

April 27, 2016



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April 18, 2016

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

Re: CHPRC SAF F15-015  
Work Order: 394185  
SDG: GEL394185

Dear Mr. Fitzgerald:

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

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

Sincerely,

*B Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Purchase Order: 300115 - 7H  
Chain of Custody: F15-015-216 and F15-015-221  
Enclosures



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# Case Narrative

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F15-015  
SDG: GEL394185

April 18, 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 April 01, 2016, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

**Items of Note** All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative and DER.

**Sample Identification**

The laboratory received the following samples:

<b>Laboratory Identification</b>	<b>Sample Description</b>
394185001	B34R30
394185002	B34R35

**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: 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.

**April 27, 2016**

*B. Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

**Metals  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL394185  
Work Order #: 394185**

**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 potassium and sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 394185001 (B34R30) and 394185002 (B34R35).

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of potassium, sodium and vanadium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203519942 (MB).

**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.

**Calibration Information**

**CRDL/PQL Requirements**

The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of uranium. Client sample concentrations were greater than two times the PQL; therefore the data were not adversely affected.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of chromium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203519967 (MB).

**Serial Dilution % Difference Statement**

Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

<b>Sample</b>	<b>Analyte</b>	<b>Value</b>
1203519971 (B34R30SDILT)	Manganese	13.6 *(0%-10%)

**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**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

PROJECT COORDINATOR: TODAY, D  
 SAF NO.: F15-015  
 COA: 300115  
 BILL OF LADING/AIR BILL NO.: 7760 0948 5994

COMPANY CONTACT: TODAY, D  
 TELEPHONE NO.: 376-6427

PROJECT DESIGNATION: FY15 100-HR-3 Drilling - Water  
 FIELD LOGBOOK NO. 3 - 58  
 HNF-N-845  
 ACTUAL SAMPLE DEPTH: 47.0'

OFFSITE PROPERTY NO.: 6481

ICE CHEST NO.: 605-510

SHIPPED TO: GEL Laboratories, LLC

PRICE CODE: 7H  
 AIR QUALITY:   
 METHOD OF SHIPMENT: FEDERAL EXPRESS  
 DATA TURNAROUND: 30 Days / 30 Days  
**ORIGINAL**

MATRIX*	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME
A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	HNO3 to pH <2	6 Months	G/P	1	500mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	MAR 30 2016	0951

394185

**FILTER**

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	DATE/TIME	DATE/TIME
RELINQUISHED BY/REMOVED FROM Curt Hoffman CHPRC	RECEIVED BY/STORED IN SSU-1	MAR 30 2016 1120	MAR 30 2016 1120
RELINQUISHED BY/REMOVED FROM L.D. Wait CHPRC	RECEIVED BY/STORED IN L.D. Wait	MAR 31 2015 1215	MAR 31 2015 1215
RELINQUISHED BY/REMOVED FROM L.D. Wait CHPRC	RECEIVED BY/STORED IN FEDEX	MAR 31 2015 1400	MAR 31 2015 1400
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN		
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN		
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN		
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN		
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN		
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN		
LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

**SPECIAL INSTRUCTIONS**

(1) 6010\_METALS\_ICP: COMMON {Calcium, Iron, Magnesium, Nickel, Potassium, Sodium, Vanadium}; 6020\_METALS\_ICPMS: COMMON {Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper}; 6020\_METALS\_ICPMS: COMMON (Add-on) {Antimony, Manganese, Silver, Strontium, Uranium, Zinc};

**FILTER**

**CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST**

CH2M Hill Plateau Remediation Company

COLLECTOR: Curt Hoffman, CHPRC

COMPANY CONTACT: TODAY, D

TELEPHONE NO.: 376-6427

PROJECT COORDINATOR: TODAY, D

PRICE CODE: 7H

DATA TURNAROUND: 30 Days / 30 Days

SAMPLING LOCATION: C8735, I-001, DUP

PROJECT DESIGNATION: FY15 100-HR-3 Drilling - Water

SAF NO.: F15-015

AIR QUALITY:

METHOD OF SHIPMENT: ORIGINAL

ICE CHEST NO.: GWS-510

FIELD LOGBOOK NO.: HNF-N-645 3-58

ACTUAL SAMPLE DEPTH: 470'

COA: 300115

FEDERAL EXPRESS

SHIPPED TO: GEL Laboratories, LLC

OFFSITE PROPERTY NO.: 6481

BILL OF LADING/AIR BILL NO.: 7760 0948 5994

394185

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HNO3 to pH
A=Air	*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		<2
DL=Drum			6 Months
Liquids			G/P
DS=Drum			1
Solids			500ml
L=Liquid			SEE ITEM (1) IN SPECIAL INSTRUCTIONS
O=Oil			
S=Soil			
SF=Sediment			
T=Tissue			
V=Vegetation			
W=Water			
WI=Wipe			
X=Other			

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B34R35	WATER	MAR 30 2016	0951

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM: Curt Hoffman, CHPRC		SSU-1	MAR 30 2016 1120
RELINQUISHED BY/REMOVED FROM: SSU-1		L.D. Wald	MAR 31 2016 1215
RELINQUISHED BY/REMOVED FROM: L.D. Wald		CHPRC	MAR 31 2016 1400
RELINQUISHED BY/REMOVED FROM: CHPRC		FEDEX	
RELINQUISHED BY/REMOVED FROM: [Signature]		M. Enslow	MAR 31 2016 0355
RELINQUISHED BY/REMOVED FROM: [Signature]			
RELINQUISHED BY/REMOVED FROM: [Signature]			
RELINQUISHED BY/REMOVED FROM: [Signature]			
RELINQUISHED BY/REMOVED FROM: [Signature]			

**SPECIAL INSTRUCTIONS**

(1) 6010\_METALS\_ICP: COMMON {Calcium, Iron, Magnesium, Nickel, Potassium, Sodium, Vanadium}; 6020\_METALS\_ICPMS: COMMON {Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper}; 6020\_METALS\_ICPMS: COMMON (Add-on) {Antimony, Manganese, Silver, Strontium, Uranium, Zinc};

**FILTER**

**LABORATORY SECTION** RECEIVED BY: TITLE: DATE/TIME:

**FINAL SAMPLE DISPOSITION** DISPOSAL METHOD: DATE/TIME:

PRINTED ON 2/17/2016 FSR ID = FSR25571 TRVL NUM = TRVL-16-084 A-6003-618 (REV 2)

**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>CPRC</u>		SDG/AR/COC/Work Order:
Received By: <u>mm</u>		Date Received: <u>4-1-16</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</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 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 type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>IC</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>170862862</u> Secondary Temperature Device Serial # (if Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" 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 checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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 type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" 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 checked="" 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 checked="" type="checkbox"/>	<input 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 type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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>7760 0948 5994</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 >= 2X the MDA and, after corrections, result is >= 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 >= 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 >= 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 18 April 2016**

<b>State</b>	<b>Certification</b>
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 #: GEL394185  
Work Order #: 394185

**Product: Determination of Metals by ICP**

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

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

**Analytical Batch:** 1556682

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

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

**Analytical Procedure:** GL-MA-E-014 REV# 27

**Analytical Batch:** 1556690

**Preparation Method:** SW846 3005A

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

**Preparation Batches:** 1556681 and 1556689

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>
394185001	B34R30
394185002	B34R35
1203519942	Method Blank (MB)ICP
1203519943	Laboratory Control Sample (LCS)
1203519946	394185001(B34R30L) Serial Dilution (SD)
1203519944	394185001(B34R30S) Matrix Spike (MS)
1203519945	394185001(B34R30SD) Matrix Spike Duplicate (MSD)
1203519967	Method Blank (MB)ICP-MS
1203519968	Laboratory Control Sample (LCS)
1203519971	394185001(B34R30L) Serial Dilution (SD)
1203519969	394185001(B34R30S) Matrix Spike (MS)
1203519970	394185001(B34R30SD) 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 potassium and sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 394185001 (B34R30) and 394185002 (B34R35)-ICP. The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of uranium. Client sample concentrations were greater than two times the PQL; therefore the data were not adversely affected.

ICP-MS.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of potassium, sodium and vanadium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203519942 (MB)-ICP. The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of chromium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203519967 (MB)-ICP-MS.

**Serial Dilution % Difference Statement**

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Sample	Analyte	Value
1203519971 (B34R30SDILT)	Manganese	13.6 *(0%-10%)

**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: GEL394185 GEL Work Order: 394185

**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.
- M Duplicate precision not met.
- 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: 26 APR 2016

Title: Data Validator

# Sample Data Summary

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

**SDG No:** GEL394185

**CONTRACT:** CPRC0F15015

**METHOD TYPE:** SW846

**SAMPLE ID:**394185001

**BASIS:** As Received

**DATE COLLECTED** 30-MAR-16

**CLIENT ID:** B34R30

**LEVEL:** Low

**DATE RECEIVED** 01-APR-16

**MATRIX:** WATER

**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	SKJ	04/05/16 21:38	160405-2	1556690
7440-39-3	Barium	61.6	ug/L		0.6	2	2	1	MS	SKJ	04/05/16 23:04	160405-3	1556690
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	04/06/16 14:19	160406-4	1556690
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	04/05/16 23:04	160405-3	1556690
7440-70-2	Calcium	68600	ug/L		50	200	200	1	P	JWJ	04/07/16 20:13	040716A-1	1556682
7440-47-3	Chromium	2	ug/L	U	2	10	10	1	MS	SKJ	04/05/16 23:04	160405-3	1556690
7440-48-4	Cobalt	1.17	ug/L		0.1	1	1	1	MS	SKJ	04/05/16 23:04	160405-3	1556690
7440-50-8	Copper	1.29	ug/L		0.35	1	1	1	MS	SKJ	04/07/16 14:19	160407-8	1556690
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	JWJ	04/07/16 20:13	040716A-1	1556682
7439-95-4	Magnesium	11700	ug/L		110	300	300	1	P	JWJ	04/07/16 20:13	040716A-1	1556682
7439-96-5	Manganese	490	ug/L	M	1	5	5	1	MS	SKJ	04/05/16 23:04	160405-3	1556690
7440-02-0	Nickel	9.12	ug/L		1.5	5	5	1	P	JWJ	04/07/16 20:13	040716A-1	1556682
7440-09-7	Potassium	5560	ug/L		50	150	150	1	P	JWJ	04/07/16 20:13	040716A-1	1556682
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	04/05/16 23:04	160405-3	1556690
7440-23-5	Sodium	17200	ug/L		100	300	300	1	P	JWJ	04/07/16 20:13	040716A-1	1556682
7440-24-6	Strontium	292	ug/L		2	10	10	1	MS	SKJ	04/05/16 23:04	160405-3	1556690
7440-61-1	Uranium	2.15	ug/L		0.067	0.2	0.2	1	MS	SKJ	04/06/16 16:35	160406-7	1556690
7440-62-2	Vanadium	2.35	ug/L	CB	1	5	5	1	P	JWJ	04/07/16 21:03	040716A-1	1556682
7440-66-6	Zinc	3.5	ug/L	U	3.5	10	10	1	MS	SKJ	04/05/16 23:04	160405-3	1556690

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1556682	1556681	SW846 3005A	50	mL	50	mL	04/01/16	JP1
1556690	1556689	SW846 3005A	50	mL	50	mL	04/01/16	JP1

**\*Analytical Methods:**

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

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

**SDG No:** GEL394185

**CONTRACT:** CPRC0F15015

**METHOD TYPE:** SW846

**SAMPLE ID:**394185002

**BASIS:** As Received

**DATE COLLECTED** 30-MAR-16

**CLIENT ID:** B34R35

**LEVEL:** Low

**DATE RECEIVED** 01-APR-16

**MATRIX:** WATER

**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	SKJ	04/05/16 21:46	160405-2	1556690
7440-39-3	Barium	58.5	ug/L		0.6	2	2	1	MS	SKJ	04/05/16 23:24	160405-3	1556690
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	SKJ	04/06/16 14:34	160406-4	1556690
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	04/05/16 23:24	160405-3	1556690
7440-70-2	Calcium	69700	ug/L		50	200	200	1	P	JWJ	04/07/16 20:27	040716A-1	1556682
7440-47-3	Chromium	2.22	ug/L	CB	2	10	10	1	MS	SKJ	04/05/16 23:24	160405-3	1556690
7440-48-4	Cobalt	1.12	ug/L		0.1	1	1	1	MS	SKJ	04/05/16 23:24	160405-3	1556690
7440-50-8	Copper	1.36	ug/L		0.35	1	1	1	MS	SKJ	04/07/16 14:25	160407-8	1556690
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	JWJ	04/07/16 20:27	040716A-1	1556682
7439-95-4	Magnesium	11800	ug/L		110	300	300	1	P	JWJ	04/07/16 20:27	040716A-1	1556682
7439-96-5	Manganese	489	ug/L	M	1	5	5	1	MS	SKJ	04/05/16 23:24	160405-3	1556690
7440-02-0	Nickel	9.09	ug/L		1.5	5	5	1	P	JWJ	04/07/16 20:27	040716A-1	1556682
7440-09-7	Potassium	5750	ug/L		50	150	150	1	P	JWJ	04/07/16 20:27	040716A-1	1556682
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	04/05/16 23:24	160405-3	1556690
7440-23-5	Sodium	17400	ug/L		100	300	300	1	P	JWJ	04/07/16 20:27	040716A-1	1556682
7440-24-6	Strontium	295	ug/L		2	10	10	1	MS	SKJ	04/05/16 23:24	160405-3	1556690
7440-61-1	Uranium	2.12	ug/L		0.067	0.2	0.2	1	MS	SKJ	04/06/16 16:43	160406-7	1556690
7440-62-2	Vanadium	2.71	ug/L	CB	1	5	5	1	P	JWJ	04/07/16 21:17	040716A-1	1556682
7440-66-6	Zinc	3.5	ug/L	U	3.5	10	10	1	MS	SKJ	04/05/16 23:24	160405-3	1556690

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1556682	1556681	SW846 3005A	50	mL	50	mL	04/01/16	JP1
1556690	1556689	SW846 3005A	50	mL	50	mL	04/01/16	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: April 26, 2016

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 394185

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1556690										
QC1203519968	LCS										
Antimony	50.0			49.4	ug/L		98.8	(80%-120%)	SKJ	04/05/16	21:33
Barium	50.0			49.0	ug/L		98	(80%-120%)		04/05/16	22:52
Beryllium	50.0			58.9	ug/L		118	(80%-120%)		04/06/16	14:10
Cadmium	50.0			50.8	ug/L		102	(80%-120%)		04/05/16	22:52
Chromium	50.0			54.1	ug/L		108	(80%-120%)			
Cobalt	50.0			51.4	ug/L		103	(80%-120%)			
Copper	50.0			52.0	ug/L		104	(80%-120%)		04/07/16	14:14
Manganese	50.0			52.4	ug/L		105	(80%-120%)		04/05/16	22:52
Silver	50.0			52.1	ug/L		104	(80%-120%)			
Strontium	50.0			52.3	ug/L		105	(80%-120%)			
Uranium	50.0			55.6	ug/L		111	(80%-120%)		04/06/16	16:31
Zinc	50.0			50.9	ug/L		102	(80%-120%)		04/05/16	22:52
QC1203519967	MB										
Antimony			U	1.00	ug/L					04/05/16	21:32
Barium			U	0.600	ug/L					04/05/16	22:48
Beryllium			U	0.200	ug/L					04/06/16	14:07
Cadmium			U	0.110	ug/L					04/05/16	22:48
Chromium			B	3.29	ug/L						
Cobalt			U	0.100	ug/L						
Copper			U	0.350	ug/L					04/07/16	14:13

April 27, 2016

GEL LABORATORIES LLC

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

QC Summary

Workorder: 394185

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1556690										
Manganese			U	1.00	ug/L					04/05/16	22:48
Silver			U	0.200	ug/L				SKJ		
Strontium			U	2.00	ug/L						
Uranium			U	0.067	ug/L					04/06/16	16:29
Zinc			U	3.50	ug/L					04/05/16	22:48
QC1203519969 394185001 MS											
Antimony	50.0	U	1.00	50.5	ug/L		101	(75%-125%)		04/05/16	21:40
Barium	50.0		61.6	107	ug/L		91.7	(75%-125%)		04/05/16	23:08
Beryllium	50.0	U	0.200	57.0	ug/L		114	(75%-125%)		04/06/16	14:22
Cadmium	50.0	U	0.110	49.5	ug/L		98.9	(75%-125%)		04/05/16	23:08
Chromium	50.0	U	2.00	51.0	ug/L		98.3	(75%-125%)			
Cobalt	50.0		1.17	48.7	ug/L		95.2	(75%-125%)			
Copper	50.0		1.29	48.5	ug/L		94.4	(75%-125%)		04/07/16	14:20
Manganese	50.0	M	490	524	ug/L		N/A	(75%-125%)		04/05/16	23:08
Silver	50.0	U	0.200	49.3	ug/L		98.6	(75%-125%)			
Strontium	50.0		292	338	ug/L		N/A	(75%-125%)			
Uranium	50.0		2.15	56.1	ug/L		108	(75%-125%)		04/06/16	16:37
Zinc	50.0	U	3.50	50.4	ug/L		98	(75%-125%)		04/05/16	23:08
QC1203519970 394185001 MSD											
Antimony	50.0	U	1.00	50.4	ug/L	0.157	100	(0%-20%)		04/05/16	21:41
Barium	50.0		61.6	104	ug/L	2.87	85.6	(0%-20%)		04/05/16	23:12
Beryllium	50.0	U	0.200	57.9	ug/L	1.56	116	(0%-20%)		04/06/16	14:25
Cadmium	50.0	U	0.110	49.4	ug/L	0.103	98.8	(0%-20%)		04/05/16	23:12
Chromium	50.0	U	2.00	50.8	ug/L	0.389	97.9	(0%-20%)			

April 27, 2016

### GEL LABORATORIES LLC

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

## QC Summary

Workorder: 394185

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1556690										
Cobalt	50.0		1.17	48.5	ug/L	0.504	94.7	(0%-20%)	SKJ	04/05/16	23:12
Copper	50.0		1.29	48.9	ug/L	0.778	95.2	(0%-20%)		04/07/16	14:22
Manganese	50.0	M	490	519	ug/L	0.895	N/A	(0%-20%)		04/05/16	23:12
Silver	50.0	U	0.200	48.8	ug/L	1.01	97.6	(0%-20%)			
Strontium	50.0		292	332	ug/L	1.64	N/A	(0%-20%)			
Uranium	50.0		2.15	56.8	ug/L	1.2	109	(0%-20%)		04/06/16	16:38
Zinc	50.0	U	3.50	50.5	ug/L	0.0951	98.1	(0%-20%)		04/05/16	23:12
QC1203519971 394185001 SDILT											
Antimony		U	0.204	DU	5.00	ug/L	N/A	(0%-10%)		04/05/16	21:45
Barium			61.6	D	11.8	ug/L	4.06	(0%-10%)		04/05/16	23:20
Beryllium		U	0.025	DU	1.00	ug/L	N/A	(0%-10%)		04/06/16	14:31
Cadmium		U	0.024	DU	0.550	ug/L	N/A	(0%-10%)		04/05/16	23:20
Chromium		U	1.84	DU	10.0	ug/L	N/A	(0%-10%)			
Cobalt			1.17	D	0.236	ug/L	1.11	(0%-10%)			
Copper			1.29	DU	1.75	ug/L	N/A	(0%-10%)		04/07/16	14:23
Manganese		M	490	DM	111	ug/L	13.6*	(0%-10%)		04/05/16	23:20
Silver		U	0.009	DU	1.00	ug/L	N/A	(0%-10%)			
Strontium			292	D	61.4	ug/L	5.15	(0%-10%)			
Uranium			2.15	D	0.426	ug/L	.699	(0%-10%)		04/06/16	16:41
Zinc		U	1.44	DU	17.5	ug/L	N/A	(0%-10%)		04/05/16	23:20

**Metals Analysis-ICP**

Batch 1556682

QC1203519943 LCS

April 27, 2016

### GEL LABORATORIES LLC

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

## QC Summary

Workorder: 394185

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1556682										
Calcium	5000			5230	ug/L		105	(80%-120%)	JWJ	04/07/16	20:09
Iron	5000			5120	ug/L		102	(80%-120%)			
Magnesium	5000			5320	ug/L		106	(80%-120%)			
Nickel	500			524	ug/L		105	(80%-120%)			
Potassium	5000			5090	ug/L		102	(80%-120%)			
Sodium	5000			5280	ug/L		106	(80%-120%)			
Vanadium	500			519	ug/L		104	(80%-120%)			
QC1203519942 MB											
Calcium			U	50.0	ug/L					04/07/16	20:06
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Nickel			U	1.50	ug/L						
Potassium			B	72.4	ug/L						
Sodium			B	167	ug/L						
Vanadium			B	1.13	ug/L						
QC1203519944 394185001 MS											
Calcium	5000	68600		73600	ug/L		N/A	(75%-125%)		04/07/16	20:16
Iron	5000	U 30.0		5140	ug/L		103	(75%-125%)			
Magnesium	5000	11700		16900	ug/L		105	(75%-125%)			
Nickel	500	9.12		525	ug/L		103	(75%-125%)			
Potassium	5000	5560		10400	ug/L		96.8	(75%-125%)			
Sodium	5000	17200		21800	ug/L		91.9	(75%-125%)			
Vanadium	500	BC 2.35		522	ug/L		104	(75%-125%)		04/07/16	21:06
QC1203519945 394185001 MSD											

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 394185

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1556682										
Calcium	5000	68600		74100	ug/L	0.788	N/A	(0%-20%)		04/07/16	20:20
Iron	5000	U	30.0	5320	ug/L	3.42	106	(0%-20%)	JWJ		
Magnesium	5000	11700		17300	ug/L	1.89	111	(0%-20%)			
Nickel	500	9.12		532	ug/L	1.3	105	(0%-20%)			
Potassium	5000	5560		10700	ug/L	2.41	102	(0%-20%)			
Sodium	5000	17200		22100	ug/L	1.34	97.7	(0%-20%)			
Vanadium	500	BC	2.35	527	ug/L	0.822	105	(0%-20%)		04/07/16	21:10
QC1203519946 394185001 SDILT											
Calcium		68600	D	14500	ug/L	5.81		(0%-10%)		04/07/16	20:24
Iron		U	0.361	DU	150	ug/L	N/A	(0%-10%)			
Magnesium		11700	D	2460	ug/L	5.24		(0%-10%)			
Nickel		9.12	D	1.86	ug/L	1.84		(0%-10%)			
Potassium		5560	D	1160	ug/L	4.3		(0%-10%)			
Sodium		17200	D	3680	ug/L	6.89		(0%-10%)			
Vanadium		BC	2.35	D	1.25	ug/L	166	(0%-10%)		04/07/16	21:13

**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)

GEL LABORATORIES LLC

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

QC Summary

Workorder: 394185

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

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

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

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

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

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