

June 27, 2018

Rev 0



a member of **The GEL Group** INC



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June 22, 2018

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

Re: CHCPRC SAF X18-031
Work Order: 451938
SDG: GEL451938

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 07, 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: X18-031-019, X18-031-020, X18-031-023, X18-031-056 and X18-031-058
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHCPRC SAF X18-031
SDG: GEL451938**

June 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 June 07, 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:

<u>Laboratory Identification</u>	<u>Sample Description</u>
451938001	B3JDK5
451938002	B3JDK6
451938003	B3JDM5
451938004	B3JJD9
451938005	B3JF1

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 Radiochemistry.

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 #: GEL451938
Work Order #: 451938

General Chemistry

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 1204045135 (Non SDG 451969001DUP), 1204045136 (Non SDG 451969001PS) and 451938002 (B3JDK6) were diluted because target analyte concentrations exceeded the calibration range.

Analyte	451938
	002
Chloride	10X
Sulfate	10X

Miscellaneous Information

Manual Integrations

Sample 1204045135 (Non SDG 451969001DUP) were manually integrated to correctly position the baseline as set in the calibration standards.

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.

Radiochemistry

9310_ALPHABETA_GPC: ALPHA

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

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Miscellaneous Information

Additional Comments

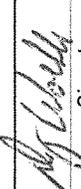
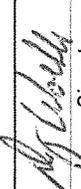
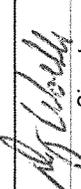
The matrix spike and matrix spike duplicate, 1204047471 (B3JDM5MS) and 1204047472 (B3JDM5MSD), aliquots were reduced to conserve sample volume.

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 451938		C.O.C.# X18-031-019 Page 1 of 1			
Collector: Dan Woehle CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650					
SAF No.: X18-031	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 304546					
Project Title: 300-FF-5 Uranium Sequestration	Logbook No.: HNF-N-506-97-91	Ice Chest No.: GWS-735					
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 772413885044					
Protocol: CERCLA	Priority: 30 Days	Offsite Property No.: 9526					
POSSIBLE SAMPLE HAZARDS/REMARK ** ** 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							
SPECIAL INSTRUCTIONS N/A							
Sample No. B3JDK5	Filter N	Date JUN 06 2018	Time 0700	No/Type Container 1x125-mL G/P	Sample Analysis 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: GW 01	Holding Time 48 Hours	Preservative Cool <=6C

Relinquished By: Dan Woehle CHPRC	Signature 	Date/Time JUN 06 2018 1230	Received By: Tim Callaway CHPRC	Signature 	Date/Time JUN 06 2018 1230	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquid T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: Tim Callaway CHPRC	Signature 	Date/Time JUN 06 2018 1400	Received By: FEDEX	Signature FEDEX	Date/Time 6/7/18 900	
Relinquished By: Fed Ex	Signature 	Date/Time JUN 06 2018 1400	Received By: Chakeris Tarplin GEL Laboratories	Signature 	Date/Time 6/7/18 900	
Relinquished By: (Blank)	Signature (Blank)	Date/Time (Blank)	Received By: (Blank)	Signature (Blank)	Date/Time (Blank)	
Disposal Method (e.g., Return to customer, per lab procedure, used in process):			Disposed By:			

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 451938		C.O.C.# X18-031-023 Page 1 of 1
Collector: Dan Woehle CHPRC X18-031	Contact/Requester: Karen Waters-Husted Telephone No.: 509-376-4650	Sampling Origin: Hanford Site Purchase Order/Charge Code: 304546	Ice Chest No.: GWS-735- Bill of Lading/Air Bill No.: 77241388-5044 Offsite Property No.: 9524	
Project Title: 300-FF-5 Uranium Sequestration Shipped To (Lab): GEL Laboratories, LLC	Logbook No.: HNF-N-506 - 98-94 Method of Shipment: Commercial Carrier Priority: 30 Days	SPECIAL INSTRUCTIONS N/A		
Protocol: CERCLA POSSIBLE SAMPLE HAZARDS/REMARK ** ** 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	No/Type Container: 1x1-L P 9310_ALPHABETA_GPC: Gross Alpha	Sample Analysis:	Holding Time: 6 Months Preservative: HNO3 to pH <2	

Relinquished By: Dan Woehle CHPRC Signature: <i>Dan Woehle</i> Date: JUN 05 2018 12:32 Date/Time: JUN 05 2018 1325	Received By: SSU #1 Signature: <i>[Signature]</i> Date/Time: JUN 05 2018 1325	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquid T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: SSU-1 Signature: <i>[Signature]</i> Date/Time: JUN 06 2018 1205	Received By: Janella Zunker CHPRC Signature: <i>[Signature]</i> Date/Time: JUN 06 2018 1205	
Relinquished By: Janella Zunker CHPRC Signature: <i>[Signature]</i> Date/Time: JUN 06 2018 1400	Received By: SEDEX Signature: <i>[Signature]</i> Date/Time: JUN 06 2018 1400	
Relinquished By: Fed Ex Signature: <i>[Signature]</i> Date/Time: JUN 06 2018 1400	Received By: Chakeris Tarplin GEL Laboratories Signature: <i>[Signature]</i> Date/Time: JUN 06 2018 1400	
Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:

CH2M Hill Plateau Remediation Company <small>Dan Woehle CHPRC</small>		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 457938 C.O.C.# X18-031-056 Page 1 of 1	
Collector: X18-031	Contact/Requester: Karen Waters-Husted Telephone No.: 509-376-4650	SAF No.: 300-FF-5 Uranium Sequestration	Purchase Order/Charge Code: 304546
Project Title: GEL Laboratories, LLC	Sampling Origin: Hanford Site	Logbook No.: HNF-N-506 - 97-91	Ice Chest No.: GWS735
Shipped To (Lab): CERCLA	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 772413885044	Offsite Property No.: 0524
Protocol: CERCLA	Priority: 30 Days	SPECIAL INSTRUCTIONS N/A	
POSSIBLE SAMPLE HAZARDS/REMARK ** ** 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			
Sample No.: B3JJD9	Filter: N	Date: JUN 06 2018 0903	Time: 0903
No/Type Container: 1x250-mL G/P	Sample Analysis: 2320_AKALINITY: GW 01	Holding Time: 14 Days	Preservative: Cool <=6C

Relinquished By: Dan Woehle <small>CHPRC</small>	JUN 06 2018 1230 Date/Time	Received By: Tim Callaway <small>CHPRC</small>	JUN 06 2018 1230 Date/Time
Signature	Signature	Signature	Signature
Relinquished By: Tim Callaway <small>CHPRC</small>	JUN 06 2018 1400 Date/Time	Received By: FEDEX	Date/Time
Signature	Signature	Signature	Signature
Relinquished By: Fed Ex	Date/Time	Received By: Bakeris Tarplin <small>GEL Laboratories</small>	Date/Time
Signature	Signature	Signature	Signature
Relinquished By:	Date/Time	Received By:	Date/Time
Signature	Signature	Signature	Signature
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:

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



SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>457938</u>	
Received By: <u>C. TARPLIN</u>		Date Received: <u>06-07-2018</u> <u>HS</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>772413885044</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 checked="" type="checkbox"/> CPM / mR/Hr Classified as: <input checked="" type="checkbox"/> Rad 1 <input type="checkbox"/> Rad 2 <input type="checkbox"/> 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: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None Other: _____ *all temperatures are recorded in Celsius TEMP: <u>1°C</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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"/>	<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, Lot#: _____
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 <input type="checkbox"/> No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A _____ (If unknown, select No) VOA vials free of headspace? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A _____ Sample ID's and containers affected: <u>B34802 5 q 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 checked="" 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 CS Date 6/8/18 Page 1 of 1

Data Review Qualifier Definitions

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 (843) 556-8171

Report Date: 22-JUN-18

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 June 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

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL451938
Work Order #: 451938**

Product: Ion Chromatography**Analytical Method:** 9056_ANIONS_IC**Analytical Procedure:** GL-GC-E-086 REV# 25**Analytical Batch:** 1771626

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
451938001	B3JDK5
451938002	B3JDK6
1204045133	Method Blank (MB)
1204045134	Laboratory Control Sample (LCS)
1204045135	451969001(NonSDG) Sample Duplicate (DUP)
1204045136	451969001(NonSDG) 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 1204045135 (Non SDG 451969001DUP), 1204045136 (Non SDG 451969001PS) and 451938002 (B3JDK6) 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	451938
	002
Chloride	10X
Sulfate	10X

Miscellaneous Information**Manual Integrations**

Sample 1204045135 (Non SDG 451969001DUP) were manually integrated to correctly position the baseline as set in the calibration standards.

Product: Alkalinity**Analytical Method:** 2320_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 13**Analytical Batch:** 1773008

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
451938004	B3JJD9
451938005	B3JF1
1204048426	Laboratory Control Sample (LCS)
1204048428	452358001(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: GEL451938 GEL Work Order: 451938

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: Kristen Mizzell

Date: 22 JUN 2018

Title: Team Leader

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 22, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHCPRC SAF X18-031

Client Sample ID: B3JDK5 Project: CPRC0X18031
 Sample ID: 451938001 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 06-JUN-18 07:00
 Receive Date: 07-JUN-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography												
9056_ANIONS_IC: COMMON + GW 01 "As Received"												
Chloride	U	67.0	67.0	200	ug/L		1	MAR1	06/07/18	2114	1771626	1
Fluoride	U	33.0	33.0	500	ug/L		1					
Nitrate-N	U	33.0	33.0	250	ug/L		1					
Nitrite-N	U	33.0	33.0	250	ug/L		1					
Phosphorus in phosphate	U	67.0	67.0	200	ug/L		1					
Sulfate	U	133	133	500	ug/L		1					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: June 22, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHCPRC SAF X18-031

Client Sample ID: B3JJD9 Project: CPRC0X18031
 Sample ID: 451938004 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 06-JUN-18 09:03
 Receive Date: 07-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		83600	1450	4000	ug/L			RXB5	06/15/18	1319	1773008	1
Bicarbonate alkalinity (CaCO3)		83600	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
- DL: Detection Limit
- MDA: Minimum Detectable Activity
- MDC: Minimum Detectable Concentration
- Lc/LC: Critical Level
- PF: Prep Factor
- RL: Reporting Limit
- SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: June 22, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHCPRC SAF X18-031

Client Sample ID: B3JF1 Project: CPRC0X18031
 Sample ID: 451938005 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 06-JUN-18 12:08
 Receive Date: 07-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		126000	1450	4000	ug/L			RXB5	06/15/18	1321	1773008	1
Bicarbonate alkalinity (CaCO3)		126000	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
- DL: Detection Limit
- MDA: Minimum Detectable Activity
- MDC: Minimum Detectable Concentration
- Lc/LC: Critical Level
- PF: Prep Factor
- RL: Reporting Limit
- 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: June 22, 2018

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 451938

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1771626										
QC1204045135	451969001	DUP									
Chloride	D	21300	D	21300	ug/L	0.0094		(0%-20%)	MAR1	06/08/18	02:23
Fluoride		474		407	ug/L	15.3	^	(+/-100)		06/07/18	22:47
Nitrate-N	D	31900	D	31900	ug/L	0.0471		(0%-20%)		06/08/18	02:23
Nitrite-N	B	44.3	B	43.2	ug/L	2.51	^	(+/-100)		06/07/18	22:47
Phosphorus in phosphate	U	67.0	U	67.0	ug/L	N/A					
Sulfate	D	40000	D	40200	ug/L	0.594		(0%-20%)		06/08/18	02:23
QC1204045134	LCS										
Chloride	5000			4880	ug/L		97.7	(80%-120%)		06/07/18	20:44
Fluoride	2500			2540	ug/L		102	(80%-120%)			
Nitrate-N	2500			2470	ug/L		98.8	(80%-120%)			
Nitrite-N	2500			2500	ug/L		100	(80%-120%)			
Phosphorus in phosphate	1250			1280	ug/L		102	(80%-120%)			
Sulfate	10000			9860	ug/L		98.6	(80%-120%)			
QC1204045133	MB										
Chloride			U	67.0	ug/L					06/07/18	20:13

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QC Summary

Workorder: 451938

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1771626										
Fluoride			U	33.0	ug/L				MAR1	06/07/18	20:13
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						
QC1204045136 451969001 PS											
Chloride	5.00	D	2.13	D	7.27	mg/L	103	(75%-125%)		06/08/18	02:54
Fluoride	2.50		0.474		2.91	mg/L	97.6	(75%-125%)		06/07/18	23:18
Nitrate-N	2.50	D	3.19	D	5.94	mg/L	110	(75%-125%)		06/08/18	02:54
Nitrite-N	2.50	B	0.0443		2.47	mg/L	97	(75%-125%)		06/07/18	23:18
Phosphorus in phosphate	1.25	U	0.0399		1.16	mg/L	89.7	(75%-125%)			
Sulfate	10.0	D	4.00	D	14.1	mg/L	101	(75%-125%)		06/08/18	02:54
Titration and Ion Analysis											
Batch	1773008										
QC1204048428 452358001 DUP											
Alkalinity, Total as CaCO3			98000		97800	ug/L	0.204	(0%-20%)	RXB5	06/15/18	13:52
QC1204048426 LCS											
Alkalinity, Total as CaCO3	100000				110000	ug/L	110	(80%-120%)		06/15/18	13:14

Notes:

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QC Summary

Workorder: 451938

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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The Qualifiers in this report are defined as follows:

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

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

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

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

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

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

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL451938
Work Order #: 451938**

Product: 9310_ALPHABETA_GPC: ALPHA
Analytical Method: 9310_ALPHABETA_GPC
Analytical Procedure: GL-RAD-A-001 REV# 20
Analytical Batch: 1772582

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
451938003	B3JDM5
1204047469	Method Blank (MB)
1204047470	451938003(B3JDM5) Sample Duplicate (DUP)
1204047471	451938003(B3JDM5) Matrix Spike (MS)
1204047472	451938003(B3JDM5) Matrix Spike Duplicate (MSD)
1204047473	Laboratory Control Sample (LCS)

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

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1204047471 (B3JDM5MS) and 1204047472 (B3JDM5MSD), aliquots were reduced to conserve sample volume.

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.

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL451938 GEL Work Order: 451938

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: Heather McCarty

Date: 26 JUN 2018

Title: Analyst II

Sample Data Summary

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL451938	Client: CPRC001	Project: CPRC0X18031
Lab Sample ID: 451938003	Date Collected: 06/05/2018 12:32	Matrix: WATER
	Date Received: 06/07/2018 09:00	
Client ID: B3JDM5	Method: 9310_ALPHA_BETA_GPC	Prep Basis: "As Received"
Batch ID: 1772582	Analyst: AXH4	SOP Ref: GL-RAD-A-001
Run Date: 06/19/2018 13:26	Aliquot: 150 mL	Instrument: PIC10B
Data File: AB1772582r1.xls	Prep Method: EPA 900.0/SW846 9310	Count Time: 120 min
Prep Batch: 1772582		
Prep Date: 06/18/2018 13:54		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA		38.7	pCi/L	+/-5.80	8.58	2.88	3.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
The MDC is a sample specific MDC.

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 26, 2018
Page 1 of 2

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 451938

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1772582								
QC1204047469	MB								
Alpha			U	-0.874	pCi/L			AXH4	06/19/1813:26
				Uncert: +/-1.01					
				TPU: +/-1.01					
QC1204047470	451938003	DUP							
Alpha		38.7		32.6	pCi/L				06/19/1813:26
				Uncert: +/-5.80		RPD: 17	(0%-20%)		
				TPU: +/-8.58		RER: 1.03	(0-2)		
QC1204047471	451938003	MS							
Alpha	241	38.7		278	pCi/L	REC: 99	(75%-125%)		06/19/1812:18
				Uncert: +/-5.80					
				TPU: +/-8.58					
QC1204047472	451938003	MSD							
Alpha	241	38.7		264	pCi/L	REC: 93	(75%-125%)		06/19/1812:18
				Uncert: +/-5.80		RPD: 5	(0%-20%)		
				TPU: +/-8.58		RER: 0.382	(0-2)		
QC1204047473	LCS								
Alpha	80.5			89.8	pCi/L	REC: 112	(80%-120%)		06/19/1812:18
				Uncert: +/-7.84					
				TPU: +/-16.8					

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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).
- B The analyte was detected in the associated method blank >= MDC or >5% sample activity.
- 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.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- UX Gamma Spectroscopy--Uncertain identification
- 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

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QC Summary

Workorder: 451938

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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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.

** Indicates analyte is a surrogate compound.

^ 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.

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.