

7/21/2016



July 21, 2016

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

Re: CHPRC SAF S16-006  
Work Order: 400138  
SDG: GEL400138

Dear Mr. Fitzgerald:

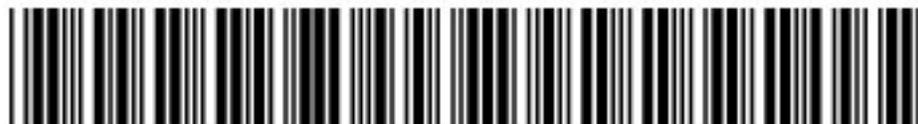
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 25, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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,

*B Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Purchase Order: 300071 - 7H  
Chain of Custody: S16-006-272 and S16-006-273  
Enclosures



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# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF S16-006  
SDG: GEL400138**

**July 21, 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 25, 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><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
400138001	B35C73
400138002	B35C77
400138003	B35C74
400138004	B35C78

**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 #: GEL400138**  
**Work Order #: 400138**

## 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**

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.

## General Chemistry

### **Alkalinity**

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

<b>Sample</b>	<b>Analyte</b>	<b>Value</b>
1203574837 (MB)	Alkalinity, Total as CaCO <sub>3</sub> and Bicarbonate alkalinity (CaCO <sub>3</sub> )	1.52 * 10 > 3.54

## Radiochemistry

**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.

#### **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**

###### **Recounts**

Sample 400138001 (B35C73) was recounted due to results more negative than the three sigma TPU. The second count is reported. Sample 400138003 (B35C74) was verified by recounting at least five days from the separation date. The recount is reported.

#### **9310\_ALPHABETA\_GPC: Gross Beta**

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

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

###### **QC Information**

The sample and the duplicate, 1203579110 (B35BW1DUP), did not meet the client alpha relative error ratio requirement; However, both results are less than the MDA.

##### **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**

Sample 1203579113 (LCS) was recounted due to high recovery. The recount is reported.

##### **Miscellaneous Information**

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

The matrix spike and matrix spike duplicate, 1203579111 (B35BW1MS) and 1203579112 (B35BW1MSD), aliquots were 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 400138003 (B35C74) was recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

**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**

82165

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# S16-006-272  
Page 1 of 1

Collector: Dave Floyd CHPRC  
 SAF No.: S16-006  
 Project Title: SURV, JUNE 2016  
 Shipped To (Lab): GEL Laboratories, LLC  
 Protocol: SURV  
 Priority: 30 Days  
 SPECIAL INSTRUCTIONS: N/A  
 Hold Time: N/A  
 Total Activity Exemption: Yes  No

Contact/Requester: Karen Waters-Husted  
 Telephone No.: 509-376-4650  
 Sampling Origin: Hanford Site  
 Logbook No.: HNF-N-506 82183  
 Method of Shipment: Commercial Carrier  
 Purchase Order/Charge Code: 300071  
 Ice Chest No.: 605-433  
 Bill of Lading/Air Bill No.: 7766 04885062  
 Offsite Property No.: 6774

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35C73	N	W JUN 24 2016	0715	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B35C73	N	W		1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B35C73	N	W		2x1-L P	9310_ALPHABETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B35C73	N	W		1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B35C73	N	W		3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B35C73	N	W		1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B35C77	Y	W		1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2

Relinquished By Dave Floyd CHPRC	Print [Signature]	Sign [Signature]	Date JUN 24 2016	Time 1000	Received By Leahy Wall CHPRC	Print [Signature]	Sign [Signature]	Date/Time JUN 24 2016 1000
Relinquished By Leahy Wall CHPRC	Print [Signature]	Sign [Signature]	Date JUN 24 2016	Time 1400	Received By FEDEX	Print [Signature]	Sign [Signature]	Date/Time JUN 24 2016 0825
Relinquished By	Print	Sign	Date	Time	Received By	Print	Sign	Date/Time

FINAL SAMPLE DISPOSITION  
 Disposal Method (e.g., Return to customer, per lab procedure, used in process)  
 Disposed By  
 Date/Time

**CH2M Hill Plateau Remediation Company**  
**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**  
 C.O.C.# **S16-006-273**  
 Page 1 of 1

400138 581b5  
 Contact/Requester: Karen Waters-Husted  
 Telephone No. 509-376-4650  
 Collector: Dave Floyd CHPRC  
 SAF No. S16-006  
 Purchase Order/Charge Code 300071  
 Project Title: SURV, JUNE 2016  
 Sampling Origin: Hanford Site  
 Shipped To (Lab): GEL Laboratories, LLC  
 Logbook No. HNF-N-506 82483  
 Ice Chest No. GWS-556  
 Method of Shipment: Commercial Carrier  
 Bill of Lading/Air Bill No. 7760 0488 5246  
 Priority: 30 Days  
 Priority: **PRIORITY**  
 Offsite Property No. 6774  
 Hold Time  
 SPECIAL INSTRUCTIONS: N/A  
 Total Activity Exemption: Yes  No

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 \*\*\* 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.	Filter	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35C74	N	JUN 24 2016	0834	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B35C74	N			1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B35C74	N			2x1-L P	9310_ALPHABETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B35C74	N			1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B35C74	N			3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B35C74	N			1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B35C78	Y			1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
Dave Floyd CHPRC			JUN 24 2016 1050	Troy Bacon CHPRC			JUN 24 2016 1000	S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other
Troy Bacon CHPRC			JUN 24 2016 1400	FEDEX				
				M. Karslow			6.25.16 0835	

**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>400138</u>
Received By: <u>MK</u>		Date Received: <u>6-25-16</u>
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.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>Cpm 2</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"/>	<input checked="" type="checkbox"/>	<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"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Preservation Method: Ice bags <input checked="" type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> None <input type="checkbox"/> Other (describe) *all temperatures are recorded in Celsius <u>2 C</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Temperature Device Serial #: <u>30462962</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<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"/>	<input checked="" type="checkbox"/>	<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"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
15 COC form is properly signed in-relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: FedEx Air <input checked="" type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>7766 0488 4136 2 C</u> <u>5062 2 C</u> <u>5246 2 C</u>

Comments (Use Continuation Form if needed):

# **Data Review Qualifier Definitions**

## Project Specific Qualifier Definitions for GEL Client Code: CPRC

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is $\geq$ MDA for this sample	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	General Chemistry	
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is $\geq$ EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Inorganics	Metals
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is $\geq$ EQL or is > 5% of the measured concentration and/or decision level for associated samples.	General Chemistry	
<	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	General Chemistry	
UX	Gamma Spectroscopy--Uncertain identification	Radiological	

# Laboratory Certifications

## List of current GEL Certifications as of 21 July 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 #: GEL400138**  
**Work Order #: 400138**

**Product: Determination of Metals by ICP****Analytical Method:** 6010\_METALS\_ICP**Analytical Procedure:** GL-MA-E-013 REV# 26**Analytical Batch:** 1577375**Product: Determination of Metals by ICP-MS****Analytical Method:** 6020\_METALS\_ICPMS**Analytical Procedure:** GL-MA-E-014 REV# 28**Analytical Batch:** 1577378**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batches:** 1577374 and 1577377

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>
400138001	B35C73
400138002	B35C77
400138003	B35C74
400138004	B35C78
1203574642	Method Blank (MB)ICP
1203574643	Laboratory Control Sample (LCS)
1203574646	400138001(B35C73L) Serial Dilution (SD)
1203574644	400138001(B35C73S) Matrix Spike (MS)
1203574645	400138001(B35C73SD) Matrix Spike Duplicate (MSD)
1203574647	Method Blank (MB)ICP-MS
1203574648	Laboratory Control Sample (LCS)
1203574651	400138001(B35C73L) Serial Dilution (SD)
1203574649	400138001(B35C73S) Matrix Spike (MS)
1203574650	400138001(B35C73SD) Matrix Spike Duplicate (MSD)

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

**Data Summary:**

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

**Certification Statement**

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

**GEL LABORATORIES LLC**

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

**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400138 GEL Work Order: 400138

**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.

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:** Jamie Johnson

**Date:** 20 JUL 2016

**Title:** Group Leader

# Sample Data Summary

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

SDG No: GEL400138

CONTRACT: CPRC0S16006

METHOD TYPE: SW846

SAMPLE ID: 400138001

BASIS: As Received

DATE COLLECTED 24-JUN-16

CLIENT ID: B35C73

LEVEL: Low

DATE RECEIVED 25-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	15	ug/L	U	15	50	50	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	06/29/16 09:31	160628-7	1577378
7440-38-2	Arsenic	1.7	ug/L	U	1.7	5	5	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-39-3	Barium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/06/16 11:07	070616-1	1577375
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	BAJ	06/28/16 19:40	160628-3	1577378
7440-70-2	Calcium	50	ug/L	U	50	200	200	1	P	HSC	07/06/16 11:07	070616-1	1577375
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-48-4	Cobalt	0.10	ug/L	U	0.1	1	1	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-50-8	Copper	0.350	ug/L	U	0.35	1	1	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/06/16 11:07	070616-1	1577375
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7439-95-4	Magnesium	110	ug/L	U	110	300	300	1	P	HSC	07/06/16 11:07	070616-1	1577375
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7439-98-7	Molybdenum	0.187	ug/L	B	0.165	0.5	0.5	1	MS	BAJ	06/29/16 11:50	160629-8	1577378
7440-02-0	Nickel	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-09-7	Potassium	50	ug/L	U	50	150	150	1	P	HSC	07/06/16 11:07	070616-1	1577375
7782-49-2	Selenium	1.5	ug/L	U	1.5	5	5	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-23-5	Sodium	100	ug/L	U	100	300	300	1	P	HSC	07/06/16 11:07	070616-1	1577375
7440-24-6	Strontium	2	ug/L	U	2	10	10	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-29-1	Thorium	0.921	ug/L	B	0.383	2	2	1	MS	BAJ	06/28/16 19:40	160628-3	1577378
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	BAJ	06/28/16 15:08	160628-2	1577378
7440-61-1	Uranium	0.067	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	06/28/16 19:40	160628-3	1577378
7440-62-2	Vanadium	1	ug/L	U	1	5	5	1	P	HSC	07/06/16 11:07	070616-1	1577375
7440-66-6	Zinc	3.5	ug/L	U	3.5	10	10	1	MS	BAJ	06/28/16 15:08	160628-2	1577378

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1577375	1577374	SW846 3005A	50	mL	50	mL	06/27/16	SXW1
1577378	1577377	SW846 3005A	50	mL	50	mL	06/27/16	SXW1

**\*Analytical Methods:**

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METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

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

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

SDG No: GEL400138

CONTRACT: CPRC0S16006

METHOD TYPE: SW846

SAMPLE ID: 400138002

BASIS: As Received

DATE COLLECTED 24-JUN-16

CLIENT ID: B35C77

LEVEL: Low

DATE RECEIVED 25-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	15	ug/L	U	15	50	50	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	06/29/16 09:36	160628-7	1577378
7440-38-2	Arsenic	1.7	ug/L	U	1.7	5	5	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-39-3	Barium	0.60	ug/L	U	0.6	2	2	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/06/16 11:22	070616-1	1577375
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	BAJ	06/28/16 19:56	160628-3	1577378
7440-70-2	Calcium	50	ug/L	U	50	200	200	1	P	HSC	07/06/16 11:22	070616-1	1577375
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-48-4	Cobalt	0.10	ug/L	U	0.1	1	1	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-50-8	Copper	0.350	ug/L	U	0.35	1	1	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/06/16 11:22	070616-1	1577375
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7439-95-4	Magnesium	110	ug/L	U	110	300	300	1	P	HSC	07/06/16 11:22	070616-1	1577375
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7439-98-7	Molybdenum	0.165	ug/L	U	0.165	0.5	0.5	1	MS	BAJ	06/29/16 11:55	160629-8	1577378
7440-02-0	Nickel	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-09-7	Potassium	50	ug/L	U	50	150	150	1	P	HSC	07/06/16 11:22	070616-1	1577375
7782-49-2	Selenium	1.5	ug/L	U	1.5	5	5	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-23-5	Sodium	100	ug/L	U	100	300	300	1	P	HSC	07/06/16 11:22	070616-1	1577375
7440-24-6	Strontium	2	ug/L	U	2	10	10	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-29-1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	BAJ	06/28/16 19:56	160628-3	1577378
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	BAJ	06/28/16 15:20	160628-2	1577378
7440-61-1	Uranium	0.067	ug/L	U	0.067	0.2	0.2	1	MS	BAJ	06/28/16 19:56	160628-3	1577378
7440-62-2	Vanadium	1	ug/L	U	1	5	5	1	P	HSC	07/06/16 11:22	070616-1	1577375
7440-66-6	Zinc	3.5	ug/L	U	3.5	10	10	1	MS	BAJ	06/28/16 15:20	160628-2	1577378

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1577375	1577374	SW846 3005A	50	mL	50	mL	06/27/16	SXW1
1577378	1577377	SW846 3005A	50	mL	50	mL	06/27/16	SXW1

**\*Analytical Methods:**

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METALS

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INORGANICS ANALYSIS DATA PACKAGE

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

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

SDG No: GEL400138

CONTRACT: CPCR0S16006

METHOD TYPE: SW846

SAMPLE ID: 400138003

BASIS: As Received

DATE COLLECTED 24-JUN-16

CLIENT ID: B35C74

LEVEL: Low

DATE RECEIVED 25-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	15	ug/L	U	15	50	50	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	06/29/16 09:37	160628-7	1577378
7440-38-2	Arsenic	1.7	ug/L	U	1.7	5	5	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-39-3	Barium	45	ug/L		0.6	2	2	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-42-8	Boron	23.5	ug/L	B	15	50	50	1	P	HSC	07/06/16 11:26	070616-1	1577375
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	BAJ	06/28/16 19:58	160628-3	1577378
7440-70-2	Calcium	88200	ug/L		50	200	200	1	P	HSC	07/06/16 11:26	070616-1	1577375
7440-47-3	Chromium	8.21	ug/L	B	2	10	10	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-48-4	Cobalt	0.10	ug/L	U	0.1	1	1	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-50-8	Copper	0.507	ug/L	B	0.35	1	1	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7439-89-6	Iron	31.4	ug/L	B	30	100	100	1	P	HSC	07/06/16 11:26	070616-1	1577375
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7439-95-4	Magnesium	14500	ug/L		110	300	300	1	P	HSC	07/06/16 11:26	070616-1	1577375
7439-96-5	Manganese	1.45	ug/L	B	1	5	5	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7439-98-7	Molybdenum	0.608	ug/L		0.165	0.5	0.5	1	MS	BAJ	06/29/16 11:57	160629-8	1577378
7440-02-0	Nickel	3.45	ug/L		0.5	2	2	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-09-7	Potassium	2830	ug/L		50	150	150	1	P	HSC	07/06/16 11:26	070616-1	1577375
7782-49-2	Selenium	5.32	ug/L		1.5	5	5	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-23-5	Sodium	4350	ug/L		100	300	300	1	P	HSC	07/06/16 11:26	070616-1	1577375
7440-24-6	Strontium	385	ug/L		2	10	10	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-28-0	Thallium	0.464	ug/L	B	0.45	2	2	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-29-1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	BAJ	06/28/16 19:58	160628-3	1577378
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	BAJ	06/28/16 15:30	160628-2	1577378
7440-61-1	Uranium	0.556	ug/L		0.067	0.2	0.2	1	MS	BAJ	06/28/16 19:58	160628-3	1577378
7440-62-2	Vanadium	2.62	ug/L	B	1	5	5	1	P	HSC	07/06/16 11:26	070616-1	1577375
7440-66-6	Zinc	3.5	ug/L	U	3.5	10	10	1	MS	BAJ	06/28/16 15:30	160628-2	1577378

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1577375	1577374	SW846 3005A	50	mL	50	mL	06/27/16	SXW1
1577378	1577377	SW846 3005A	50	mL	50	mL	06/27/16	SXW1

**\*Analytical Methods:**

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METALS

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INORGANICS ANALYSIS DATA PACKAGE

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

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

SDG No: GEL400138

CONTRACT: CPCR0S16006

METHOD TYPE: SW846

SAMPLE ID: 400138004

BASIS: As Received

DATE COLLECTED 24-JUN-16

CLIENT ID: B35C78

LEVEL: Low

DATE RECEIVED 25-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	15	ug/L	U	15	50	50	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	BAJ	06/29/16 09:39	160628-7	1577378
7440-38-2	Arsenic	1.7	ug/L	U	1.7	5	5	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-39-3	Barium	46.7	ug/L		0.6	2	2	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-42-8	Boron	22.4	ug/L	B	15	50	50	1	P	HSC	07/06/16 11:29	070616-1	1577375
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	BAJ	06/28/16 20:00	160628-3	1577378
7440-70-2	Calcium	87600	ug/L		50	200	200	1	P	HSC	07/06/16 11:29	070616-1	1577375
7440-47-3	Chromium	3.06	ug/L	B	2	10	10	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-48-4	Cobalt	0.242	ug/L	B	0.1	1	1	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-50-8	Copper	0.350	ug/L	U	0.35	1	1	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/06/16 11:29	070616-1	1577375
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7439-95-4	Magnesium	14500	ug/L		110	300	300	1	P	HSC	07/06/16 11:29	070616-1	1577375
7439-96-5	Manganese	1.03	ug/L	B	1	5	5	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7439-98-7	Molybdenum	0.559	ug/L		0.165	0.5	0.5	1	MS	BAJ	06/29/16 11:58	160629-8	1577378
7440-02-0	Nickel	1.63	ug/L	B	0.5	2	2	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-09-7	Potassium	2740	ug/L		50	150	150	1	P	HSC	07/06/16 11:29	070616-1	1577375
7782-49-2	Selenium	5.15	ug/L		1.5	5	5	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-23-5	Sodium	4650	ug/L		100	300	300	1	P	HSC	07/06/16 11:29	070616-1	1577375
7440-24-6	Strontium	376	ug/L		2	10	10	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-29-1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	BAJ	06/28/16 20:00	160628-3	1577378
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	BAJ	06/28/16 15:33	160628-2	1577378
7440-61-1	Uranium	0.550	ug/L		0.067	0.2	0.2	1	MS	BAJ	06/28/16 20:00	160628-3	1577378
7440-62-2	Vanadium	2.49	ug/L	B	1	5	5	1	P	HSC	07/06/16 11:29	070616-1	1577375
7440-66-6	Zinc	3.5	ug/L	U	3.5	10	10	1	MS	BAJ	06/28/16 15:33	160628-2	1577378

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1577375	1577374	SW846 3005A	50	mL	50	mL	06/27/16	SXW1
1577378	1577377	SW846 3005A	50	mL	50	mL	06/27/16	SXW1

**\*Analytical Methods:**

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METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

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: July 21, 2016

Page 1 of 8

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400138

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1577378										
QC1203574648	LCS										
Aluminum	2000			2020	ug/L		101	(80%-120%)	BAJ	06/28/16	14:57
Antimony	50.0			49.3	ug/L		98.6	(80%-120%)		06/29/16	09:30
Arsenic	50.0			51.6	ug/L		103	(80%-120%)		06/28/16	14:57
Barium	50.0			49.5	ug/L		99	(80%-120%)			
Beryllium	50.0			57.1	ug/L		114	(80%-120%)			
Cadmium	50.0			50.8	ug/L		102	(80%-120%)		06/28/16	19:38
Chromium	50.0			51.0	ug/L		102	(80%-120%)		06/28/16	14:57
Cobalt	50.0			50.7	ug/L		101	(80%-120%)			
Copper	50.0			52.6	ug/L		105	(80%-120%)			
Lead	50.0			50.9	ug/L		102	(80%-120%)			
Manganese	50.0			53.3	ug/L		107	(80%-120%)			
Molybdenum	50.0			50.5	ug/L		101	(80%-120%)		06/29/16	11:49
Nickel	50.0			52.1	ug/L		104	(80%-120%)		06/28/16	14:57
Selenium	50.0			53.3	ug/L		107	(80%-120%)			
Silver	50.0			54.5	ug/L		109	(80%-120%)			
Strontium	50.0			52.2	ug/L		104	(80%-120%)			
Thallium	50.0			50.3	ug/L		101	(80%-120%)			
Thorium	50.0			47.3	ug/L		94.5	(80%-120%)		06/28/16	19:38
Tin	50.0			52.5	ug/L		105	(80%-120%)		06/28/16	14:57
Uranium	50.0			50.2	ug/L		100	(80%-120%)		06/28/16	19:38

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 400138

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1577378										
Zinc	50.0			53.8	ug/L		108	(80%-120%)	BAJ	06/28/16	14:57
QC1203574647	MB										
Aluminum			U	15.0	ug/L					06/28/16	14:54
Antimony			U	1.00	ug/L					06/29/16	09:28
Arsenic			U	1.70	ug/L					06/28/16	14:54
Barium			U	0.600	ug/L						
Beryllium			U	0.200	ug/L						
Cadmium			U	0.110	ug/L					06/28/16	19:36
Chromium			U	2.00	ug/L					06/28/16	14:54
Cobalt			U	0.100	ug/L						
Copper			U	0.350	ug/L						
Lead			U	0.500	ug/L						
Manganese			U	1.00	ug/L						
Molybdenum			U	0.165	ug/L					06/29/16	11:47
Nickel			U	0.500	ug/L					06/28/16	14:54
Selenium			U	1.50	ug/L						
Silver			U	0.200	ug/L						
Strontium			U	2.00	ug/L						
Thallium			U	0.450	ug/L						
Thorium			U	0.383	ug/L					06/28/16	19:36
Tin			U	1.00	ug/L					06/28/16	14:54
Uranium			U	0.067	ug/L					06/28/16	19:36

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 400138

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch 1577378											
Zinc			U	3.50	ug/L				BAJ	06/28/16	14:54
QC1203574649 400138001 MS											
Aluminum	2000	U	15.0	2110	ug/L		105	(75%-125%)		06/28/16	15:10
Antimony	50.0	U	1.00	48.3	ug/L		96.5	(75%-125%)		06/29/16	09:32
Arsenic	50.0	U	1.70	50.6	ug/L		99.7	(75%-125%)		06/28/16	15:10
Barium	50.0	U	0.600	49.9	ug/L		99.8	(75%-125%)			
Beryllium	50.0	U	0.200	56.6	ug/L		113	(75%-125%)			
Cadmium	50.0	U	0.110	49.9	ug/L		99.7	(75%-125%)		06/28/16	19:42
Chromium	50.0	U	2.00	51.3	ug/L		103	(75%-125%)		06/28/16	15:10
Cobalt	50.0	U	0.100	50.7	ug/L		101	(75%-125%)			
Copper	50.0	U	0.350	51.8	ug/L		103	(75%-125%)			
Lead	50.0	U	0.500	50.1	ug/L		100	(75%-125%)			
Manganese	50.0	U	1.00	52.9	ug/L		106	(75%-125%)			
Molybdenum	50.0	B	0.187	48.2	ug/L		96	(75%-125%)		06/29/16	11:51
Nickel	50.0	U	0.500	51.5	ug/L		103	(75%-125%)		06/28/16	15:10
Selenium	50.0	U	1.50	51.1	ug/L		102	(75%-125%)			
Silver	50.0	U	0.200	52.2	ug/L		104	(75%-125%)			
Strontium	50.0	U	2.00	47.4	ug/L		92.6	(75%-125%)			
Thallium	50.0	U	0.450	49.4	ug/L		98.3	(75%-125%)			
Thorium	50.0	B	0.921	47.4	ug/L		93	(75%-125%)		06/28/16	19:42
Tin	50.0	U	1.00	50.0	ug/L		99.5	(75%-125%)		06/28/16	15:10
Uranium	50.0	U	0.067	49.4	ug/L		98.8	(75%-125%)		06/28/16	19:42

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**QC Summary**

Workorder: 400138

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1577378										
Zinc	50.0	U	3.50	54.0	ug/L		107	(75%-125%)	BAJ	06/28/16	15:10
QC1203574650 400138001 MSD											
Aluminum	2000	U	15.0	2040	ug/L	3.33	102	(0%-20%)		06/28/16	15:13
Antimony	50.0	U	1.00	49.4	ug/L	2.24	98.6	(0%-20%)		06/29/16	09:34
Arsenic	50.0	U	1.70	50.9	ug/L	0.684	100	(0%-20%)		06/28/16	15:13
Barium	50.0	U	0.600	48.1	ug/L	3.68	96.2	(0%-20%)			
Beryllium	50.0	U	0.200	57.0	ug/L	0.653	114	(0%-20%)			
Cadmium	50.0	U	0.110	50.4	ug/L	0.984	101	(0%-20%)		06/28/16	19:44
Chromium	50.0	U	2.00	51.4	ug/L	0.0331	103	(0%-20%)		06/28/16	15:13
Cobalt	50.0	U	0.100	51.8	ug/L	2.15	104	(0%-20%)			
Copper	50.0	U	0.350	52.3	ug/L	0.961	104	(0%-20%)			
Lead	50.0	U	0.500	49.1	ug/L	2.07	98.1	(0%-20%)			
Manganese	50.0	U	1.00	52.1	ug/L	1.44	104	(0%-20%)			
Molybdenum	50.0	B	0.187	49.0	ug/L	1.63	97.6	(0%-20%)		06/29/16	11:53
Nickel	50.0	U	0.500	51.9	ug/L	0.797	104	(0%-20%)		06/28/16	15:13
Selenium	50.0	U	1.50	53.1	ug/L	3.85	106	(0%-20%)			
Silver	50.0	U	0.200	52.8	ug/L	1.22	106	(0%-20%)			
Strontium	50.0	U	2.00	51.7	ug/L	8.56	101	(0%-20%)			
Thallium	50.0	U	0.450	49.1	ug/L	0.576	97.8	(0%-20%)			
Thorium	50.0	B	0.921	48.2	ug/L	1.66	94.6	(0%-20%)		06/28/16	19:44
Tin	50.0	U	1.00	51.0	ug/L	1.92	101	(0%-20%)		06/28/16	15:13
Uranium	50.0	U	0.067	49.2	ug/L	0.361	98.4	(0%-20%)		06/28/16	19:44

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**QC Summary**

Workorder: 400138

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1577378										
Zinc	50.0	U	3.50		54.7	ug/L	1.34	108	(0%-20%)	BAJ	06/28/16 15:13
QC1203574651 400138001 SDILT											
Aluminum		U	1.30	DU	75.0	ug/L	N/A		(0%-10%)		06/28/16 15:18
Antimony		U	0.059	DU	5.00	ug/L	N/A		(0%-10%)		06/29/16 09:35
Arsenic		U	0.718	DU	8.50	ug/L	N/A		(0%-10%)		06/28/16 15:18
Barium		U	0.021	DU	3.00	ug/L	N/A		(0%-10%)		
Beryllium		U	0.002	DU	1.00	ug/L	N/A		(0%-10%)		
Cadmium		U	-0.006	DU	0.550	ug/L	N/A		(0%-10%)		06/28/16 19:48
Chromium		U	0.066	DU	10.0	ug/L	N/A		(0%-10%)		06/28/16 15:18
Cobalt		U	0.005	DU	0.500	ug/L	N/A		(0%-10%)		
Copper		U	0.111	DU	1.75	ug/L	N/A		(0%-10%)		
Lead		U	0.022	DU	2.50	ug/L	N/A		(0%-10%)		
Manganese		U	0.001	DU	5.00	ug/L	N/A		(0%-10%)		
Molybdenum		B	0.187	DU	0.825	ug/L	N/A		(0%-10%)		06/29/16 11:54
Nickel		U	0.028	DU	2.50	ug/L	N/A		(0%-10%)		06/28/16 15:18
Selenium		U	0.299	DU	7.50	ug/L	N/A		(0%-10%)		
Silver		U	-0.001	DU	1.00	ug/L	N/A		(0%-10%)		
Strontium		U	1.16	DU	10.0	ug/L	N/A		(0%-10%)		
Thallium		U	0.243	BD	0.761	ug/L	N/A		(0%-10%)		
Thorium		B	0.921	DU	1.92	ug/L	N/A		(0%-10%)		06/28/16 19:48
Tin		U	0.295	DU	5.00	ug/L	N/A		(0%-10%)		06/28/16 15:18
Uranium		U	0.035	BD	0.147	ug/L	N/A		(0%-10%)		06/28/16 19:48

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**QC Summary**

Workorder: 400138

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1577378										
Zinc		U	0.719	DU	17.5	ug/L	N/A	(0%-10%)	BAJ	06/28/16	15:18
<b>Metals Analysis-ICP</b>											
Batch	1577375										
QC1203574643	LCS										
Boron	500				525	ug/L		105 (80%-120%)	HSC	07/06/16	11:03
Calcium	5000				5230	ug/L		105 (80%-120%)			
Iron	5000				5270	ug/L		105 (80%-120%)			
Magnesium	5000				5210	ug/L		104 (80%-120%)			
Potassium	5000				5020	ug/L		100 (80%-120%)			
Sodium	5000				5190	ug/L		104 (80%-120%)			
Vanadium	500				509	ug/L		102 (80%-120%)			
QC1203574642	MB										
Boron			U		15.0	ug/L				07/06/16	10:59
Calcium			U		50.0	ug/L					
Iron			U		30.0	ug/L					
Magnesium			U		110	ug/L					
Potassium			U		50.0	ug/L					
Sodium			U		100	ug/L					
Vanadium			U		1.00	ug/L					
QC1203574644	400138001 MS										
Boron	500	U	15.0		521	ug/L		103 (75%-125%)		07/06/16	11:11
Calcium	5000	U	50.0		5230	ug/L		104 (75%-125%)			
Iron	5000	U	30.0		5270	ug/L		105 (75%-125%)			
Magnesium	5000	U	110		5210	ug/L		104 (75%-125%)			

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**QC Summary**

Workorder: 400138

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1577375										
Potassium	5000	U	50.0	4980	ug/L		99.6	(75%-125%)			
Sodium	5000	U	100	5070	ug/L		101	(75%-125%)	HSC	07/06/16	11:11
Vanadium	500	U	1.00	505	ug/L		101	(75%-125%)			
QC1203574645	400138001	MSD									
Boron	500	U	15.0	520	ug/L	0.202	102	(0%-20%)		07/06/16	11:14
Calcium	5000	U	50.0	5210	ug/L	0.32	104	(0%-20%)			
Iron	5000	U	30.0	5340	ug/L	1.29	107	(0%-20%)			
Magnesium	5000	U	110	5270	ug/L	1.11	105	(0%-20%)			
Potassium	5000	U	50.0	4980	ug/L	0.0582	99.6	(0%-20%)			
Sodium	5000	U	100	5060	ug/L	0.0829	101	(0%-20%)			
Vanadium	500	U	1.00	502	ug/L	0.614	100	(0%-20%)			
QC1203574646	400138001	SDILT									
Boron		U	7.35	DU	75.0	ug/L	N/A	(0%-10%)		07/06/16	11:17
Calcium		U	24.3	DU	250	ug/L	N/A	(0%-10%)			
Iron		U	0.631	DU	150	ug/L	N/A	(0%-10%)			
Magnesium		U	-10.6	DU	550	ug/L	N/A	(0%-10%)			
Potassium		U	-2.42	DU	250	ug/L	N/A	(0%-10%)			
Sodium		U	-23.4	DU	500	ug/L	N/A	(0%-10%)			
Vanadium		U	0.114	DU	5.00	ug/L	N/A	(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



# General Chem Analysis

# Case Narrative

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL400138  
Work Order #: 400138**

**Product: Alkalinity****Analytical Method:** 2320\_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 12**Analytical Batch:** 1577434

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>
400138001	B35C73
400138003	B35C74
1203574834	Laboratory Control Sample (LCS)
1203574837	Method Blank (MB)
1203574838	400025001(NonSDG) Sample Duplicate (DUP)

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

**Data Summary:**

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

**Quality Control (QC) Information****Method Blank (MB) Statement**

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

<b>Sample</b>	<b>Analyte</b>	<b>Value</b>
1203574837 (MB)	Alkalinity, Total as CaCO <sub>3</sub> and Bicarbonate alkalinity (CaCO <sub>3</sub> )	1.52 * 10 > 3.54

**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: GEL400138 GEL Work Order: 400138

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

C Target analyte was detected in the sample and the associated blank. The associated blank concentration is  $\geq$  EQL or is  $> 5\%$  of the measured concentration and/or decision level for associated samples.

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

**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: 29 JUN 2016

Title: Analyst I

# Sample Data Summary



7/21/2016

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: June 29, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF S16-006

Client Sample ID:	B35C74	Project:	CPRC0S16006
Sample ID:	400138003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	24-JUN-16 09:34		
Receive Date:	25-JUN-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
2320_ALKALINITY: GW 01 "As Received"											
Alkalinity, Total as CaCO3	C	63100	725	1000	ug/L		KLP1	06/27/16	1409	1577434	1
Bicarbonate alkalinity (CaCO3)	C	63100	725	1000	ug/L						
Carbonate alkalinity (CaCO3)	U	725	725	1000	ug/L						
Hydroxide alkalinity as CaCO3	U	725	725	1000	ug/L						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	2320_ALKALINITY	

Notes:

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: June 29, 2016

**CH2MHill Plateau Remediation Company**  
**MSIN R3-50 CHPRC**  
**PO Box 1600**  
**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 400138**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1577434										
QC1203574838	400025001	DUP									
Alkalinity, Total as CaCO3	C	113000		116000	ug/L	2.21		(0%-20%)	KLP1	06/27/16	12:39
Bicarbonate alkalinity (CaCO3)	C	113000		116000	ug/L	2.21		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	725	U	725	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	725	U	725	ug/L	N/A					
QC1203574834	LCS										
Alkalinity, Total as CaCO3	50000			49500	ug/L		99	(80%-120%)		06/27/16	12:30
QC1203574837	MB										
Alkalinity, Total as CaCO3				1520	ug/L					06/27/16	12:26
Bicarbonate alkalinity (CaCO3)				1520	ug/L						
Carbonate alkalinity (CaCO3)			U	725	ug/L						
Hydroxide alkalinity as CaCO3			U	725	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 >= 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

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 400138

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ 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 #: GEL400138  
 Work Order #: 400138**

**Product:** GAMMA\_GS:COMMON + GW 01  
**Analytical Method:** 901.1\_GAMMA\_GS  
**Analytical Procedure:** GL-RAD-A-013 REV# 25  
**Analytical Batch:** 1577515

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>
400138001	B35C73
400138003	B35C74
1203575112	Method Blank (MB)
1203575113	400138001(B35C73) Sample Duplicate (DUP)
1203575114	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:** SRISO\_SEP\_PRECIP\_GPC: COMMON  
**Analytical Method:** SRISO\_SEP\_PRECIP\_GPC  
**Analytical Procedure:** GL-RAD-A-004 REV# 17  
**Analytical Batch:** 1579220

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>
400138001	B35C73
400138003	B35C74
1203579106	Method Blank (MB)
1203579107	400141005(NonSDG) Sample Duplicate (DUP)
1203579108	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 400138001 (B35C73) was recounted due to results more negative than the three sigma TPU. The second count is reported. Sample 400138003 (B35C74) was verified by recounting at least five days from the separation date. The recount is reported.

**Product:** 9310\_ALPHABETA\_GPC: Gross Beta

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

**Analytical Procedure:** GL-RAD-A-001 REV# 18

**Analytical Batch:** 1579221

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>
400138001	B35C73
400138003	B35C74
1203579109	Method Blank (MB)
1203579110	400022003(B35BW1) Sample Duplicate (DUP)
1203579111	400022003(B35BW1) Matrix Spike (MS)
1203579112	400022003(B35BW1) Matrix Spike Duplicate (MSD)
1203579113	Laboratory Control Sample (LCS)

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

**Data Summary:**

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

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

All of the QC samples meet the required acceptance limits with the following exceptions: The sample and the duplicate, 1203579110 (B35BW1DUP), did not meet the client alpha relative error ratio requirement; However, both results are less than the MDA.

**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**

Sample 1203579113 (LCS) was recounted due to high recovery. The recount is reported.

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

The matrix spike and matrix spike duplicate, 1203579111 (B35BW1MS) and 1203579112 (B35BW1MSD), aliquots were reduced to conserve sample volume.

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

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

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

**Analytical Batch:** 1579141

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>
400138001	B35C73
400138003	B35C74
1203578832	Method Blank (MB)
1203578833	400025001(NonSDG) Sample Duplicate (DUP)
1203578834	400025001(NonSDG) Matrix Spike (MS)
1203578835	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 400138003 (B35C74) was recounted to verify sample results. The recount results are similar to the original results. Original results are reported.

**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: GEL400138 GEL Work Order: 400138

**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:** Kate Gellatly

**Date:** 20 JUL 2016

**Title:** Analyst I

# Sample Data Summary

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

SDG Number: GEL400138	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 400138001	Date Collected: 06/24/2016 07:15	Matrix: WATER
	Date Received: 06/25/2016 08:45	
Client ID: B35C73		Prep Basis: "As Received"
Batch ID: 1579220	Method: SRISO_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 07/18/2016 12:24	Analyst: BXF1	Instrument: PIC11D
Data File: S1579220r1.xls	Aliquot: 300 mL	Count Time: 60 min
Prep Batch: 1579220	Prep Method: EPA 905.0 Modified/DOE RP5	
Prep Date: 07/12/2016 14:13		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	-0.453	pCi/L	+/-0.498	0.498	1.02	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.90	7.37	mg	93.7	(40%-110%)

**Comments:**

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

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

SDG Number: GEL400138  
 Lab Sample ID: 400138001

Client: CPRC001  
 Date Collected: 06/24/2016 07:15  
 Date Received: 06/25/2016 08:45

Project: CPRC0S16006  
 Matrix: WATER

Client ID: B35C73  
 Batch ID: 1579221  
 Run Date: 07/13/2016 16:05  
 Data File: AB1579221r1.xls  
 Prep Batch: 1579221  
 Prep Date: 07/13/2016 09:06

Method: 9310\_ALPHABETA\_GPC  
 Analyst: JXC9  
 Aliquot: 125 mL  
 Prep Method: EPA 900.0/SW846 9310

Prep Basis: "As Received"  
 SOP Ref: GL-RAD-A-001  
 Instrument: LB4100G3  
 Count Time: 80 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA	U	-0.34	pCi/L	+/-2.09	2.09	3.87	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:** GEL400138  
**Lab Sample ID:** 400138001  
  
**Client ID:** B35C73  
**Batch ID:** 1577515  
**Run Date:** 07/15/2016 10:11  
**Data File:** G400138001.CNF;1  
**Prep Batch:** 1577515  
**Prep Date:** 07/14/2016 00:00

**Client:** CPRC001  
**Date Collected:** 06/24/2016 07:15  
**Date Received:** 06/25/2016 08:45  
  
**Method:** 901.1\_GAMMA\_GS  
**Analyst:** MJH1  
**Aliquot:** 2 L  
**Prep Method:** EPA 901.1

**Project:** CPRC0S16006  
**Matrix:** WATER  
  
**Prep Basis:** "As Received"  
**SOP Ref:** GL-RAD-A-013  
**Instrument:** GAM08  
**Count Time:** 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	-2.89	pCi/L	+/-6.93	7.06	12.6	
13967-70-9	Cesium-134	U	-1.59	pCi/L	+/-3.20	3.28	5.78	
10045-97-3	Cesium-137	U	-1.57	pCi/L	+/-3.24	3.32	5.63	15.0
10198-40-0	Cobalt-60	U	-2.11	pCi/L	+/-3.29	3.43	5.54	
14683-23-9	Europium-152	U	-5.15	pCi/L	+/-8.96	9.27	15.0	
15585-10-1	Europium-154	U	-6.42	pCi/L	+/-6.79	7.40	10.2	
14391-16-3	Europium-155	U	-0.765	pCi/L	+/-11.5	11.5	19.8	
13966-00-2	Potassium-40	U	-0.362	pCi/L	+/-34.5	34.5	71.7	

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> GEL400138	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S16006
<b>Lab Sample ID:</b> 400138001	<b>Date Collected:</b> 06/24/2016 07:15	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/25/2016 08:45	
<b>Client ID:</b> B35C73	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1579141	<b>Analyst:</b> TXJ1	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 07/13/2016 16:09	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCBROWN
<b>Data File:</b> T1579141.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 45 min
<b>Prep Batch:</b> 1579141		
<b>Prep Date:</b> 07/13/2016 10:38		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	14.8	pCi/L	+/-185	185	324	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> GEL400138	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0S16006
<b>Lab Sample ID:</b> 400138003	<b>Date Collected:</b> 06/24/2016 09:34	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/25/2016 08:45	
<b>Client ID:</b> B35C74	<b>Method:</b> SRISO_SEP_PRECIP_GPC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1579220	<b>Analyst:</b> BXF1	<b>SOP Ref:</b> GL-RAD-A-004
<b>Run Date:</b> 07/18/2016 12:24	<b>Aliquot:</b> 300 mL	<b>Instrument:</b> PIC13A
<b>Data File:</b> S1579220r1.xls	<b>Prep Method:</b> EPA 905.0 Modified/DOE RP5	<b>Count Time:</b> 60 min
<b>Prep Batch:</b> 1579220		
<b>Prep Date:</b> 07/12/2016 14:13		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		302	pCi/L	+/-6.47	47.7	0.679	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.50	7.37	mg	88.3	(40%-110%)

**Comments:**

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

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

SDG Number: GEL400138	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 400138003	Date Collected: 06/24/2016 09:34	Matrix: WATER
	Date Received: 06/25/2016 08:45	
Client ID: B35C74		Prep Basis: "As Received"
Batch ID: 1579221	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 07/13/2016 16:05	Analyst: JXC9	Instrument: LB4100H3
Data File: AB1579221r1.xls	Aliquot: 125 mL	Count Time: 140 min
Prep Batch: 1579221	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 07/13/2016 09:06		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		808	pCi/L	+/-13.8	131	3.22	4.00

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:** GEL400138  
**Lab Sample ID:** 400138003  
  
**Client ID:** B35C74  
**Batch ID:** 1577515  
**Run Date:** 07/15/2016 10:11  
**Data File:** G400138003.CNF;1  
**Prep Batch:** 1577515  
**Prep Date:** 07/14/2016 00:00

**Client:** CPRC001  
**Date Collected:** 06/24/2016 09:34  
**Date Received:** 06/25/2016 08:45  
  
**Method:** 901.1\_GAMMA\_GS  
**Analyst:** MJH1  
**Aliquot:** 2 L  
**Prep Method:** EPA 901.1

**Project:** CPRC0S16006  
**Matrix:** WATER  
  
**Prep Basis:** "As Received"  
**SOP Ref:** GL-RAD-A-013  
**Instrument:** GAM11  
**Count Time:** 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	-1.1	pCi/L	+/-6.28	6.30	11.4	
13967-70-9	Cesium-134	U	-0.183	pCi/L	+/-2.47	2.47	4.73	
10045-97-3	Cesium-137	U	-0.818	pCi/L	+/-3.37	3.39	6.12	15.0
10198-40-0	Cobalt-60	U	0.692	pCi/L	+/-2.79	2.81	5.72	
14683-23-9	Europium-152	U	4.28	pCi/L	+/-7.18	7.44	14.0	
15585-10-1	Europium-154	U	0.914	pCi/L	+/-7.93	7.94	14.1	
14391-16-3	Europium-155	U	-11.4	pCi/L	+/-8.43	9.94	13.6	
13966-00-2	Potassium-40	U	-17.9	pCi/L	+/-24.2	25.6	49.5	

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: GEL400138	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 400138003	Date Collected: 06/24/2016 09:34	Matrix: WATER
	Date Received: 06/25/2016 08:45	
Client ID: B35C74	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1579141	Analyst: TXJ1	SOP Ref: GL-RAD-A-002
Run Date: 07/13/2016 16:57	Aliquot: 50 mL	Instrument: LSCBROWN
Data File: T1579141.xls	Prep Method: EPA 906.0 Modified	Count Time: 45 min
Prep Batch: 1579141		
Prep Date: 07/13/2016 10:38		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		9550	pCi/L	+/-461	1900	317	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

**Comments:**

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

# Quality Control Summary

7/21/2016

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: July 20, 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: 400138

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1577515								
QC1203575112	MB								
Antimony-125			U	-2.88	pCi/L			MJH1	07/15/1610:12
				Uncert: +/-7.15					
				TPU: +/-7.27					
Cesium-134			U	-0.226	pCi/L				
				Uncert: +/-2.67					
				TPU: +/-2.68					
Cesium-137			U	0.735	pCi/L				
				Uncert: +/-2.73					
				TPU: +/-2.75					
Cobalt-60			U	-1.15	pCi/L				
				Uncert: +/-2.38					
				TPU: +/-2.44					
Europium-152			U	4.22	pCi/L				
				Uncert: +/-7.97					
				TPU: +/-8.21					
Europium-154			U	2.32	pCi/L				
				Uncert: +/-6.67					
				TPU: +/-6.76					
Europium-155			U	0.290	pCi/L				
				Uncert: +/-7.72					
				TPU: +/-7.72					
Potassium-40			U	26.7	pCi/L				
				Uncert: +/-37.6					
				TPU: +/-37.6					
QC1203575113	400138001	DUP							
Antimony-125		U	-2.89	U	-4.56	pCi/L			07/15/1612:31
			Uncert: +/-6.93		+/-7.09		RPD: 0	N/A	
			TPU: +/-7.06		+/-7.40		RER: 0.32	(0-2)	
Cesium-134		U	-1.59	U	0.369	pCi/L			
			Uncert: +/-3.20		+/-2.69		RPD: 0	N/A	
			TPU: +/-3.28		+/-2.70		RER: 0.907	(0-2)	
Cesium-137		U	-1.57	U	0.557	pCi/L			
			Uncert: +/-3.24		+/-3.03		RPD: 0	N/A	
			TPU: +/-3.32		+/-3.04		RER: 0.924	(0-2)	
Cobalt-60		U	-2.11	U	-1.39	pCi/L			
			Uncert: +/-3.29		+/-2.35		RPD: 0	N/A	
			TPU: +/-3.43		+/-2.44		RER: 0.337	(0-2)	
Europium-152		U	-5.15	U	1.78	pCi/L			
			Uncert: +/-8.96		+/-6.46		RPD: 0	N/A	
			TPU: +/-9.27		+/-6.51		RER: 1.2	(0-2)	
Europium-154		U	-6.42	U	2.21	pCi/L			
			Uncert: +/-6.79		+/-7.07		RPD: 0	N/A	
			TPU: +/-7.40		+/-7.15		RER: 1.65	(0-2)	
Europium-155		U	-0.765	U	3.78	pCi/L			

7/21/2016

## GEL LABORATORIES LLC

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QC Summary

Workorder: 400138

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gamma Spec</b>									
Batch	1577515								
		Uncert:	+/-11.5	+/-8.70					
		TPU:	+/-11.5	+/-8.87		RPD: 0	N/A		
Potassium-40		U	-0.362	U	-21	pCi/L	RER: 0.612	(0-2)	
		Uncert:	+/-34.5	+/-34.2		RPD: 0	N/A		
		TPU:	+/-34.5	+/-35.5		RER: 0.817	(0-2)		
QC1203575114	LCS								
Americium-241	34400			38900	pCi/L	REC: 113	(80%-120%)		07/15/1610:39
		Uncert:		+/-1570					
		TPU:		+/-4870					
Antimony-125			U	140	pCi/L				
		Uncert:		+/-224					
		TPU:		+/-233					
Cesium-134			U	45.0	pCi/L				
		Uncert:		+/-90.2					
		TPU:		+/-92.6					
Cesium-137	13400			13600	pCi/L	REC: 101	(80%-120%)		
		Uncert:		+/-342					
		TPU:		+/-1130					
Cobalt-60	13400			13900	pCi/L	REC: 104	(80%-120%)		
		Uncert:		+/-374					
		TPU:		+/-1140					
Europium-152			U	-121	pCi/L				
		Uncert:		+/-221					
		TPU:		+/-228					
Europium-154			U	-18.1	pCi/L				
		Uncert:		+/-134					
		TPU:		+/-134					
Europium-155			U	-152	pCi/L				
		Uncert:		+/-252					
		TPU:		+/-261					
Potassium-40			U	-78.4	pCi/L				
		Uncert:		+/-330					
		TPU:		+/-332					
<b>Rad Gas Flow</b>									
Batch	1579220								
QC1203579106	MB								
Strontium-90			U	0.441	pCi/L			BXF1	07/13/1613:40
		Uncert:		+/-0.786					
		TPU:		+/-0.789					
**Strontium Carrier	7.37			5.90	mg	REC: 80	(40%-110%)		
QC1203579107	400141005	DUP							
Strontium-90		U	-0.937	U	-0.00283	pCi/L			07/13/1613:40
		Uncert:	+/-0.740	+/-0.611		RPD: 0	N/A		
		TPU:	+/-0.740	+/-0.611		RER: 1.91	(0-2)		
**Strontium Carrier	7.37		6.90	7.10	mg	REC: 96	(40%-110%)		
QC1203579108	LCS								
Strontium-90	72.9			77.0	pCi/L	REC: 106	(80%-120%)		07/13/1613:32
		Uncert:		+/-4.42					
		TPU:		+/-12.8					

## GEL LABORATORIES LLC

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

QC Summary

Workorder: 400138

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Gas Flow</b>									
Batch	1579220								
**Strontium Carrier									
Batch	1579221			7.30	mg	REC: 99	(40%-110%)		
QC1203579109 MB									
Beta			U	0.908	pCi/L			JXC9	07/13/1616:03
				Uncert: +/-2.03					
				TPU: +/-2.04					
QC1203579110 400022003 DUP									
Beta		22.1		21.8	pCi/L				07/13/1616:05
				Uncert: +/-1.63		RPD: 1	(0% - 20%)		
				TPU: +/-3.93		RER: 0.0832	(0-2)		
QC1203579111 400022003 MS									
Beta	875	22.1		1070	pCi/L	REC: 120	(75%-125%)		07/13/1616:03
				Uncert: +/-1.63					
				TPU: +/-3.93					
QC1203579112 400022003 MSD									
Beta	875	22.1		1060	pCi/L	REC: 118	(75%-125%)		
				Uncert: +/-1.63		RPD: 2	(0%-20%)		
				TPU: +/-3.93		RER: 0.125	(0-2)		
QC1203579113 LCS									
Beta	292			349	pCi/L	REC: 120	(80%-120%)		07/18/1610:53
				Uncert: +/-12.3					
				TPU: +/-58.1					
<b>Rad Liquid Scintillation</b>									
Batch	1579141								
QC1203578832 MB									
Tritium			U	-4.81	pCi/L			TXJ1	07/14/1607:52
				Uncert: +/-190					
				TPU: +/-190					
QC1203578833 400025001 DUP									
Tritium		1460		1490	pCi/L				07/14/1608:39
				Uncert: +/-246		RPD: 2	(0% - 100%)		
				TPU: +/-374		RER: 0.109	(0-2)		
QC1203578834 400025001 MS									
Tritium	2330	1460		3380	pCi/L	REC: 82	(75%-125%)		07/14/1609:26
				Uncert: +/-246					
				TPU: +/-374					
QC1203578835 LCS									
Tritium	2320			1860	pCi/L	REC: 80	(80%-120%)		07/14/1610:13
				Uncert: +/-260					
				TPU: +/-444					

**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: 400138

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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.