



June 21, 2017

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

Re: CHPRC SAF S17-005
Work Order: 424398
SDG: GEL424398

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 01, 2017. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 300071 - 7H
Chain of Custody: S17-005-222
Enclosures



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Case Narrative

June 26, 2017

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S17-005
SDG: GEL424398

June 21, 2017

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 01, 2017, 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:

Laboratory Identification	Sample Description
424398001	B39DJ6
424398002	B39DJ5

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, Metals 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.

June 26, 2017

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

June 26, 2017

Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL424398
Work Order #: 424398

Metals

Determination of Metals by ICP

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.

Radiochemistry

9310_ALPHABETA_GPC: COMMON

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.

Quality Control (QC) Information

QC Information

Matrix Spike and Matrix Spike Duplicate, 1203803803 (Non SDG 424658003MS) and 1203803804 (Non SDG 424658003MSD), do not meet the beta recovery requirement due to the sample activity being greater than five times the spiked nominal concentration.

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.

Recounts

June 26, 2017

Sample 1203803801 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203803803 (Non SDG 424658003MS) and 1203803804 (Non SDG 424658003MSD), aliquots were reduced to conserve sample volume.

TC99_EIE_LSC: COMMON

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

Recounts

Sample 1203803133 (LCS) was recounted due to low recovery. The recount is reported.

TRITIUM_DIST_LSC: COMMON

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.

C14_LSC: COMMON

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

June 26, 2017

SAMPLE RECEIPT & REVIEW FORM

Client: CPRC		SDG/AR/COC/Work Order: 424398		
Received By: Stacy Boone		Date Received: 1 JUNE -17		
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 7792 6984 3245		
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 checked="" type="checkbox"/> No <input 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: Rad 1 Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?	Yes <input checked="" type="checkbox"/> No <input 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 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other *all temperatures are recorded in Celsius
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>IR3-17</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#:
7 Do any samples require Volatile Analysis?			<input checked="" type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A ___ Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
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):				

PM (or PMA) review: Initials BL Date 6.2.17 Page 1 of 6

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	General Chemistry	
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \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 21 June 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122017-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-22
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

June 26, 2017

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL424398

Work Order #: 424398

Product: Determination of Metals by ICP

Analytical Method: SW846 3005A/6010D

Analytical Procedure: GL-MA-E-013 REV# 28

Analytical Batch: 1670309

Preparation Method: SW846 3005A

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

Preparation Batch: 1670308

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424398001	B39DJ6
424398002	B39DJ5
1203802106	Method Blank (MB)ICP
1203802107	Laboratory Control Sample (LCS)
1203802110	424396002(NonSDGL) Serial Dilution (SD)
1203802108	424396002(NonSDGS) Matrix Spike (MS)
1203802109	424396002(NonSDGSD) Matrix Spike Duplicate (MSD)

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.

June 26, 2017

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: GEL424398 GEL Work Order: 424398

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.

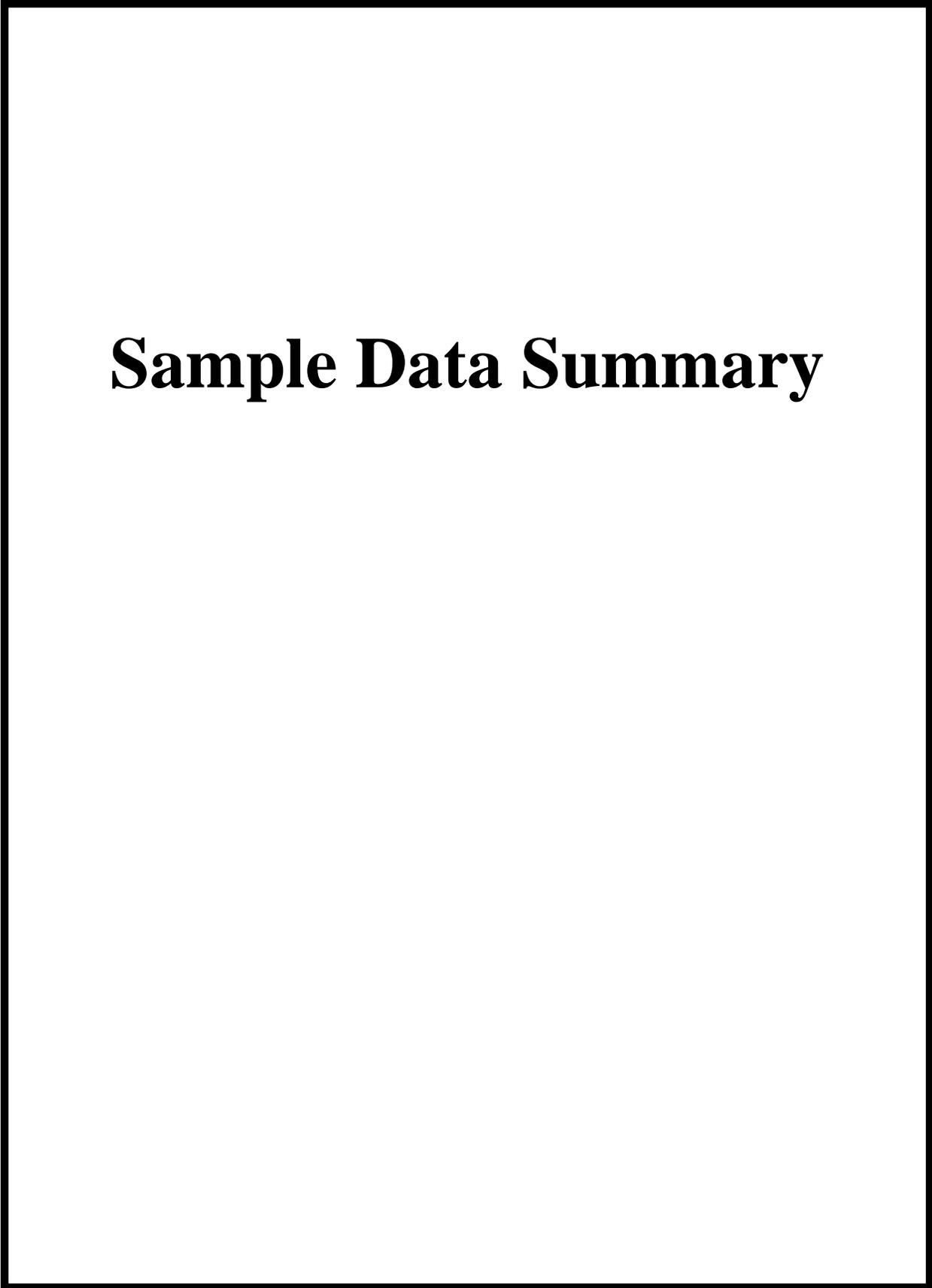
The following data validator verified the information presented in this data report:

Signature: 

Name: Nik-Cole Elmore

Date: 20 JUN 2017

Title: Data Validator



Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL424398

CONTRACT: CPRC0S17005

METHOD TYPE: SW846

SAMPLE ID: 424398001

BASIS: As Received

DATE COLLECTED 31-MAY-17

CLIENT ID: B39DJ6

LEVEL: Low

DATE RECEIVED 01-JUN-17

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	3.5	ug/L	U	3.5	10	10	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-38-2	Arsenic	5	ug/L	U	5	30	30	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-39-3	Barium	26.4	ug/L		1	5	5	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-70-2	Calcium	44300	ug/L		50	200	200	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-47-3	Chromium	18.4	ug/L		1	5	5	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-50-8	Copper	10.3	ug/L		3	10	10	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7439-95-4	Magnesium	10100	ug/L		110	300	300	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-02-0	Nickel	1.5	ug/L	U	1.5	5	5	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-09-7	Potassium	4800	ug/L		50	150	150	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-23-5	Sodium	12400	ug/L		100	300	300	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-24-6	Strontium	222	ug/L		1	5	5	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-62-2	Vanadium	9.21	ug/L		1	5	5	1	P	TXT1	06/15/17 13:35	061517A-1	1670309
7440-66-6	Zinc	54.9	ug/L		3.3	10	10	1	P	TXT1	06/15/17 13:35	061517A-1	1670309

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1670309	1670308	SW846 3005A	50	mL	50	mL	06/01/17	CXW4

***Analytical Methods:**

P SW846 3005A/6010D

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL424398

CONTRACT: CPRC0S17005

METHOD TYPE: SW846

SAMPLE ID: 424398002

BASIS: As Received

DATE COLLECTED 31-MAY-17

CLIENT ID: B39DJ5

LEVEL: Low

DATE RECEIVED 01-JUN-17

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	3.5	ug/L	U	3.5	10	10	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-38-2	Arsenic	5	ug/L	U	5	30	30	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-39-3	Barium	26.7	ug/L		1	5	5	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-41-7	Beryllium	1	ug/L	U	1	5	5	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-70-2	Calcium	44700	ug/L		50	200	200	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-47-3	Chromium	18.5	ug/L		1	5	5	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-50-8	Copper	9.92	ug/L	B	3	10	10	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7439-95-4	Magnesium	10100	ug/L		110	300	300	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-02-0	Nickel	1.5	ug/L	U	1.5	5	5	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-09-7	Potassium	4870	ug/L		50	150	150	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-23-5	Sodium	12600	ug/L		100	300	300	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-24-6	Strontium	225	ug/L		1	5	5	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-62-2	Vanadium	9.6	ug/L		1	5	5	1	P	TXT1	06/15/17 13:38	061517A-1	1670309
7440-66-6	Zinc	16.5	ug/L		3.3	10	10	1	P	TXT1	06/15/17 13:38	061517A-1	1670309

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1670309	1670308	SW846 3005A	50	mL	50	mL	06/01/17	CXW4

***Analytical Methods:**

P SW846 3005A/6010D

Quality Control Summary

June 26, 2017 GEL LABORATORIES LLC

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

QC Summary

Report Date: June 20, 2017

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CH2M Hill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 424398

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1670309										
QC1203802107	LCS										
Antimony	500			464	ug/L		92.9	(80%-120%)	TXT1	06/15/17	13:21
Arsenic	500			479	ug/L		95.8	(80%-120%)			
Barium	500			485	ug/L		96.9	(80%-120%)			
Beryllium	500			483	ug/L		96.7	(80%-120%)			
Cadmium	500			478	ug/L		95.6	(80%-120%)			
Calcium	5000			4850	ug/L		97	(80%-120%)			
Chromium	500			483	ug/L		96.7	(80%-120%)			
Cobalt	500			485	ug/L		97	(80%-120%)			
Copper	500			486	ug/L		97.2	(80%-120%)			
Iron	5000			4850	ug/L		97.1	(80%-120%)			
Magnesium	5000			4840	ug/L		96.7	(80%-120%)			
Manganese	500			484	ug/L		96.7	(80%-120%)			
Nickel	500			484	ug/L		96.7	(80%-120%)			

June 26, 2017

GEL LABORATORIES LLC

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

QC Summary

Workorder: 424398

Page 2 of 8

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1670309										
Potassium	5000			4800	ug/L		96	(80%-120%)	TXT1	06/15/17	13:21
Silver	500			482	ug/L		96.4	(80%-120%)			
Sodium	5000			4750	ug/L		95	(80%-120%)			
Strontium	500			476	ug/L		95.2	(80%-120%)			
Vanadium	500			484	ug/L		96.8	(80%-120%)			
Zinc	500			475	ug/L		94.9	(80%-120%)			
QC1203802106	MB										
Antimony			U	3.50	ug/L					06/15/17	13:18
Arsenic			U	5.00	ug/L						
Barium			U	1.00	ug/L						
Beryllium			U	1.00	ug/L						
Cadmium			U	1.00	ug/L						
Calcium			U	50.0	ug/L						
Chromium			U	1.00	ug/L						
Cobalt			U	1.00	ug/L						
Copper			U	3.00	ug/L						

June 26, 2017

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QC Summary

Workorder: 424398

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1670309										
Iron			U	30.0	ug/L				TXT1	06/15/17	13:18
Magnesium			U	110	ug/L						
Manganese			U	2.00	ug/L						
Nickel			U	1.50	ug/L						
Potassium			U	50.0	ug/L						
Silver			U	1.00	ug/L						
Sodium			U	100	ug/L						
Strontium			U	1.00	ug/L						
Vanadium			U	1.00	ug/L						
Zinc			U	3.30	ug/L						
QC1203802108 424396002 MS											
Antimony	500	U	3.50	469	ug/L		93.7	(75%-125%)		06/15/17	13:26
Arsenic	500	U	5.00	486	ug/L		96.6	(75%-125%)			
Barium	500		23.6	505	ug/L		96.3	(75%-125%)			
Beryllium	500	U	1.00	485	ug/L		96.9	(75%-125%)			
Cadmium	500	U	1.00	476	ug/L		95.2	(75%-125%)			

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QC Summary

Workorder: 424398

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Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP												
Batch	1670309											
Calcium	5000		38300		42300	ug/L		N/A	(75%-125%)	TXT1	06/15/17	13:26
Chromium	500		14.8		496	ug/L		96.2	(75%-125%)			
Cobalt	500	U	1.00		481	ug/L		96.3	(75%-125%)			
Copper	500	U	3.00		496	ug/L		98.8	(75%-125%)			
Iron	5000	U	30.0		4850	ug/L		97	(75%-125%)			
Magnesium	5000		6250		11000	ug/L		94.1	(75%-125%)			
Manganese	500	U	2.00		479	ug/L		95.9	(75%-125%)			
Nickel	500	U	1.50		480	ug/L		95.8	(75%-125%)			
Potassium	5000		2570		7310	ug/L		94.8	(75%-125%)			
Silver	500	U	1.00		483	ug/L		96.6	(75%-125%)			
Sodium	5000		10700		15200	ug/L		90.1	(75%-125%)			
Strontium	500		193		667	ug/L		94.7	(75%-125%)			
Vanadium	500	B	4.10		486	ug/L		96.3	(75%-125%)			
Zinc	500		11.7		482	ug/L		94.1	(75%-125%)			
QC1203802109	424396002	MSD										
Antimony	500	U	3.50		469	ug/L	0.0426	93.7	(0%-20%)		06/15/17	13:28

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QC Summary

Workorder: 424398

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1670309										
Arsenic	500	U	5.00	482	ug/L	0.725	95.9	(0%-20%)	TXT1	06/15/17	13:28
Barium	500		23.6	506	ug/L	0.136	96.5	(0%-20%)			
Beryllium	500	U	1.00	485	ug/L	0.0206	96.9	(0%-20%)			
Cadmium	500	U	1.00	475	ug/L	0.181	95	(0%-20%)			
Calcium	5000		38300	42700	ug/L	0.927	N/A	(0%-20%)			
Chromium	500		14.8	495	ug/L	0.127	96	(0%-20%)			
Cobalt	500	U	1.00	481	ug/L	0.129	96.1	(0%-20%)			
Copper	500	U	3.00	496	ug/L	0.133	98.6	(0%-20%)			
Iron	5000	U	30.0	4840	ug/L	0.202	96.8	(0%-20%)			
Magnesium	5000		6250	11000	ug/L	0.428	95	(0%-20%)			
Manganese	500	U	2.00	479	ug/L	0.0188	95.9	(0%-20%)			
Nickel	500	U	1.50	480	ug/L	0.148	95.7	(0%-20%)			
Potassium	5000		2570	7350	ug/L	0.607	95.7	(0%-20%)			
Silver	500	U	1.00	482	ug/L	0.166	96.5	(0%-20%)			
Sodium	5000		10700	15400	ug/L	0.739	92.3	(0%-20%)			

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QC Summary

Workorder: 424398

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1670309										
Strontium	500	193		669	ug/L	0.368	95.2	(0%-20%)	TXT1	06/15/17	13:28
Vanadium	500	B	4.10	485	ug/L	0.0968	96.3	(0%-20%)			
Zinc	500	11.7		481	ug/L	0.363	93.8	(0%-20%)			
QC1203802110 424396002 SDILT											
Antimony		U	0.530	DU	17.5	ug/L	N/A	(0%-20%)		06/15/17	13:29
Arsenic		U	3.12	DU	25.0	ug/L	N/A	(0%-20%)			
Barium			23.6	D	5.85	ug/L	23.8	(0%-20%)			
Beryllium		U	0.001	DU	5.00	ug/L	N/A	(0%-20%)			
Cadmium		U	-0.0529	DU	5.00	ug/L	N/A	(0%-20%)			
Calcium			38300	D	7700	ug/L	.533	(0%-20%)			
Chromium			14.8	BD	4.44	ug/L	49.4	(0%-20%)			
Cobalt		U	0.127	DU	5.00	ug/L	N/A	(0%-20%)			
Copper		U	2.63	DU	15.0	ug/L	N/A	(0%-20%)			
Iron		U	3.70	DU	150	ug/L	N/A	(0%-20%)			
Magnesium			6250	D	1270	ug/L	1.48	(0%-20%)			
Manganese		U	-0.0401	DU	10.0	ug/L	N/A	(0%-20%)			

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QC Summary

Workorder: 424398

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Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD/D%, REC%, Range, Anlst, Date, Time. Rows include Nickel, Potassium, Silver, Sodium, Strontium, Vanadium, and Zinc.

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

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QC Summary

Workorder: 424398

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

June 26, 2017

General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL424398
Work Order #: 424398

Product: Alkalinity

Analytical Method: 2320_ALKALINITY

Analytical Procedure: GL-GC-E-033 REV# 13

Analytical Batch: 1672781

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424398002	B39DJ5
1203808387	Laboratory Control Sample (LCS)
1203808388	424398002(B39DJ5) 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.

June 26, 2017

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL424398 GEL Work Order: 424398

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.

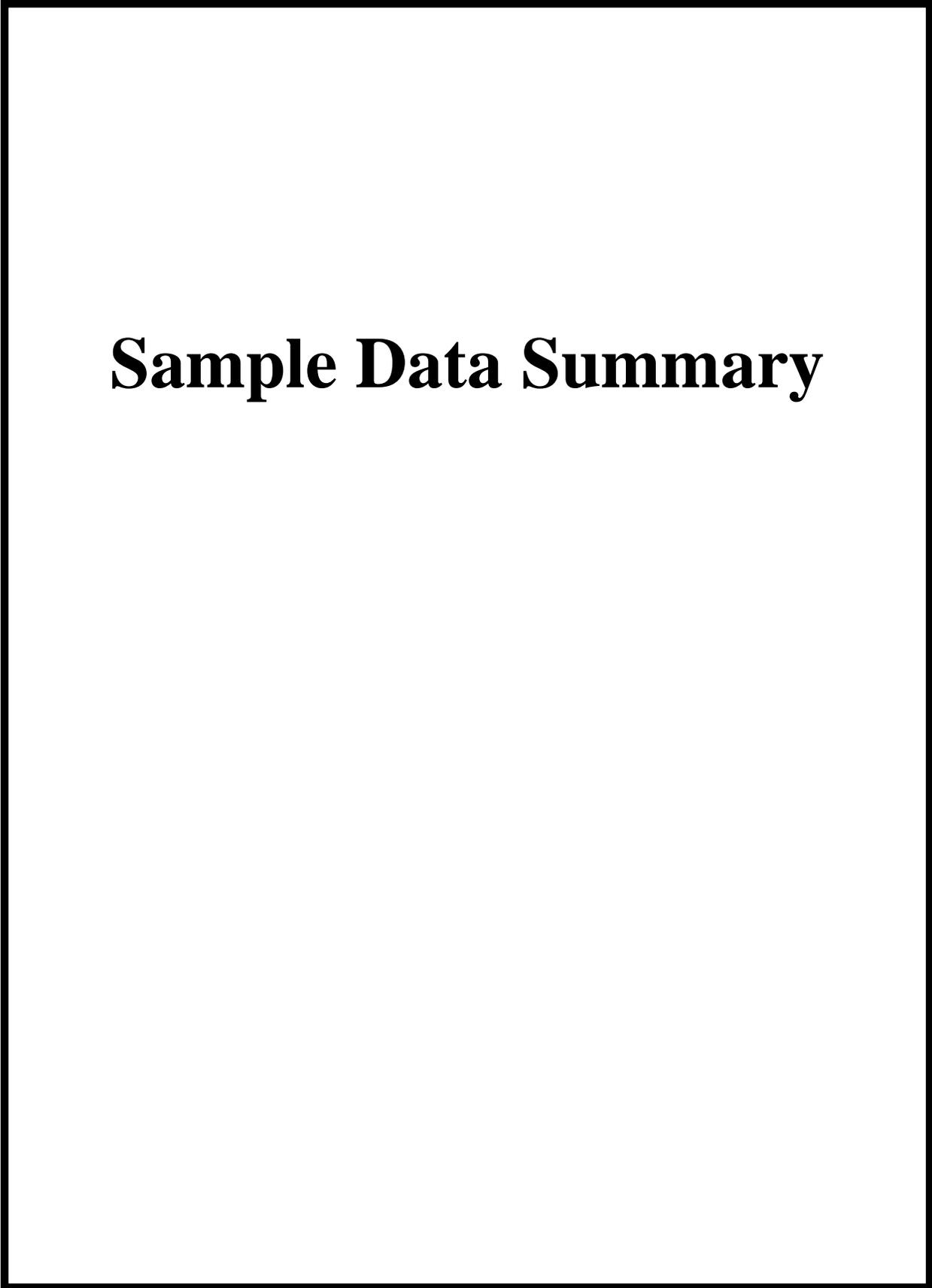
The following data validator verified the information presented in this data report:

Signature: 

Name: Aubrey Kingsbury

Date: 21 JUN 2017

Title: Analyst I



Sample Data Summary

Certificate of Analysis

Report Date: June 21, 2017

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF S17-005

Client Sample ID: B39DJ5	Project: CPRC0S17005
Sample ID: 424398002	Client ID: CPRC001
Matrix: WATER	
Collect Date: 31-MAY-17 09:45	
Receive Date: 01-JUN-17	
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		132000	1450	4000	ug/L			RXB5	06/10/17	1405	1672781	1
Bicarbonate alkalinity (CaCO3)		132000	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

June 26, 2017 GEL LABORATORIES LLC

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

QC Summary

Report Date: June 21, 2017

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CH2M Hill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 424398

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1672781										
QC1203808388	424398002	DUP									
Alkalinity, Total as CaCO3		132000		132000	ug/L	0.152		(0%-20%)	RXB5	06/10/17	14:06
Bicarbonate alkalinity (CaCO3)		132000		132000	ug/L	0.152		(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					
QC1203808387	LCS										
Alkalinity, Total as CaCO3	100000			108000	ug/L		108	(80%-120%)		06/10/17	14:03

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.
- 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

June 26, 2017

GEL LABORATORIES LLC

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

QC Summary

Workorder: 424398

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
-----------------	------------	---------------	-------------	-----------	--------------	-------------	-------------	--------------	--------------	-------------	-------------

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

June 26, 2017

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL424398

Work Order #: 424398

Product: 9310_ALPHABETA_GPC: COMMON

Analytical Method: 9310_ALPHABETA_GPC

Analytical Procedure: GL-RAD-A-001 REV# 19

Analytical Batch: 1670989

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424398002	B39DJ5
1203803801	Method Blank (MB)
1203803802	424658003(NonSDG) Sample Duplicate (DUP)
1203803803	424658003(NonSDG) Matrix Spike (MS)
1203803804	424658003(NonSDG) Matrix Spike Duplicate (MSD)
1203803805	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.

Quality Control (QC) Information

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: Matrix Spike and Matrix Spike Duplicate, 1203803803 (Non SDG 424658003MS) and 1203803804 (Non SDG 424658003MSD), do not meet the beta recovery requirement due to the sample activity being greater than five times the spiked nominal concentration.

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.

Recounts

Sample 1203803801 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203803803 (Non SDG 424658003MS) and 1203803804 (Non

June 26, 2017

SDG 424658003MSD), aliquots were reduced to conserve sample volume.

Product: TC99_EIE_LSC: COMMON

Analytical Method: TC99_EIE_LSC

Analytical Procedure: GL-RAD-A-059 REV# 5

Analytical Batch: 1670715

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424398002	B39DJ5
1203803131	Method Blank (MB)
1203803132	424396002(NonSDG) Sample Duplicate (DUP)
1203803133	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

Recounts

Sample 1203803133 (LCS) was recounted due to low recovery. The recount is reported.

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

Analytical Procedure: GL-RAD-A-002 REV# 22

Analytical Batch: 1670731

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424398002	B39DJ5
1203803163	Method Blank (MB)
1203803164	424396002(NonSDG) Sample Duplicate (DUP)
1203803165	424396002(NonSDG) Matrix Spike (MS)
1203803166	Laboratory Control Sample (LCS)

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.

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

Analytical Procedure: GL-RAD-A-003 REV# 15

Analytical Batch: 1670749

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424398002	B39DJ5
1203803225	Method Blank (MB)
1203803226	424396002(NonSDG) Sample Duplicate (DUP)
1203803227	424396002(NonSDG) Matrix Spike (MS)
1203803228	Laboratory Control Sample (LCS)

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.

June 26, 2017

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: GEL424398 GEL Work Order: 424398

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.

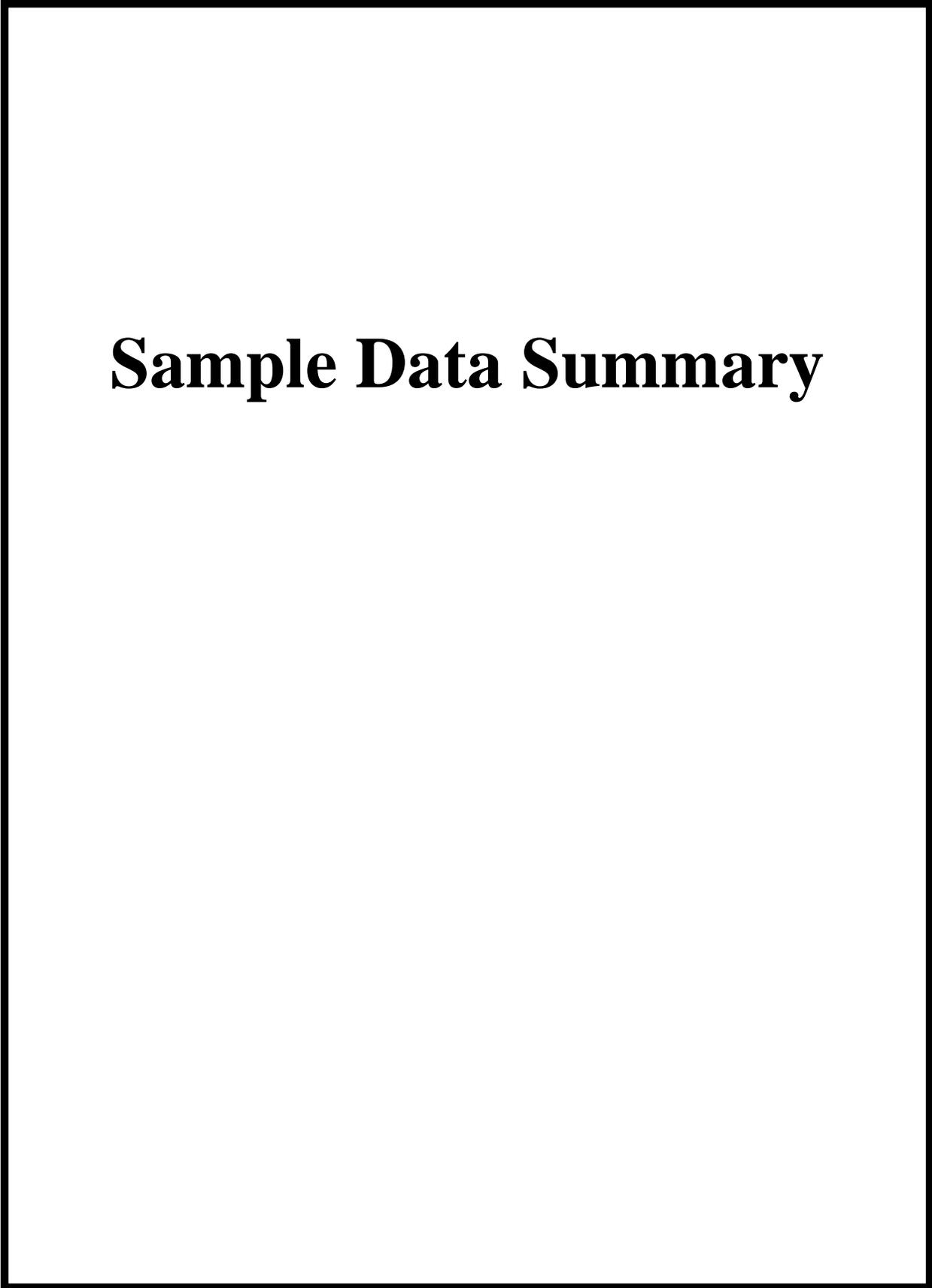
The following data validator verified the information presented in this data report:

Signature: 

Name: Theresa Austin

Date: 13 JUN 2017

Title: Group Leader



Sample Data Summary

June 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424398	Client: CPRC001	Project: CPRC0S17005
Lab Sample ID: 424398002	Date Collected: 05/31/2017 09:45	Matrix: WATER
	Date Received: 06/01/2017 09:10	
Client ID: B39DJ5		Prep Basis: "As Received"
Batch ID: 1670989	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 06/06/2017 18:18	Analyst: LXB3	Instrument: LB4100I3
Data File: AB1670989.xls	Aliquot: 150 mL	Count Time: 500 min
Prep Batch: 1670989	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/06/2017 09:56		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA		1.97	pCi/L	+/-0.887	0.945	1.27	3.00
12587-47-2	Beta BETA		139	pCi/L	+/-2.68	22.6	1.34	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
---------------------------	--------	---------	-------	-----------	-------------------

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error. TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma). The MDC is a sample specific MDC.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424398	Client: CPRC001	Project: CPRC0S17005
Lab Sample ID: 424398002	Date Collected: 05/31/2017 09:45	Matrix: WATER
	Date Received: 06/01/2017 09:10	
Client ID: B39DJ5	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1670715	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 06/11/2017 06:04	Aliquot: 100 mL	Instrument: LSCSILVER
Data File: E1670715R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1670715		
Prep Date: 06/06/2017 12:11		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	10.8	pCi/L	+/-20.3	20.4	34.7	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	43900	46400	CPM	94.6	(30%-105%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424398	Client: CPRC001	Project: CPRC0S17005
Lab Sample ID: 424398002	Date Collected: 05/31/2017 09:45	Matrix: WATER
	Date Received: 06/01/2017 09:10	
Client ID: B39DJ5	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1670731	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 06/09/2017 00:07	Aliquot: 50 mL	Instrument: LSCBLUE
Data File: T1670731.xls	Prep Method: EPA 906.0 Modified	Count Time: 45 min
Prep Batch: 1670731		
Prep Date: 06/08/2017 10:01		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1380	pCi/L	+/-287	392	396	400

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

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

June 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424398	Client: CPRC001	Project: CPRC0S17005
Lab Sample ID: 424398002	Date Collected: 05/31/2017 09:45	Matrix: WATER
	Date Received: 06/01/2017 09:10	
Client ID: B39DJ5	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1670749	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 06/09/2017 23:25	Aliquot: 60 mL	Instrument: LSCGREEN
Data File: C1670749.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 45 min
Prep Batch: 1670749		
Prep Date: 06/09/2017 09:17		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		197	pCi/L	+/-22.7	43.1	31.4	50.0

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

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Quality Control Summary

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QC Summary

Report Date: June 13, 2017
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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 424398

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1670989								
QC1203803801	MB								
Alpha			U	-0.337	pCi/L			LXB3	06/07/1712:39
				Uncert: +/-0.783					
				TPU: +/-0.784					
Beta			U	0.291	pCi/L				
				Uncert: +/-1.60					
				TPU: +/-1.60					
QC1203803802	424658003	DUP							
Alpha		U	3.30	4.91	pCi/L				06/06/1718:21
				Uncert: +/-2.70		RPD: 39	(0% - 100%)		
				TPU: +/-2.82		RER: 0.87	(0-2)		
Beta			14900	13800	pCi/L				
				Uncert: +/-29.0		RPD: 8	(0% - 20%)		
				TPU: +/-2410		RER: 0.652	(0-2)		
QC1203803803	424658003	MS							
Alpha		U	3.30	375	pCi/L	REC: 78	(75%-125%)		06/06/1716:27
				Uncert: +/-2.70					
				TPU: +/-2.82					
Beta			1750	19300	pCi/L	REC: N/A			
				Uncert: +/-29.0					
				TPU: +/-2410					
QC1203803804	424658003	MSD							
Alpha		U	3.30	409	pCi/L	REC: 85	(75%-125%)		06/06/1716:27
				Uncert: +/-2.70		RPD: 9	(0%-20%)		
				TPU: +/-2.82		RER: 0.577	(0-2)		
Beta			1750	22200	pCi/L	REC: N/A			
				Uncert: +/-29.0		RPD: 14	(0%-20%)		
				TPU: +/-2410		RER: 1.16	(0-2)		
QC1203803805	LCS								
Alpha			80.6	82.6	pCi/L	REC: 103	(80%-120%)		06/06/1716:27
				Uncert: +/-8.91					
				TPU: +/-16.3					
Beta			292	331	pCi/L	REC: 113	(80%-120%)		
				Uncert: +/-12.0					
				TPU: +/-57.6					
Rad Liquid Scintillation									
Batch	1670715								
QC1203803131	MB								
Technetium-99			U	16.3	pCi/L			CXS7	06/11/1707:53
				Uncert: +/-21.0					
				TPU: +/-21.1					
**Technetium-99m Tracer	46400			42900	CPM	REC: 93	(30%-105%)		
QC1203803132	424396002	DUP							
Technetium-99		U	2.58	U	14.6	pCi/L			06/11/1708:14
						RPD: 0	N/A		

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QC Summary

Workorder: 424398

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1670715								
		Uncert:	+/-21.2	+/-21.3					
		TPU:	+/-21.2	+/-21.4					
**Technetium-99m Tracer	46400	42000		41900	CPM	RER: 0.784 REC: 90	(0-2) (30%-105%)		
QC1203803133 LCS									
Technetium-99	861			817	pCi/L	REC: 95	(80%-120%)		06/12/1707:30
		Uncert:		+/-47.9					
		TPU:		+/-103					
**Technetium-99m Tracer	46400			44700	CPM	REC: 96	(30%-105%)		
Batch	1670731								
QC1203803163 MB									
Tritium			U	-60.1	pCi/L			BXM4	06/09/1700:54
		Uncert:		+/-222					
		TPU:		+/-222					
QC1203803164 424396002 DUP									
Tritium		955		983	pCi/L				06/09/1702:52
		Uncert:	+/-273	+/-270		RPD: 3	(0% - 100%)		
		TPU:	+/-330	+/-330		RER: 0.119	(0-2)		
QC1203803165 424396002 MS									
Tritium	2240	955		2670	pCi/L	REC: 77	(75%-125%)		06/09/1703:39
		Uncert:	+/-273	+/-335					
		TPU:	+/-330	+/-615					
QC1203803166 LCS									
Tritium	2240			1970	pCi/L	REC: 88	(80%-120%)		06/09/1704:26
		Uncert:		+/-310					
		TPU:		+/-490					
Batch	1670749								
QC1203803225 MB									
Carbon-14			U	-5.32	pCi/L			BXM4	06/10/1709:05
		Uncert:		+/-18.3					
		TPU:		+/-18.3					
QC1203803226 424396002 DUP									
Carbon-14		202		193	pCi/L				06/10/1709:52
		Uncert:	+/-22.9	+/-22.7		RPD: 5	(0% - 20%)		
		TPU:	+/-44.0	+/-42.3		RER: 0.317	(0-2)		
QC1203803227 424396002 MS									
Carbon-14	1250	202		1380	pCi/L	REC: 94	(75%-125%)		06/10/1710:39
		Uncert:	+/-22.9	+/-40.2					
		TPU:	+/-44.0	+/-259					
QC1203803228 LCS									
Carbon-14	1250			1170	pCi/L	REC: 94	(80%-120%)		06/10/1711:26
		Uncert:		+/-37.7					
		TPU:		+/-220					

Notes:

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

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

QC Summary

Workorder: 424398

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
+						Correlation coefficient for Method of Standard Additions (MSA) is < 0.995				
<						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 associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample				
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.				
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.				
UX						Gamma Spectroscopy--Uncertain identification				
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.

** 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.