

6/15/2016



a member of **The GEL Group** INC



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June 15, 2016

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

Re: CHPRC SAF F16-041  
Work Order: 398421  
SDG: GEL398421

Dear Mr. Fitzgerald:

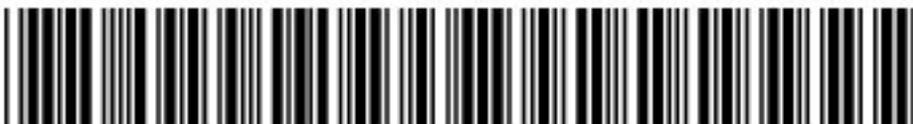
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 01, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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,

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Purchase Order: 303864 7c  
Chain of Custody: F16-041-071, F16-041-072 and F16-041-073  
Enclosures



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# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F16-041  
SDG: GEL398421**

**June 15, 2016**

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 01, 2016, 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 and DER.

**Sample Identification**

The laboratory received the following samples:

<b>Laboratory Identification</b>	<b>Sample Description</b>
398421001	B35L02
398421002	B35L03
398421003	B35L01

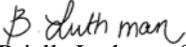
**Case Narrative**

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

**Data Package**

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

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

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL398421**  
**Work Order #: 398421**

## Metals

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

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.

### **Determination of Metals by ICP-MS**

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

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

#### **Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of thallium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203559436 (MB).

## General Chemistry

### **Carbon, Total Organic**

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 1203561745 (B35L03DUP), 1203561748 (B35L03PS) and 398421002 (B35L03) were diluted because target analyte concentrations exceeded the calibration range. The following samples were originally diluted at 500X due to the matrix of the sample. The samples were re-analyzed at 20X, the lowest dilution possible in order to bring the samples results within the required reporting limits, however the final results were less than the PQL which may be due to matrix interference. The data is being reported. 1203561745 (B35L03DUP), 1203561748 (B35L03PS) and 398421002 (B35L03).

Analyte	398421
	002

Total Inorganic Carbon #1	20X
Total Inorganic Carbon #2	20X
Total Inorganic Carbon #3	20X
Total Inorganic Carbon #4	20X
Total Inorganic Carbon Average	20X
Total Organic Carbon #1	20X
Total Organic Carbon #2	20X
Total Organic Carbon #3	20X
Total Organic Carbon #4	20X
Total Organic Carbon Average	20X

### **Cyanide, Total**

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.

### **Solids, Total Dissolved**

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.

### **Alkalinity**

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

## **Radiochemistry**

### **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.

### **SRTOT\_SEP\_PRECIP\_GPC: COMMON**

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

**TC99\_EIE\_LSC: COMMON**

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

**Technical Information****Recounts**

Sample 398421003 (B35L01) was recounted to verify sample result. The recount result is similar to the original result. Original result is reported.

**TRITIUM\_DIST\_LSC: COMMON**

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

**C14\_LSC: COMMON**

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

**Certification Statement**

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

# **Chain of Custody and Supporting Documentation**







**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>CPBC</u>		SDG/AR/COC/Work Order: <u>398421</u>	
Received By: <u>P. Went</u>		Date Received: <u>6/1/16</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0/cpm</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>1°C</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>201404337</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?			<input checked="" type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?			<input checked="" type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?			<input checked="" type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16 Carrier and tracking number.				Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other  <u>7764 0929 2190-1°C</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials DS Date 6/2/16 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 15 June 2016

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	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL398421**  
**Work Order #: 398421**

**Product: Determination of Metals by ICP****Analytical Method:** 6010\_METALS\_ICP**Analytical Procedure:** GL-MA-E-013 REV# 26**Analytical Batch:** 1571435**Product: Determination of Metals by ICP-MS****Analytical Method:** 6020\_METALS\_ICPMS**Analytical Procedure:** GL-MA-E-014 REV# 28**Analytical Batch:** 1571456**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batches:** 1571434 and 1571455

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>
398421001	B35L02
1203559388	Method Blank (MB)ICP
1203559389	Laboratory Control Sample (LCS)
1203559392	398441001(NonSDGL) Serial Dilution (SD)
1203559390	398441001(NonSDGS) Matrix Spike (MS)
1203559391	398441001(NonSDGSD) Matrix Spike Duplicate (MSD)
1203559436	Method Blank (MB)ICP-MS
1203559437	Laboratory Control Sample (LCS)
1203559440	398441001(NonSDGL) Serial Dilution (SD)
1203559438	398441001(NonSDGS) Matrix Spike (MS)
1203559439	398441001(NonSDGSD) 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****Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of thallium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203559436 (MB)-ICP-MS.

**Certification Statement**

6/15/2016

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: GEL398421 GEL Work Order: 398421

**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:** 13 JUN 2016

**Title:** Data Validator

# Sample Data Summary

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

SDG No: GEL398421

CONTRACT: CPRC0F16041

METHOD TYPE: SW846

SAMPLE ID: 398421001

BASIS: As Received

DATE COLLECTED 27-MAY-16

CLIENT ID: B35L02

LEVEL: Low

DATE RECEIVED 01-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-38-2	Arsenic	5.63	ug/L		1.7	5	10	1	MS	BAJ	06/08/16 13:09	160608-2	1571456
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	5	1	MS	BAJ	06/08/16 13:09	160608-2	1571456
7440-70-2	Calcium	66600	ug/L		50	200	200	1	P	LS	06/03/16 11:15	060316-1	1571435
7440-47-3	Chromium	56.6	ug/L		2	10	10	1	MS	BAJ	06/08/16 13:09	160608-2	1571456
7439-89-6	Iron	26500	ug/L		30	100	100	1	P	LS	06/03/16 11:15	060316-1	1571435
7439-95-4	Magnesium	20600	ug/L		110	300	300	1	P	LS	06/03/16 11:15	060316-1	1571435
7439-96-5	Manganese	121	ug/L		1	5	5	1	MS	BAJ	06/08/16 13:09	160608-2	1571456
7440-23-5	Sodium	27300	ug/L		100	300	300	1	P	LS	06/03/16 11:15	060316-1	1571435
7440-61-1	Uranium	1.96	ug/L		0.067	0.2	0.2	1	MS	BAJ	06/08/16 17:06	160608-4	1571456

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1571435	1571434	SW846 3005A	50	mL	50	mL	06/02/16	SXW1
1571456	1571455	SW846 3005A	50	mL	50	mL	06/02/16	SXW1

**\*Analytical Methods:**

P SW846 3005A/6010C  
MS SW846 3005A/6020A

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: June 13, 2016

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 398421

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1571456										
QC1203559437	LCS										
Arsenic	50.0			52.2	ug/L		104	(80%-120%)	BAJ	06/08/16	13:06
Cadmium	50.0			49.9	ug/L		99.9	(80%-120%)			
Chromium	50.0			53.4	ug/L		107	(80%-120%)			
Manganese	50.0			50.9	ug/L		102	(80%-120%)			
Uranium	50.0			50.6	ug/L		101	(80%-120%)		06/08/16	17:05
QC1203559436	MB										
Arsenic			U	1.70	ug/L					06/08/16	13:04
Cadmium			U	0.110	ug/L						
Chromium			U	2.00	ug/L						
Manganese			U	1.00	ug/L						
Uranium			U	0.067	ug/L					06/08/16	17:03
QC1203559438	398441001 MS										
Arsenic	50.0	U	1.70	53.4	ug/L		104	(75%-125%)		06/08/16	13:14
Cadmium	50.0	U	0.110	50.6	ug/L		101	(75%-125%)			
Chromium	50.0	B	3.06	57.3	ug/L		108	(75%-125%)			
Manganese	50.0	B	4.79	55.2	ug/L		101	(75%-125%)			
Uranium	50.0		0.886	50.9	ug/L		100	(75%-125%)		06/08/16	17:09
QC1203559439	398441001 MSD										
Arsenic	50.0	U	1.70	52.5	ug/L	1.65	102	(0%-20%)		06/08/16	13:17
Cadmium	50.0	U	0.110	52.4	ug/L	3.48	105	(0%-20%)			
Chromium	50.0	B	3.06	56.5	ug/L	1.35	107	(0%-20%)			

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 398421

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1571456										
Manganese	50.0	B	4.79	58.3	ug/L	5.38	107	(0%-20%)			
Uranium	50.0		0.886	50.7	ug/L	0.525	99.6	(0%-20%)	BAJ	06/08/16	17:11
QC1203559440	398441001 SDILT										
Arsenic		U	1.50 DU	8.50	ug/L	N/A		(0%-10%)		06/08/16	13:22
Cadmium		U	0.015 DU	0.550	ug/L	N/A		(0%-10%)			
Chromium		B	3.06 DU	10.0	ug/L	N/A		(0%-10%)			
Manganese		B	4.79 DU	5.00	ug/L	N/A		(0%-10%)			
Uranium			0.886 D	0.200	ug/L	12.9		(0%-10%)		06/08/16	17:13
<b>Metals Analysis-ICP</b>											
Batch	1571435										
QC1203559389	LCS										
Calcium	5000			5040	ug/L		101	(80%-120%)	LS	06/03/16	11:00
Iron	5000			5030	ug/L		101	(80%-120%)			
Magnesium	5000			4890	ug/L		97.8	(80%-120%)			
Sodium	5000			5050	ug/L		101	(80%-120%)			
QC1203559388	MB										
Calcium			U	50.0	ug/L					06/03/16	10:57
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Sodium			U	100	ug/L						
QC1203559390	398441001 MS										
Calcium	5000		33200	37600	ug/L		N/A	(75%-125%)		06/03/16	11:06
Iron	5000		158	5260	ug/L		102	(75%-125%)			
Magnesium	5000		6220	11200	ug/L		99.5	(75%-125%)			
Sodium	5000		31000	35900	ug/L		N/A	(75%-125%)			
QC1203559391	398441001 MSD										

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 398421

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1571435										
Calcium	5000	33200		36900	ug/L	1.89	N/A	(0%-20%)		06/03/16	11:09
Iron	5000	158		5190	ug/L	1.19	101	(0%-20%)	LS		
Magnesium	5000	6220		11000	ug/L	2.12	94.8	(0%-20%)			
Sodium	5000	31000		35100	ug/L	2.24	N/A	(0%-20%)			
QC1203559392	398441001	SDILT									
Calcium		33200	D	6830	ug/L	2.89		(0%-10%)		06/03/16	11:12
Iron		158	D	37.7	ug/L	18.9		(0%-10%)			
Magnesium		6220	D	1300	ug/L	4.67		(0%-10%)			
Sodium		31000	D	6300	ug/L	1.53		(0%-10%)			

**Notes:**

The Qualifiers in this report are defined as follows:

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

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**QC Summary**

Workorder: 398421

Page 4 of 4

<b>Parmname</b>	<b>NOM</b>	<b>Sample</b>	<b>Qual</b>	<b>QC</b>	<b>Units</b>	<b>RPD/D%</b>	<b>REC%</b>	<b>Range</b>	<b>Anlst</b>	<b>Date</b>	<b>Time</b>
-----------------	------------	---------------	-------------	-----------	--------------	---------------	-------------	--------------	--------------	-------------	-------------

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 #: GEL398421  
 Work Order #: 398421**

**Product:** Carbon, Total Organic

**Analytical Method:** SW846 9060A

**Analytical Procedure:** GL-GC-E-093 REV# 14

**Analytical Batch:** 1572395

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>
398421002	B35L03
1203561742	Method Blank (MB)
1203561743	Laboratory Control Sample (LCS)
1203561745	398421002(B35L03) Sample Duplicate (DUP)
1203561746	398441001(NonSDG) Sample Duplicate (DUP)
1203561748	398421002(B35L03) Post Spike (PS)
1203561749	398441001(NonSDG) 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 1203561745 (B35L03DUP), 1203561748 (B35L03PS) and 398421002 (B35L03) were diluted because target analyte concentrations exceeded the calibration range. The following samples were originally diluted at 500X due to the matrix of the sample. The samples were re-analyzed at 20X ,the lowest dilution possible in order to bring the samples results within the required reporting limits,however the final results were less then the PQL which maybe due to matrix interference. The data is being reported. 1203561745 (B35L03DUP), 1203561748 (B35L03PS) and 398421002 (B35L03).

Analyte	<b>398421</b>
	<b>002</b>
Total Inorganic Carbon #1	20X
Total Inorganic Carbon #2	20X
Total Inorganic Carbon #3	20X
Total Inorganic Carbon #4	20X
Total Inorganic Carbon Average	20X
Total Organic Carbon #1	20X
Total Organic Carbon #2	20X
Total Organic Carbon #3	20X
Total Organic Carbon #4	20X
Total Organic Carbon Average	20X

**Product:** Cyanide, Total

**Analytical Method:** 9012\_CYANIDE

**Analytical Procedure:** GL-GC-E-095 REV# 18

**Analytical Batches:** 1571334 and 1571333

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>
398421002	B35L03
1203559099	Method Blank (MB)
1203559100	Laboratory Control Sample (LCS)
1203559103	398342005(B35KW8) Sample Duplicate (DUP)
1203559106	398342005(B35KW8) Matrix Spike (MS)

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:** Solids, Total Dissolved

**Analytical Method:** 160.1\_TDS

**Analytical Procedure:** GL-GC-E-001 REV# 15

**Analytical Batch:** 1571409

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>
398421002	B35L03
1203559320	Method Blank (MB)
1203559321	Laboratory Control Sample (LCS)
1203559325	398421002(B35L03) Sample Duplicate (DUP)

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

**Data Summary:**

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

**Product: Alkalinity****Analytical Method:** 2320\_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 12**Analytical Batch:** 1573116

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>
398421002	B35L03
1203563782	Method Blank (MB)
1203563789	398346003(B35KY7) Sample Duplicate (DUP)

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

**Data Summary:**

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

**Certification Statement**

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

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL398421 GEL Work Order: 398421

**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: **14 JUN 2016**

Title: **Analyst I**

# Sample Data Summary

6/15/2016

**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: June 14, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F16-041

Client Sample ID: B35L03 Project: CPRC0F16041  
 Sample ID: 398421002 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 27-MAY-16 14:10  
 Receive Date: 01-JUN-16  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Carbon Analysis</b>											
9060_TOC: COMMON + TIC: COMMON "As Received"											
Total Inorganic Carbon #1	BD	11900	6600	20000	ug/L	20	TSM	06/07/16	1439	1572395	1
Total Inorganic Carbon #2	BD	11700	6600	20000	ug/L	20					
Total Inorganic Carbon #3	BD	12100	6600	20000	ug/L	20					
Total Inorganic Carbon #4	BD	11900	6600	20000	ug/L	20					
Total Inorganic Carbon Average	BD	11900	6600	20000	ug/L	20					
Total Organic Carbon #1	BD	16700	6600	20000	ug/L	20					
Total Organic Carbon #2	BD	18500	6600	20000	ug/L	20					
Total Organic Carbon #3	BD	16800	6600	20000	ug/L	20					
Total Organic Carbon #4	BD	17700	6600	20000	ug/L	20					
Total Organic Carbon Average	BD	17400	6600	20000	ug/L	20					
<b>Flow Injection Analysis</b>											
9012_CYANIDE: COMMON "As Received"											
Cyanide, Total	U	1.67	1.67	5.00	ug/L	1	AXH3	06/03/16	1057	1571334	2
<b>Solids Analysis</b>											
160.1_TDS:COMMON "As Received"											
Total Dissolved Solids		423000	3400	14300	ug/L		VH1	06/02/16	1154	1571409	3
<b>Titration and Ion Analysis</b>											
2320_ALKALINITY: COMMON (Add-on) "As Received"											
Bicarbonate alkalinity (CaCO3)		111000	330	1000	ug/L	1	RXB5	06/08/16	1749	1573116	4
Carbonate alkalinity (CaCO3)	U	330	330	1000	ug/L	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 9010C Distillation	SW846 9010C Prep	AXH3	06/03/16	0932	1571333

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060A	
2	9012_CYANIDE	
3	160.1_TDS	
4	2320_ALKALINITY	

**Notes:**

# Quality Control Summary

**GEL LABORATORIES LLC**

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**QC Summary**

Report Date: June 14, 2016

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 398421

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1572395										
QC1203561745	398421002	DUP									
Total Inorganic Carbon Average	BD	11900	BD	11500	ug/L	3.59	^	(+/-20000)	TSM	06/07/16	15:23
Total Organic Carbon Average	BD	17400	BD	17000	ug/L	2.56		(0%-20%)			
QC1203561746	398441001	DUP									
Total Organic Carbon Average		1400		1400	ug/L	0	^	(+/-1000)		06/06/16	20:13
QC1203561743	LCS										
Total Inorganic Carbon Average	10000			11400	ug/L			(80%-120%)		06/06/16	15:40
Total Organic Carbon Average	10000			10900	ug/L			(80%-120%)			
QC1203561742	MB										
Total Inorganic Carbon Average			U	330	ug/L					06/06/16	15:30
Total Organic Carbon Average			U	330	ug/L						
QC1203561748	398421002	PS									
Total Inorganic Carbon Average	10.0	BD	0.595	D	11.8	mg/L		112	(75%-125%)	06/07/16	16:07
Total Organic Carbon Average	10.0	BD	0.872	D	11.4	mg/L		105	(75%-125%)		
QC1203561749	398441001	PS									
Total Organic Carbon Average	10.0		1.40		12.5	mg/L		111	(75%-125%)	06/06/16	20:54
<b>Flow Injection Analysis</b>											
Batch	1571334										
QC1203559103	398342005	DUP									
Cyanide, Total			117		116	ug/L	0.858		(0%-20%)	AXH3	06/03/16 10:47
QC1203559100	LCS										
Cyanide, Total	50.0				45.1	ug/L		90.2	(80%-120%)		06/03/16 10:26
QC1203559099	MB										
Cyanide, Total			U	1.67	ug/L						06/03/16 10:25
QC1203559106	398342005	MS									
Cyanide, Total	100		117		221	ug/L		104	(75%-125%)	06/03/16	10:53
<b>Solids Analysis</b>											
Batch	1571409										

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**QC Summary**

Workorder: 398421

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Solids Analysis</b>											
Batch	1571409										
QC1203559325	398421002	DUP									
Total Dissolved Solids		423000		459000	ug/L	8.1		(0%-20%)	VH1	06/02/16	11:54
QC1203559321	LCS										
Total Dissolved Solids	300000			297000	ug/L		99	(80%-120%)		06/02/16	11:54
QC1203559320	MB										
Total Dissolved Solids			U	3400	ug/L					06/02/16	11:54
<b>Titration and Ion Analysis</b>											
Batch	1573116										
QC1203563789	398346003	DUP									
Bicarbonate alkalinity (CaCO3)		93800		94800	ug/L	1.11		(0%-20%)	RXB5	06/08/16	16:27
Carbonate alkalinity (CaCO3)	U	330	U	330	ug/L	N/A					
QC1203563782	MB										
Bicarbonate alkalinity (CaCO3)			U	330	ug/L					06/08/16	15:43
Carbonate alkalinity (CaCO3)			U	330	ug/L						

**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 #: GEL398421**  
**Work Order #: 398421**

**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:** 1571732

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>
398421003	B35L01
1203560189	Method Blank (MB)
1203560190	398421003(B35L01) Sample Duplicate (DUP)
1203560191	398421003(B35L01) Matrix Spike (MS)
1203560192	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:** SRTOT\_SEP\_PRECIP\_GPC: COMMON

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

**Analytical Procedure:** GL-RAD-A-004 REV# 17

**Analytical Batch:** 1572624

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>
398421003	B35L01
1203562326	Method Blank (MB)
1203562327	398421003(B35L01) Sample Duplicate (DUP)
1203562328	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# 4

**Analytical Batch:** 1571786

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>
398421003	B35L01
1203560316	Method Blank (MB)
1203560317	398180005(NonSDG) Sample Duplicate (DUP)
1203560318	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 398421003 (B35L01) was recounted to verify sample result. The recount result is similar to the original result. Original result is reported.

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

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

**Analytical Procedure:** GL-RAD-A-002 REV# 21

**Analytical Batch:** 1572441

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>
398421003	B35L01
1203561879	Method Blank (MB)
1203561880	398168011(NonSDG) Sample Duplicate (DUP)
1203561881	398168011(NonSDG) Matrix Spike (MS)
1203561882	Laboratory Control Sample (LCS)

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

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this

report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** C14\_LSC: COMMON

**Analytical Method:** C14\_LSC

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

**Analytical Batch:** 1572447

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>
398421003	B35L01
1203561899	Method Blank (MB)
1203561900	398180005(NonSDG) Sample Duplicate (DUP)
1203561901	398180005(NonSDG) Matrix Spike (MS)
1203561902	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

**Certification Statement**

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

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL398421 GEL Work Order: 398421

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

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

**Review/Validation**

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

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

**Signature:** 

**Name:** Theresa Austin

**Date:** 15 JUN 2016

**Title:** Group Leader

# Sample Data Summary

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

<b>SDG Number:</b> GEL398421	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F16041
<b>Lab Sample ID:</b> 398421003	<b>Date Collected:</b> 05/27/2016 14:10	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/01/2016 09:05	
<b>Client ID:</b> B35L01	<b>Method:</b> SRTOT_SEP_PRECIP_GPC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1572624	<b>Analyst:</b> KSD1	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 06/10/2016 13:20	<b>Aliquot:</b> 300 mL	<b>Instrument:</b> PIC2C
<b>Data File:</b> S1572624.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1572624		
<b>Prep Date:</b> 06/09/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	1.01	pCi/L	+/-0.926	0.955	1.49	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.00	7.37	mg	81.5	(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: GEL398421	Client: CPRC001	Project: CPRC0F16041
Lab Sample ID: 398421003	Date Collected: 05/27/2016 14:10	Matrix: WATER
	Date Received: 06/01/2016 09:05	
Client ID: B35L01		Prep Basis: "As Received"
Batch ID: 1571732	Method: DOE EML HASL-300,I-01 Mo	SOP Ref: GL-RAD-A-006
Run Date: 06/08/2016 16:08	Analyst: MJH1	Instrument: XRAY5
Data File: I398421003.CNF;1	Aliquot: 1.5 L	Count Time: 240 min
Prep Batch: 1571732	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 06/08/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.430	pCi/L	+/-0.381	0.384	0.520	1.00

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: GEL398421	Client: CPRC001	Project: CPRC0F16041
Lab Sample ID: 398421003	Date Collected: 05/27/2016 14:10	Matrix: WATER
	Date Received: 06/01/2016 09:05	
Client ID: B35L01	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1571786	Analyst: GXR1	SOP Ref: GL-RAD-A-059
Run Date: 06/12/2016 10:39	Aliquot: 100 mL	Instrument: LSCSILVER
Data File: E1571786.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1571786		
Prep Date: 06/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		55.4	pCi/L	+/-22.6	23.4	35.7	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	29100	30300	CPM	96.1	(30%-105%)

**Comments:**

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

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

Page 1 of 1

SDG Number: GEL398421  
 Lab Sample ID: 398421003

Client: CPRC001  
 Date Collected: 05/27/2016 14:10  
 Date Received: 06/01/2016 09:05

Project: CPRC0F16041  
 Matrix: WATER

Client ID: B35L01  
 Batch ID: 1572441  
 Run Date: 06/15/2016 09:40  
 Data File: T1572441.xls  
 Prep Batch: 1572441  
 Prep Date: 06/13/2016 10:16

Method: TRITIUM\_DIST\_LSC  
 Analyst: TXJ1  
 Aliquot: 50 mL  
 Prep Method: EPA 906.0 Modified

Prep Basis: "As Received"  
 SOP Ref: GL-RAD-A-002  
 Instrument: LSCPINK  
 Count Time: 15.02965 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		3990	pCi/L	+/-585	969	337	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**

SDG Number: GEL398421	Client: CPRC001	Project: CPRC0F16041
Lab Sample ID: 398421003	Date Collected: 05/27/2016 14:10	Matrix: WATER
	Date Received: 06/01/2016 09:05	
Client ID: B35L01	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1572447	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 06/14/2016 07:57	Aliquot: 60 mL	Instrument: LSCTEAL
Data File: C1572447.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 30 min
Prep Batch: 1572447		
Prep Date: 06/13/2016 09:21		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-2.58	pCi/L	+/-19.0	19.0	33.2	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.

# Quality Control Summary

6/15/2016

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: June 15, 2016

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**Client :** CH2MHill Plateau Remediation Company  
**MSIN R3-50 CHPRC**  
**PO Box 1600**  
**Richland, Washington 99352**  
**Contact:** Mr. Scot Fitzgerald  
**Workorder:** 398421

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1571732								
QC1203560189	MB								
Iodine-129			U	0.322	pCi/L			MJH1	06/09/1608:57
				Uncert: +/-0.478					
				TPU: +/-0.500					
QC1203560190	398421003	DUP							
Iodine-129		U	0.430	U	0.289				06/09/1609:28
				Uncert: +/-0.381		RPD: 0	N/A		
				TPU: +/-0.384		RER: 0.469	(0-2)		
QC1203560191	398421003	MS							
Iodine-129		U	0.430		22.4	REC: 81	(75%-125%)		06/09/1611:05
				Uncert: +/-0.381					
				TPU: +/-0.384					
QC1203560192	LCS								
Iodine-129					27.2	REC: 98	(80%-120%)		06/09/1611:05
				Uncert: +/-4.08					
				TPU: +/-4.91					
<b>Rad Gas Flow</b>									
Batch	1572624								
QC1203562326	MB								
Total Strontium			U	-0.298	pCi/L			KSD1	06/10/1613:20
				Uncert: +/-0.593					
				TPU: +/-0.594					
**Strontium Carrier				7.37	mg	REC: 90	(40%-110%)		
QC1203562327	398421003	DUP							
Total Strontium		U	1.01	U	-0.0703				06/10/1613:20
				Uncert: +/-0.926		RPD: 0	N/A		
				TPU: +/-0.955		RER: 1.77	(0-2)		
**Strontium Carrier				7.37	mg	REC: 82	(40%-110%)		
QC1203562328	LCS								
Total Strontium					73.1	REC: 113	(80%-120%)		06/10/1613:20
				Uncert: +/-5.00					
				TPU: +/-19.9					
**Strontium Carrier				7.37	mg	REC: 80	(40%-110%)		
<b>Rad Liquid Scintillation</b>									
Batch	1571786								
QC1203560316	MB								
Technetium-99			U	-3.28	pCi/L			GXR1	06/12/1611:45
				Uncert: +/-19.9					
				TPU: +/-19.9					
**Technetium-99m Tracer				30300	CPM	REC: 97	(30%-105%)		
QC1203560317	398180005	DUP							
Technetium-99		U	-11.8	U	1.48				06/12/1612:06
				Uncert: +/-19.9		RPD: 0	N/A		
				TPU: +/-19.9		RER: 0.902	(0-2)		

## GEL LABORATORIES LLC

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

QC Summary

Workorder: 398421

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
Batch	1571786								
*Technetium-99m Tracer	30300	28500		28600	CPM	REC: 94	(30%-105%)		
QC1203560318 LCS									
Technetium-99	861			731	pCi/L	REC: 85	(80%-120%)		06/12/1612:28
	Uncert:			+/-39.0					
	TPU:			+/-90.0					
*Technetium-99m Tracer	30300			30100	CPM	REC: 100	(30%-105%)		
Batch	1572441								
QC1203561879 MB									
Tritium			U	108	pCi/L			TXJ1	06/15/1609:58
	Uncert:			+/-193					
	TPU:			+/-194					
QC1203561880 398168011 DUP									
Tritium		6280		5800	pCi/L				06/15/1610:15
	Uncert:	+/-746		+/-705		RPD: 8	(0% - 20%)		
	TPU:	+/-1430		+/-1320		RER: 0.489	(0-2)		
QC1203561881 398168011 MS									
Tritium	2340	6280		8790	pCi/L	REC: 107	(75%-125%)		06/15/1610:33
	Uncert:	+/-746		+/-876					
	TPU:	+/-1430		+/-1910					
QC1203561882 LCS									
Tritium	2330			2100	pCi/L	REC: 90	(80%-120%)		06/15/1610:50
	Uncert:			+/-435					
	TPU:			+/-594					
Batch	1572447								
QC1203561899 MB									
Carbon-14			U	-0.941	pCi/L			TXJ1	06/14/1608:28
	Uncert:			+/-19.1					
	TPU:			+/-19.1					
QC1203561900 398180005 DUP									
Carbon-14		245		272	pCi/L				06/14/1608:59
	Uncert:	+/-26.5		+/-27.0		RPD: 10	(0% - 20%)		
	TPU:	+/-52.6		+/-57.2		RER: 0.673	(0-2)		
QC1203561901 398180005 MS									
Carbon-14	1260	245		1500	pCi/L	REC: 100	(75%-125%)		06/14/1609:31
	Uncert:	+/-26.5		+/-49.5					
	TPU:	+/-52.6		+/-283					
QC1203561902 LCS									
Carbon-14	1260			1270	pCi/L	REC: 101	(80%-120%)		06/14/1610:02
	Uncert:			+/-46.2					
	TPU:			+/-241					

**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

QC Summary

Workorder: 398421

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
B						The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).				
B						The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is $\geq$ MDA for this sample				
C						Target analyte was detected in the sample and the associated blank. The associated blank concentration is $\geq$ EQL or is $> 5\%$ of the measured concentration and/or decision level for associated samples.				
D						Results are reported from a diluted aliquot of sample.				
E						Reported value is estimated due to interferences. See comment in narrative.				
M						Duplicate precision not met.				
N						Spike Sample recovery is outside control limits.				
S						Reported value determined by the Method of Standard Additions (MSA)				
U						Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.				
UX						Gamma Spectroscopy--Uncertain identification				
W						Post-digestion spike recovery for GFAA out of control limit. Sample absorbency $< 50\%$ of spike absorbency.				
X						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
Y						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				
Z						Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier				

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

\*\* Indicates analyte is a surrogate compound.

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

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

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