



February 22, 2018

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

Re: CHPRC SAF F16-047  
Work Order: 443834  
SDG: GEL443834

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 15, 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,

Heather Shaffer  
Project Manager

Purchase Order: 304234 - 7C  
Chain of Custody: F16-047-379  
Enclosures



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# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F16-047  
SDG: GEL443834**

**February 22, 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 February 15, 2018, for analysis. The sample was 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 sample:

<b>Laboratory Identification</b>	<b>Sample Description</b>
443834001	B3HMX2

**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.

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.

2/23/2018

REV.0

*Heather Shaffer*

Heather Shaffer  
Project Manager

**General Chemistry**  
**Technical Case Narrative**  
**CH2M Hill Plateau Remediation Company (CPRC)**  
**SDG #: GEL443834**  
**Work Order #: 443834**

### **Ion Chromatography**

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.

#### **Technical Information**

##### **Sample Dilutions**

The following samples 1203972280 (B3HMX2DUP), 1203972281 (B3HMX2PS) and 443834001 (B3HMX2) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	<b>443834</b>
	<b>001</b>
Chloride	10X
Sulfate	10X

#### **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** *4705634* **PAGE 1 OF 1**

**CH2MHill Plateau Remediation Company**

**COLLECTOR** Kevin Patterson  
CHPRC

**COMPANY CONTACT** SUMNER, LC

**TELEPHONE NO.** 376-3922

**PROJECT COORDINATOR** SUMNER, LC

**SAMPLING LOCATION** 289-T, Effluent Tank, Valve V20-Y80C

**PROJECT DESIGNATION** 200 West Pump & Treat - Fluidized Bed Reactor (FBR) Micronutrient Analysis

**ICE CHEST NO.** *GWS-748*

**FIELD LOGBOOK NO.** HNF-N-49119

**PURCHASE ORDER/CHARGE CODE** 304234

**N/A**

**SAF NO.** F16-047

**ORIGINAL**

**SHIPPED TO** *Just at 2/13/18* *CEL*

**OFFSITE PROPERTY NO.** *9057*

**BILL OF LADING/AIR BILL NO.** *77148346 3899*

**METHOD OF SHIPMENT** GOVERNMENT VEHICLE

**REQUIRED TAT** 15 Days

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	COOL <=6C
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	*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.	Cool <=6C	
	<b>HOLDING TIME</b>	48 Hours	
	<b>TYPE OF CONTAINER</b>	P	
	<b>NO. OF CONTAINER(S)</b>	1	
	<b>VOLUME</b>	250mL	
	<b>SAMPLE ANALYSIS</b>	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	
<b>SAMPLE NO.</b>	<b>FILTERED</b>	<b>MATRIX*</b>	<b>SAMPLE DATE</b> <b>SAMPLE TIME</b>
B3HMX2	Yes	WATER	FEB 14 2018 0900 ✓

**CHAIN OF POSSESSION**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME	SPECIAL INSTRUCTIONS
Kevin Patterson CHPRC	FEB 14 2018 1015	<i>Jessy Wall</i>	Lesly Wall CHPRC	FEB 14 2018 1015	TRVL-18-079; Filtering shall be performed by SGRP Field Sampling Services using a (0.45µm) filter while in the field.
Lesly Wall CHPRC	FEB 14 2018 1400	<i>Jessy Wall</i>	FEDEX		(1) 300.0_ANIONS_IC: COMMON {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Sulfate}; 300.0_ANIONS_IC: COMMON (Add-on) {Phosphorus in phosphate};
		<i>C. Tomlin</i>	<i>2/15/18</i>		

**DISPOSED BY** *TRVL-18-079*

**DATE/TIME**

**FINAL SAMPLE DISPOSITION** PRINTED ON 1/30/2018

**DISPOSAL METHOD** FSR ID = FSR57452

**TRVL NUM = TRVL-18-079**

**A-6003-618 (REV 3)**



SAMPLE RECEIPT & REVIEW FORM

#5

Client: CPRC SDG/AR/COC/Work Order: 443834

Received By: C. Tarplin Date Received: 15 Feb 2018

Carrier and Tracking Number: FedEx Express 771480048406, 771483778109, 771485129455; FedEx Ground 771482218489, 771483463299

Suspected Hazard Information: \*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

Shipped as a DOT Hazardous? [X] Hazard Class Shipped: UN#:

COC/Samples marked or classified as radioactive? [X] Maximum Net Counts Observed\* (Observed Counts - Area Background Counts): 0 CPM/mR/Hr Classified as: Rad 1 Rad 2 Rad 3

Is package, COC, and/or Samples marked HAZ? [X] If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

Table with 4 columns: Sample Receipt Criteria, Yes, NA, No, and Comments/Qualifiers (Required for Non-Conforming Items). Rows 1-13 cover criteria like shipping containers, cold preservation, and chemical preservation.

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials MTH Date 02/16/18 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 22 February 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 Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# General Chem Analysis

# Case Narrative

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL443834  
Work Order #: 443834**

**Product: Ion Chromatography****Analytical Method:** 9056\_ANIONS\_IC**Analytical Procedure:** GL-GC-E-086 REV# 25**Analytical Batch:** 1739427

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>
443834001	B3HMX2
1203972278	Method Blank (MB)
1203972279	Laboratory Control Sample (LCS)
1203972280	443834001(B3HMX2) Sample Duplicate (DUP)
1203972281	443834001(B3HMX2) Post Spike (PS)

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.

**Technical Information****Sample Dilutions**

The following samples 1203972280 (B3HMX2DUP), 1203972281 (B3HMX2PS) and 443834001 (B3HMX2) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	<b>443834</b>
	<b>001</b>
Chloride	10X
Sulfate	10X

**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: GEL443834 GEL Work Order: 443834

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

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

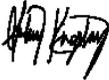
D Results are reported from a diluted aliquot of sample.

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: Aubrey Kingsbury****Date: 22 FEB 2018****Title: Analyst I**

# Sample Data Summary

**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: February 22, 2018

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF F16-047

Client Sample ID: B3HMX2 Project: CPRC0F16047  
 Sample ID: 443834001 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 14-FEB-18 09:02  
 Receive Date: 15-FEB-18  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON + (add-on) "As Received"												
Fluoride	B	300	33.0	500	ug/L		1	MAR1	02/15/18	1338	1739427	1
Nitrate-N		4150	33.0	250	ug/L		1					
Nitrite-N		421	33.0	250	ug/L		1					
Phosphorus in phosphate	U	67.0	67.0	500	ug/L		1					
Chloride	D	42300	670	2000	ug/L		10	MAR1	02/15/18	2051	1739427	2
Sulfate	D	96300	1330	4000	ug/L		10					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	9056_ANIONS_IC	
2	9056_ANIONS_IC	

**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: February 22, 2018

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 443834

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1739427										
QC1203972280	443834001	DUP									
Chloride	D	42300	D	42300	ug/L	0.00237		(0%-20%)	MAR1	02/15/18	21:20
Fluoride	B	300	B	304	ug/L	1.33	^	(+/-500)		02/15/18	18:55
Nitrate-N		4150		4170	ug/L	0.505		(0%-20%)			
Nitrite-N		421		411	ug/L	2.31	^	(+/-250)			
Phosphorus in phosphate	U	67.0	U	67.0	ug/L	N/A					
Sulfate	D	96300	D	96500	ug/L	0.177		(0%-20%)		02/15/18	21:20
QC1203972279	LCS										
Chloride	5000			4820	ug/L		96.4	(80%-120%)		02/15/18	16:02
Fluoride	2500			2560	ug/L		102	(80%-120%)			
Nitrate-N	2500			2490	ug/L		99.4	(80%-120%)			
Nitrite-N	2500			2420	ug/L		96.6	(80%-120%)			
Phosphorus in phosphate	1250			1290	ug/L		103	(80%-120%)			
Sulfate	10000			9870	ug/L		98.7	(80%-120%)			
QC1203972278	MB										
Chloride			U	67.0	ug/L					02/15/18	10:14

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 443834

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Ion Chromatography</b>											
Batch	1739427										
Fluoride			U	33.0	ug/L				MAR1	02/15/18	10:14
Nitrate-N			U	33.0	ug/L						
Nitrite-N			U	33.0	ug/L						
Phosphorus in phosphate			U	67.0	ug/L						
Sulfate			U	133	ug/L						
QC1203972281	443834001 PS										
Chloride	5.00	D	4.23	D	9.28	mg/L	101	(75%-125%)		02/15/18	21:49
Fluoride	2.50	B	0.300		2.88	mg/L	103	(75%-125%)		02/15/18	19:24
Nitrate-N	2.50		4.15		6.86	mg/L	109	(75%-125%)			
Nitrite-N	2.50		0.421		2.88	mg/L	98.4	(75%-125%)			
Phosphorus in phosphate	1.25	U	0.0237		1.27	mg/L	100	(75%-125%)			
Sulfate	10.0	D	9.63	D	19.9	mg/L	102	(75%-125%)		02/15/18	21:49

**Notes:**

The Qualifiers in this report are defined as follows:

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

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 443834

Page 3 of 3

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.