

8/10/2016



August 10, 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: 401646
SDG: GEL401646

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 15, 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: 304070 - 7H
Chain of Custody: F16-042-070 and F16-042-075
Enclosures

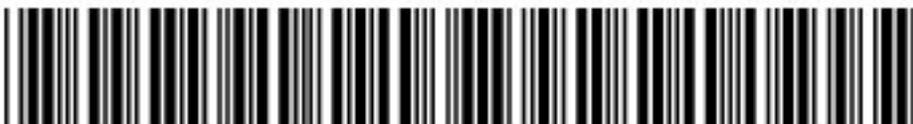


Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	5
Data Review Qualifier Definitions.....	9
Laboratory Certifications.....	11
Metals Analysis.....	13
Case Narrative.....	14
Sample Data Summary.....	18
Quality Control Summary.....	21
General Chem Analysis.....	29
Case Narrative.....	30
Sample Data Summary.....	33
Quality Control Summary.....	35

Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F16-042
SDG: GEL401646**

August 10, 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 July 15, 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:

Laboratory Identification	Sample Description
401646001	B35XD6
401646002	B35XD1

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.

8/10/2016

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL401646
Work Order #: 401646

Metals

Determination of Metals by ICP

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

Calibration Information

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 401646001 (B35XD6) and 401646002 (B35XD1).

Determination of Metals by ICP-MS

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

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of arsenic. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203586147 (MB).

General Chemistry

Alkalinity

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

Certification Statement

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

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-042-075	PAGE 1 OF 1
COLLECTOR	Chris Fulton CHPRC	COMPANY CONTACT	TODAK, D	PROJECT COORDINATOR	TODAK, D
SAMPLING LOCATION	C9403, I-007	PROJECT DESIGNATION	100-NR-2 Drilling - Water	SAF NO.	F16-042
ICE CHEST NO.	GWS-413	FIELD LOGBOOK NO.	HNF-N-645 4-8-15	COA	304070
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	10824	BILL OF LADING/AIR BILL NO.	7767 4418 3318

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
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: NA	HOLDING TIME	6 Months
SPECIAL HANDLING AND/OR STORAGE		TYPE OF CONTAINER	G/P
		NO. OF CONTAINER(S)	1
		VOLUME	500ml
		SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B35XD6	WATER	JUL 13 2016	1116

401644

FILTER

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Chris Fulton CHPRC	JUL 13 2016	SSU	JUL 13 2016 1343
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
SSU-1	JUL 14 2016 1300	Troy Bacon CHPRC	JUL 14 2016 0730
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Troy Bacon CHPRC	JUL 14 2016 1400	FEDEX	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
FX		M. K. ...	7-15-16 0810
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

(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};

FILTER

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME
PRINTED ON 6/2/2016	FSR ID = FSR33028	TRVL NUM = TRVL-16-165	A-6003-618 (REV 2)

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRE</u>		SDG/AR/COC/Work Order: <u>401646</u>	
Received By: <u>MF</u>		Date Received: <u>7-15-16</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?			<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?			<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?			<input checked="" type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?			<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: 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"/>			Temperature Device Serial #: <u>130462862</u> Secondary Temperature Device Serial # (if Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7	VOA vials contain acid preservation?	<input checked="" type="checkbox"/>			(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
9	Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
15	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16	Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7767 8931 5299 2c</u> <u>7767 4415 3330 2c</u> <u>7767 4415 3318 2c</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 10 August 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 #: GEL401646
Work Order #: 401646

Product: Determination of Metals by ICP-MS**Analytical Method:** 6020_METALS_ICPMS**Analytical Procedure:** GL-MA-E-014 REV# 28**Analytical Batch:** 1582235**Product: Determination of Metals by ICP****Analytical Method:** 6010_METALS_ICP**Analytical Procedure:** GL-MA-E-013 REV# 26**Analytical Batch:** 1582262**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batches:** 1582234 and 1582261

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401646001	B35XD6
401646002	B35XD1
1203586202	Method Blank (MB)ICP
1203586203	Laboratory Control Sample (LCS)
1203586206	401646001(B35XD6L) Serial Dilution (SD)
1203586204	401646001(B35XD6S) Matrix Spike (MS)
1203586205	401646001(B35XD6SD) Matrix Spike Duplicate (MSD)
1203586147	Method Blank (MB)ICP-MS
1203586148	Laboratory Control Sample (LCS)
1203586151	401646001(B35XD6L) Serial Dilution (SD)
1203586149	401646001(B35XD6S) Matrix Spike (MS)
1203586150	401646001(B35XD6SD) Matrix Spike Duplicate (MSD)

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

Data Summary:

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

Calibration Information**CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 401646001 (B35XD6) and 401646002 (B35XD1)-ICP.

Quality Control (QC) Information

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of arsenic. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203586147 (MB)-ICP-MS.

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: GEL401646 GEL Work Order: 401646

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).
- 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.

Review/Validation

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

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

Signature: 

Name: Nik-Cole Elmore

Date: 10 AUG 2016

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL401646

CONTRACT: CPRC0F16042

METHOD TYPE: SW846

SAMPLE ID: 401646001

BASIS: As Received

DATE COLLECTED 13-JUL-16

CLIENT ID: B35XD6

LEVEL: Low

DATE RECEIVED 15-JUL-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	78	ug/L		15	50	50	1	MS	SKJ	08/03/16 17:41	160803-7	1582235
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	08/05/16 16:37	160805-3	1582235
7440-38-2	Arsenic	11.9	ug/L	C	1.7	5	5	1	MS	PRB	08/05/16 20:04	160805-6	1582235
7440-39-3	Barium	24.3	ug/L		0.6	2	2	1	MS	SKJ	08/03/16 17:41	160803-7	1582235
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	08/03/16 17:41	160803-7	1582235
7440-70-2	Calcium	20300	ug/L		50	200	200	1	P	HSC	07/19/16 15:36	071916-1	1582262
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	SKJ	08/03/16 17:41	160803-7	1582235
7440-48-4	Cobalt	0.408	ug/L	B	0.1	1	1	1	MS	SKJ	08/04/16 19:07	160804-8	1582235
7440-50-8	Copper	1.41	ug/L		0.35	1	1	1	MS	SKJ	08/04/16 19:07	160804-8	1582235
7439-89-6	Iron	154	ug/L		30	100	100	1	P	HSC	07/19/16 15:36	071916-1	1582262
7439-92-1	Lead	0.851	ug/L	B	0.5	2	2	1	MS	SKJ	08/03/16 17:41	160803-7	1582235
7439-95-4	Magnesium	4960	ug/L		110	300	300	1	P	HSC	07/19/16 15:36	071916-1	1582262
7439-96-5	Manganese	38	ug/L		1	5	5	1	MS	SKJ	08/04/16 19:07	160804-8	1582235
7439-98-7	Molybdenum	6.16	ug/L		0.165	0.5	0.5	1	MS	SKJ	08/03/16 17:41	160803-7	1582235
7440-02-0	Nickel	0.891	ug/L	B	0.5	2	2	1	MS	SKJ	08/04/16 19:07	160804-8	1582235
7723-14-0	Phosphorous	67.3	ug/L	B	60	150	150	1	P	HSC	07/19/16 15:36	071916-1	1582262
7440-09-7	Potassium	4710	ug/L		50	150	150	1	P	HSC	07/19/16 15:36	071916-1	1582262
7782-49-2	Selenium	1.5	ug/L	U	1.5	5	5	1	MS	PRB	08/05/16 20:04	160805-6	1582235
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	08/03/16 17:41	160803-7	1582235
7440-23-5	Sodium	108000	ug/L		100	300	300	1	P	HSC	07/19/16 15:36	071916-1	1582262
7440-24-6	Strontium	165	ug/L		2	10	10	1	MS	PRB	08/05/16 20:04	160805-6	1582235
7440-62-2	Vanadium	26.5	ug/L		4.5	10	10	1	MS	PRB	08/05/16 20:04	160805-6	1582235
7440-66-6	Zinc	7.93	ug/L	B	3.5	10	10	1	MS	SKJ	08/04/16 19:07	160804-8	1582235

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1582235	1582234	SW846 3005A	50	mL	50	mL	07/18/16	SXW1
1582262	1582261	SW846 3005A	50	mL	50	mL	07/18/16	SXW1

***Analytical Methods:**

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL401646

CONTRACT: CPRC0F16042

METHOD TYPE: SW846

SAMPLE ID: 401646002

BASIS: As Received

DATE COLLECTED 13-JUL-16

CLIENT ID: B35XD1

LEVEL: Low

DATE RECEIVED 15-JUL-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	741	ug/L		15	50	50	1	MS	SKJ	08/03/16 18:09	160803-7	1582235
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	08/05/16 16:47	160805-3	1582235
7440-38-2	Arsenic	11.9	ug/L	C	1.7	5	5	1	MS	PRB	08/05/16 20:19	160805-6	1582235
7440-39-3	Barium	31.6	ug/L		0.6	2	2	1	MS	SKJ	08/03/16 18:09	160803-7	1582235
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	08/03/16 18:09	160803-7	1582235
7440-70-2	Calcium	26400	ug/L		50	200	200	1	P	HSC	07/19/16 15:49	071916-1	1582262
7440-47-3	Chromium	4.56	ug/L	B	2	10	10	1	MS	SKJ	08/03/16 18:09	160803-7	1582235
7440-48-4	Cobalt	0.879	ug/L	B	0.1	1	1	1	MS	SKJ	08/04/16 19:35	160804-8	1582235
7440-50-8	Copper	239	ug/L		0.35	1	1	1	MS	SKJ	08/04/16 19:35	160804-8	1582235
7439-89-6	Iron	6180	ug/L		30	100	100	1	P	HSC	07/19/16 15:49	071916-1	1582262
7439-92-1	Lead	9.46	ug/L		0.5	2	2	1	MS	SKJ	08/03/16 18:09	160803-7	1582235
7439-95-4	Magnesium	10100	ug/L		110	300	300	1	P	HSC	07/19/16 15:49	071916-1	1582262
7439-96-5	Manganese	67	ug/L		1	5	5	1	MS	SKJ	08/04/16 19:35	160804-8	1582235
7439-98-7	Molybdenum	6.71	ug/L		0.165	0.5	0.5	1	MS	SKJ	08/03/16 18:09	160803-7	1582235
7440-02-0	Nickel	3.15	ug/L		0.5	2	2	1	MS	SKJ	08/04/16 19:35	160804-8	1582235
7723-14-0	Phosphorous	637	ug/L		60	150	150	1	P	HSC	07/19/16 15:49	071916-1	1582262
7440-09-7	Potassium	10500	ug/L		50	150	150	1	P	HSC	07/19/16 15:49	071916-1	1582262
7782-49-2	Selenium	1.5	ug/L	U	1.5	5	5	1	MS	PRB	08/05/16 20:19	160805-6	1582235
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	08/03/16 18:09	160803-7	1582235
7440-23-5	Sodium	109000	ug/L		100	300	300	1	P	HSC	07/19/16 15:49	071916-1	1582262
7440-24-6	Strontium	172	ug/L		2	10	10	1	MS	PRB	08/05/16 20:19	160805-6	1582235
7440-62-2	Vanadium	30.9	ug/L		4.5	10	10	1	MS	PRB	08/05/16 20:19	160805-6	1582235
7440-66-6	Zinc	146	ug/L		3.5	10	10	1	MS	SKJ	08/04/16 19:35	160804-8	1582235

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1582235	1582234	SW846 3005A	50	mL	50	mL	07/18/16	SXW1
1582262	1582261	SW846 3005A	50	mL	50	mL	07/18/16	SXW1

***Analytical Methods:**

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

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: August 10, 2016

Page 1 of 7

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 401646

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
QC1203586148	LCS										
Aluminum	2000			2050	ug/L		102	(80%-120%)	SKJ	08/03/16	17:37
Antimony	50.0			50.4	ug/L		101	(80%-120%)	PRB	08/05/16	16:36
Arsenic	50.0			53.3	ug/L		107	(80%-120%)		08/05/16	20:02
Barium	50.0			47.5	ug/L		95	(80%-120%)	SKJ	08/03/16	17:37
Cadmium	50.0			50.7	ug/L		101	(80%-120%)			
Chromium	50.0			52.3	ug/L		105	(80%-120%)			
Cobalt	50.0			53.8	ug/L		108	(80%-120%)		08/04/16	19:03
Copper	50.0			54.8	ug/L		110	(80%-120%)			
Lead	50.0			49.6	ug/L		99.1	(80%-120%)		08/03/16	17:37
Manganese	50.0			55.5	ug/L		111	(80%-120%)		08/04/16	19:03
Molybdenum	50.0			52.0	ug/L		104	(80%-120%)		08/03/16	17:37
Nickel	50.0			54.0	ug/L		108	(80%-120%)		08/04/16	19:03
Selenium	50.0			53.4	ug/L		107	(80%-120%)	PRB	08/05/16	20:02
Silver	50.0			50.6	ug/L		101	(80%-120%)	SKJ	08/03/16	17:37
Strontium	50.0			54.2	ug/L		108	(80%-120%)	PRB	08/05/16	20:02
Vanadium	50.0			54.1	ug/L		108	(80%-120%)			
Zinc	50.0			54.9	ug/L		110	(80%-120%)	SKJ	08/04/16	19:03
QC1203586147	MB										
Aluminum			U	15.0	ug/L					08/03/16	17:33
Antimony			U	1.00	ug/L				PRB	08/05/16	16:34

GEL LABORATORIES LLC

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

QC Summary

Workorder: 401646

Page 2 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
Arsenic			B	1.75	ug/L					08/05/16	20:00
Barium			U	0.600	ug/L				SKJ	08/03/16	17:33
Cadmium			U	0.110	ug/L						
Chromium			U	2.00	ug/L						
Cobalt			U	0.100	ug/L					08/04/16	18:59
Copper			U	0.350	ug/L						
Lead			U	0.500	ug/L					08/03/16	17:33
Manganese			U	1.00	ug/L					08/04/16	18:59
Molybdenum			U	0.165	ug/L					08/03/16	17:33
Nickel			U	0.500	ug/L					08/04/16	18:59
Selenium			U	1.50	ug/L				PRB	08/05/16	20:00
Silver			U	0.200	ug/L				SKJ	08/03/16	17:33
Strontium			U	2.00	ug/L				PRB	08/05/16	20:00
Vanadium			U	4.50	ug/L						
Zinc			U	3.50	ug/L				SKJ	08/04/16	18:59
QC1203586149 401646001 MS											
Aluminum	2000			78.0	ug/L		94.4	(75%-125%)		08/03/16	17:45
Antimony	50.0	U		1.00	ug/L		99.8	(75%-125%)	PRB	08/05/16	16:39
Arsenic	50.0	C		11.9	ug/L		98.2	(75%-125%)		08/05/16	20:06
Barium	50.0			24.3	ug/L		90.8	(75%-125%)	SKJ	08/03/16	17:45
Cadmium	50.0	U		0.110	ug/L		101	(75%-125%)			
Chromium	50.0	U		2.00	ug/L		103	(75%-125%)			
Cobalt	50.0	B		0.408	ug/L		102	(75%-125%)		08/04/16	19:11

GEL LABORATORIES LLC

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

QC Summary

Workorder: 401646

Page 3 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
Copper	50.0		1.41	52.8	ug/L		103	(75%-125%)	SKJ	08/04/16	19:11
Lead	50.0	B	0.851	48.1	ug/L		94.4	(75%-125%)		08/03/16	17:45
Manganese	50.0		38.0	89.9	ug/L		104	(75%-125%)		08/04/16	19:11
Molybdenum	50.0		6.16	59.5	ug/L		107	(75%-125%)		08/03/16	17:45
Nickel	50.0	B	0.891	51.5	ug/L		101	(75%-125%)		08/04/16	19:11
Selenium	50.0	U	1.50	49.5	ug/L		96.5	(75%-125%)	PRB	08/05/16	20:06
Silver	50.0	U	0.200	49.9	ug/L		99.8	(75%-125%)	SKJ	08/03/16	17:45
Strontium	50.0		165	216	ug/L		103	(75%-125%)	PRB	08/05/16	20:06
Vanadium	50.0		26.5	78.6	ug/L		104	(75%-125%)			
Zinc	50.0	B	7.93	60.1	ug/L		104	(75%-125%)	SKJ	08/04/16	19:11
QC1203586150 401646001 MSD											
Aluminum	2000		78.0	2050	ug/L	3.98	98.4	(0%-20%)		08/03/16	17:49
Antimony	50.0	U	1.00	50.7	ug/L	0.792	101	(0%-20%)	PRB	08/05/16	16:40
Arsenic	50.0	C	11.9	62.4	ug/L	2.26	101	(0%-20%)		08/05/16	20:09
Barium	50.0		24.3	71.7	ug/L	2.83	94.8	(0%-20%)	SKJ	08/03/16	17:49
Cadmium	50.0	U	0.110	50.4	ug/L	0.452	101	(0%-20%)			
Chromium	50.0	U	2.00	55.7	ug/L	5.27	109	(0%-20%)			
Cobalt	50.0	B	0.408	51.1	ug/L	0.509	101	(0%-20%)		08/04/16	19:15
Copper	50.0		1.41	52.2	ug/L	1.17	102	(0%-20%)			
Lead	50.0	B	0.851	48.2	ug/L	0.26	94.7	(0%-20%)		08/03/16	17:49
Manganese	50.0		38.0	89.4	ug/L	0.505	103	(0%-20%)		08/04/16	19:15
Molybdenum	50.0		6.16	58.9	ug/L	1.06	105	(0%-20%)		08/03/16	17:49

GEL LABORATORIES LLC

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

QC Summary

Workorder: 401646

Page 4 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
Nickel	50.0	B	0.891		51.2	ug/L	0.624	101	(0%-20%)	SKJ	08/04/16 19:15
Selenium	50.0	U	1.50		49.1	ug/L	0.9	95.6	(0%-20%)	PRB	08/05/16 20:09
Silver	50.0	U	0.200		48.6	ug/L	2.75	97.1	(0%-20%)	SKJ	08/03/16 17:49
Strontium	50.0		165		219	ug/L	1.65	110	(0%-20%)	PRB	08/05/16 20:09
Vanadium	50.0		26.5		79.8	ug/L	1.43	106	(0%-20%)		
Zinc	50.0	B	7.93		58.3	ug/L	2.96	101	(0%-20%)	SKJ	08/04/16 19:15
QC1203586151 401646001 SDILT											
Aluminum			78.0	DU	75.0	ug/L	N/A		(0%-10%)		08/03/16 17:57
Antimony		U	0.365	DU	5.00	ug/L	N/A		(0%-10%)	PRB	08/05/16 16:42
Arsenic		C	11.9	BD	2.38	ug/L	.452		(0%-10%)		08/05/16 20:11
Barium			24.3	D	4.72	ug/L	2.93		(0%-10%)	SKJ	08/03/16 17:57
Cadmium		U	0.015	DU	0.550	ug/L	N/A		(0%-10%)		
Chromium		U	1.31	DU	10.0	ug/L	N/A		(0%-10%)		
Cobalt		B	0.408	BD	0.109	ug/L	33.6		(0%-10%)		08/04/16 19:23
Copper			1.41	DU	1.75	ug/L	N/A		(0%-10%)		
Lead		B	0.851	DU	2.50	ug/L	N/A		(0%-10%)		08/03/16 17:57
Manganese			38.0	D	7.85	ug/L	3.23		(0%-10%)		08/04/16 19:23
Molybdenum			6.16	D	1.12	ug/L	8.79		(0%-10%)		08/03/16 17:57
Nickel		B	0.891	DU	2.50	ug/L	N/A		(0%-10%)		08/04/16 19:23
Selenium		U	1.30	DU	7.50	ug/L	N/A		(0%-10%)	PRB	08/05/16 20:11
Silver		U	0.023	DU	1.00	ug/L	N/A		(0%-10%)	SKJ	08/03/16 17:57
Strontium			165	D	33.0	ug/L	.273		(0%-10%)	PRB	08/05/16 20:11

GEL LABORATORIES LLC

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

QC Summary

Workorder: 401646

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1582235										
Vanadium		26.5	BD	5.86	ug/L	10.4		(0%-10%)	PRB	08/05/16	20:11
Zinc	B	7.93	DU	17.5	ug/L	N/A		(0%-10%)	SKJ	08/04/16	19:23
Metals Analysis-ICP											
Batch	1582262										
QC1203586203	LCS										
Calcium	5000			5080	ug/L		102	(80%-120%)	HSC	07/19/16	15:33
Iron	5000			5050	ug/L		101	(80%-120%)			
Magnesium	5000			5160	ug/L		103	(80%-120%)			
Phosphorous	500			481	ug/L		96.1	(80%-120%)			
Potassium	5000			4870	ug/L		97.3	(80%-120%)			
Sodium	5000			5490	ug/L		110	(80%-120%)			
QC1203586202	MB										
Calcium			U	50.0	ug/L					07/19/16	15:29
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						
QC1203586204	401646001 MS										
Calcium	5000	20300		25600	ug/L		N/A	(75%-125%)		07/19/16	15:39
Iron	5000	154		5230	ug/L		101	(75%-125%)			
Magnesium	5000	4960		10100	ug/L		103	(75%-125%)			
Phosphorous	500	B	67.3	551	ug/L		96.8	(75%-125%)			
Potassium	5000	4710		10100	ug/L		107	(75%-125%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 401646

Page 6 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1582262										
Sodium	5000	108000		115000	ug/L		N/A	(75%-125%)			
QC1203586205 401646001 MSD											
Calcium	5000	20300		26100	ug/L	1.82	N/A	(0%-20%)	HSC	07/19/16	15:42
Iron	5000	154		5250	ug/L	0.458	102	(0%-20%)			
Magnesium	5000	4960		10200	ug/L	1.05	106	(0%-20%)			
Phosphorous	500	B	67.3	554	ug/L	0.543	97.4	(0%-20%)			
Potassium	5000	4710		10200	ug/L	1.57	111	(0%-20%)			
Sodium	5000	108000		117000	ug/L	1.55	N/A	(0%-20%)			
QC1203586206 401646001 SDILT											
Calcium		20300	D	4120	ug/L	1.45		(0%-10%)		07/19/16	15:45
Iron		154	BD	35.6	ug/L	15.5		(0%-10%)			
Magnesium		4960	D	1040	ug/L	5.34		(0%-10%)			
Phosphorous		B	67.3	DU	300	ug/L	N/A	(0%-10%)			
Potassium		4710	D	881	ug/L	6.53		(0%-10%)			
Sodium		108000	D	21000	ug/L	2.98		(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: 401646

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 #: GEL401646
Work Order #: 401646**

Product: Alkalinity

Analytical Method: 2320_ALKALINITY

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

Analytical Batch: 1583508

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
401646002	B35XD1
1203589088	Method Blank (MB)
1203589089	Laboratory Control Sample (LCS)
1203589090	401514002(B35VV0) Sample Duplicate (DUP)

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

Data Summary:

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

Certification Statement

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

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: GEL401646 GEL Work Order: 401646

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: Kristen Mizzell

Date: 28 JUL 2016

Title: Analyst I

Sample Data Summary

8/10/2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 28, 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:	B35XD1	Project:	CPRC0F16042
Sample ID:	401646002	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	13-JUL-16 11:46		
Receive Date:	15-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
2320_ALKALINITY: COMMON "As Received"												
Alkalinity, Total as CaCO3		138000	330	1000	ug/L		1	RXB5	07/22/16	2118	1583508	1

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	2320_ALKALINITY		

Notes:

Column headers are defined as follows:

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

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 28, 2016

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

Contact: Mr. Scot Fitzgerald

Workorder: 401646

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1583508										
QC1203589090	401514002	DUP									
Alkalinity, Total as CaCO3		136000		136000	ug/L	0.133		(0%-20%)	RXB5	07/22/16	21:00
QC1203589089	LCS										
Alkalinity, Total as CaCO3	50000			53900	ug/L		108	(80%-120%)		07/22/16	20:48
QC1203589088	MB										
Alkalinity, Total as CaCO3			U	330	ug/L					07/22/16	20:43

Notes:

The Qualifiers in this report are defined as follows:

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
 ^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
 * Indicates that a Quality Control parameter was not within specifications.
 For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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