

July 12, 2018

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

Re: CHPRC SAF X18-048  
Work Order: 453576  
SDG: GEL453576

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 30, 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: 304546 - 7H  
Chain of Custody: X18-048-002 and X18-048-003  
Enclosures



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# Sample Issue Resolution

**SAMPLE ISSUE RESOLUTION (SIR) REPORT**

**SIR Number:** SIR18-0795  
**Rev. Number:** 0  
**Date Initiated:** 07/02/2018

**SAMPLE EVENT INFORMATION**

**SAF NUM(S):** X18-048  
**LABORATORY:** GEL

**SAMPLING INFORMATION**

**NUMBER OF SAMPLES:** 2  
**SAMPLE NUMBERS:** B3K480, B3K481  
**SAMPLE MATRIX:** WATER  
**SDG NUM(S):** GEL453576

**ISSUE BACKGROUND**

**CLASS:** Field Sampling Issue  
**TYPE:** Incorrect Sample Preservation  
**DESCRIPTION:** GEL received one 500 mL container for analysis 6010\_METALS\_ICP: GW 04; 6020\_METALS\_ICPMS: Uranium (1) for sample IDs B3K480 and B3K481 that came in unpreserved.

**RESOLUTION**

**PROPOSED RESOLUTION:** The lab will preserve the samples to the correct pH.

**FINAL RESOLUTION:** Accept proposed resolution and proceed with analysis.

**SUBMITTED BY:**

DUPREE, ANNA

07/02/2018

**ACCEPTED BY:**

CUTSFORTH, EC

07/02/2018

# Case Narrative

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF X18-048  
SDG: GEL453576

July 12, 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 30, 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. Please see the enclosed SIR for further details 453576001(B3K480), 453576003(B3K481).

**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>Laboratory Identification</b>	<b>Sample Description</b>
453576001	B3K480
453576002	B3K479
453576003	B3K481
453576004	B3K482

**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.



Anna Dupree for  
Heather Shaffer  
Project Manager

Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL453576  
Work Order #: 453576

**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 calcium and potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 453576001 (B3K480), 453576002 (B3K479), 453576003 (B3K481) and 453576004 (B3K482).

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The samples in this SDG contained analytes at concentrations more than ten times the negative value reported in the method blank, therefore the data was not adversely affected.

Sample	Analyte	Value
1204061008 (MB)	Calcium	See applicable report

**Determination of Metals by ICP-MS**

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

**General Chemistry**

**Alkalinity**

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

C.O.C. #  
X18-048-002  
Page 1 of 1

453576

**Collector:** WILLIAM COLLINS  
CHERC  
X18-048

**Contact/Requester:** WATERS-HUSTED, K  
Telephone No.: 376-4650

**Sampling Origin:** Hanford Site  
Purchase Order/Charge Code: 304546

**Project Title:** Weekly High Water Sampling, Ju

**Logbook No.:** HNF-N-506 89/64

**Shipped To (Lab):** GEL Laboratories, LLC  
Ice Chest No.: GWS-737

**Protocol:** CERCLA  
Method of Shipment: Commercial Carrier  
Bill of Lading/Air Bill No.: 772589615267

**Priority:** 30 Days  
Offsite Property No.: 9633

**POSSIBLE SAMPLE HAZARDS/REMARK**  
\*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

**SPECIAL INSTRUCTIONS**  
N/A

Sample No.	Filter	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3K480	N	JUN 27 2018	1247	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B3K480	N	/	/	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B3K479	Y	JUN 27 2018	1247	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2

07/17/2018

REV.0

Relinquished By: *[Signature]* JUN 27 2018 1330  
Signature: \_\_\_\_\_ Date/Time: JUN 27 2018 1330

Relinquished By: *[Signature]* JUN 28 2018 0730  
Signature: \_\_\_\_\_ Date/Time: JUN 28 2018 0730

Relinquished By: *[Signature]* JUN 28 2018 1400  
Signature: \_\_\_\_\_ Date/Time: JUN 28 2018 1400

Relinquished By: **Fed Ex**  
Signature: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Received By: **SSU-1** JUN 27 2018 1330  
Signature: \_\_\_\_\_ Date/Time: JUN 27 2018 1330

Received By: *[Signature]* JUN 28 2018 0730  
Signature: \_\_\_\_\_ Date/Time: JUN 28 2018 0730

Received By: **FEDEX**  
Signature: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Received By: *[Signature]* JUN 28 2018 0730  
Signature: \_\_\_\_\_ Date/Time: JUN 28 2018 0730

**Matrix \***  
S = Soil DS = Drum Solids  
SE = Sediment DL = Drum Liquids  
SO = Solid T = Tissue  
SL = Sludge WI = Wipe  
W = Water L = Liquid  
O = Oil V = Vegetation  
A = Air X = Other

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

CH2M Hill Plateau  
Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

X18-048-003

Page 1 of 1

453576

<b>Collector:</b>	WILLIAM COLLINS CHERC	<b>Contact/Requester:</b>	WATERS-HUSTED, K	<b>Telephone No.:</b>	376-4650
<b>SAF No.:</b>	X18-048	<b>Sampling Origin:</b>	Hanford Site	<b>Purchase Order/Charge Code:</b>	304546
<b>Project Title:</b>	Weekly High Water Sampling, Ju	<b>Logbook No.:</b>	HNF-N-506 89664	<b>Ice Chest No.:</b>	GWS-737
<b>Shipped To (Lab):</b>	GEL Laboratories, LLC	<b>Method of Shipment:</b>	Commercial Carrier	<b>Bill of Lading/Air Bill No.:</b>	772589615267
<b>Protocol:</b>	CERCLA	<b>Priority:</b>	30 Days	<b>Offsite Property No.:</b>	9633

**POSSIBLE SAMPLE HAZARDS/REMARK**

\*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.1.

**SPECIAL INSTRUCTIONS**

N/A

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3K481	Y	JUN 27 2018	1247	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B3K482	N	1	1	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B3K482	N	JUN 27 2018	1247	1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C

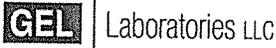
07/17/2018

REV.0

<b>Relinquished By:</b> WILLIAM COLLINS Print First and Last Name	<i>[Signature]</i> Signature	JUN 27 2018 Date/Time	<b>Received By:</b> SSU-1 Print First and Last Name	<i>[Signature]</i> Signature	JUN 27 2018 Date/Time	<b>Matrix *</b> S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
<b>Relinquished By:</b> SSU #1 Print First and Last Name	<i>[Signature]</i> Signature	JUN 28 2018 0730 Date/Time	<b>Received By:</b> Lesly West ICAPRC Print First and Last Name	<i>[Signature]</i> Signature	JUN 28 2018 0730 Date/Time	
<b>Relinquished By:</b> Lesly West ICAPRC Print First and Last Name	<i>[Signature]</i> Signature	JUN 28 2018 1400 Date/Time	<b>Received By:</b> FEDEX Print First and Last Name	<i>[Signature]</i> Signature	JUN 28 2018 1400 Date/Time	
<b>Relinquished By:</b> Fed Ex Print First and Last Name	<i>[Signature]</i> Signature		<b>Received By:</b> Chakeris Tarplin GEL Laboratories Print First and Last Name	<i>[Signature]</i> Signature	6/30/18 Date/Time	
<b>FINAL SAMPLE DISPOSITION</b>	Disposed Method (e.g., Return to customer, per lab procedure, used in process):			<b>Disposed By:</b>	<i>[Signature]</i> Signature	

1330

1330



SAMPLE RECEIPT & REVIEW FORM

Client: <b>CPRC</b>		SDG/AR/COC/Work Order: <b>453570</b>	
Received By: <b>C. TARPLIN</b>		Date Received: <b>06-30-2018</b> <span style="float: right;"><b>HS</b></span>	
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  <b>772592068710</b> <b>772589615267    772591659862</b>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input 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> CPM / 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"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3	Samples requiring cold preservation within (0 ≤ deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius <span style="float: right;">TEMP: <u>3°C</u></span>
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR4-17</u> Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?			<input checked="" type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#: <u>180330P CNT 180330BP</u>
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes ___ No <u>X</u> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <u>X</u> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No <u>X</u> N/A ___ Sample ID's and containers affected: <u>B30481 105 N/A</u> <u>as</u>
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected: <u>7/2/18</u>
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments (Use Continuation Form if needed):

**B3K480 (metals)**  
**B3K481 (metals) TOC** N/A as 7/2/18  
**B3J6014 (metals, FOR COC, ARAMONIA)** HS 7/2/18  
 → Bottles received unpreserved. Preserved metals bottles upon arrival.

PM (or PMA) review: Initials AS Date 6/7/2/18 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 >= 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 >= 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	
o	Analyte failed to recover within LCS limits	Radiological	Rad

# Laboratory Certifications

## List of current GEL Certifications as of 12 July 2018

State	Certification
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 #: GEL453576  
Work Order #: 453576

**Product: Determination of Metals by ICP**  
**Analytical Method:** SW846 3005A/6010D  
**Analytical Procedure:** GL-MA-E-013 REV# 30  
**Analytical Batch:** 1778458

**Product: Determination of Metals by ICP-MS**  
**Analytical Method:** SW846 3005A/6020B  
**Analytical Procedure:** GL-MA-E-014 REV# 32  
**Analytical Batch:** 1778445

**Preparation Method:** SW846 3005A  
**Preparation Procedure:** GL-MA-E-006 REV# 14  
**Preparation Batches:** 1778444 and 1778457

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453576001	B3K480
453576002	B3K479
453576003	B3K481
453576004	B3K482
1204061008	Method Blank (MB) <b>ICP</b>
1204061009	Laboratory Control Sample (LCS)
1204061012	453576001(B3K480L) Serial Dilution (SD)
1204061010	453576001(B3K480S) Matrix Spike (MS)
1204061011	453576001(B3K480SD) Matrix Spike Duplicate (MSD)
1204060977	Method Blank (MB) <b>ICP-MS</b>
1204060978	Laboratory Control Sample (LCS)
1204060981	453576001(B3K480L) Serial Dilution (SD)
1204060979	453576001(B3K480S) Matrix Spike (MS)
1204060980	453576001(B3K480SD) 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 calcium and potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 453576001 (B3K480), 453576002 (B3K479), 453576003

(B3K481) and 453576004 (B3K482)-ICP.

**ICSA/ICSAB Statement**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The samples in this SDG contained analytes at concentrations more than ten times the negative value reported in the method blank, therefore the data was not adversely affected.

Sample	Analyte	Value
1204061008 (MB)	Calcium	See applicable report

**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: GEL453576 GEL Work Order: 453576

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

- \* Duplicate analysis not within control limits
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

**Review/Validation**

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

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

**Signature:** 

**Name:** Nik-Cole Elmore

**Date:** 12 JUL 2018

**Title:** Data Validator

# Sample Data Summary

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

SDG No: GEL453576

CONTRACT: CPRC0X18048

METHOD TYPE: SW846

SAMPLE ID:453576001

BASIS: As Received

DATE COLLECTED 27-JUN-18

CLIENT ID: B3K480

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-42-8	Boron	29.3	ug/L	B	15	50	50	1	P	HSC	07/05/18 19:04	070518-1	1778458
7440-70-2	Calcium	57400	ug/L		50	200	200	1	P	HSC	07/05/18 19:04	070518-1	1778458
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/05/18 19:04	070518-1	1778458
7439-95-4	Magnesium	14000	ug/L		110	300	300	1	P	HSC	07/05/18 19:04	070518-1	1778458
7440-09-7	Potassium	7290	ug/L		50	150	150	1	P	HSC	07/05/18 19:04	070518-1	1778458
7440-23-5	Sodium	27500	ug/L		100	300	300	1	P	HSC	07/05/18 19:04	070518-1	1778458
7440-61-1	Uranium	168	ug/L		0.067	0.2	15	1	MS	BAJ	07/09/18 21:12	180709-2	1778445
7440-62-2	Vanadium	8.62	ug/L		1	5	5	1	P	HSC	07/05/18 19:04	070518-1	1778458

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778445	1778444	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778458	1778457	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

**\*Analytical Methods:**

P SW846 3005A/6010D  
MS SW846 3005A/6020B

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

**SDG No:** GEL453576

**CONTRACT:** CPRC0X18048

**METHOD TYPE:** SW846

**SAMPLE ID:**453576002

**BASIS:** As Received

**DATE COLLECTED** 27-JUN-18

**CLIENT ID:** B3K479

**LEVEL:** Low

**DATE RECEIVED** 30-JUN-18

**MATRIX:** WATER

**%SOLIDS:** 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-42-8	Boron	27.2	ug/L	B	15	50	50	1	P	HSC	07/05/18 19:14	070518-1	1778458
7440-70-2	Calcium	56700	ug/L		50	200	200	1	P	HSC	07/05/18 19:14	070518-1	1778458
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/05/18 19:14	070518-1	1778458
7439-95-4	Magnesium	14200	ug/L		110	300	300	1	P	HSC	07/05/18 19:14	070518-1	1778458
7440-09-7	Potassium	7300	ug/L		50	150	150	1	P	HSC	07/05/18 19:14	070518-1	1778458
7440-23-5	Sodium	27500	ug/L		100	300	300	1	P	HSC	07/05/18 19:14	070518-1	1778458
7440-61-1	Uranium	167	ug/L		0.067	0.2	15	1	MS	BAJ	07/09/18 21:35	180709-2	1778445
7440-62-2	Vanadium	9.06	ug/L		1	5	5	1	P	HSC	07/05/18 19:14	070518-1	1778458

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778445	1778444	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778458	1778457	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

**\*Analytical Methods:**

**P** SW846 3005A/6010D  
**MS** SW846 3005A/6020B

METALS  
-1-  
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL453576

CONTRACT: CPRC0X18048

METHOD TYPE: SW846

SAMPLE ID: 453576003

BASIS: As Received

DATE COLLECTED 27-JUN-18

CLIENT ID: B3K481

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-42-8	Boron	27.4	ug/L	B	15	50	50	1	P	HSC	07/05/18 19:17	070518-1	1778458
7440-70-2	Calcium	57100	ug/L		50	200	200	1	P	HSC	07/05/18 19:17	070518-1	1778458
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/05/18 19:17	070518-1	1778458
7439-95-4	Magnesium	14000	ug/L		110	300	300	1	P	HSC	07/05/18 19:17	070518-1	1778458
7440-09-7	Potassium	7280	ug/L		50	150	150	1	P	HSC	07/05/18 19:17	070518-1	1778458
7440-23-5	Sodium	27600	ug/L		100	300	300	1	P	HSC	07/05/18 19:17	070518-1	1778458
7440-61-1	Uranium	168	ug/L		0.067	0.2	15	1	MS	BAJ	07/09/18 21:38	180709-2	1778445
7440-62-2	Vanadium	8.57	ug/L		1	5	5	1	P	HSC	07/05/18 19:17	070518-1	1778458

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778445	1778444	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778458	1778457	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

**\*Analytical Methods:**

P SW846 3005A/6010D  
MS SW846 3005A/6020B

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

SDG No: GEL453576

CONTRACT: CPRC0X18048

METHOD TYPE: SW846

SAMPLE ID:453576004

BASIS: As Received

DATE COLLECTED 27-JUN-18

CLIENT ID: B3K482

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-42-8	Boron	27	ug/L	B	15	50	50	1	P	HSC	07/05/18 19:20	070518-1	1778458
7440-70-2	Calcium	56600	ug/L		50	200	200	1	P	HSC	07/05/18 19:20	070518-1	1778458
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/05/18 19:20	070518-1	1778458
7439-95-4	Magnesium	14000	ug/L		110	300	300	1	P	HSC	07/05/18 19:20	070518-1	1778458
7440-09-7	Potassium	7250	ug/L		50	150	150	1	P	HSC	07/05/18 19:20	070518-1	1778458
7440-23-5	Sodium	27500	ug/L		100	300	300	1	P	HSC	07/05/18 19:20	070518-1	1778458
7440-61-1	Uranium	175	ug/L		0.067	0.2	15	1	MS	BAJ	07/09/18 21:41	180709-2	1778445
7440-62-2	Vanadium	8.51	ug/L		1	5	5	1	P	HSC	07/05/18 19:20	070518-1	1778458

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778445	1778444	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778458	1778457	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

**\*Analytical Methods:**

**P** SW846 3005A/6010D  
**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: July 12, 2018

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 453576

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1778445										
QC1204060978		LCS									
Uranium	50.0			49.3	ug/L		98.6	(80%-120%)	BAJ	07/09/18	21:09
QC1204060977		MB									
Uranium			U	0.067	ug/L					07/09/18	21:05
QC1204060979		453576001	MS								
Uranium	50.0	168		216	ug/L		96.6	(75%-125%)		07/09/18	21:15
QC1204060980		453576001	MSD								
Uranium	50.0	168		222	ug/L	2.63	108	(0%-20%)		07/09/18	21:18
QC1204060981		453576001	SDILT								
Uranium		168	D	32.5	ug/L	3.16		(0%-20%)		07/09/18	21:25
<b>Metals Analysis-ICP</b>											
Batch	1778458										
QC1204061009		LCS									
Boron	500			511	ug/L		102	(80%-120%)	HSC	07/05/18	19:01
Calcium	5000			5040	ug/L		101	(80%-120%)			
Iron	5000			5000	ug/L		100	(80%-120%)			
Magnesium	5000			5100	ug/L		102	(80%-120%)			
Potassium	5000			4860	ug/L		97.2	(80%-120%)			
Sodium	5000			4980	ug/L		99.7	(80%-120%)			

07/17/2018

REV.0

GEL LABORATORIES LLC

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

QC Summary

Workorder: 453576

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1778458										
Vanadium	500			502	ug/L		100	(80%-120%)	HSC	07/05/18	19:01
QC1204061008	MB										
Boron			U	15.0	ug/L					07/05/18	18:58
Calcium			B	-66.3	ug/L						
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Potassium			U	50.0	ug/L						
Sodium			U	100	ug/L						
Vanadium			U	1.00	ug/L						
QC1204061010	453576001 MS										
Boron	500	B	29.3	543	ug/L		103	(75%-125%)		07/05/18	19:07
Calcium	5000		57400	60100	ug/L		N/A	(75%-125%)			
Iron	5000	U	30.0	4860	ug/L		97.1	(75%-125%)			
Magnesium	5000		14000	18200	ug/L		83.2	(75%-125%)			
Potassium	5000		7290	11700	ug/L		88.2	(75%-125%)			
Sodium	5000		27500	31300	ug/L		N/A	(75%-125%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 453576

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1778458										
Vanadium	500	8.62		504	ug/L		99.1	(75%-125%)	HSC	07/05/18	19:07
QC1204061011 453576001 MSD											
Boron	500	B	29.3	552	ug/L	1.77	105	(0%-20%)		07/05/18	19:09
Calcium	5000	57400		62400	ug/L	3.75	N/A	(0%-20%)			
Iron	5000	U	30.0	4930	ug/L	1.46	98.5	(0%-20%)			
Magnesium	5000	14000		18900	ug/L	3.85	97.5	(0%-20%)			
Potassium	5000	7290		12100	ug/L	3.29	96	(0%-20%)			
Sodium	5000	27500		32300	ug/L	3.22	N/A	(0%-20%)			
Vanadium	500	8.62		514	ug/L	1.85	101	(0%-20%)			
QC1204061012 453576001 SDILT											
Boron		B	29.3	U	15.0	ug/L	N/A	(0%-20%)		07/05/18	19:11
Calcium		57400		11300	ug/L	1.79		(0%-20%)			
Iron		U	9.30	U	30.0	ug/L	N/A	(0%-20%)			
Magnesium		14000		2780	ug/L	1.03		(0%-20%)			
Potassium		7290		1400	ug/L	4.09		(0%-20%)			
Sodium		27500		5560	ug/L	.941		(0%-20%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 453576

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1778458										
Vanadium		8.62	B	2.01	ug/L	16.7		(0%-20%)	HSC	07/05/18	19:11

**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
- 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 #: GEL453576  
Work Order #: 453576**

**Product: Alkalinity****Analytical Method:** 2320\_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 13**Analytical Batch:** 1779460

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>
453576001	B3K480
453576004	B3K482
1204063332	Laboratory Control Sample (LCS)
1204063333	453485003(NonSDG) Sample Duplicate (DUP)
1204063334	453485001(NonSDG) 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: GEL453576 GEL Work Order: 453576

**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: Aubrey Kingsbury

Date: 12 JUL 2018

Title: Data Validator

# Sample Data Summary

## Certificate of Analysis

Report Date: July 12, 2018

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF X18-048

Client Sample ID: B3K480	Project: CPRC0X18048
Sample ID: 453576001	Client ID: CPRC001
Matrix: WATER	
Collect Date: 27-JUN-18 12:47	
Receive Date: 30-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
2320_ALKALINITY: GW 01 "As Received"												
Alkalinity, Total as CaCO3		118000	1450	4000	ug/L			RXB5	07/10/18	1640	1779460	1
Bicarbonate alkalinity (CaCO3)		118000	1450	4000	ug/L							
Carbonate alkalinity (CaCO3)	U	1450	1450	4000	ug/L							
Hydroxide alkalinity as CaCO3	U	1450	1450	4000	ug/L							

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

## Certificate of Analysis

Report Date: July 12, 2018

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF X18-048

Client Sample ID: B3K482	Project: CPRC0X18048
Sample ID: 453576004	Client ID: CPRC001
Matrix: WATER	
Collect Date: 27-JUN-18 12:47	
Receive Date: 30-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
2320_ALKALINITY: GW 01 "As Received"												
Alkalinity, Total as CaCO3		118000	1450	4000	ug/L			RXB5	07/10/18	1643	1779460	1
Bicarbonate alkalinity (CaCO3)		118000	1450	4000	ug/L							
Carbonate alkalinity (CaCO3)	U	1450	1450	4000	ug/L							
Hydroxide alkalinity as CaCO3	U	1450	1450	4000	ug/L							

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 12, 2018

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 453576

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1779460										
QC1204063333 453485003 DUP											
Alkalinity, Total as CaCO3		103000		102000	ug/L	0.78		(0%-20%)	RXB5	07/10/18	16:37
Bicarbonate alkalinity (CaCO3)		103000		102000	ug/L	0.78		(0%-20%)			
Carbonate alkalinity (CaCO3)	U	1450	U	1450	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	1450	U	1450	ug/L	N/A					
QC1204063334 453485001 DUP											
Alkalinity, Total as CaCO3	U	1450	U	1450	ug/L	N/A				07/10/18	16:33
Bicarbonate alkalinity (CaCO3)	U	1450	U	1450	ug/L	N/A					
Carbonate alkalinity (CaCO3)	U	1450	U	1450	ug/L	N/A					
Hydroxide alkalinity as CaCO3	U	1450	U	1450	ug/L	N/A					
QC1204063332 LCS											
Alkalinity, Total as CaCO3	100000			112000	ug/L		112	(80%-120%)		07/10/18	16:26

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.

GEL LABORATORIES LLC

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

QC Summary

Workorder: 453576

Parmname	NOM	Sample	Qual	QC	Units	RPD%	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.										
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.