

7/26/2018

REV.0



a member of **The GEL Group** INC



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July 26, 2018

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

Re: CHCPRC SAF I18-012
Work Order: 453730
SDG: GEL453730

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 30, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Sincerely,

A handwritten signature in cursive script that reads "Anna Dupree".

Anna Dupree for
Heather Shaffer
Project Manager

Purchase Order: 300071 7H
Chain of Custody: I18-012-115, I18-012-116 and I18-012-117
Enclosures

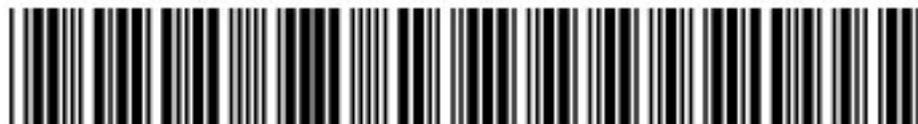


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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHCPRC SAF I18-012
SDG: GEL453730**

July 26, 2018

Laboratory Identification:

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

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 30, 2018, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. 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>
453730001	B3J967
453730002	B3J969
453730003	B3J976
453730004	B3J978
453730005	B3J8W2
453730006	B3J8W4

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Metals 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
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL453730
Work Order #: 453730

Metals

Determination of Metals by ICP

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of calcium and potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 453730001 (B3J967), 453730002 (B3J969), 453730003 (B3J976), 453730004 (B3J978), 453730005 (B3J8W2) and 453730006 (B3J8W4).

Quality Control (QC) Information

Method Blank (MB) Statement

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

Sample	Analyte	Value
1204062119 (MB)	Calcium	See applicable report

Determination of Metals by ICP-MS

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

Radiochemistry

SRISO_SEP_PRECIP_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.

Technical Information**Recounts**

Samples 1204062549 (B3J8W2DUP), 453730001 (B3J967) and 453730005 (B3J8W2) were verified by recounting at least five days from the separation date. The recounts are reported.

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**Matrix Spike (MS) Recovery**

Matrix Spike Duplicate did not meet the recovery requirement; however the Matrix Spike did meet the recovery requirement. The Matrix Spike and Matrix Spike Duplicate also meet the relative error ratio requirement.

Sample	Analyte	Value
1204062554 (Non SDG 453729003MSD)	ALPHA	65.9* (75%-125%)

Duplication Criteria between MS and MSD

The Matrix Spike and Matrix Spike Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204062553MS and 1204062554MSD (Non SDG 453729003)	ALPHA	RPD 22* (0%-20%) RER 1.24 (0-2)

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 1204062554 (Non SDG 453729003MSD) was recounted due to low recovery. The recount is reported.

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 453730		C.O.C.# I18-012-115 Page 1 of 1
Collector: CHRIS FULTON <small>CHPRC</small>	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650	Purchase Order/Charge Code: 300071	
SAF No.: I18-012	Sampling Origin: Hanford Site	Logbook No.: HNF-N-506-100-55	Ice Chest No.: 605085	
Project Title: 100-N Apatite Barrier, June 20	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 77260607230	Offsite Property No.: 9641	
Shipped To (Lab): GEL Laboratories, LLC	Priority: 30 Days			
Protocol: CERCLA	SPECIAL INSTRUCTIONS N/A			

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3J967	N	W	6/29/18	1051	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B3J967	N	W			1x1-L P	9310_ALPHABETA_GPC: COMMON	6 Months	HNO3 to pH <2
B3J967	N	W			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B3J969	Y	W	6/29/18	1051	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

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

Relinquished By: CHRIS FULTON <small>CHPRC</small>	Received By: Jeff Lucas <small>ICHPRC</small>	JUN 29 2018 Date/Time	JUN 29 2018 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
Print First and Last Name Signature	Print First and Last Name Signature	Date/Time	Date/Time	
Relinquished By: Fed Ex	Received By: Chakeris Tarplin <small>GEL Laboratories</small>	JUN 29 2018 Date/Time	JUN 29 2018 Date/Time	
Print First and Last Name Signature	Print First and Last Name Signature	Date/Time	Date/Time	
Relinquished By:	Received By:	Date/Time	Date/Time	
Print First and Last Name Signature	Print First and Last Name Signature	Date/Time	Date/Time	
Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:		

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.#
I18-012-116
Page 1 of 1

453730

Collector: CHRIS FULTON
Remediation Company

Contact/Requester: Karen Waters-Husted
Telephone No.: 509-376-4650

SAF No.: I18-012
Purchase Order/Charge Code: 300071

Project Title: 100-N Apatite Barrier, June 20
Logbook No.: HNF-N-506-160
Ice Chest No.: 6WS-1085

Shipped To (Lab): GEL Laboratories, LLC
Method of Shipment: Commercial Carrier
Bill of Lading/Air Bill No.: 772400607238

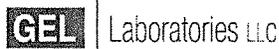
Protocol: CERCLA
Priority: 30 Days
Offsite Property No.: 9641

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.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3J976	N	W	6/24/18	0955	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2
B3J976	N	W	6/24/18	0955	1x1-L P	9310_ALPHABETA_GPC: COMMON	6 Months	HNO3 to pH <2
B3J978	Y	W	6/24/18	0955	1x500-mL G/P	6010_METALS_ICP: GW 04; 6020_METALS_ICPMS: GW 01	6 Months	HNO3 to pH <2

Relinquished By: CHRIS FULTON Signature: [Signature] Print First and Last Name: CHRIS FULTON	Date/Time: JUN 29 2018 1125	Received By: Jeff Lucas Signature: [Signature] Print First and Last Name: Jeff Lucas	Date/Time: JUN 29 2018 1125	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: Jeff Lucas Signature: [Signature] Print First and Last Name: Jeff Lucas	Date/Time: JUN 29 2018 1400	Received By: FEDEX Signature: [Signature] Print First and Last Name: FEDEX	Date/Time: JUN 29 2018 1400	Received By: Chakeris Turpilis Signature: [Signature] Print First and Last Name: Chakeris Turpilis	Date/Time: JUN 29 2018 1400
Relinquished By: Fed Ex Signature: [Signature] Print First and Last Name: Fed Ex	Date/Time: JUN 29 2018 1400	Received By: [Signature] Signature: [Signature] Print First and Last Name: [Signature]	Date/Time: JUN 29 2018 1400	Received By: [Signature] Signature: [Signature] Print First and Last Name: [Signature]	Date/Time: JUN 29 2018 1400
Relinquished By: [Signature] Signature: [Signature] Print First and Last Name: [Signature]	Date/Time: JUN 29 2018 1400	Received By: [Signature] Signature: [Signature] Print First and Last Name: [Signature]	Date/Time: JUN 29 2018 1400	Received By: [Signature] Signature: [Signature] Print First and Last Name: [Signature]	Date/Time: JUN 29 2018 1400
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:		



SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPEC</u>		SDG/AR/COC/Work Order: <u>453730</u>		
Received By: <u>C. TARPLIN</u>		Date Received: <u>06-30-2018</u> HS		
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>7726 0033 3336</u> <u>7726 0607 2789 (2)</u>		
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?	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <input checked="" type="checkbox"/> CPM / mR/Hr Classified as: <u>Rad 1</u> Rad 2 Rad 3		
Is package, COC, and/or Samples marked HAZ?	<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:		
Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None <input type="checkbox"/> 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"/>			Temperature Device Serial #: <u>IR4-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>			If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No <input checked="" type="checkbox"/> N/A ___ Sample ID's and containers affected: <u>CT B3111 1065</u> <u>B3111 1065</u> <u>B3111 1065</u> <u>AS 11</u>
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected: <u>7/2/18</u>
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials ast Date 7/2/18 Page 1 of 1

GL-CHL-SR-001 Rev 5

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The analyte was detected in the associated method blank \geq MDC or $>$ 5% sample activity.	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	General Chemistry	
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $>$ 5% of the measured concentration and/or decision level for associated samples.	Inorganics	Metals
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $>$ 5% of the measured concentration and/or decision level for associated samples.	General Chemistry	
<	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	General Chemistry	
UX	Gamma Spectroscopy--Uncertain identification	Radiological	
o	Analyte failed to recover within LCS limits	Radiological	Rad

Laboratory Certifications

List of current GEL Certifications as of 26 July 2018

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL453730
Work Order #: 453730

Product: Determination of Metals by ICP**Analytical Method:** SW846 3005A/6010D**Analytical Procedure:** GL-MA-E-013 REV# 30**Analytical Batch:** 1778920**Product: Determination of Metals by ICP-MS****Analytical Method:** SW846 3005A/6020B**Analytical Procedure:** GL-MA-E-014 REV# 32**Analytical Batch:** 1778932**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 14**Preparation Batches:** 1778919 and 1778931

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453730001	B3J967
453730002	B3J969
453730003	B3J976
453730004	B3J978
453730005	B3J8W2
453730006	B3J8W4
1204062119	Method Blank (MB) ICP
1204062120	Laboratory Control Sample (LCS)
1204062123	453729003(NonSDGL) Serial Dilution (SD)
1204062121	453729003(NonSDGS) Matrix Spike (MS)
1204062122	453729003(NonSDGSD) Matrix Spike Duplicate (MSD)
1204062149	Method Blank (MB) ICP-MS
1204062150	Laboratory Control Sample (LCS)
1204062153	453616007(NonSDGL) Serial Dilution (SD)
1204062151	453616007(NonSDGS) Matrix Spike (MS)
1204062152	453616007(NonSDGSD) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information**CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of calcium

and potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 453730001 (B3J967), 453730002 (B3J969), 453730003 (B3J976), 453730004 (B3J978), 453730005 (B3J8W2) and 453730006 (B3J8W4)-ICP.

ICSA/ICSAB Statement

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

Quality Control (QC) Information**Method Blank (MB) Statement**

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

Sample	Analyte	Value
1204062119 (MB)	Calcium	See applicable report

Certification Statement

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

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL453730 GEL Work Order: 453730

The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: **Name: Nik-Cole Elmore****Date: 12 JUL 2018****Title: Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL453730

CONTRACT: CPRC0118012

METHOD TYPE: SW846

SAMPLE ID: 453730001

BASIS: As Received

DATE COLLECTED 29-JUN-18

CLIENT ID: B3J967

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	42.2	ug/L	B	19.3	50	50	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-38-2	Arsenic	2.07	ug/L	B	2	5	5	1	MS	PRB	07/06/18 10:39	180706-3	1778932
7440-39-3	Barium	30.3	ug/L		0.67	2	2	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/18 10:39	180706-3	1778932
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/05/18 19:56	070518-1	1778920
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-70-2	Calcium	26000	ug/L		50	200	200	1	P	HSC	07/05/18 19:56	070518-1	1778920
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-48-4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-50-8	Copper	0.557	ug/L	B	0.3	1	1	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7439-89-6	Iron	94.7	ug/L	B	30	100	100	1	P	HSC	07/05/18 19:56	070518-1	1778920
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7439-95-4	Magnesium	5330	ug/L		110	300	300	1	P	HSC	07/05/18 19:56	070518-1	1778920
7439-96-5	Manganese	5.7	ug/L		1	5	5	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7439-98-7	Molybdenum	0.645	ug/L		0.2	0.5	0.5	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-09-7	Potassium	1290	ug/L		50	150	150	1	P	HSC	07/05/18 19:56	070518-1	1778920
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-23-5	Sodium	5170	ug/L		100	300	300	1	P	HSC	07/05/18 19:56	070518-1	1778920
7440-24-6	Strontium	112	ug/L		2	10	10	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	PRB	07/06/18 10:39	180706-3	1778932
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-61-1	Uranium	0.681	ug/L		0.067	0.2	0.2	1	MS	PRB	07/06/18 02:26	180705-2	1778932
7440-62-2	Vanadium	2	ug/L	B	1	5	5	1	P	HSC	07/05/18 19:56	070518-1	1778920
7440-66-6	Zinc	14.5	ug/L		3.3	10	10	1	MS	PRB	07/06/18 02:26	180705-2	1778932

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778920	1778919	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778932	1778931	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

***Analytical Methods:**

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL453730

CONTRACT: CPRC0118012

METHOD TYPE: SW846

SAMPLE ID:453730002

BASIS: As Received

DATE COLLECTED 29-JUN-18

CLIENT ID: B3J969

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 10:41	180706-3	1778932
7440-39-3	Barium	30.8	ug/L		0.67	2	2	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/18 10:41	180706-3	1778932
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/05/18 19:59	070518-1	1778920
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-70-2	Calcium	26500	ug/L		50	200	200	1	P	HSC	07/05/18 19:59	070518-1	1778920
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-48-4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-50-8	Copper	0.482	ug/L	B	0.3	1	1	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/05/18 19:59	070518-1	1778920
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7439-95-4	Magnesium	5410	ug/L		110	300	300	1	P	HSC	07/05/18 19:59	070518-1	1778920
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7439-98-7	Molybdenum	0.645	ug/L		0.2	0.5	0.5	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-09-7	Potassium	1300	ug/L		50	150	150	1	P	HSC	07/05/18 19:59	070518-1	1778920
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-23-5	Sodium	5260	ug/L		100	300	300	1	P	HSC	07/05/18 19:59	070518-1	1778920
7440-24-6	Strontium	112	ug/L		2	10	10	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	PRB	07/06/18 10:41	180706-3	1778932
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-61-1	Uranium	0.679	ug/L		0.067	0.2	0.2	1	MS	PRB	07/06/18 02:29	180705-2	1778932
7440-62-2	Vanadium	2.29	ug/L	B	1	5	5	1	P	HSC	07/05/18 19:59	070518-1	1778920
7440-66-6	Zinc	3.57	ug/L	B	3.3	10	10	1	MS	PRB	07/06/18 02:29	180705-2	1778932

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778920	1778919	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778932	1778931	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

***Analytical Methods:**

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL453730

CONTRACT: CPRC0118012

METHOD TYPE: SW846

SAMPLE ID: 453730003

BASIS: As Received

DATE COLLECTED 29-JUN-18

CLIENT ID: B3J976

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	39.1	ug/L	B	19.3	50	50	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 10:43	180706-3	1778932
7440-39-3	Barium	18.4	ug/L		0.67	2	2	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/18 10:43	180706-3	1778932
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/05/18 20:02	070518-1	1778920
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-70-2	Calcium	23500	ug/L		50	200	200	1	P	HSC	07/05/18 20:02	070518-1	1778920
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-48-4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-50-8	Copper	0.895	ug/L	B	0.3	1	1	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/05/18 20:02	070518-1	1778920
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7439-95-4	Magnesium	4830	ug/L		110	300	300	1	P	HSC	07/05/18 20:02	070518-1	1778920
7439-96-5	Manganese	3.59	ug/L	B	1	5	5	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7439-98-7	Molybdenum	0.871	ug/L		0.2	0.5	0.5	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-09-7	Potassium	1050	ug/L		50	150	150	1	P	HSC	07/05/18 20:02	070518-1	1778920
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-23-5	Sodium	5590	ug/L		100	300	300	1	P	HSC	07/05/18 20:02	070518-1	1778920
7440-24-6	Strontium	99.9	ug/L		2	10	10	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	PRB	07/06/18 10:43	180706-3	1778932
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-61-1	Uranium	0.544	ug/L		0.067	0.2	0.2	1	MS	PRB	07/06/18 02:33	180705-2	1778932
7440-62-2	Vanadium	1.53	ug/L	B	1	5	5	1	P	HSC	07/05/18 20:02	070518-1	1778920
7440-66-6	Zinc	4.53	ug/L	B	3.3	10	10	1	MS	PRB	07/06/18 02:33	180705-2	1778932

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778920	1778919	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778932	1778931	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

*Analytical Methods:

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL453730

CONTRACT: CPRC0118012

METHOD TYPE: SW846

SAMPLE ID: 453730004

BASIS: As Received

DATE COLLECTED 29-JUN-18

CLIENT ID: B3J978

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-38-2	Arsenic	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 10:45	180706-3	1778932
7440-39-3	Barium	16.3	ug/L		0.67	2	2	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/18 10:45	180706-3	1778932
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/05/18 20:05	070518-1	1778920
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-70-2	Calcium	23300	ug/L		50	200	200	1	P	HSC	07/05/18 20:05	070518-1	1778920
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-48-4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-50-8	Copper	0.562	ug/L	B	0.3	1	1	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/05/18 20:05	070518-1	1778920
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7439-95-4	Magnesium	4770	ug/L		110	300	300	1	P	HSC	07/05/18 20:05	070518-1	1778920
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7439-98-7	Molybdenum	0.794	ug/L		0.2	0.5	0.5	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-09-7	Potassium	1040	ug/L		50	150	150	1	P	HSC	07/05/18 20:05	070518-1	1778920
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-23-5	Sodium	5500	ug/L		100	300	300	1	P	HSC	07/05/18 20:05	070518-1	1778920
7440-24-6	Strontium	89.4	ug/L		2	10	10	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	PRB	07/06/18 10:45	180706-3	1778932
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-61-1	Uranium	0.484	ug/L		0.067	0.2	0.2	1	MS	PRB	07/06/18 02:36	180705-2	1778932
7440-62-2	Vanadium	1.59	ug/L	B	1	5	5	1	P	HSC	07/05/18 20:05	070518-1	1778920
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	MS	PRB	07/06/18 02:36	180705-2	1778932

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778920	1778919	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778932	1778931	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

*Analytical Methods:

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL453730

CONTRACT: CPRC0118012

METHOD TYPE: SW846

SAMPLE ID: 453730005

BASIS: As Received

DATE COLLECTED 29-JUN-18

CLIENT ID: B3J8W2

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	105	ug/L		19.3	50	50	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-38-2	Arsenic	2.28	ug/L	B	2	5	5	1	MS	PRB	07/06/18 10:47	180706-3	1778932
7440-39-3	Barium	24.3	ug/L		0.67	2	2	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/18 10:47	180706-3	1778932
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/05/18 20:08	070518-1	1778920
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-70-2	Calcium	26700	ug/L		50	200	200	1	P	HSC	07/05/18 20:08	070518-1	1778920
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-48-4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-50-8	Copper	0.763	ug/L	B	0.3	1	1	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7439-89-6	Iron	116	ug/L		30	100	100	1	P	HSC	07/05/18 20:08	070518-1	1778920
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7439-95-4	Magnesium	5100	ug/L		110	300	300	1	P	HSC	07/05/18 20:08	070518-1	1778920
7439-96-5	Manganese	10.6	ug/L		1	5	5	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7439-98-7	Molybdenum	0.635	ug/L		0.2	0.5	0.5	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-09-7	Potassium	1440	ug/L		50	150	150	1	P	HSC	07/05/18 20:08	070518-1	1778920
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-23-5	Sodium	4120	ug/L		100	300	300	1	P	HSC	07/05/18 20:08	070518-1	1778920
7440-24-6	Strontium	111	ug/L		2	10	10	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	PRB	07/06/18 10:47	180706-3	1778932
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-61-1	Uranium	0.617	ug/L		0.067	0.2	0.2	1	MS	PRB	07/06/18 02:39	180705-2	1778932
7440-62-2	Vanadium	2.57	ug/L	B	1	5	5	1	P	HSC	07/05/18 20:08	070518-1	1778920
7440-66-6	Zinc	4.98	ug/L	B	3.3	10	10	1	MS	PRB	07/06/18 02:39	180705-2	1778932

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778920	1778919	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778932	1778931	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

***Analytical Methods:**

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

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

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL453730

CONTRACT: CPRC0118012

METHOD TYPE: SW846

SAMPLE ID:453730006

BASIS: As Received

DATE COLLECTED 29-JUN-18

CLIENT ID: B3J8W4

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-38-2	Arsenic	2.23	ug/L	B	2	5	5	1	MS	PRB	07/06/18 10:49	180706-3	1778932
7440-39-3	Barium	25	ug/L		0.67	2	2	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/18 10:49	180706-3	1778932
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	07/05/18 20:11	070518-1	1778920
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-70-2	Calcium	26300	ug/L		50	200	200	1	P	HSC	07/05/18 20:11	070518-1	1778920
7440-47-3	Chromium	3	ug/L	U	3	10	10	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-48-4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-50-8	Copper	0.410	ug/L	B	0.3	1	1	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/05/18 20:11	070518-1	1778920
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7439-95-4	Magnesium	5060	ug/L		110	300	300	1	P	HSC	07/05/18 20:11	070518-1	1778920
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7439-98-7	Molybdenum	0.743	ug/L		0.2	0.5	0.5	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-02-0	Nickel	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-09-7	Potassium	1420	ug/L		50	150	150	1	P	HSC	07/05/18 20:11	070518-1	1778920
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-23-5	Sodium	4080	ug/L		100	300	300	1	P	HSC	07/05/18 20:11	070518-1	1778920
7440-24-6	Strontium	125	ug/L		2	10	10	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	PRB	07/06/18 10:49	180706-3	1778932
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-61-1	Uranium	0.670	ug/L		0.067	0.2	0.2	1	MS	PRB	07/06/18 02:42	180705-2	1778932
7440-62-2	Vanadium	2.56	ug/L	B	1	5	5	1	P	HSC	07/05/18 20:11	070518-1	1778920
7440-66-6	Zinc	3.32	ug/L	B	3.3	10	10	1	MS	PRB	07/06/18 02:42	180705-2	1778932

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778920	1778919	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778932	1778931	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

***Analytical Methods:**

METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

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

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 12, 2018

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 453730

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
QC1204062150	LCS										
Aluminum	2000			2250	ug/L		112	(80%-120%)	PRB	07/06/18	01:48
Antimony	50.0			50.2	ug/L		100	(80%-120%)			
Arsenic	50.0			48.3	ug/L		96.6	(80%-120%)		07/06/18	10:17
Barium	50.0			50.1	ug/L		100	(80%-120%)		07/06/18	01:48
Beryllium	50.0			56.8	ug/L		114	(80%-120%)		07/06/18	10:17
Cadmium	50.0			52.1	ug/L		104	(80%-120%)		07/06/18	01:48
Chromium	50.0			50.8	ug/L		102	(80%-120%)			
Cobalt	50.0			49.7	ug/L		99.4	(80%-120%)			
Copper	50.0			49.9	ug/L		99.9	(80%-120%)			
Lead	50.0			51.9	ug/L		104	(80%-120%)			
Manganese	50.0			48.8	ug/L		97.6	(80%-120%)			
Molybdenum	50.0			51.5	ug/L		103	(80%-120%)			
Nickel	50.0			49.4	ug/L		98.9	(80%-120%)			

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QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Selenium	50.0			48.2	ug/L		96.4	(80%-120%)	PRB	07/06/18	01:48
Silver	50.0			51.7	ug/L		103	(80%-120%)			
Strontium	50.0			51.2	ug/L		102	(80%-120%)			
Thallium	50.0			47.3	ug/L		94.6	(80%-120%)			
Thorium	50.0			46.6	ug/L		93.2	(80%-120%)		07/06/18	10:17
Tin	50.0			50.7	ug/L		101	(80%-120%)		07/06/18	01:48
Uranium	50.0			51.0	ug/L		102	(80%-120%)			
Zinc	50.0			52.6	ug/L		105	(80%-120%)			
QC1204062149	MB										
Aluminum			U	19.3	ug/L					07/06/18	01:44
Antimony			U	1.00	ug/L						
Arsenic			U	2.00	ug/L					07/06/18	10:15
Barium			U	0.670	ug/L					07/06/18	01:44
Beryllium			U	0.200	ug/L					07/06/18	10:15
Cadmium			U	0.300	ug/L					07/06/18	01:44
Chromium			U	3.00	ug/L						

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QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Cobalt			U	0.300	ug/L				PRB	07/06/18	01:44
Copper			U	0.300	ug/L						
Lead			U	0.500	ug/L						
Manganese			U	1.00	ug/L						
Molybdenum			U	0.200	ug/L						
Nickel			U	0.600	ug/L						
Selenium			U	2.00	ug/L						
Silver			U	0.300	ug/L						
Strontium			U	2.00	ug/L						
Thallium			U	0.600	ug/L						
Thorium			U	0.700	ug/L					07/06/18	10:15
Tin			U	1.00	ug/L					07/06/18	01:44
Uranium			U	0.067	ug/L						
Zinc			U	3.30	ug/L						
QC1204062151	453616007 MS										
Aluminum	2000	279		2470	ug/L		109	(75%-125%)		07/06/18	01:54

GEL LABORATORIES LLC

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QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Antimony	50.0	U	1.00	51.1	ug/L		102	(75%-125%)	PRB	07/06/18	01:54
Arsenic	50.0	U	2.00	51.8	ug/L		100	(75%-125%)		07/06/18	10:21
Barium	50.0		44.4	91.0	ug/L		93.2	(75%-125%)		07/06/18	01:54
Beryllium	50.0	U	0.200	53.9	ug/L		108	(75%-125%)		07/06/18	10:21
Cadmium	50.0	U	0.300	51.5	ug/L		103	(75%-125%)		07/06/18	01:54
Chromium	50.0	B	3.84	56.4	ug/L		105	(75%-125%)			
Cobalt	50.0	B	0.833	51.1	ug/L		100	(75%-125%)			
Copper	50.0		1.19	50.7	ug/L		99	(75%-125%)			
Lead	50.0	U	0.500	50.3	ug/L		100	(75%-125%)			
Manganese	50.0		52.0	99.3	ug/L		94.5	(75%-125%)			
Molybdenum	50.0		2.29	55.7	ug/L		107	(75%-125%)			
Nickel	50.0		3.84	53.3	ug/L		98.9	(75%-125%)			
Selenium	50.0	B	3.17	52.2	ug/L		98.2	(75%-125%)			
Silver	50.0	U	0.300	50.1	ug/L		100	(75%-125%)			
Strontium	50.0		267	306	ug/L		N/A	(75%-125%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Thallium	50.0	U	0.600	46.1	ug/L		92.1	(75%-125%)	PRB	07/06/18	01:54
Thorium	50.0	B	0.700	49.4	ug/L		97.4	(75%-125%)		07/06/18	10:21
Tin	50.0	U	1.00	52.5	ug/L		105	(75%-125%)		07/06/18	01:54
Uranium	50.0		1.55	50.9	ug/L		98.8	(75%-125%)			
Zinc	50.0		112	155	ug/L		85.1	(75%-125%)			
QC1204062152 453616007 MSD											
Aluminum	2000		279	2710	ug/L	9.43	122	(0%-20%)		07/06/18	01:57
Antimony	50.0	U	1.00	51.2	ug/L	0.346	102	(0%-20%)			
Arsenic	50.0	U	2.00	53.0	ug/L	2.3	102	(0%-20%)		07/06/18	10:23
Barium	50.0		44.4	92.6	ug/L	1.83	96.6	(0%-20%)		07/06/18	01:57
Beryllium	50.0	U	0.200	55.0	ug/L	2.15	110	(0%-20%)		07/06/18	10:23
Cadmium	50.0	U	0.300	51.4	ug/L	0.241	103	(0%-20%)		07/06/18	01:57
Chromium	50.0	B	3.84	62.5	ug/L	10.2	117	(0%-20%)			
Cobalt	50.0	B	0.833	51.8	ug/L	1.49	102	(0%-20%)			
Copper	50.0		1.19	51.9	ug/L	2.46	102	(0%-20%)			
Lead	50.0	U	0.500	51.3	ug/L	1.8	102	(0%-20%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Manganese	50.0	52.0		104	ug/L	4.6	104	(0%-20%)	PRB	07/06/18	01:57
Molybdenum	50.0	2.29		56.6	ug/L	1.65	109	(0%-20%)			
Nickel	50.0	3.84		57.0	ug/L	6.74	106	(0%-20%)			
Selenium	50.0	B	3.17	52.1	ug/L	0.222	97.9	(0%-20%)			
Silver	50.0	U	0.300	50.3	ug/L	0.253	101	(0%-20%)			
Strontium	50.0		267	308	ug/L	0.708	N/A	(0%-20%)			
Thallium	50.0	U	0.600	47.2	ug/L	2.39	94.4	(0%-20%)			
Thorium	50.0	B	0.700	49.9	ug/L	1.05	98.5	(0%-20%)		07/06/18	10:23
Tin	50.0	U	1.00	52.2	ug/L	0.6	104	(0%-20%)		07/06/18	01:57
Uranium	50.0		1.55	52.1	ug/L	2.26	101	(0%-20%)			
Zinc	50.0		112	155	ug/L	0.579	86.9	(0%-20%)			
QC1204062153 453616007 SDILT											
Aluminum		279	BD	46.1	ug/L	17.4		(0%-20%)		07/06/18	02:04
Antimony		U	0.127	DU	5.00	ug/L	N/A	(0%-20%)			
Arsenic		U	1.83	DU	10.0	ug/L	N/A	(0%-20%)		07/06/18	10:26
Barium			44.4	D	7.58	ug/L	14.5	(0%-20%)		07/06/18	02:04

GEL LABORATORIES LLC

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QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Beryllium	U	0.057	DU	1.00	ug/L	N/A		(0%-20%)	PRB	07/06/18	10:26
Cadmium	U	0.013	DU	1.50	ug/L	N/A		(0%-20%)		07/06/18	02:04
Chromium	B	3.84	DU	15.0	ug/L	N/A		(0%-20%)			
Cobalt	B	0.833	DU	1.50	ug/L	N/A		(0%-20%)			
Copper		1.19	DU	1.50	ug/L	N/A		(0%-20%)			
Lead	U	0.291	DU	2.50	ug/L	N/A		(0%-20%)			
Manganese		52.0	D	9.16	ug/L	12		(0%-20%)			
Molybdenum		2.29	BD	0.404	ug/L	11.8		(0%-20%)			
Nickel		3.84	BD	0.664	ug/L	13.5		(0%-20%)			
Selenium	B	3.17	DU	10.0	ug/L	N/A		(0%-20%)			
Silver	U	0.010	DU	1.50	ug/L	N/A		(0%-20%)			
Strontium		267	D	44.6	ug/L	16.5		(0%-20%)			
Thallium	U	0.048	DU	3.00	ug/L	N/A		(0%-20%)			
Thorium	B	0.700	DU	3.50	ug/L	N/A		(0%-20%)		07/06/18	10:26
Tin	U	0.097	DU	5.00	ug/L	N/A		(0%-20%)		07/06/18	02:04

GEL LABORATORIES LLC

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QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Uranium		1.55	D	0.275	ug/L	11		(0%-20%)	PRB	07/06/18	02:04
Zinc		112	D	24.5	ug/L	9.58		(0%-20%)			
Metals Analysis-ICP											
Batch	1778920										
QC1204062120	LCS										
Boron	500			509	ug/L		102	(80%-120%)	HSC	07/05/18	19:34
Calcium	5000			4970	ug/L		99.5	(80%-120%)			
Iron	5000			4960	ug/L		99.2	(80%-120%)			
Magnesium	5000			5000	ug/L		99.9	(80%-120%)			
Potassium	5000			4840	ug/L		96.8	(80%-120%)			
Sodium	5000			4880	ug/L		97.7	(80%-120%)			
Vanadium	500			500	ug/L		99.9	(80%-120%)			
QC1204062119	MB										
Boron			U	15.0	ug/L					07/05/18	19:31
Calcium			B	-66.9	ug/L						
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Potassium			U	50.0	ug/L						

GEL LABORATORIES LLC

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QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1778920										
Sodium			U	100	ug/L				HSC	07/05/18	19:31
Vanadium			U	1.00	ug/L						
QC1204062121 453729003 MS											
Boron	500	72.7		591	ug/L		104	(75%-125%)		07/05/18	19:39
Calcium	5000	38000		42500	ug/L		N/A	(75%-125%)			
Iron	5000	B 63.0		4960	ug/L		98	(75%-125%)			
Magnesium	5000	7710		12600	ug/L		97.1	(75%-125%)			
Potassium	5000	4520		9300	ug/L		95.7	(75%-125%)			
Sodium	5000	68100		73900	ug/L		N/A	(75%-125%)			
Vanadium	500	10.5		512	ug/L		100	(75%-125%)			
QC1204062122 453729003 MSD											
Boron	500	72.7		582	ug/L	1.63	102	(0%-20%)		07/05/18	19:42
Calcium	5000	38000		40500	ug/L	4.63	N/A	(0%-20%)			
Iron	5000	B 63.0		4870	ug/L	1.94	96.1	(0%-20%)			
Magnesium	5000	7710		12200	ug/L	3.25	89.1	(0%-20%)			
Potassium	5000	4520		9020	ug/L	3.06	90.1	(0%-20%)			
Sodium	5000	68100		71700	ug/L	3	N/A	(0%-20%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1778920										
Vanadium	500	10.5		502	ug/L	2.07	98.3	(0%-20%)	HSC	07/05/18	19:42
QC1204062123 453729003 SDILT											
Boron		72.7	BD	15.5	ug/L	6.65		(0%-20%)		07/05/18	19:44
Calcium		38000	D	7490	ug/L	1.45		(0%-20%)			
Iron	B	63.0	DU	150	ug/L	N/A		(0%-20%)			
Magnesium		7710	D	1570	ug/L	1.64		(0%-20%)			
Potassium		4520	D	864	ug/L	4.34		(0%-20%)			
Sodium		68100	D	14200	ug/L	4.56		(0%-20%)			
Vanadium		10.5	BD	2.54	ug/L	21.1		(0%-20%)			

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 \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.
- 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

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QC Summary

Workorder: 453730

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
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 #: GEL453730
Work Order #: 453730

Product: SRISO_SEP_PRECIP_GPC: COMMON

Analytical Method: SRISO_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 20

Analytical Batch: 1779094

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453730001	B3J967
453730005	B3J8W2
1204062548	Method Blank (MB)
1204062549	453730005(B3J8W2) Sample Duplicate (DUP)
1204062550	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

Samples 1204062549 (B3J8W2DUP), 453730001 (B3J967) and 453730005 (B3J8W2) were verified by recounting at least five days from the separation date. The recounts are reported.

Product: 9310_ALPHABETA_GPC: COMMON

Analytical Method: 9310_ALPHABETA_GPC

Analytical Procedure: GL-RAD-A-001 REV# 20

Analytical Batch: 1779095

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453730001	B3J967
453730003	B3J976
453730005	B3J8W2
1204062551	Method Blank (MB)
1204062552	453729003(NonSDG) Sample Duplicate (DUP)
1204062553	453729003(NonSDG) Matrix Spike (MS)
1204062554	453729003(NonSDG) Matrix Spike Duplicate (MSD)

1204062555 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

Matrix Spike (MS) Recovery

Matrix Spike Duplicate did not meet the recovery requirement; however the Matrix Spike did meet the recovery requirement. The Matrix Spike and Matrix Spike Duplicate also meet the relative error ratio requirement.

Sample	Analyte	Value
1204062554 (Non SDG 453729003MSD)	ALPHA	65.9* (75%-125%)

Duplication Criteria between MS and MSD

The Matrix Spike and Matrix Spike Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204062553MS and 1204062554MSD (Non SDG 453729003)	ALPHA	RPD 22* (0%-20%) RER 1.24 (0-2)

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 1204062554 (Non SDG 453729003MSD) was recounted due to low recovery. The recount is reported.

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: GEL453730 GEL Work Order: 453730

The Qualifiers in this report are defined as follows:

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: Kate Gellatly****Date: 26 JUL 2018****Title: Analyst I**

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL453730	Client: CPRC001	Project: CPRC0118012
Lab Sample ID: 453730001	Date Collected: 06/29/2018 10:51	Matrix: WATER
	Date Received: 06/30/2018 09:15	
Client ID: B3J967		Prep Basis: "As Received"
Batch ID: 1779094	Method: SRISO_SEP_PRECIP_GPC	SOP Ref: GL-RAD-A-004
Run Date: 07/16/2018 11:15	Analyst: LXB3	Instrument: PIC12C
Data File: S1779094r3.xls	Aliquot: 300 mL	Count Time: 60 min
Prep Batch: 1779094	Prep Method: EPA 905.0 Modified/DOE RP5	
Prep Date: 07/10/2018 10:36		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		197	pCi/L	+/-4.75	32.3	0.734	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	4.50	4.19	mg	107	(40%-110%)

Comments:

N Spike Sample recovery is outside control limits.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL453730	Client: CPRC001	Project: CPRC0118012
Lab Sample ID: 453730001	Date Collected: 06/29/2018 10:51	Matrix: WATER
	Date Received: 06/30/2018 09:15	
Client ID: B3J967		Prep Basis: "As Received"
Batch ID: 1779095	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 07/10/2018 12:46	Analyst: BXG2	Instrument: PIC12B
Data File: AB1779095r1.xls	Aliquot: 150 mL	Count Time: 60 min
Prep Batch: 1779095	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 07/10/2018 08:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha <i>ALPHA</i>	N	3.50	pCi/L	+/-2.19	2.29	2.25	3.00
12587-47-2	Beta <i>BETA</i>		609	pCi/L	+/-15.7	100	3.06	4.00

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

N Spike Sample recovery is outside control limits.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL453730	Client: CPRC001	Project: CPRC0118012
Lab Sample ID: 453730003	Date Collected: 06/29/2018 09:55	Matrix: WATER
	Date Received: 06/30/2018 09:15	
Client ID: B3J976		Prep Basis: "As Received"
Batch ID: 1779095	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 07/10/2018 12:46	Analyst: BXG2	Instrument: PIC11D
Data File: AB1779095r1.xls	Aliquot: 150 mL	Count Time: 60 min
Prep Batch: 1779095	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 07/10/2018 08:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha <i>ALPHA</i>	N	3.33	pCi/L	+/-2.16	2.25	2.73	3.00
12587-47-2	Beta <i>BETA</i>		466	pCi/L	+/-13.4	76.8	3.41	4.00

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

N Spike Sample recovery is outside control limits.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL453730	Client: CPRC001	Project: CPRC0118012
Lab Sample ID: 453730005	Date Collected: 06/29/2018 08:51	Matrix: WATER
	Date Received: 06/30/2018 09:15	
Client ID: B3J8W2	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1779094	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 07/16/2018 11:15	Aliquot: 300 mL	Instrument: PIC13A
Data File: S1779094r3.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1779094		
Prep Date: 07/10/2018 10:36		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		214	pCi/L	+/-6.22	34.1	0.984	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	2.80	4.19	mg	66.8	(40%-110%)

Comments:

N Spike Sample recovery is outside control limits.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL453730	Client: CPRC001	Project: CPRC0118012
Lab Sample ID: 453730005	Date Collected: 06/29/2018 08:51	Matrix: WATER
	Date Received: 06/30/2018 09:15	
Client ID: B3J8W2	Method: 9310_ALPHABETA_GPC	Prep Basis: "As Received"
Batch ID: 1779095	Analyst: BXG2	SOP Ref: GL-RAD-A-001
Run Date: 07/10/2018 12:46	Aliquot: 150 mL	Instrument: PIC11C
Data File: AB1779095r1.xls	Prep Method: EPA 900.0/SW846 9310	Count Time: 60 min
Prep Batch: 1779095		
Prep Date: 07/10/2018 08:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha <i>ALPHA</i>	N	4.32	pCi/L	+/-2.41	2.53	2.90	3.00
12587-47-2	Beta <i>BETA</i>		290	pCi/L	+/-10.7	48.5	2.12	4.00

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

N Spike Sample recovery is outside control limits.
 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: July 26, 2018
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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 453730

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1779094								
QC1204062548	MB								
Strontium-90			U	0.173	pCi/L			LXB3	07/11/1814:07
				Uncert: +/-0.713					
				TPU: +/-0.714					
**Strontium Carrier		4.19		3.40	mg	REC: 81	(40%-110%)		
QC1204062549	453730005	DUP							
Strontium-90		214		198	pCi/L				07/16/1811:15
				Uncert: +/-6.22		RPD: 8	(0%-20%)		
				TPU: +/-34.1		RER: 0.691	(0-2)		
**Strontium Carrier		4.19	2.80	3.10	mg	REC: 74	(40%-110%)		
QC1204062550	LCS								
Strontium-90		77.8		84.2	pCi/L	REC: 108	(80%-120%)		07/11/1814:07
				Uncert: +/-4.90					
				TPU: +/-14.6					
**Strontium Carrier		4.19		3.50	mg	REC: 84	(40%-110%)		
Batch	1779095								
QC1204062551	MB								
Alpha			U	0.143	pCi/L			BXG2	07/10/1812:45
				Uncert: +/-1.06					
				TPU: +/-1.06					
Beta			U	0.590	pCi/L				
				Uncert: +/-1.37					
				TPU: +/-1.37					
QC1204062552	453729003	DUP							
Alpha		N	5.11	9.45	pCi/L				07/10/1812:45
				Uncert: +/-3.45		RPD: 60	(0% - 100%)		
				TPU: +/-3.56		RER: 1.43	(0-2)		
Beta			81.1	81.2	pCi/L				
				Uncert: +/-6.43		RPD: 0	(0%-20%)		
				TPU: +/-14.6		RER: 0.0122	(0-2)		
QC1204062553	453729003	MS							
Alpha		96.6	N	5.11	85.7	pCi/L	REC: 83.5	(75%-125%)	07/10/1812:45
				Uncert: +/-3.45					
				TPU: +/-3.56					
Beta		373		81.1	506	pCi/L	REC: 114	(75%-125%)	
				Uncert: +/-6.43					
				TPU: +/-14.6					
QC1204062554	453729003	MSD							
Alpha		96.6	N	5.11	68.7	pCi/L	REC: 65.9*	(75%-125%)	07/10/1814:20
				Uncert: +/-3.45			RPD: 22*	(0%-20%)	
				TPU: +/-3.56			RER: 1.24	(0-2)	
Beta		373		81.1	461	pCi/L	REC: 102	(75%-125%)	
				Uncert: +/-6.43			RPD: 9	(0%-20%)	
				TPU: +/-14.6			RER: 0.773	(0-2)	
QC1204062555	LCS								

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QC Summary

Workorder: 453730

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Paramname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gas Flow										
Batch		1779095								
Alpha	80.5			70.3	pCi/L	REC: 87.3	(80%-120%)			
	Uncert:			+/-7.07						
	TPU:			+/-13.8						
Beta	311			311	pCi/L	REC: 100	(80%-120%)			
	Uncert:			+/-11.1						
	TPU:			+/-53.1						

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
- + 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).
- B The analyte was detected in the associated method blank \geq MDC or $>5\%$ sample activity.
- 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
- o Analyte failed to recover within LCS limits

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.