

June 29, 2016



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June 29, 2016

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

Re: CHPRC SAF F16-042  
Work Order: 398673  
SDG: GEL398673

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 04, 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,

A handwritten signature in black ink that reads "Heather Shaffer".

Heather Shaffer  
Project Manager

Purchase Order: 304070 - 7H  
Chain of Custody: F16-042-008 and F16-042-013  
Enclosures



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# Case Narrative

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F16-042  
SDG: GEL398673

June 29, 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 04, 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>
398673001	B35VF4
398673002	B35VF9

**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 and Metals.

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.

**June 29, 2016**

*Heather Shaffer*

Heather Shaffer  
Project Manager

Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL398673  
Work Order #: 398673

## 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 MB 1203565686 (MB) 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.

#### **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**

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-042-013	PAGE 1 OF 1
COLLECTOR F. Hall ckprc	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9400, I-006	PROJECT DESIGNATION 100-NR-2 Drilling - Water		SAF NO. F16-042	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GWS-158	FIELD LOGBOOK NO. HNF-N-645 2-12	ACTUAL SAMPLE DEPTH 85.6	COA 304070	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 6687		BILL OF LADING/AIR BILL NO. 7764 2959 4310		

MATRIX* A=Air DL=Drum L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	PRESERVATION HNO3 to pH <2	HOLDING TIME 6 Months	TYPE OF CONTAINER G/P	NO. OF CONTAINER(S) 1	VOLUME 500ml	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS
POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. NA						
SPECIAL HANDLING AND/OR STORAGE						
SAMPLE NO. B35VF9	MATRIX* WATER	SAMPLE DATE JUN 01 2016	SAMPLE TIME 1300			

398673

FILTER

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM F. HALL	DATE/TIME JUN 01 2016 1409	RECEIVED BY/STORED IN SSU-1	DATE/TIME JUN 01 2016 1409	FILTER (1) 6020_METALS_ICPMS: COMMON {Aluminum, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Selenium}; 6020_METALS_ICPMS: COMMON (Add-on) {Antimony, Arsenic, Manganese, Nickel, Silver, Strontium, Vanadium, Zinc}; 6010_METALS_ICP: COMMON {Calcium, Iron, Magnesium, Potassium, Sodium}; 6010_METALS_ICP: COMMON (Add-on) {Phosphorus};	
RELINQUISHED BY/REMOVED FROM SSU-1	DATE/TIME JUN 02 2016 0930	RECEIVED BY/STORED IN Troy Bacon CHPRC	DATE/TIME JUN 02 2016 0930		
RELINQUISHED BY/REMOVED FROM Troy Bacon CHPRC	DATE/TIME JUN 02 2016 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME 6/14/16 1030		
RELINQUISHED BY/REMOVED FROM Fecky	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		

FILTER

LABORATORY SECTION 8 of 8	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION 8 of 8	DISPOSAL METHOD	DISPOSED BY	DATE/TIME
PRINTED ON 5/23/2016	FSR ID = FSR32406	TRVL NUM = TRVL-16-151	A-6003-618 (REV 2)





SAMPLE RECEIPT & REVIEW FORM

Client: <b>CPRC</b>		SDG/AR/COC/Work Order: <b>398273</b>
Received By: <b>H. Taylor</b>		Date Received: <b>06/04/16</b>
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"/> <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts):
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/> <input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels? <b>nope</b>
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/> <input type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/> <input type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/> <input type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/> <input type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <b>216120</b> Secondary Temperature Device Serial # (if applicable): <b>ES032015830</b>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: <b>missing coolers</b>
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other  <b>see continuation sheet</b>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials **DS** Date **6/6/16** 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 29 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 #: GEL398673**  
**Work Order #: 398673**

**Product: Determination of Metals by ICP**

**Analytical Method:** 6010\_METALS\_ICP

**Analytical Procedure:** GL-MA-E-013 REV# 26

**Analytical Batch:** 1572316

**Product: Determination of Metals by ICP-MS**

**Analytical Method:** 6020\_METALS\_ICPMS

**Analytical Procedure:** GL-MA-E-014 REV# 28

**Analytical Batch:** 1572327

**Preparation Method:** SW846 3005A

**Preparation Procedure:** GL-MA-E-006 REV# 13

**Preparation Batches:** 1572315 and 1572326

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>
398673001	B35VF4
398673002	B35VF9
1203561571	Method Blank (MB)ICP
1203561572	Laboratory Control Sample (LCS)
1203561575	398673001(B35VF4L) Serial Dilution (SD)
1203561573	398673001(B35VF4S) Matrix Spike (MS)
1203561574	398673001(B35VF4SD) Matrix Spike Duplicate (MSD)
1203561590	Method Blank (MB)ICP-MS
1203561591	Laboratory Control Sample (LCS)
1203561594	398673001(B35VF4L) Serial Dilution (SD)
1203561592	398673001(B35VF4S) Matrix Spike (MS)
1203561593	398673001(B35VF4SD) 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: GEL398673 GEL Work Order: 398673

**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:** Jamie Johnson

**Date:** 29 JUN 2016

**Title:** Group Leader

# Sample Data Summary

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

**SDG No:** GEL398673

**CONTRACT:** CPRC0F16042

**METHOD TYPE:** SW846

**SAMPLE ID:**398673001

**BASIS:** As Received

**DATE COLLECTED** 01-JUN-16

**CLIENT ID:** B35VF4

**LEVEL:** Low

**DATE RECEIVED** 04-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	1700	ug/L		15	50	50	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	06/23/16 13:14	160623-3	1572327
7440-38-2	Arsenic	8.63	ug/L		1.7	5	5	1	MS	PRB	06/23/16 15:37	160623-4	1572327
7440-39-3	Barium	79.6	ug/L		0.6	2	2	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-70-2	Calcium	23900	ug/L		50	200	200	1	P	TXT1	06/08/16 11:20	060816-1	1572316
7440-47-3	Chromium	15	ug/L		2	10	10	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-48-4	Cobalt	3.03	ug/L		0.1	1	1	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-50-8	Copper	392	ug/L		0.35	1	1	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7439-89-6	Iron	1630	ug/L		30	100	100	1	P	TXT1	06/08/16 11:20	060816-1	1572316
7439-92-1	Lead	17.5	ug/L		0.5	2	2	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7439-95-4	Magnesium	5820	ug/L		110	300	300	1	P	TXT1	06/08/16 11:20	060816-1	1572316
7439-96-5	Manganese	227	ug/L		1	5	5	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7439-98-7	Molybdenum	6.68	ug/L		0.165	0.5	0.5	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-02-0	Nickel	11.8	ug/L		0.5	2	2	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7723-14-0	Phosphorous	432	ug/L		60	150	150	1	P	TXT1	06/08/16 11:20	060816-1	1572316
7440-09-7	Potassium	4820	ug/L		50	150	150	1	P	TXT1	06/08/16 11:20	060816-1	1572316
7782-49-2	Selenium	1.5	ug/L	U	1.5	5	5	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-23-5	Sodium	92700	ug/L		100	300	300	1	P	TXT1	06/08/16 11:20	060816-1	1572316
7440-24-6	Strontium	177	ug/L		2	10	10	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-62-2	Vanadium	23	ug/L		4.5	10	10	1	MS	PRB	06/22/16 19:44	160622-2	1572327
7440-66-6	Zinc	255	ug/L		3.5	10	10	1	MS	PRB	06/22/16 19:44	160622-2	1572327

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1572316	1572315	SW846 3005A	50	mL	50	mL	06/07/16	JP1
1572327	1572326	SW846 3005A	50	mL	50	mL	06/07/16	JP1

**\*Analytical Methods:**

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

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

**SDG No:** GEL398673

**CONTRACT:** CPRC0F16042

**METHOD TYPE:** SW846

**SAMPLE ID:**398673002

**BASIS:** As Received

**DATE COLLECTED** 01-JUN-16

**CLIENT ID:** B35VF9

**LEVEL:** Low

**DATE RECEIVED** 04-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	43.3	ug/L	B	15	50	50	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	06/23/16 13:26	160623-3	1572327
7440-38-2	Arsenic	8.47	ug/L		1.7	5	5	1	MS	PRB	06/23/16 15:49	160623-4	1572327
7440-39-3	Barium	33.9	ug/L		0.6	2	2	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-70-2	Calcium	22500	ug/L		50	200	200	1	P	TXT1	06/08/16 11:33	060816-1	1572316
7440-47-3	Chromium	3.07	ug/L	B	2	10	10	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-48-4	Cobalt	0.231	ug/L	B	0.1	1	1	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-50-8	Copper	0.350	ug/L	U	0.35	1	1	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7439-89-6	Iron	37.4	ug/L	B	30	100	100	1	P	TXT1	06/08/16 11:33	060816-1	1572316
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7439-95-4	Magnesium	5400	ug/L		110	300	300	1	P	TXT1	06/08/16 11:33	060816-1	1572316
7439-96-5	Manganese	15.3	ug/L		1	5	5	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7439-98-7	Molybdenum	6.64	ug/L		0.165	0.5	0.5	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-02-0	Nickel	0.528	ug/L	B	0.5	2	2	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7723-14-0	Phosphorous	86.5	ug/L	B	60	150	150	1	P	TXT1	06/08/16 11:33	060816-1	1572316
7440-09-7	Potassium	4560	ug/L		50	150	150	1	P	TXT1	06/08/16 11:33	060816-1	1572316
7782-49-2	Selenium	1.66	ug/L	B	1.5	5	5	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-23-5	Sodium	92600	ug/L		100	300	300	1	P	TXT1	06/08/16 11:33	060816-1	1572316
7440-24-6	Strontium	163	ug/L		2	10	10	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-62-2	Vanadium	19.7	ug/L		4.5	10	10	1	MS	PRB	06/22/16 20:09	160622-2	1572327
7440-66-6	Zinc	5.03	ug/L	B	3.5	10	10	1	MS	PRB	06/22/16 20:09	160622-2	1572327

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1572316	1572315	SW846 3005A	50	mL	50	mL	06/07/16	JP1
1572327	1572326	SW846 3005A	50	mL	50	mL	06/07/16	JP1

**\*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 29, 2016

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 398673

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1572327										
QC1203561591	LCS										
Aluminum	2000			2040	ug/L		102	(80%-120%)	PRB	06/22/16	19:41
Antimony	50.0			54.7	ug/L		109	(80%-120%)		06/23/16	13:12
Arsenic	50.0			51.0	ug/L		102	(80%-120%)		06/23/16	15:35
Barium	50.0			50.9	ug/L		102	(80%-120%)		06/22/16	19:41
Cadmium	50.0			50.1	ug/L		100	(80%-120%)			
Chromium	50.0			49.4	ug/L		98.9	(80%-120%)			
Cobalt	50.0			48.6	ug/L		97.2	(80%-120%)			
Copper	50.0			51.3	ug/L		103	(80%-120%)			
Lead	50.0			45.6	ug/L		91.1	(80%-120%)			
Manganese	50.0			48.1	ug/L		96.2	(80%-120%)			
Molybdenum	50.0			49.0	ug/L		98.1	(80%-120%)			
Nickel	50.0			49.4	ug/L		98.8	(80%-120%)			
Selenium	50.0			51.5	ug/L		103	(80%-120%)			
Silver	50.0			51.5	ug/L		103	(80%-120%)			
Strontium	50.0			49.6	ug/L		99.2	(80%-120%)			
Vanadium	50.0			49.5	ug/L		99.1	(80%-120%)			
Zinc	50.0			51.8	ug/L		104	(80%-120%)			
QC1203561590	MB										
Aluminum			U	15.0	ug/L					06/22/16	19:37
Antimony			U	1.00	ug/L					06/23/16	13:10

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 398673

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1572327										
Arsenic			U	1.70	ug/L					06/23/16	15:34
Barium			U	0.600	ug/L				PRB	06/22/16	19:37
Cadmium			U	0.110	ug/L						
Chromium			U	2.00	ug/L						
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						
Nickel			U	0.500	ug/L						
Selenium			U	1.50	ug/L						
Silver			U	0.200	ug/L						
Strontium			U	2.00	ug/L						
Vanadium			U	4.50	ug/L						
Zinc			U	3.50	ug/L						
QC1203561592 398673001 MS											
Aluminum	2000			1700	3760	ug/L	103	(75%-125%)		06/22/16	19:47
Antimony	50.0	U		1.00	59.8	ug/L	118	(75%-125%)		06/23/16	13:16
Arsenic	50.0			8.63	59.2	ug/L	101	(75%-125%)		06/23/16	15:38
Barium	50.0			79.6	131	ug/L	103	(75%-125%)		06/22/16	19:47
Cadmium	50.0	U		0.110	49.2	ug/L	98.3	(75%-125%)			
Chromium	50.0			15.0	60.9	ug/L	91.9	(75%-125%)			
Cobalt	50.0			3.03	49.7	ug/L	93.4	(75%-125%)			

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 398673

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1572327										
Copper	50.0	392		433	ug/L		N/A	(75%-125%)	PRB	06/22/16	19:47
Lead	50.0	17.5		60.3	ug/L		85.7	(75%-125%)			
Manganese	50.0	227		272	ug/L		N/A	(75%-125%)			
Molybdenum	50.0	6.68		57.9	ug/L		103	(75%-125%)			
Nickel	50.0	11.8		58.2	ug/L		92.7	(75%-125%)			
Selenium	50.0	U	1.50	52.2	ug/L		102	(75%-125%)			
Silver	50.0	U	0.200	49.5	ug/L		98.8	(75%-125%)			
Strontium	50.0	177		227	ug/L		101	(75%-125%)			
Vanadium	50.0	23.0		70.9	ug/L		95.9	(75%-125%)			
Zinc	50.0	255		303	ug/L		N/A	(75%-125%)			
QC1203561593 398673001 MSD											
Aluminum	2000	1700		3880	ug/L	3.1	109	(0%-20%)		06/22/16	19:50
Antimony	50.0	U	1.00	55.7	ug/L	7.01	110	(0%-20%)		06/23/16	13:17
Arsenic	50.0	8.63		57.9	ug/L	2.26	98.5	(0%-20%)		06/23/16	15:40
Barium	50.0	79.6		130	ug/L	0.966	100	(0%-20%)		06/22/16	19:50
Cadmium	50.0	U	0.110	49.7	ug/L	1.13	99.4	(0%-20%)			
Chromium	50.0	15.0		61.7	ug/L	1.4	93.6	(0%-20%)			
Cobalt	50.0	3.03		50.6	ug/L	1.65	95.1	(0%-20%)			
Copper	50.0	392		439	ug/L	1.21	N/A	(0%-20%)			
Lead	50.0	17.5		60.7	ug/L	0.608	86.5	(0%-20%)			
Manganese	50.0	227		281	ug/L	3.16	N/A	(0%-20%)			
Molybdenum	50.0	6.68		57.7	ug/L	0.374	102	(0%-20%)			

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 398673

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1572327										
Nickel	50.0	11.8		57.7	ug/L	0.874	91.7	(0%-20%)	PRB	06/22/16	19:50
Selenium	50.0	U	1.50	53.8	ug/L	2.94	105	(0%-20%)			
Silver	50.0	U	0.200	49.1	ug/L	0.78	98	(0%-20%)			
Strontium	50.0	177		226	ug/L	0.655	98.3	(0%-20%)			
Vanadium	50.0	23.0		72.6	ug/L	2.33	99.2	(0%-20%)			
Zinc	50.0	255		308	ug/L	1.48	N/A	(0%-20%)			
QC1203561594 398673001 SDILT											
Aluminum		1700	D	327	ug/L	3.9		(0%-10%)		06/22/16	19:56
Antimony		U	0.747	DU	5.00	ug/L	N/A	(0%-10%)		06/23/16	13:20
Arsenic		8.63	BD	1.82	ug/L	5.29		(0%-10%)		06/23/16	15:43
Barium		79.6	D	15.4	ug/L	3.21		(0%-10%)		06/22/16	19:56
Cadmium		U	0.044	DU	0.550	ug/L	N/A	(0%-10%)			
Chromium		15.0	BD	2.93	ug/L	2.21		(0%-10%)			
Cobalt		3.03	BD	0.613	ug/L	1.06		(0%-10%)			
Copper		392	D	81.4	ug/L	3.88		(0%-10%)			
Lead		17.5	D	3.78	ug/L	8.27		(0%-10%)			
Manganese		227	D	47.1	ug/L	3.42		(0%-10%)			
Molybdenum		6.68	D	1.31	ug/L	1.74		(0%-10%)			
Nickel		11.8	D	2.39	ug/L	1.34		(0%-10%)			
Selenium		U	1.06	DU	7.50	ug/L	N/A	(0%-10%)			
Silver		U	0.135	DU	1.00	ug/L	N/A	(0%-10%)			
Strontium		177	D	32.5	ug/L	8.03		(0%-10%)			

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 398673

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1572327										
Vanadium		23.0	DU	22.5	ug/L	N/A		(0%-10%)	PRB	06/22/16	19:56
Zinc		255	D	54.9	ug/L	7.83		(0%-10%)			
<b>Metals Analysis-ICP</b>											
Batch	1572316										
QC1203561572	LCS										
Calcium	5000			5030	ug/L		101	(80%-120%)	TXT1	06/08/16	11:18
Iron	5000			4960	ug/L		99.2	(80%-120%)			
Magnesium	5000			5000	ug/L		100	(80%-120%)			
Phosphorous	500			497	ug/L		99.5	(80%-120%)			
Potassium	5000			4910	ug/L		98.2	(80%-120%)			
Sodium	5000			4970	ug/L		99.5	(80%-120%)			
QC1203561571	MB										
Calcium			U	50.0	ug/L					06/08/16	11:15
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Phosphorous			U	60.0	ug/L						
Potassium			U	50.0	ug/L						
Sodium			U	100	ug/L						
QC1203561573	398673001	MS									
Calcium	5000	23900		29100	ug/L		N/A	(75%-125%)		06/08/16	11:22
Iron	5000	1630		6760	ug/L		103	(75%-125%)			
Magnesium	5000	5820		10700	ug/L		97.7	(75%-125%)			
Phosphorous	500	432		929	ug/L		99.3	(75%-125%)			
Potassium	5000	4820		9800	ug/L		99.6	(75%-125%)			

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 398673

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1572316										
Sodium	5000	92700		97700	ug/L		N/A	(75%-125%)			
QC1203561574 398673001 MSD											
Calcium	5000	23900		28700	ug/L	1.13	N/A	(0%-20%)	TXT1	06/08/16	11:24
Iron	5000	1630		6910	ug/L	2.11	105	(0%-20%)			
Magnesium	5000	5820		10600	ug/L	0.628	96.3	(0%-20%)			
Phosphorous	500	432		934	ug/L	0.624	100	(0%-20%)			
Potassium	5000	4820		9730	ug/L	0.701	98.2	(0%-20%)			
Sodium	5000	92700		96200	ug/L	1.56	N/A	(0%-20%)			
QC1203561575 398673001 SDILT											
Calcium		23900	D	4540	ug/L	5.18		(0%-10%)		06/08/16	11:26
Iron		1630	D	308	ug/L	5.88		(0%-10%)			
Magnesium		5820	D	1120	ug/L	4.11		(0%-10%)			
Phosphorous		432	D	79.8	ug/L	7.61		(0%-10%)			
Potassium		4820	D	957	ug/L	.647		(0%-10%)			
Sodium		92700	D	17600	ug/L	4.87		(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.

GEL LABORATORIES LLC

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

QC Summary

Workorder: 398673

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

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

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

\* Indicates that a Quality Control parameter was not within specifications.

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

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

# General Chem Analysis

# Case Narrative

General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL398673  
Work Order #: 398673

**Product:** Alkalinity

**Analytical Method:** 2320\_ALKALINITY

**Analytical Procedure:** GL-GC-E-033 REV# 12

**Analytical Batch:** 1573904

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>
398673001	B35VF4
1203565686	Method Blank (MB)
1203565687	Laboratory Control Sample (LCS)
1203565688	398479002(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 MB 1203565686 (MB) 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.

**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: GEL398673 GEL Work Order: 398673

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

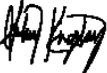
B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

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: 23 JUN 2016

Title: Analyst I

# Sample Data Summary

June 29, 2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 23, 2016

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF F16-042

Client Sample ID: B35VF4 Project: CPRC0F16042
Sample ID: 398673001 Client ID: CPRC001
Matrix: WATER
Collect Date: 01-JUN-16 13:00
Receive Date: 04-JUN-16
Collector: Client

Table with 11 columns: Parameter, Qualifier, Result, DL, RL, Units, DF, Analyst, Date, Time Batch, Method. Row 1: Titration and Ion Analysis. Row 2: 2320\_ALKALINITY: COMMON "As Received". Row 3: Alkalinity, Total as CaCO3, 130000, 330, 1000, ug/L, 1, RXB5, 06/14/16, 2131, 1573904, 1.

The following Analytical Methods were performed:

Table with 3 columns: Method, Description, Analyst Comments. Row 1: 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 23, 2016

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 398673

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1573904										
QC1203565688	398479002	DUP									
Alkalinity, Total as CaCO3		132000		126000	ug/L	5.12		(0%-20%)	RXB5	06/14/16	21:19
QC1203565687	LCS										
Alkalinity, Total as CaCO3	50000			51500	ug/L		103	(80%-120%)		06/14/16	21:06
QC1203565686	MB										
Alkalinity, Total as CaCO3			B	464	ug/L					06/14/16	21:00

**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.