ug/L	N/A		(0%-20%)			
Nickel	U	0.0444	DU	7.50	ug/L	N/A		(0%-20%)			
Potassium		5770	D	1150	ug/L	.646		(0%-20%)			
Silver	U	-0.984	DU	5.00	ug/L	N/A		(0%-20%)			
Sodium		27800	D	5820	ug/L	4.56		(0%-20%)		09/27/17	11:34
Vanadium		16.2	BD	3.25	ug/L	.311		(0%-20%)		09/26/17	15:16
Zinc	U	3.29	BD	5.32	ug/L	N/A		(0%-20%)		09/27/17	11:34

**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.

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**QC Summary**

Workorder: 433405

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

# General Chem Analysis

# Case Narrative

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL433405  
Work Order #: 433405**

**Product: Ion Chromatography****Analytical Method:** 9056\_ANIONS\_IC**Analytical Procedure:** GL-GC-E-086 REV# 25**Analytical Batch:** 1703011

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>
433405001	B3BVP0
433405002	B3BVP1
433405003	B3BVM0
433405004	B3BVN1
433405005	B3BVN6
433405006	B3BWP8
433405007	B3BWP4
1203880824	Method Blank (MB)
1203880825	Laboratory Control Sample (LCS)
1203880826	433405005(B3BVN6) Sample Duplicate (DUP)
1203880827	433405005(B3BVN6) Post Spike (PS)

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****Sample Dilutions**

The following samples 1203880826 (B3BVN6DUP), 1203880827 (B3BVN6PS), 433405002 (B3BVP1), 433405003 (B3BVM0), 433405004 (B3BVN1), 433405005 (B3BVN6), 433405006 (B3BWP8) and 433405007 (B3BWP4) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	433405					
	002	003	004	005	006	007
Several	10X 1X	5X 1X	5X 1X	10X 1X	5X 1X	10X 1X

**Miscellaneous Information**

**Manual Integrations**

Samples 433405001 (B3BVP0), 433405003 (B3BVM0), 433405004 (B3BVN1), 433405006 (B3BWP8) and 433405007 (B3BWP4) were manually integrated to correctly position the baseline as set in the calibration standards.

**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**

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL433405 GEL Work Order: 433405

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

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

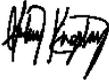
**D** Results are reported from a diluted aliquot of sample.

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

**Review/Validation**

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

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

**Signature:****Name: Aubrey Kingsbury****Date: 27 SEP 2017****Title: Analyst I**

# Sample Data Summary

**GEL LABORATORIES LLC**

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**Certificate of Analysis**

Report Date: September 27, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-009

Client Sample ID: B3BVP0 Project: CPRC0S17009  
 Sample ID: 433405001 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 21-SEP-17 07:10  
 Receive Date: 22-SEP-17  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON + GW 02 "As Received"												
Bromide	U	67.0	67.0	250	ug/L		1	MXL2	09/22/17	1256	1703011	1
Chloride	B	134	67.0	200	ug/L		1					
Fluoride	U	33.0	33.0	500	ug/L		1					
Nitrate-N	B	51.6	33.0	250	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Phosphorus in phosphate	U	67.0	67.0	500	ug/L		1					
Sulfate	U	133	133	500	ug/L		1					

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	9056_ANIONS_IC		

**Notes:**

Column headers are defined as follows:

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



**GEL LABORATORIES LLC**

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**Certificate of Analysis**

Report Date: September 27, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-009

Client Sample ID: B3BVM0 Project: CPRC0S17009  
 Sample ID: 433405003 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 21-SEP-17 10:16  
 Receive Date: 22-SEP-17  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON + GW 02 "As Received"												
Bromide	B	176	67.0	250	ug/L		1	MXL2	09/22/17	1354	1703011	1
Fluoride	B	78.4	33.0	500	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Phosphorus in phosphate	U	67.0	67.0	500	ug/L		1					
Chloride	D	12300	335	1000	ug/L		5	MXL2	09/22/17	1747	1703011	2
Nitrate-N	D	10600	165	500	ug/L		5					
Sulfate	D	68100	665	2000	ug/L		5					

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	9056_ANIONS_IC		
2	9056_ANIONS_IC		

**Notes:**

Column headers are defined as follows:

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

**GEL LABORATORIES LLC**

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**Certificate of Analysis**

Report Date: September 27, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-009

Client Sample ID: B3BVN1 Project: CPRC0S17009  
 Sample ID: 433405004 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 21-SEP-17 10:45  
 Receive Date: 22-SEP-17  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON + GW 02 "As Received"												
Bromide	B	176	67.0	250	ug/L		1	MXL2	09/22/17	1423	1703011	1
Fluoride	B	70.9	33.0	500	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Phosphorus in phosphate		529	67.0	500	ug/L		1					
Chloride	D	12500	335	1000	ug/L		5	MXL2	09/22/17	1816	1703011	2
Nitrate-N	D	11300	165	500	ug/L		5					
Sulfate	D	62000	665	2000	ug/L		5					

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	9056_ANIONS_IC		
2	9056_ANIONS_IC		

**Notes:**

Column headers are defined as follows:

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



**GEL LABORATORIES LLC**

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**Certificate of Analysis**

Report Date: September 27, 2017

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S17-009

Client Sample ID: B3BWP8 Project: CPRC0S17009  
 Sample ID: 433405006 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 20-SEP-17 12:20  
 Receive Date: 22-SEP-17  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON "As Received"												
Fluoride	B	343	33.0	500	ug/L		1	MXL2	09/22/17	1101	1703011	1
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Chloride	D	18000	335	1000	ug/L		5	MXL2	09/22/17	1158	1703011	2
Nitrate-N	D	15100	165	500	ug/L		5					
Sulfate	D	31500	665	2000	ug/L		5					

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	9056_ANIONS_IC		
2	9056_ANIONS_IC		

**Notes:**

Column headers are defined as follows:

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



# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: September 27, 2017

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 433405

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1703011										
QC1203880826	433405005	DUP									
Bromide	B	181	B	177	ug/L	2.18	^	(+/-250)	MXL2	09/22/17	16:18
Chloride	D	22200	D	22200	ug/L	0.113		(0%-20%)		09/22/17	19:14
Fluoride	B	84.8	B	98.9	ug/L	15.4	^	(+/-500)		09/22/17	16:18
Nitrate-N	D	16500	D	16600	ug/L	0.248		(0%-20%)		09/22/17	19:14
Nitrite-N	U	33.0	U	33.0	ug/L	N/A				09/22/17	16:18
Phosphorus in phosphate	U	67.0	U	67.0	ug/L	N/A					
Sulfate	D	101000	D	101000	ug/L	0.0474		(0%-20%)		09/22/17	19:14
QC1203880825	LCS										
Bromide	1250			1220	ug/L			97.8	(80%-120%)	09/22/17	10:29
Chloride	5000			4730	ug/L			94.6	(80%-120%)		
Fluoride	2500			2330	ug/L			93.3	(80%-120%)		
Nitrate-N	2500			2390	ug/L			95.6	(80%-120%)		
Nitrite-N	2500			2430	ug/L			97.3	(80%-120%)		
Phosphorus in phosphate	1250			1210	ug/L			97.1	(80%-120%)		

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**QC Summary**

Workorder: 433405

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1703011										
Sulfate	10000			9800	ug/L		98	(80%-120%)	MXL2	09/22/17	10:29
QC1203880824	MB										
Bromide			U	67.0	ug/L					09/22/17	10:00
Chloride			U	67.0	ug/L						
Fluoride			U	33.0	ug/L						
Nitrate-N			U	33.0	ug/L						
Nitrite-N			U	33.0	ug/L						
Phosphorus in phosphate			U	67.0	ug/L						
Sulfate			U	133	ug/L						
QC1203880827	433405005 PS										
Bromide	1.25	B	0.181	1.40	mg/L		97.5	(75%-125%)		09/22/17	16:47
Chloride	5.00	D	2.22 D	7.13	mg/L		98.3	(75%-125%)		09/22/17	19:43
Fluoride	2.50	B	0.0848	2.30	mg/L		88.7	(75%-125%)		09/22/17	16:47
Nitrate-N	2.50	D	1.65 D	4.17	mg/L		101	(75%-125%)		09/22/17	19:43
Nitrite-N	2.50	U	0.00	2.40	mg/L		95.8	(75%-125%)		09/22/17	16:47
Phosphorus in phosphate	1.25	U	0.00	1.20	mg/L		95.9	(75%-125%)			

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 433405

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1703011										
Sulfate	10.0	D	10.1	D	20.7	mg/L	106	(75%-125%)	MXL2	09/22/17	19:43

**Notes:**

The Qualifiers in this report are defined as follows:

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

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 #: GEL433405**  
**Work Order #: 433405**

**Product:** AMCMISO\_EIE\_PRECIP\_AEA: COMMON

**Analytical Method:** AMCMISO\_EIE\_PREC\_AEA

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

**Analytical Batch:** 1706080

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>
433405009	B3BVN0
1203887933	Method Blank (MB)
1203887934	433155003(B3BVF4) Sample Duplicate (DUP)
1203887935	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:** PUISO\_PRECIP\_AEA:COMMON

**Analytical Method:** PUISO\_PRECIP\_AEA

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

**Analytical Batch:** 1706081

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>
433405009	B3BVN0
1203887936	Method Blank (MB)
1203887937	433155003(B3BVF4) Sample Duplicate (DUP)
1203887938	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:** UISO\_IE\_PRECIP\_AEA:COMMON

**Analytical Method:** UISO\_IE\_PRECIP\_AEA

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

**Analytical Batch:** 1706082

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>
433405009	B3BVN0
1203887940	Method Blank (MB)
1203887941	433155003(B3BVF4) Sample Duplicate (DUP)
1203887942	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Technical Information**

**Recounts**

Sample 1203887941 (B3BVF4DUP) recounted due to high relative percent difference/relative error ratio. Sample was then recounted due to detector error. Sample was then recounted again due to high relative percent difference/relative error ratio. The fourth count is reported.

**Product:** GAMMA\_GS:COMMON + GW 01

**Analytical Method:** 901.1\_GAMMA\_GS

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1703792

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>
433405009	B3BVN0
433405012	B3BW79
1203882770	Method Blank (MB)
1203882771	433155003(B3BVF4) Sample Duplicate (DUP)
1203882772	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.

#### Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
X	Results are considered a false positive due to low abundance.	Cesium-134	1203882771	B3BVF4(433155003DUP)

**Product:** I129LL\_SEP\_LEPS\_GS: COMMON (low level)

**Analytical Method:** DOE EML HASL-300,I-01 Modified

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

**Analytical Batch:** 1709823

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
433405014	B3BWP2
1203897199	Method Blank (MB)
1203897200	433550004(NonSDG) Sample Duplicate (DUP)
1203897201	433550004(NonSDG) Matrix Spike (MS)
1203897202	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:** 9310\_ALPHABETA\_GPC: COMMON

**Analytical Method:** 9310\_ALPHABETA\_GPC

**Analytical Procedure:** GL-RAD-A-001 REV# 19

**Analytical Batch:** 1703109

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
433405012	B3BW79
1203881076	Method Blank (MB)
1203881077	433452003(NonSDG) Sample Duplicate (DUP)
1203881078	433452003(NonSDG) Matrix Spike (MS)
1203881079	433452003(NonSDG) Matrix Spike Duplicate (MSD)

1203881080                      Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Technical Information**

**Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

**Recounts**

Samples 1203881077 (Non SDG 433452003DUP) and 433405012 (B3BW79) were recounted to verify sample results. The second counts are reported.

**Miscellaneous Information**

**Additional Comments**

The matrix spike and matrix spike duplicate, 1203881078 (Non SDG 433452003MS) and 1203881079 (Non SDG 433452003MSD), aliquots were reduced to conserve sample volume.

**Product: SRISO\_SEP\_PRECIP\_GPC: COMMON**

**Analytical Method: SRISO\_SEP\_PRECIP\_GPC**

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

**Analytical Batch: 1708662**

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>
433405009	B3BVN0
433405010	B3BVN5
433405011	B3BVP3
433405012	B3BW79
1203894169	Method Blank (MB)
1203894170	433173004(NonSDG) Sample Duplicate (DUP)
1203894171	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

applicable, with the following exceptions.

**Technical Information**

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

Samples were reprepared to verify the results. The re-analysis is being reported.

**Recounts**

Sample 1203894171 (LCS) was recounted due to low recovery. The recount is reported.

**Product:** PU241\_IE\_LSC: COMMON

**Analytical Method:** PU241\_IE\_LSC

**Analytical Procedure:** GL-RAD-A-035 REV# 19

**Analytical Batch:** 1706083

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>
433405009	B3BVN0
1203887944	Method Blank (MB)
1203887945	433155003(B3BVF4) Sample Duplicate (DUP)
1203887946	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:** SE79\_SEP\_IE\_LSC: COMMON

**Analytical Method:** SE79\_SEP\_IE\_LSC

**Analytical Procedure:** GL-RAD-A-031 REV# 13

**Analytical Batch:** 1703169

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>
433405009	B3BVN0
1203881242	Method Blank (MB)
1203881243	433155003(B3BVF4) Sample Duplicate (DUP)
1203881244	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:** 1703627

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>
433405009	B3BVN0
433405012	B3BW79
433405014	B3BWP2
1203882395	Method Blank (MB)
1203882396	433155003(B3BVF4) Sample Duplicate (DUP)
1203882397	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Technical Information****Recounts**

Samples 433405012 (B3BW79) and 433405014 (B3BWP2) were recounted to verify sample results. Recounts are reported.

**Product:** C14\_LSC: COMMON

**Analytical Method:** C14\_LSC

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

**Analytical Batch:** 1705229

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>
433405009	B3BVN0
1203886025	Method Blank (MB)
1203886026	433280008(NonSDG) Sample Duplicate (DUP)

1203886027                    433280008(NonSDG) Matrix Spike (MS)  
 1203886028                    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.

**Miscellaneous Information**

**Additional Comments**

The matrix spike, 1203886027 (Non SDG 433280008MS), aliquot was reduced to conserve sample volume.

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

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

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

**Analytical Batch:** 1705260

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>
433405008	B3BVL9
433405009	B3BVN0
433405010	B3BVN5
433405011	B3BVP3
433405012	B3BW79
433405014	B3BWP2
1203886143	Method Blank (MB)
1203886144	433182001(NonSDG) Sample Duplicate (DUP)
1203886145	433182001(NonSDG) Matrix Spike (MS)
1203886146	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Technical Information**

**Recounts**

Sample 1203886146 (LCS) was recounted due to low recovery. The recount is reported.

**Miscellaneous Information**

**Additional Comments**

The matrix spike, 1203886145 (Non SDG 433182001MS), aliquot was reduced to conserve sample volume.

**Certification Statement**

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

**GEL LABORATORIES LLC**

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

**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL433405 GEL Work Order: 433405

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

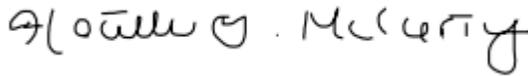
U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

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

**Review/Validation**

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

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

**Signature:****Name: Heather McCarty****Date: 19 OCT 2017****Title: Analyst II**

# Sample Data Summary

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

SDG Number: GEL433405	Client: CPRC001	Project: CPRC0S17009
Lab Sample ID: 433405008	Date Collected: 09/21/2017 10:16	Matrix: WATER
	Date Received: 09/22/2017 09:20	
Client ID: B3BVL9	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1705260	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 10/05/2017 18:34	Aliquot: 50 mL	Instrument: LSCMOCHA
Data File: T1705260.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1705260		
Prep Date: 10/04/2017 14:45		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		6960	pCi/L	+/-425	1410	371	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

**Comments:**

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> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405009	<b>Date Collected:</b> 09/21/2017 10:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BVN0	<b>Method:</b> AMCMISO_EIE_PREC_AEA	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1706080	<b>Analyst:</b> BXA4	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 10/09/2017 18:33	<b>Aliquot:</b> 0.4 L	<b>Instrument:</b> 1067
<b>Data File:</b> S0433405009_AM.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Am-05	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1706080		
<b>Prep Date:</b> 10/05/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0576	pCi/L	+/-0.0563	0.0564	0.175	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	5.40	5.24	pCi/L	103	(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> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405009	<b>Date Collected:</b> 09/21/2017 10:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BVN0	<b>Method:</b> PUIISO_PRECIP_AEA	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1706081	<b>Analyst:</b> BXA4	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 10/09/2017 18:33	<b>Aliquot:</b> 0.4 L	<b>Instrument:</b> 1092
<b>Data File:</b> S0433405009_PU.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, Pu-11-	<b>Count Time:</b> 239.9998 min
<b>Prep Batch:</b> 1706081		
<b>Prep Date:</b> 10/05/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0566	pCi/L	+/-0.084	0.0844	0.123	1.00
OER-100-70	Plutonium-239/240	U	-0.0536	pCi/L	+/-0.0483	0.0484	0.172	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-236 Tracer	2.82	3.38	pCi/L	83.5	(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> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405009	<b>Date Collected:</b> 09/21/2017 10:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BVN0	<b>Method:</b> UIISO_IE_PRECIP_AEA	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1706082	<b>Analyst:</b> BXA4	<b>SOP Ref:</b> GL-RAD-A-011
<b>Run Date:</b> 10/09/2017 18:47	<b>Aliquot:</b> 0.4 L	<b>Instrument:</b> 1004
<b>Data File:</b> S0433405009_UU.1A.gcnf	<b>Prep Method:</b> DOE EML HASL-300, U-02-R	<b>Count Time:</b> 240 min
<b>Prep Batch:</b> 1706082		
<b>Prep Date:</b> 10/05/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		0.929	pCi/L	+/-0.273	0.303	0.139	1.00
15117-96-1/13982-7	Uranium-235/236		0.209	pCi/L	+/-0.153	0.156	0.136	1.00
7440-61-1	Uranium-238		0.700	pCi/L	+/-0.237	0.257	0.121	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	4.25	5.24	pCi/L	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: GEL433405	Client: CPRC001	Project: CPRC0S17009
Lab Sample ID: 433405009	Date Collected: 09/21/2017 10:45	Matrix: WATER
	Date Received: 09/22/2017 09:20	
Client ID: B3BVN0	Method: PU241_IE_LSC	Prep Basis: "As Received"
Batch ID: 1706083	Analyst: BXA4	SOP Ref: GL-RAD-A-035
Run Date: 10/16/2017 13:45	Aliquot: 0.4 L	Instrument: LSCSILVER
Data File: PU1706083.xls	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 45 min
Prep Batch: 1706083		
Prep Date: 10/05/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14119-32-5	Plutonium-241	U	0.546	pCi/L	+/-8.16	8.16	14.0	25.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-236 Tracer	2.82	3.38	pCi/L	83.5	(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: GEL433405	Client: CPRC001	Project: CPRC0S17009
Lab Sample ID: 433405009	Date Collected: 09/21/2017 10:45	Matrix: WATER
	Date Received: 09/22/2017 09:20	
Client ID: B3BVN0	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1708662	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 10/13/2017 14:05	Aliquot: 300 mL	Instrument: LB4100J2
Data File: S1708662.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1708662		
Prep Date: 10/12/2017 10:59		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		1590	pCi/L	+/-17.9	251	1.42	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	8.50	7.85	mg	108	(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:** GEL433405  
**Lab Sample ID:** 433405009  
  
**Client ID:** B3BVN0  
**Batch ID:** 1703792  
**Run Date:** 10/14/2017 06:19  
**Data File:** G433405009.CNF;1  
**Prep Batch:** 1703792  
**Prep Date:** 10/13/2017 12:14

**Client:** CPRC001  
**Date Collected:** 09/21/2017 10:45  
**Date Received:** 09/22/2017 09:20  
  
**Method:** 901.1\_GAMMA\_GS  
**Analyst:** MJH1  
**Aliquot:** 0.5 L  
**Prep Method:** EPA 901.1

**Project:** CPRC0S17009  
**Matrix:** WATER  
  
**Prep Basis:** "As Received"  
**SOP Ref:** GL-RAD-A-013  
**Instrument:** GAM25  
**Count Time:** 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	-4.94	pCi/L	+/-11.3	11.6	20.2	
13967-70-9	Cesium-134	U	-0.628	pCi/L	+/-5.34	5.35	10.4	
10045-97-3	Cesium-137	U	-0.119	pCi/L	+/-5.05	5.05	9.32	15.0
10198-40-0	Cobalt-60	U	-0.0662	pCi/L	+/-6.00	6.00	11.6	
14683-23-9	Europium-152	U	-4.86	pCi/L	+/-12.4	12.6	22.4	
15585-10-1	Europium-154	U	-9.27	pCi/L	+/-16.1	16.6	27.6	
14391-16-3	Europium-155	U	0.116	pCi/L	+/-12.0	12.0	21.5	
13966-00-2	Potassium-40	U	15.5	pCi/L	+/-79.3	79.3	105	

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**

<b>SDG Number:</b> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405009	<b>Date Collected:</b> 09/21/2017 10:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BVN0	<b>Method:</b> SE79_SEP_IE_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1703169	<b>Analyst:</b> CXS7	<b>SOP Ref:</b> GL-RAD-A-031
<b>Run Date:</b> 09/27/2017 21:53	<b>Aliquot:</b> 0.08 L	<b>Instrument:</b> LSCBROWN
<b>Data File:</b> SE1703169.xls	<b>Prep Method:</b> NERC ORD	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1703169		
<b>Prep Date:</b> 09/25/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	U	-0.938	pCi/L	+/-16.5	16.5	28.4	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	19.4	20.0	mg	97	(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**

<b>SDG Number:</b> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405009	<b>Date Collected:</b> 09/21/2017 10:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BVN0	<b>Method:</b> TC99_EIE_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1703627	<b>Analyst:</b> CXS7	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 10/10/2017 07:35	<b>Aliquot:</b> 100 mL	<b>Instrument:</b> LSCYELLOW
<b>Data File:</b> E1703627R.xls	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1703627		
<b>Prep Date:</b> 10/05/2017 14:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-7.43	pCi/L	+/-12.9	12.9	22.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	25100	25800	CPM	97.3	(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: GEL433405	Client: CPRC001	Project: CPRC0S17009
Lab Sample ID: 433405009	Date Collected: 09/21/2017 10:45	Matrix: WATER
	Date Received: 09/22/2017 09:20	
Client ID: B3BVN0	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1705229	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 10/05/2017 12:08	Aliquot: 100.04 mL	Instrument: LSCGOLD
Data File: C1705229.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1705229		
Prep Date: 10/04/2017 14:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		276	pCi/L	+/-28.9	58.8	34.5	50.0

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**

<b>SDG Number:</b> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405009	<b>Date Collected:</b> 09/21/2017 10:45	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BVN0	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1705260	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 10/05/2017 19:25	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCMOCHA
<b>Data File:</b> T1705260.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 50 min
<b>Prep Batch:</b> 1705260		
<b>Prep Date:</b> 10/04/2017 14:45		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		7700	pCi/L	+/-452	1560	385	400

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**

<b>SDG Number:</b> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405010	<b>Date Collected:</b> 09/21/2017 09:53	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BVN5	<b>Method:</b> SRISO_SEP_PRECIP_GPC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1708662	<b>Analyst:</b> LXB3	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 10/13/2017 14:05	<b>Aliquot:</b> 300 mL	<b>Instrument:</b> LB4100J3
<b>Data File:</b> S1708662.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1708662		
<b>Prep Date:</b> 10/12/2017 10:59		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		433	pCi/L	+/-9.57	70.5	1.56	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	8.20	7.85	mg	104	(40%-110%)

**Comments:**

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: GEL433405	Client: CPRC001	Project: CPRC0S17009
Lab Sample ID: 433405010	Date Collected: 09/21/2017 09:53	Matrix: WATER
	Date Received: 09/22/2017 09:20	
Client ID: B3BVN5	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1705260	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 10/05/2017 20:17	Aliquot: 50 mL	Instrument: LSCMOCHA
Data File: T1705260.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1705260		
Prep Date: 10/04/2017 14:45		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		8310	pCi/L	+/-467	1670	388	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

**Comments:**

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: GEL433405	Client: CPRC001	Project: CPRC0S17009
Lab Sample ID: 433405011	Date Collected: 09/21/2017 09:24	Matrix: WATER
	Date Received: 09/22/2017 09:20	
Client ID: B3BVP3	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1708662	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 10/13/2017 14:05	Aliquot: 300 mL	Instrument: LB4100J4
Data File: S1708662.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1708662		
Prep Date: 10/12/2017 10:59		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		3230	pCi/L	+/-27.8	512	1.72	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.90	7.85	mg	87.9	(40%-110%)

**Comments:**

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> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405011	<b>Date Collected:</b> 09/21/2017 09:24	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BVP3	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1705260	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 10/05/2017 21:08	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCMOCHA
<b>Data File:</b> T1705260.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 50 min
<b>Prep Batch:</b> 1705260		
<b>Prep Date:</b> 10/04/2017 14:45		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		3380	pCi/L	+/-333	733	372	400

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

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> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405012	<b>Date Collected:</b> 09/21/2017 08:11	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BW79	<b>Method:</b> 9310_ALPHABETA_GPC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1703109	<b>Analyst:</b> BXG2	<b>SOP Ref:</b> GL-RAD-A-001
<b>Run Date:</b> 09/27/2017 15:14	<b>Aliquot:</b> 150 mL	<b>Instrument:</b> PIC1A
<b>Data File:</b> AB1703109r.xls	<b>Prep Method:</b> EPA 900.0/SW846 9310	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1703109		
<b>Prep Date:</b> 09/26/2017 09:10		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA		61.8	pCi/L	+/-18.2	30.7	5.63	3.00
12587-47-2	Beta BETA		24200	pCi/L	+/-100	3910	2.72	4.00

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: GEL433405	Client: CPRC001	Project: CPRC0S17009
Lab Sample ID: 433405012	Date Collected: 09/21/2017 08:11	Matrix: WATER
	Date Received: 09/22/2017 09:20	
Client ID: B3BW79	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1708662	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 10/13/2017 14:06	Aliquot: 300 mL	Instrument: LB4100G1
Data File: S1708662.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1708662		
Prep Date: 10/12/2017 10:59		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		10400	pCi/L	+/-45.7	1670	1.51	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.90	7.85	mg	101	(40%-110%)

**Comments:**

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

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

**SDG Number:** GEL433405  
**Lab Sample ID:** 433405012  
  
**Client ID:** B3BW79  
**Batch ID:** 1703792  
**Run Date:** 10/14/2017 06:39  
**Data File:** G433405012.CNF;1  
**Prep Batch:** 1703792  
**Prep Date:** 10/13/2017 12:14

**Client:** CPRC001  
**Date Collected:** 09/21/2017 08:11  
**Date Received:** 09/22/2017 09:20  
  
**Method:** 901.1\_GAMMA\_GS  
**Analyst:** MJH1  
**Aliquot:** 0.5 L  
**Prep Method:** EPA 901.1

**Project:** CPRC0S17009  
**Matrix:** WATER  
  
**Prep Basis:** "As Received"  
**SOP Ref:** GL-RAD-A-013  
**Instrument:** GAM14  
**Count Time:** 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	-1.14	pCi/L	+/-12.2	12.2	23.0	
13967-70-9	Cesium-134	U	0.239	pCi/L	+/-4.89	4.90	9.42	
10045-97-3	Cesium-137	U	2.17	pCi/L	+/-5.02	5.11	9.33	15.0
10198-40-0	Cobalt-60	U	-3.57	pCi/L	+/-3.75	4.08	5.76	
14683-23-9	Europium-152	U	-0.311	pCi/L	+/-12.9	12.9	24.4	
15585-10-1	Europium-154	U	-2.6	pCi/L	+/-10.4	10.5	20.8	
14391-16-3	Europium-155	U	-11	pCi/L	+/-18.1	18.8	30.5	
13966-00-2	Potassium-40	U	-3.68	pCi/L	+/-62.6	62.7	125	

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**

<b>SDG Number:</b> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405012	<b>Date Collected:</b> 09/21/2017 08:11	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BW79	<b>Method:</b> TC99_EIE_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1703627	<b>Analyst:</b> CXS7	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 10/12/2017 13:00	<b>Aliquot:</b> 100 mL	<b>Instrument:</b> LSCYELLOW
<b>Data File:</b> E1703627R.xls	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1703627		
<b>Prep Date:</b> 10/05/2017 14:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		42.4	pCi/L	+/-13.8	14.6	21.3	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	24200	25800	CPM	94	(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: GEL433405	Client: CPRC001	Project: CPRC0S17009
Lab Sample ID: 433405012	Date Collected: 09/21/2017 08:11	Matrix: WATER
	Date Received: 09/22/2017 09:20	
Client ID: B3BW79	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1705260	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 10/05/2017 21:59	Aliquot: 50 mL	Instrument: LSCMOCHA
Data File: T1705260.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1705260		
Prep Date: 10/04/2017 14:45		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		8050	pCi/L	+/-459	1620	385	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**

SDG Number: GEL433405	Client: CPRC001	Project: CPRC0S17009
Lab Sample ID: 433405014	Date Collected: 09/20/2017 14:20	Matrix: WATER
	Date Received: 09/22/2017 09:20	
Client ID: B3BWP2	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1709823	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 10/16/2017 09:24	Aliquot: 1 L	Instrument: XRAY1
Data File: I433405014.CNF;2	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 180 min
Prep Batch: 1709823		
Prep Date: 10/14/2017 16:33		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129		3.58	pCi/L	+/-1.16	1.21	0.785	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

**Comments:**

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> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405014	<b>Date Collected:</b> 09/20/2017 14:20	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BWP2	<b>Method:</b> TC99_EIE_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1703627	<b>Analyst:</b> CXS7	<b>SOP Ref:</b> GL-RAD-A-059
<b>Run Date:</b> 10/12/2017 13:32	<b>Aliquot:</b> 100 mL	<b>Instrument:</b> LSCYELLOW
<b>Data File:</b> E1703627R.xls	<b>Prep Method:</b> DOE EML HASL-300, Tc-02-	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1703627		
<b>Prep Date:</b> 10/05/2017 14:58		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		191	pCi/L	+/-19.1	28.5	22.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	23200	25800	CPM	89.9	(30%-105%)

**Comments:**

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> GEL433405	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S17009
<b>Lab Sample ID:</b> 433405014	<b>Date Collected:</b> 09/20/2017 14:20	<b>Matrix:</b> WATER
	<b>Date Received:</b> 09/22/2017 09:20	
<b>Client ID:</b> B3BWP2	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1705260	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 10/05/2017 22:51	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCMOCHA
<b>Data File:</b> T1705260.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 50 min
<b>Prep Batch:</b> 1705260		
<b>Prep Date:</b> 10/04/2017 14:45		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		23300	pCi/L	+/-713	4550	378	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

**Comments:**

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: October 19, 2017

Page 1 of 8

**Client :** CH2MHill Plateau Remediation Company  
**MSIN R3-50 CHPRC**  
**PO Box 1600**  
**Richland, Washington 99352**  
**Contact:** Mr. Scot Fitzgerald  
**Workorder:** 433405

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1706080								
QC1203887933 MB									
Americium-241			U	0.016	pCi/L			BXA4	10/09/1718:33
				Uncert: +/-0.0714					
				TPU: +/-0.0714					
**Americium-243 Tracer	5.24			5.17	pCi/L	REC: 99	(30%-105%)		
				Uncert: +/-0.526					
				TPU: +/-0.820					
QC1203887934 433155003 DUP									
Americium-241		U 0.0349	U	-0.00133	pCi/L				
				Uncert: +/-0.0555		RPD: 0	N/A		
				TPU: +/-0.0556		RER: 0.481	(0-2)		
**Americium-243 Tracer	5.24	5.48		5.05	pCi/L	REC: 96	(30%-105%)		
				Uncert: +/-0.527					
				TPU: +/-0.821					
QC1203887935 LCS									
Americium-241		4.92		5.03	pCi/L	REC: 102	(80%-120%)		
				Uncert: +/-0.549					
				TPU: +/-0.835					
**Americium-243 Tracer	5.24			5.12	pCi/L	REC: 98	(30%-105%)		
				Uncert: +/-0.559					
				TPU: +/-0.862					
Batch	1706081								
QC1203887936 MB									
Plutonium-238			U	-0.00476	pCi/L			BXA4	10/09/1718:49
				Uncert: +/-0.041					
				TPU: +/-0.0411					
Plutonium-239/240			U	0.0262	pCi/L				
				Uncert: +/-0.082					
				TPU: +/-0.0821					
**Plutonium-236 Tracer	3.35			3.09	pCi/L	REC: 92	(30%-105%)		
				Uncert: +/-0.508					
				TPU: +/-0.741					
QC1203887937 433155003 DUP									
Plutonium-238		U 0.123	U	0.0461	pCi/L				10/09/1718:49
				Uncert: +/-0.115		RPD: 0	N/A		
				TPU: +/-0.117		RER: 1.02	(0-2)		
Plutonium-239/240		U -0.0236	U	0.0398	pCi/L				
				Uncert: +/-0.0639		RPD: 0	N/A		
				TPU: +/-0.064		RER: 1.11	(0-2)		
**Plutonium-236 Tracer	3.39	2.62		2.45	pCi/L	REC: 72	(30%-105%)		
				Uncert: +/-0.530					
				TPU: +/-0.772					
QC1203887938 LCS									
Plutonium-238				0.164	pCi/L				10/09/1718:33
				Uncert: +/-0.113					

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**QC Summary**

Workorder: 433405

Page 2 of 8

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1706081								
Plutonium-239/240	4.94	TPU:		+/-0.116					
		Uncert:		5.09	pCi/L	REC: 103	(80%-120%)		
		TPU:		+/-0.600					
**Plutonium-236 Tracer	3.35	TPU:		+/-0.993					
		Uncert:		2.61	pCi/L	REC: 78	(30%-105%)		
		TPU:		+/-0.488					
		TPU:		+/-0.714					
Batch	1706082								
QC1203887940	MB								
Uranium-233/234			U	0.0343	pCi/L			BXA4	10/09/1718:47
		Uncert:		+/-0.108					
		TPU:		+/-0.108					
Uranium-235/236			U	0.121	pCi/L				
		Uncert:		+/-0.142					
		TPU:		+/-0.144					
Uranium-238			U	0.0208	pCi/L				
		Uncert:		+/-0.0932					
		TPU:		+/-0.0933					
**Uranium-232 Tracer	5.24			3.09	pCi/L	REC: 59	(30%-105%)		
		Uncert:		+/-0.736					
		TPU:		+/-1.11					
QC1203887941	433155003	DUP							
Uranium-233/234		0.243	U	0.200	pCi/L				10/12/1711:17
		Uncert:	+/-0.199	+/-0.193		RPD: 14	(0% - 100%)		
		TPU:	+/-0.204	+/-0.196		RER: 0.296	(0-2)		
Uranium-235/236		U	0.0834	U	0.183	pCi/L			
		Uncert:	+/-0.151	+/-0.201		RPD: 2	(0% - 100%)		
		TPU:	+/-0.152	+/-0.203		RER: 0.768	(0-2)		
Uranium-238		U	0.0588	U	0.0651	pCi/L			
		Uncert:	+/-0.123	+/-0.126		RPD: 0	N/A		
		TPU:	+/-0.123	+/-0.127		RER: 0.0695	(0-2)		
**Uranium-232 Tracer	5.25			4.57	pCi/L	REC: 87	(30%-105%)		
		Uncert:	+/-0.862	+/-0.877					
		TPU:	+/-1.28	+/-1.30					
QC1203887942	LCS								
Uranium-233/234				6.48	pCi/L				10/09/1718:47
		Uncert:		+/-0.816					
		TPU:		+/-1.30					
Uranium-235/236				0.416	pCi/L				
		Uncert:		+/-0.240					
		TPU:		+/-0.249					
Uranium-238	6.75			6.04	pCi/L	REC: 90	(80%-120%)		
		Uncert:		+/-0.786					
		TPU:		+/-1.23					
**Uranium-232 Tracer	5.24			4.16	pCi/L	REC: 79	(30%-105%)		
		Uncert:		+/-0.736					
		TPU:		+/-1.11					
Batch	1706083								
QC1203887944	MB								

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**QC Summary**

Workorder: 433405

Page 3 of 8

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Alpha Spec</b>									
Batch	1706083								
Plutonium-241			U	-7.41	pCi/L			BXA4	10/14/1714:23
				Uncert: +/-7.36					
				TPU: +/-7.36					
**Plutonium-236 Tracer	3.35			3.09	pCi/L	REC: 92 (30%-105%)			
				Uncert: +/-0.508					
				TPU: +/-0.741					
QC1203887945 433155003 DUP									
Plutonium-241		U -2.06	U	-4.98	pCi/L				10/14/1715:10
				Uncert: +/-8.79		RPD: 0 N/A			
				TPU: +/-8.79		RER: 0.442 (0-2)			
**Plutonium-236 Tracer	3.39			2.62	pCi/L	REC: 72 (30%-105%)			
				Uncert: +/-0.530					
				TPU: +/-0.772					
QC1203887946 LCS									
Plutonium-241	181			184	pCi/L	REC: 102 (80%-120%)			10/14/1715:57
				Uncert: +/-12.3					
				TPU: +/-43.3					
**Plutonium-236 Tracer	3.35			2.81	pCi/L	REC: 84 (30%-105%)			
				Uncert: +/-0.476					
				TPU: +/-0.698					
<b>Rad Gamma Spec</b>									
Batch	1703792								
QC1203882770 MB									
Antimony-125			U	7.43	pCi/L			MJH1	10/14/1707:52
				Uncert: +/-10.2					
				TPU: +/-10.8					
Cesium-134			U	-2.37	pCi/L				
				Uncert: +/-4.28					
				TPU: +/-4.41					
Cesium-137			U	0.574	pCi/L				
				Uncert: +/-7.06					
				TPU: +/-7.06					
Cobalt-60			U	1.12	pCi/L				
				Uncert: +/-3.58					
				TPU: +/-3.62					
Europium-152			U	-0.986	pCi/L				
				Uncert: +/-9.39					
				TPU: +/-9.40					
Europium-154			U	-3.61	pCi/L				
				Uncert: +/-11.7					
				TPU: +/-11.8					
Europium-155			U	-2.25	pCi/L				
				Uncert: +/-10.8					
				TPU: +/-10.9					
Potassium-40			U	50.4	pCi/L				
				Uncert: +/-53.5					
				TPU: +/-53.7					
QC1203882771 433155003 DUP									
Antimony-125		U 9.32	U	-9.5	pCi/L				10/14/1707:53
				Uncert: +/-12.6		RPD: 0 N/A			

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**QC Summary**

Workorder: 433405

Page 4 of 8

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	1703792									
		TPU:	+/-13.3							
				+/-11.8						
Cesium-134		U	1.79 UX	0.00	pCi/L	RER: 2.07	(0-2)			
		Uncert:	+/-4.53	+/-6.91		RPD: 2	N/A			
		TPU:	+/-4.61	+/-8.18		RER: 1.61	(0-2)			
Cesium-137		U	-3.98 U	0.916	pCi/L					
		Uncert:	+/-4.72	+/-4.53		RPD: 0	N/A			
		TPU:	+/-5.06	+/-4.55		RER: 1.41	(0-2)			
Cobalt-60		U	0.528 U	2.60	pCi/L					
		Uncert:	+/-5.31	+/-4.51		RPD: 0	N/A			
		TPU:	+/-5.32	+/-4.67		RER: 0.574	(0-2)			
Europium-152		U	3.94 U	-1.31	pCi/L					
		Uncert:	+/-12.4	+/-11.1		RPD: 0	N/A			
		TPU:	+/-12.5	+/-11.1		RER: 0.615	(0-2)			
Europium-154		U	10.1 U	-0.872	pCi/L					
		Uncert:	+/-14.9	+/-13.6		RPD: 0	N/A			
		TPU:	+/-15.6	+/-13.6		RER: 1.03	(0-2)			
Europium-155		U	-11.5 U	-6.32	pCi/L					
		Uncert:	+/-20.6	+/-12.9		RPD: 0	N/A			
		TPU:	+/-21.3	+/-13.3		RER: 0.403	(0-2)			
Potassium-40		U	-108 U	-6.91	pCi/L					
		Uncert:	+/-70.9	+/-63.5		RPD: 0	N/A			
		TPU:	+/-86.7	+/-63.6		RER: 1.85	(0-2)			
QC1203882772 LCS										
Americium-241	1.10E+05			1.16E+05	pCi/L	REC: 105	(80%-120%)			10/14/1707:53
		Uncert:		+/-2160						
		TPU:		+/-9370						
Antimony-125			U	-130	pCi/L					
		Uncert:		+/-310						
		TPU:		+/-315						
Cesium-134			U	-34.3	pCi/L					
		Uncert:		+/-135						
		TPU:		+/-136						
Cesium-137	41700			42800	pCi/L	REC: 103	(80%-120%)			
		Uncert:		+/-715						
		TPU:		+/-3650						
Cobalt-60	36500			37700	pCi/L	REC: 103	(80%-120%)			
		Uncert:		+/-790						
		TPU:		+/-3500						
Europium-152			U	-112	pCi/L					
		Uncert:		+/-292						
		TPU:		+/-296						
Europium-154			U	-70.9	pCi/L					
		Uncert:		+/-216						
		TPU:		+/-218						
Europium-155			U	-41.7	pCi/L					
		Uncert:		+/-303						
		TPU:		+/-304						
Potassium-40			U	367	pCi/L					



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**QC Summary**

Workorder: 433405

Page 6 of 8

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gas Flow</b>									
Batch	1703109								
Alpha	80.6			81.3	pCi/L	REC: 101	(80%-120%)		
	Uncert:			+/-8.73					
	TPU:			+/-16.0					
Beta	317			320	pCi/L	REC: 101	(80%-120%)		
	Uncert:			+/-11.7					
	TPU:			+/-55.7					
Batch	1708662								
QC1203894169	MB								
Strontium-90			U	0.618	pCi/L			LXB3	10/13/1714:06
	Uncert:			+/-0.957					
	TPU:			+/-0.962					
**Strontium Carrier	7.85			7.10	mg	REC: 90	(40%-110%)		
QC1203894170	433173004	DUP							
Strontium-90		U	-0.322	U	-0.0979	pCi/L			
	Uncert:		+/-0.486		+/-0.784	RPD: 0	N/A		
	TPU:		+/-0.486		+/-0.784	RER: 0.477	(0-2)		
**Strontium Carrier	7.85		6.30		7.70	mg	REC: 98	(40%-110%)	
QC1203894171	LCS								
Strontium-90	79.1			65.7	pCi/L	REC: 83	(80%-120%)		10/16/1707:46
	Uncert:			+/-3.02					
	TPU:			+/-10.8					
**Strontium Carrier	7.85				7.60	mg	REC: 97	(40%-110%)	
<b>Rad Liquid Scintillation</b>									
Batch	1703169								
QC1203881242	MB								
Selenium-79			U	-0.461	pCi/L			CXS7	09/27/1722:24
	Uncert:			+/-15.7					
	TPU:			+/-15.7					
**Selenium Carrier	20.0			20.4	mg	REC: 102	(40%-110%)		
QC1203881243	433155003	DUP							
Selenium-79		U	12.5	U	-2.51	pCi/L			09/27/1722:56
	Uncert:		+/-17.3		+/-16.4	RPD: 0	N/A		
	TPU:		+/-17.3		+/-16.4	RER: 1.23	(0-2)		
**Selenium Carrier	20.0		18.8		19.6	mg	REC: 98	(40%-110%)	
QC1203881244	LCS								
Selenium-79	12400			12200	pCi/L	REC: 98	(80%-120%)		09/27/1723:27
	Uncert:			+/-242					
	TPU:			+/-349					
**Selenium Carrier	20.0				19.6	mg	REC: 98	(40%-110%)	
Batch	1703627								
QC1203882395	MB								
Technetium-99			U	-10.9	pCi/L			CXS7	10/10/1715:03
	Uncert:			+/-13.5					
	TPU:			+/-13.5					
**Technetium-99m Tracer	25800			24300	CPM	REC: 94	(30%-105%)		
QC1203882396	433155003	DUP							
Technetium-99		U	-4.51	U	-10.7	pCi/L			10/10/1715:34
	Uncert:		+/-15.0		+/-13.3	RPD: 0	N/A		
	TPU:		+/-15.0		+/-13.3	RER: 0.608	(0-2)		

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

**QC Summary**

Workorder: 433405

Page 7 of 8

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
Batch	1703627								
*Technetium-99m Tracer	25800	22100		24800	CPM	REC: 96 (30%-105%)			
QC1203882397 LCS									
Technetium-99	888			855	pCi/L	REC: 96 (80%-120%)			10/10/1716:05
	Uncert:			+/-31.5					
	TPU:			+/-99.9					
*Technetium-99m Tracer	25800			24700	CPM	REC: 96 (30%-105%)			
Batch	1705229								
QC1203886025 MB									
Carbon-14			U	-1.19	pCi/L			BXM4	10/05/1714:35
	Uncert:			+/-19.9					
	TPU:			+/-19.9					
QC1203886026 433280008 DUP									
Carbon-14		U	-24.7	U	-13.6	pCi/L			10/05/1714:51
	Uncert:		+/-18.7		+/-19.3		RPD: 0 N/A		
	TPU:		+/-18.7		+/-19.3		RER: 0.808 (0-2)		
QC1203886027 433280008 MS									
Carbon-14	2500	U	-24.7		2230	pCi/L	REC: 89 (75%-125%)		10/05/1715:08
	Uncert:		+/-18.7		+/-128				
	TPU:		+/-18.7		+/-434				
QC1203886028 LCS									
Carbon-14	750				705	pCi/L	REC: 94 (80%-120%)		10/05/1715:24
	Uncert:				+/-38.9				
	TPU:				+/-137				
Batch	1705260								
QC1203886143 MB									
Tritium			U	-20.5	pCi/L			BXM4	10/06/1701:44
	Uncert:			+/-219					
	TPU:			+/-219					
QC1203886144 433182001 DUP									
Tritium		U	-58	U	7.51	pCi/L			10/06/1702:35
	Uncert:		+/-215		+/-197		RPD: 0 N/A		
	TPU:		+/-215		+/-197		RER: 0.44 (0-2)		
QC1203886145 433182001 MS									
Tritium	4410	U	-58		3840	pCi/L	REC: 87 (75%-125%)		10/06/1703:27
	Uncert:		+/-215		+/-600				
	TPU:		+/-215		+/-955				
QC1203886146 LCS									
Tritium	2200				2440	pCi/L	REC: 111 (80%-120%)		10/06/1706:56
	Uncert:				+/-507				
	TPU:				+/-692				

**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

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

**QC Summary**

Workorder: 433405

Page 8 of 8

Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
A										
B										
B										
B										
C										
C										
D										
E										
E										
J										
M										
N										
P										
S										
T										
U										
UX										
W										
X										
Y										
Z										
o										

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.