



June 14, 2018

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

Re: CHPRC SAF S18-005  
Work Order: 451434  
SDG: GEL451434

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 01, 2018. 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,

Anna Dupree for  
Heather Shaffer  
Project Manager

Purchase Order: 300071 - 7H  
Chain of Custody: S18-005-645 and S18-005-667  
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.....	17
Quality Control Summary.....	22

# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF S18-005  
SDG: GEL451434**

**June 14, 2018**

**Laboratory Identification:**

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

**Summary**

**Sample receipt**

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 01, 2018, 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.

**Sample Identification**

The laboratory received the following samples:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
451434001	B3J0P7
451434002	B3J0R0
451434003	B3J2T9
451434004	B3J2V1

**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.



Anna Dupree for  
Heather Shaffer  
Project Manager

**Metals**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL451434**  
**Work Order #: 451434**

**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.

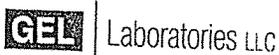
**Certification Statement**

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

# **Chain of Custody and Supporting Documentation**







**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>451434</u>
Received By: <u>C. TARPLIN</u>		Date Received: <u>June 1, 2018</u>
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>772355476086 (2.c)</u> <u>772365180450 (-1.c)</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.
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
COC/Samples marked or classified as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <input type="checkbox"/> <u>CPM</u> <input checked="" type="checkbox"/> mR/HR Classified as: <u>(Rad 1)</u> Rad 2 Rad 3
Is package, COC, and/or Samples marked HAZ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

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	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>(Vet Ice)</u> <u>(Ice Packs)</u> Dry ice None Other: *all temperatures are recorded in Celsius
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	TEMP: _____ Temperature Device Serial #: <u>IR4-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5	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)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, List:
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No <input checked="" type="checkbox"/> N/A ___ Sample ID's and containers affected: <u>B32268 2 &amp; 5</u>
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9	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:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12	Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials KS Date 6/11/18 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 analyte was detected in the associated method blank $\geq$ MDC or $>$ 5% sample activity.	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 14 June 2018**

<b>State</b>	<b>Certification</b>
Alaska	17-018
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	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
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
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# Metals Analysis

# Case Narrative

**Metals**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL451434**  
**Work Order #: 451434**

**Product: Determination of Metals by ICP-MS****Analytical Method:** SW846 3005A/6020B**Analytical Procedure:** GL-MA-E-014 REV# 32**Analytical Batch:** 1770005**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 14**Preparation Batch:** 1770004

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>
451434001	B3J0P7
451434002	B3J0R0
451434003	B3J2T9
451434004	B3J2V1
1204041381	Method Blank (MB)ICP-MS
1204041382	Laboratory Control Sample (LCS)
1204041385	451434001(B3J0P7L) Serial Dilution (SD)
1204041383	451434001(B3J0P7S) Matrix Spike (MS)
1204041384	451434001(B3J0P7SD) 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****ICSA/ICSAB Statement**

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

**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: GEL451434 GEL Work Order: 451434

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

\* Duplicate analysis not within control limits

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

D Results are reported from a diluted aliquot of sample.

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

**Review/Validation**

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

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

**Signature:****Name: Edmund Frampton****Date: 14 JUN 2018****Title: Team Leader**

# Sample Data Summary

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

**SDG No:** GEL451434

**CONTRACT:** CPRC0S18005

**METHOD TYPE:** SW846

**SAMPLE ID:**451434001

**BASIS:** As Received

**DATE COLLECTED** 30-MAY-18

**CLIENT ID:** B3J0P7

**LEVEL:** Low

**DATE RECEIVED** 01-JUN-18

**MATRIX:** WATER

**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	18.2	ug/L		3	10	10	1	MS	BAJ	06/02/18 17:18	180602-1	1770005

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1770005	1770004	SW846 3005A	50	mL	50	mL	06/01/18	JXM8

**\*Analytical Methods:**

MS SW846 3005A/6020B

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

**SDG No:** GEL451434

**CONTRACT:** CPRC0S18005

**METHOD TYPE:** SW846

**SAMPLE ID:**451434002

**BASIS:** As Received

**DATE COLLECTED** 30-MAY-18

**CLIENT ID:** B3J0R0

**LEVEL:** Low

**DATE RECEIVED** 01-JUN-18

**MATRIX:** WATER

**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	17.2	ug/L		3	10	10	1	MS	BAJ	06/02/18 17:41	180602-1	1770005

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1770005	1770004	SW846 3005A	50	mL	50	mL	06/01/18	JXM8

**\*Analytical Methods:**

MS SW846 3005A/6020B

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

**SDG No:** GEL451434

**CONTRACT:** CPRC0S18005

**METHOD TYPE:** SW846

**SAMPLE ID:** 451434003

**BASIS:** As Received

**DATE COLLECTED** 29-MAY-18

**CLIENT ID:** B3J2T9

**LEVEL:** Low

**DATE RECEIVED** 01-JUN-18

**MATRIX:** WATER

**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3.68	ug/L	B	3	10	10	1	MS	BAJ	06/02/18 17:45	180602-1	1770005

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1770005	1770004	SW846 3005A	50	mL	50	mL	06/01/18	JXM8

**\*Analytical Methods:**

MS SW846 3005A/6020B

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

**SDG No:** GEL451434

**CONTRACT:** CPRC0S18005

**METHOD TYPE:** SW846

**SAMPLE ID:**451434004

**BASIS:** As Received

**DATE COLLECTED** 29-MAY-18

**CLIENT ID:** B3J2V1

**LEVEL:** Low

**DATE RECEIVED** 01-JUN-18

**MATRIX:** WATER

**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-47-3	Chromium	3.51	ug/L	B	3	10	10	1	MS	BAJ	06/02/18 17:48	180602-1	1770005

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1770005	1770004	SW846 3005A	50	mL	50	mL	06/01/18	JXM8

**\*Analytical Methods:**

MS SW846 3005A/6020B

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: June 14, 2018

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 451434

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1770005										
QC1204041382		LCS									
Chromium	50.0			46.9	ug/L		93.7	(80%-120%)	BAJ	06/02/18	17:15
QC1204041381		MB									
Chromium			U	3.00	ug/L					06/02/18	17:12
QC1204041383		451434001 MS									
Chromium	50.0		18.2	63.8	ug/L		91.3	(75%-125%)		06/02/18	17:21
QC1204041384		451434001 MSD									
Chromium	50.0		18.2	63.2	ug/L	0.955	90.1	(0%-20%)		06/02/18	17:25
QC1204041385		451434001 SDILT									
Chromium			18.2 BD	3.62	ug/L	.659		(0%-20%)		06/02/18	17:31

**Notes:**

The Qualifiers in this report are defined as follows:

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

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 451434

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
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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.