

7/21/2016



July 21, 2016

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

Re: CHPRC SAF F16-043
Work Order: 400980
SDG: GEL400980

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 07, 2016. 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: 304070 - 8C
Chain of Custody: F16-043-053, F16-043-056 and F16-043-060
Enclosures

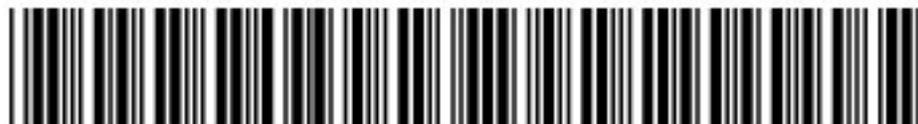


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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F16-043
SDG: GEL400980**

July 21, 2016

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 July 07, 2016, 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 and DER.

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
400980001	B35XC2
400980002	B35XB8
400980003	B35XB5

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.


Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL400980
Work Order #: 400980

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.

Quality Control (QC) Information

Matrix Spike (MS/MSD) Recovery Statement

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203580825 (B35XC2MS)	Calcium	66.2* (75%-125%)
	Potassium	46* (75%-125%)

Duplicate Relative Percent Difference (RPD) Statement

Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203580824 (B35XC2DUP)	Calcium	22* (0%-20%)
	Iron	32.8* (0%-20%)
	Magnesium	27* (0%-20%)
	Phosphorous	20.3* (0%-20%)
	Sodium	30.1* (0%-20%)

Determination of Metals by ICP-MS

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

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of zinc. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Matrix Spike (MS/MSD) Recovery Statement

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203580772 (B35XC2MS)	Chromium	188* (75%-125%)
	Copper	158* (75%-125%)
	Nickel	145* (75%-125%)
	Zinc	140* (75%-125%)

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike also did not meet the required control limits; thus, confirming matrix interferences and/or sample non-homogeneity.

Sample	Analyte	Value
1203580772 (B35XC2MS)	Strontium	174* (75%-125%)
	Vanadium	272* (75%-125%)

Duplicate Relative Percent Difference (RPD) Statement

Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203580771 (B35XC2DUP)	Chromium	45.8* (0%-20%)
	Vanadium	26.1* (0%-20%)

Post Spike (PS) Recovery Statement

The PS did not meet the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the presence of matrix interferences.

Sample	Analyte	Value
1203587526 (B35XC2PS)	Strontium	144* (80%-120%)
	Vanadium	123* (80%-120%)

Technical Information**Sample Dilutions**

The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	400980		
	001	002	003
Several	2X	2X	2X

General Chemistry

pH

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

Holding Times

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203581566 (B35XC2DUP)	pH	Received 07-JUL-16, out of holding 05-JUL-16
400980001 (B35XC2)	pH	Received 07-JUL-16, out of holding 05-JUL-16
400980002 (B35XB8)	pH	Received 07-JUL-16, out of holding 05-JUL-16
400980003 (B35XB5)	pH	Received 07-JUL-16, out of holding 05-JUL-16

Radiochemistry

Dry Weight

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

Certification Statement

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

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-043-056	PAGE 1 OF 1
COLLECTOR ELKAWA CHRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION C9403, I-004 EB	PROJECT DESIGNATION 100-NR-2 Drilling - Soil	FIELD LOGBOOK NO. 6005-487	SAF NO. F16-043	AIR QUALITY	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. 6005-487	OFFSITE PROPERTY NO. 6803	ACTUAL SAMPLE DEPTH N/A	COA 304070	BILL OF LADING/AIR BILL NO. 7766 0172 3129	
SHIPPED TO GEL Laboratories, LLC	400980				

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME	MATRIX*
A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/JATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. NA	None	6 Months	G/P	1	250mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	7-5-16	0745	SOIL
		None	ASAP	G/P	1	60mL	9045_pH (Non-Aqueous); COMMON;			
		Moisture Resistant			1	200g	SEE ITEM (2) IN SPECIAL INSTRUCTIONS			

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM ELKAWA DATE/TIME 7-5-16 1400	RECEIVED BY/STORED IN SSU-1 DATE/TIME 7-5-16 1400	SPLIT SPOON PARTS B & A WILL BE COMBINED TO ENSURE ADEQUATE SAMPLE MATERIAL FOR ANALYSIS; SAMPLE A AND B PORTION SAMPLES B35XB8, B35XB9, B35XC4 (1) 6020_METALS_ICPMS: COMMON {Aluminum, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Selenium}; 6020_METALS_ICPMS: COMMON (Add-on) {Antimony, Arsenic, Manganese, Nickel, Silver, Strontium, Vanadium, Zinc}; 6010_METALS_ICP: COMMON {Calcium, Iron, Magnesium, Potassium, Sodium}; 6010_METALS_ICP: COMMON (Add-on) {Phosphorus}; (2) Moisture Content - D2216 {Percent moisture (wet sample)};
RELINQUISHED BY/REMOVED FROM SSU-1 DATE/TIME JUL 06 2016 0900	RECEIVED BY/STORED IN LARRY WALKER DATE/TIME JUL 06 2016 0900	
RELINQUISHED BY/REMOVED FROM LARRY WALKER DATE/TIME JUL 06 2016 1400	RECEIVED BY/STORED IN FEDEX DATE/TIME JUL 06 2016 1400	
RELINQUISHED BY/REMOVED FROM LARRY WALKER DATE/TIME JUL 06 2016 1400	RECEIVED BY/STORED IN LARRY WALKER DATE/TIME JUL 06 2016 1400	
RELINQUISHED BY/REMOVED FROM LARRY WALKER DATE/TIME JUL 06 2016 1400	RECEIVED BY/STORED IN LARRY WALKER DATE/TIME JUL 06 2016 1400	

SAMPLE RECEIPT & REVIEW FORM

Client: <u>OPRC</u>		SDG/AR/COC/Work Order:
Received By: <u>ML</u>		Date Received: <u>7-7-16</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>6m</u>
Classified Radioactive II or III by RSO?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>(Ice bags)</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>2c</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>13046296</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: (If unknown, select No)
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7766 8172 3129</u>

Comments (Use Continuation Form if needed):

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 July 2016

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	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
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	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL400980
Work Order #: 400980

Product: Determination of Metals by ICP-MS**Analytical Method:** 6020_METALS_ICPMS**Analytical Procedure:** GL-MA-E-014 REV# 28**Analytical Batch:** 1580067**Product: Determination of Metals by ICP****Analytical Method:** 6010_METALS_ICP**Analytical Procedure:** GL-MA-E-013 REV# 26**Analytical Batch:** 1580087**Preparation Method:** SW846 3050B**Preparation Procedure:** GL-MA-E-009 REV# 26**Preparation Batches:** 1580066 and 1580086

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400980001	B35XC2
400980002	B35XB8
400980003	B35XB5
1203580822	Method Blank (MB)ICP
1203580823	Laboratory Control Sample (LCS)
1203580826	400980001(B35XC2L) Serial Dilution (SD)
1203580824	400980001(B35XC2D) Sample Duplicate (DUP)
1203580825	400980001(B35XC2S) Matrix Spike (MS)
1203582070	400980001(B35XC2PS) Post Spike (PS)
1203580769	Method Blank (MB)ICP-MS
1203580770	Laboratory Control Sample (LCS)
1203580773	400980001(B35XC2L) Serial Dilution (SD)
1203580771	400980001(B35XC2D) Sample Duplicate (DUP)
1203580772	400980001(B35XC2S) Matrix Spike (MS)
1203587526	400980001(B35XC2PS) Post Spike (PS)

The samples in this SDG were analyzed on a "dry weight" 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**Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of zinc. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. ICP-MS.

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analytes. The post spike recoveries were within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recoveries may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203580772 (B35XC2MS)	Chromium	188* (75%-125%)
	Copper	158* (75%-125%)
	Nickel	145* (75%-125%)
	Zinc	140* (75%-125%)
1203580825 (B35XC2MS)	Calcium	66.2* (75%-125%)
	Potassium	46* (75%-125%)

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike also did not meet the required control limits; thus, confirming matrix interferences and/or sample non-homogeneity.

Sample	Analyte	Value
1203580772 (B35XC2MS)	Strontium	174* (75%-125%)
	Vanadium	272* (75%-125%)

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. Not all the applicable analyte RPD values were within the acceptance criteria.

Sample	Analyte	Value
1203580771 (B35XC2DUP)	Chromium	45.8* (0%-20%)
	Vanadium	26.1* (0%-20%)
1203580824 (B35XC2DUP)	Calcium	22* (0%-20%)
	Iron	32.8* (0%-20%)
	Magnesium	27* (0%-20%)
	Phosphorous	20.3* (0%-20%)
	Sodium	30.1* (0%-20%)

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS did not meet the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the presence of matrix interferences.

Sample	Analyte	Value
1203587526 (B35XC2PS)	Strontium	144* (80%-120%)
	Vanadium	123* (80%-120%)

Technical Information**Preparation/Analytical Method Verification**

Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. The ICPMS solid samples in this SDG were diluted the standard two times. ICP-MS.

Analyte	400980		
	001	002	003
Several	2X 1X	2X 1X	2X 1X

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: GEL400980 GEL Work Order: 400980

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).

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.

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: **Jamie Johnson**

Date: **21 JUL 2016**

Title: **Group Leader**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL400980

CONTRACT: CPRC0F16043

METHOD TYPE: SW846

SAMPLE ID:400980001

BASIS: Dry Weight

DATE COLLECTED 05-JUL-16

CLIENT ID: B35XC2

LEVEL: Low

DATE RECEIVED 07-JUL-16

MATRIX: SOIL

%SOLIDS: 93.8

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	4920000	ug/kg	D	3170	10600	50	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7440-36-0	Antimony	346	ug/kg	U	346	1050	1050	1	P	HSC	07/13/16 15:47	071316-1	1580087
7440-38-2	Arsenic	889	ug/kg	BD	212	1060	10	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7440-39-3	Barium	59700	ug/kg	D	106	423	20	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7440-43-9	Cadmium	30	ug/kg	BD	21.2	212	5	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7440-70-2	Calcium	1380000	ug/kg	*N	8390	26200	26200	1	P	HSC	07/13/16 15:47	071316-1	1580087
7440-47-3	Chromium	8560	ug/kg	D*N	212	635	10	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7440-48-4	Cobalt	3260	ug/kg	D	63.5	212	20	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7440-50-8	Copper	8310	ug/kg	DN	69.8	212	8	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7439-89-6	Iron	7280000	ug/kg	*	8390	26200	26200	1	P	HSC	07/13/16 15:47	071316-1	1580087
7439-92-1	Lead	2260	ug/kg	D	106	423	15	2	MS	PRB	07/20/16 15:36	160720-3	1580067
7439-95-4	Magnesium	2040000	ug/kg	*	8920	31500	31500	1	P	HSC	07/13/16 15:47	071316-1	1580087
7439-96-5	Manganese	182000	ug/kg	D	212	1060	5	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7439-98-7	Molybdenum	367	ug/kg	D	63.5	212	20	2	MS	PRB	07/20/16 15:36	160720-3	1580067
7440-02-0	Nickel	9320	ug/kg	DN	106	423	40	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7723-14-0	Phosphorous	232000	ug/kg	*	5250	15700	15700	1	P	HSC	07/13/16 15:47	071316-1	1580087
7440-09-7	Potassium	739000	ug/kg	N	6720	26200	26200	1	P	HSC	07/13/16 15:47	071316-1	1580087
7782-49-2	Selenium	349	ug/kg	UD	349	1060	50	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7440-22-4	Silver	155	ug/kg	B	105	525	525	1	P	HSC	07/13/16 15:47	071316-1	1580087
7440-23-5	Sodium	131000	ug/kg	*	7350	26200	26200	1	P	HSC	07/13/16 15:47	071316-1	1580087
7440-24-6	Strontium	17500	ug/kg	DN	423	2120	10	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7440-62-2	Vanadium	15400	ug/kg	D*N	317	1060	1060	2	MS	PRB	07/19/16 17:45	160719-2	1580067
7440-66-6	Zinc	19400	ug/kg	DN	423	2120	25	2	MS	PRB	07/19/16 17:45	160719-2	1580067

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1580067	1580066	SW846 3050B	0.504	g	50	mL	07/08/16	JP1
1580087	1580086	SW846 3050B	0.508	g	50	mL	07/08/16	JP1

***Analytical Methods:**

P SW846 3050B/6010C
MS SW846 3050B/6020A

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL400980

CONTRACT: CPRC0F16043

METHOD TYPE: SW846

SAMPLE ID:400980002

BASIS: Dry Weight

DATE COLLECTED 05-JUL-16

CLIENT ID: B35XB8

LEVEL: Low

DATE RECEIVED 07-JUL-16

MATRIX: SOIL

%SOLIDS: 99.976

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	46700	ug/kg	D	2840	9450	50	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7440-36-0	Antimony	306	ug/kg	U	306	926	926	1	P	HSC	07/13/16 15:40	071316-1	1580087
7440-38-2	Arsenic	189	ug/kg	UD	189	945	10	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7440-39-3	Barium	241	ug/kg	BD	94.5	378	20	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7440-43-9	Cadmium	18.9	ug/kg	UD	18.9	189	5	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7440-70-2	Calcium	10800	ug/kg	B*N	7410	23200	23200	1	P	HSC	07/13/16 15:40	071316-1	1580087
7440-47-3	Chromium	189	ug/kg	UD*N	189	567	10	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7440-48-4	Cobalt	56.7	ug/kg	UD	56.7	189	20	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7440-50-8	Copper	178	ug/kg	BDN	62.4	189	8	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7439-89-6	Iron	120000	ug/kg	*	7410	23200	23200	1	P	HSC	07/13/16 15:40	071316-1	1580087
7439-92-1	Lead	108	ug/kg	BD	94.5	378	15	2	MS	PRB	07/20/16 15:47	160720-3	1580067
7439-95-4	Magnesium	9310	ug/kg	B*	7870	27800	27800	1	P	HSC	07/13/16 15:40	071316-1	1580087
7439-96-5	Manganese	238	ug/kg	BD	189	945	5	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7439-98-7	Molybdenum	56.7	ug/kg	UD	56.7	189	20	2	MS	PRB	07/20/16 15:47	160720-3	1580067
7440-02-0	Nickel	94.5	ug/kg	UDN	94.5	378	40	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7723-14-0	Phosphorous	4630	ug/kg	U*	4630	13900	13900	1	P	HSC	07/13/16 15:40	071316-1	1580087
7440-09-7	Potassium	11800	ug/kg	BN	5930	23200	23200	1	P	HSC	07/13/16 15:40	071316-1	1580087
7782-49-2	Selenium	312	ug/kg	UD	312	945	50	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7440-22-4	Silver	92.6	ug/kg	U	92.6	463	463	1	P	HSC	07/13/16 15:40	071316-1	1580087
7440-23-5	Sodium	6480	ug/kg	U*	6480	23200	23200	1	P	HSC	07/13/16 15:40	071316-1	1580087
7440-24-6	Strontium	568	ug/kg	BDN	378	1890	10	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7440-62-2	Vanadium	284	ug/kg	UD*N	284	945	945	2	MS	PRB	07/19/16 18:01	160719-2	1580067
7440-66-6	Zinc	515	ug/kg	CBDN	378	1890	25	2	MS	PRB	07/19/16 18:01	160719-2	1580067

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1580067	1580066	SW846 3050B	0.529	g	50	mL	07/08/16	JP1
1580087	1580086	SW846 3050B	0.54	g	50	mL	07/08/16	JP1

***Analytical Methods:**

P SW846 3050B/6010C
MS SW846 3050B/6020A

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL400980

CONTRACT: CPRC0F16043

METHOD TYPE: SW846

SAMPLE ID:400980003

BASIS: Dry Weight

DATE COLLECTED 05-JUL-16

CLIENT ID: B35XB5

LEVEL: Low

DATE RECEIVED 07-JUL-16

MATRIX: SOIL

%SOLIDS: 96.7

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	6230000	ug/kg	D	3020	10100	50	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7440-36-0	Antimony	329	ug/kg	U	329	996	996	1	P	HSC	07/13/16 15:44	071316-1	1580087
7440-38-2	Arsenic	1900	ug/kg	D	202	1010	10	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7440-39-3	Barium	38700	ug/kg	D	101	403	20	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7440-43-9	Cadmium	33.7	ug/kg	BD	20.2	202	5	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7440-70-2	Calcium	2130000	ug/kg	*N	7970	24900	24900	1	P	HSC	07/13/16 15:44	071316-1	1580087
7440-47-3	Chromium	15200	ug/kg	D*N	202	605	10	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7440-48-4	Cobalt	4070	ug/kg	D	60.5	202	20	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7440-50-8	Copper	10800	ug/kg	DN	66.5	202	8	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7439-89-6	Iron	12000000	ug/kg	*	7970	24900	24900	1	P	HSC	07/13/16 15:44	071316-1	1580087
7439-92-1	Lead	2310	ug/kg	D	101	403	15	2	MS	PRB	07/20/16 15:49	160720-3	1580067
7439-95-4	Magnesium	4130000	ug/kg	*	8470	29900	29900	1	P	HSC	07/13/16 15:44	071316-1	1580087
7439-96-5	Manganese	193000	ug/kg	D	202	1010	5	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7439-98-7	Molybdenum	182	ug/kg	BD	60.5	202	20	2	MS	PRB	07/20/16 15:49	160720-3	1580067
7440-02-0	Nickel	13900	ug/kg	DN	101	403	40	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7723-14-0	Phosphorous	425000	ug/kg	*	4980	14900	14900	1	P	HSC	07/13/16 15:44	071316-1	1580087
7440-09-7	Potassium	502000	ug/kg	N	6370	24900	24900	1	P	HSC	07/13/16 15:44	071316-1	1580087
7782-49-2	Selenium	333	ug/kg	UD	333	1010	50	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7440-22-4	Silver	376	ug/kg	B	99.6	498	498	1	P	HSC	07/13/16 15:44	071316-1	1580087
7440-23-5	Sodium	121000	ug/kg	*	6970	24900	24900	1	P	HSC	07/13/16 15:44	071316-1	1580087
7440-24-6	Strontium	45400	ug/kg	DN	403	2020	10	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7440-62-2	Vanadium	21900	ug/kg	D*N	302	1010	1010	2	MS	PRB	07/19/16 18:04	160719-2	1580067
7440-66-6	Zinc	23500	ug/kg	DN	403	2020	25	2	MS	PRB	07/19/16 18:04	160719-2	1580067

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1580067	1580066	SW846 3050B	0.513	g	50	mL	07/08/16	JP1
1580087	1580086	SW846 3050B	0.519	g	50	mL	07/08/16	JP1

***Analytical Methods:**

P SW846 3050B/6010C
MS SW846 3050B/6020A

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 21, 2016

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400980

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1580067										
QC1203580771 400980001 DUP											
Aluminum	D	4920000	D	5740000	ug/kg	15.5		(0%-20%)	PRB	07/19/16	17:48
Arsenic	BD	889	BD	853	ug/kg	4.08	^	(+/-989)			
Barium	D	59700	D	62500	ug/kg	4.54		(0%-20%)			
Cadmium	BD	30.0	BD	37.4	ug/kg	21.8	^	(+/-198)			
Chromium	*DN	8560	*D	13600	ug/kg	45.8*		(0%-20%)			
Cobalt	D	3260	D	3840	ug/kg	16.4		(0%-20%)			
Copper	DN	8310	D	9230	ug/kg	10.5		(0%-20%)			
Lead	D	2260	D	2310	ug/kg	2.07		(0%-20%)		07/20/16	15:38
Manganese	D	182000	D	192000	ug/kg	5.08		(0%-20%)		07/19/16	17:48
Molybdenum	D	367	D	518	ug/kg	34.1	^	(+/-198)		07/20/16	15:38
Nickel	DN	9320	D	10700	ug/kg	14		(0%-20%)		07/19/16	17:48
Selenium	DU	349	DU	326	ug/kg	N/A					
Strontium	DN	17500	D	18400	ug/kg	4.75		(0%-20%)			
Vanadium	*DN	15400	*D	20000	ug/kg	26.1*		(0%-20%)			
Zinc	DN	19400	D	19000	ug/kg	2.24		(0%-20%)			
QC1203580770 LCS											
Aluminum		198000	D	204000	ug/kg			103 (80%-120%)		07/19/16	17:42
Arsenic		4960	D	4430	ug/kg			89.4 (80%-120%)			
Barium		4960	D	5140	ug/kg			104 (80%-120%)			
Cadmium		4960	D	4610	ug/kg			92.9 (80%-120%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 400980

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1580067										
Chromium	4960		D	5040	ug/kg		102	(80%-120%)			
Cobalt	4960		D	5100	ug/kg		103	(80%-120%)	PRB	07/19/16	17:42
Copper	4960		D	4970	ug/kg		100	(80%-120%)			
Lead	4960		D	5270	ug/kg		106	(80%-120%)		07/20/16	15:30
Manganese	4960		D	5100	ug/kg		103	(80%-120%)		07/19/16	17:42
Molybdenum	4960		D	5310	ug/kg		107	(80%-120%)		07/20/16	15:30
Nickel	4960		D	5080	ug/kg		102	(80%-120%)		07/19/16	17:42
Selenium	4960		D	4070	ug/kg		82	(80%-120%)			
Strontium	4960		D	5360	ug/kg		108	(80%-120%)			
Vanadium	4960		D	4770	ug/kg		96.1	(80%-120%)			
Zinc	4960		D	5160	ug/kg		104	(80%-120%)			
QC1203580769	MB										
Aluminum			DU	2800	ug/kg					07/19/16	17:39
Arsenic			DU	187	ug/kg						
Barium			DU	93.5	ug/kg						
Cadmium			DU	18.7	ug/kg						
Chromium			DU	187	ug/kg						
Cobalt			DU	56.1	ug/kg						
Copper			DU	61.7	ug/kg						
Lead			DU	93.5	ug/kg					07/20/16	15:28
Manganese			DU	187	ug/kg					07/19/16	17:39
Molybdenum			DU	56.1	ug/kg					07/20/16	15:28
Nickel			DU	93.5	ug/kg					07/19/16	17:39

GEL LABORATORIES LLC

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

QC Summary

Workorder: 400980

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1580067										
Selenium			DU	308	ug/kg				PRB	07/19/16	17:39
Strontium			DU	374	ug/kg						
Vanadium			DU	280	ug/kg						
Zinc			BD	751	ug/kg						
QC1203580772 400980001 MS											
Aluminum	202000	D	4920000	D	6280000	ug/kg	N/A	(75%-125%)		07/19/16	17:52
Arsenic	5050	BD	889	D	5830	ug/kg	97.8	(75%-125%)			
Barium	5050	D	59700	D	75300	ug/kg	N/A	(75%-125%)			
Cadmium	5050	BD	30.0	D	4700	ug/kg	92.6	(75%-125%)			
Chromium	5050	*DN	8560	DN	18100	ug/kg	188*	(75%-125%)			
Cobalt	5050	D	3260	D	9070	ug/kg	115	(75%-125%)			
Copper	5050	DN	8310	DN	16300	ug/kg	158*	(75%-125%)			
Lead	5050	D	2260	D	8440	ug/kg	122	(75%-125%)		07/20/16	15:40
Manganese	5050	D	182000	D	210000	ug/kg	N/A	(75%-125%)		07/19/16	17:52
Molybdenum	5050	D	367	D	6320	ug/kg	118	(75%-125%)		07/20/16	15:40
Nickel	5050	DN	9320	DN	16600	ug/kg	145*	(75%-125%)		07/19/16	17:52
Selenium	5050	DU	349	D	4460	ug/kg	81.8	(75%-125%)			
Strontium	5050	DN	17500	DN	26300	ug/kg	174*	(75%-125%)			
Vanadium	5050	*DN	15400	DN	29100	ug/kg	272*	(75%-125%)			
Zinc	5050	DN	19400	DN	26500	ug/kg	140*	(75%-125%)			
QC1203587526 400980001 PS											
Chromium	25.0	*DN	40.5	D	68.4	ug/L	112	(80%-120%)		07/19/16	17:55
Copper	25.0	DN	39.3	D	64.6	ug/L	101	(80%-120%)			

GEL LABORATORIES LLC

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

QC Summary

Workorder: 400980

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1580067										
Nickel	25.0	DN	44.1	D	70.8	ug/L	107	(80%-120%)	PRB	07/19/16	17:55
Strontium	25.0	DN	82.8	D	119	ug/L	144 *	(80%-120%)			
Vanadium	25.0	*DN	72.6	D	103	ug/L	123 *	(80%-120%)			
Zinc	25.0	DN	91.9	D	119	ug/L	108	(80%-120%)			
QC1203580773 400980001 SDILT											
Aluminum		D	23200	D	4690	ug/L	1	(0%-10%)		07/19/16	17:58
Arsenic		BD	4.20	DU	1060	ug/L	N/A	(0%-10%)			
Barium		D	282	D	54.5	ug/L	3.48	(0%-10%)			
Cadmium		BD	0.142	DU	106	ug/L	N/A	(0%-10%)			
Chromium		*DN	40.5	D	8.45	ug/L	4.41	(0%-10%)			
Cobalt		D	15.4	D	3.14	ug/L	1.71	(0%-10%)			
Copper		DN	39.3	D	8.42	ug/L	7.17	(0%-10%)			
Lead		D	10.7	D	2.11	ug/L	1.17	(0%-10%)		07/20/16	15:45
Manganese		D	862	D	171	ug/L	.811	(0%-10%)		07/19/16	17:58
Molybdenum		D	1.74	DU	317	ug/L	N/A	(0%-10%)		07/20/16	15:45
Nickel		DN	44.1	D	9.13	ug/L	3.56	(0%-10%)		07/19/16	17:58
Selenium		DU	1.57	DU	1750	ug/L	N/A	(0%-10%)			
Strontium		DN	82.8	D	16.7	ug/L	.675	(0%-10%)			
Vanadium		*DN	72.6	D	14.0	ug/L	3.9	(0%-10%)			
Zinc		DN	91.9	D	24.2	ug/L	31.7	(0%-10%)			

Metals Analysis-ICP

Batch 1580087

QC1203580824 400980001 DUP

GEL LABORATORIES LLC

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

QC Summary

Workorder: 400980

Page 5 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1580087										
Antimony	U	346	U	326	ug/kg	N/A			HSC	07/13/16	15:51
Calcium	*N	1380000	*	1720000	ug/kg	22*		(0%-20%)			
Iron	*	7280000	*	10100000	ug/kg	32.8*		(0%-20%)			
Magnesium	*	2040000	*	2670000	ug/kg	27*		(0%-20%)			
Phosphorous	*	232000	*	284000	ug/kg	20.3*		(0%-20%)			
Potassium	N	739000		736000	ug/kg	0.461		(0%-20%)			
Silver	B	155	B	320	ug/kg	69.8 ^		(+/-494)			
Sodium	*	131000	*	178000	ug/kg	30.1*		(0%-20%)			
QC1203580823	LCS										
Antimony	48200			48400	ug/kg		101	(80%-120%)		07/13/16	15:37
Calcium	482000			485000	ug/kg		101	(80%-120%)			
Iron	482000			494000	ug/kg		103	(80%-120%)			
Magnesium	482000			489000	ug/kg		101	(80%-120%)			
Phosphorous	48200			47300	ug/kg		98.2	(80%-120%)			
Potassium	482000			450000	ug/kg		93.3	(80%-120%)			
Silver	48200			46600	ug/kg		96.7	(80%-120%)			
Sodium	482000			479000	ug/kg		99.3	(80%-120%)			
QC1203580822	MB										
Antimony			U	329	ug/kg					07/13/16	15:33
Calcium			U	7980	ug/kg						
Iron			U	7980	ug/kg						
Magnesium			U	8480	ug/kg						
Phosphorous			U	4990	ug/kg						
Potassium			U	6390	ug/kg						

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QC Summary

Workorder: 400980

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1580087										
Silver			U	99.8	ug/kg				HSC	07/13/16	15:33
Sodium			U	6990	ug/kg						
QC1203580825	400980001	MS									
Antimony	50000	U	346	50200	ug/kg		100	(75%-125%)		07/13/16	15:54
Calcium	500000	*N	1380000	N	1710000	ug/kg	66.2*	(75%-125%)			
Iron	500000	*	7280000		5330000	ug/kg	N/A	(75%-125%)			
Magnesium	500000	*	2040000		1950000	ug/kg	N/A	(75%-125%)			
Phosphorous	50000	*	232000		248000	ug/kg	N/A	(75%-125%)			
Potassium	500000	N	739000	N	969000	ug/kg	46*	(75%-125%)			
Silver	50000	B	155	49700	ug/kg		99	(75%-125%)			
Sodium	500000	*	131000	722000	ug/kg		118	(75%-125%)			
QC1203582070	400980001	PS									
Calcium	5000	*N	13100	18500	ug/L		107	(80%-120%)		07/13/16	15:57
Potassium	5000	N	7040	11600	ug/L		91.5	(80%-120%)			
QC1203580826	400980001	SDILT									
Antimony		U	0.0224	BD	5.09	ug/L	N/A	(0%-10%)		07/13/16	16:00
Calcium		*N	13100	D	2790	ug/L	6.09	(0%-10%)			
Iron		*	69400	D	14900	ug/L	7.04	(0%-10%)			
Magnesium		*	19400	D	4110	ug/L	5.78	(0%-10%)			
Phosphorous		*	2210	D	467	ug/L	5.63	(0%-10%)			
Potassium		N	7040	D	1410	ug/L	.19	(0%-10%)			
Silver		B	1.47	DU	525	ug/L	N/A	(0%-10%)			
Sodium		*	1250	BD	221	ug/L	11.6	(0%-10%)			

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QC Summary

Workorder: 400980

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
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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
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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

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

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

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

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

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL400980
Work Order #: 400980**

Product: pH**Analytical Method:** SW846 9045D**Analytical Procedure:** GL-GC-E-008 REV# 21**Analytical Batch:** 1580388

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400980001	B35XC2
400980002	B35XB8
400980003	B35XB5
1203581565	Laboratory Control Sample (LCS)
1203581566	400980001(B35XC2) Sample Duplicate (DUP)

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**Holding Times**

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1203581566 (B35XC2DUP)	pH	Received 07-JUL-16, out of holding 05-JUL-16
400980001 (B35XC2)	pH	Received 07-JUL-16, out of holding 05-JUL-16
400980002 (B35XB8)	pH	Received 07-JUL-16, out of holding 05-JUL-16
400980003 (B35XB5)	pH	Received 07-JUL-16, out of holding 05-JUL-16

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: GEL400980 GEL Work Order: 400980

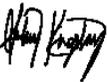
The Qualifiers in this report are defined as follows:

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Review/Validation

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 12 JUL 2016

Title: Analyst I

Sample Data Summary

7/21/2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 12, 2016

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F16-043

Client Sample ID:	B35XC2	Project:	CPRC0F16043
Sample ID:	400980001	Client ID:	CPRC001
Matrix:	SOIL		
Collect Date:	05-JUL-16 11:32		
Receive Date:	07-JUL-16		
Collector:	Client		
Moisture:	6.2%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
9045_pH (Non-Aqueous):COMMON "As Received"											
pH at Temp 24.1C	X	8.96	0.010	0.100	SU	1	RXB5	07/08/16	1843	1580388	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	

Notes:

7/21/2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 12, 2016

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F16-043

Client Sample ID:	B35XB8	Project:	CPRC0F16043
Sample ID:	400980002	Client ID:	CPRC001
Matrix:	SOIL		
Collect Date:	05-JUL-16 07:45		
Receive Date:	07-JUL-16		
Collector:	Client		
Moisture:	<0.1%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
9045_pH (Non-Aqueous):COMMON "As Received"											
pH at Temp 24.0C	X	7.23	0.010	0.100	SU	1	RXB5	07/08/16	1845	1580388	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	

Notes:

7/21/2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 12, 2016

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF F16-043

Client Sample ID: B35XB5 Project: CPRC0F16043
Sample ID: 400980003 Client ID: CPRC001
Matrix: SOIL
Collect Date: 05-JUL-16 08:53
Receive Date: 07-JUL-16
Collector: Client
Moisture: 3.28%

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis											
9045_pH (Non-Aqueous):COMMON "As Received"											
pH at Temp 24.0C	X	8.85	0.010	0.100	SU	1	RXB5	07/08/16	1848	1580388	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 12, 2016

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400980

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Titration and Ion Analysis											
Batch	1580388										
QC1203581566	400980001	DUP									
pH	X	8.96	X	8.96	SU	0		(0%-30%)	RXB5	07/08/16	18:44
QC1203581565	LCS										
pH	7.00			6.99	SU		99.9	(70%-130%)		07/08/16	18:40

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

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 #: GEL400980
Work Order #: 400980

Product: Dry Weight

Analytical Method: ASTM D 2216 (Modified)

Analytical Procedure: GL-OA-E-020 REV# 10

Analytical Batch: 1579928

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400980001	B35XC2
400980002	B35XB8
400980003	B35XB5
1203580460	400980001(B35XC2) Sample Duplicate (DUP)

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

Data Summary:

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

Certification Statement

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

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400980 GEL Work Order: 400980

The Qualifiers in this report are defined as follows:

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: 18 JUL 2016

Title: Group Leader

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL400980	Client: CPRC001	Project: CPRC0F16043
Lab Sample ID: 400980001	Date Collected: 07/05/2016 11:32	Matrix: SOIL
	Date Received: 07/07/2016 09:05	%Moisture: 6.2
Client ID: B35XC2		Prep Basis: "As Received"
Batch ID: 1579928	Method: ASTM D 2216 (Modified)	SOP Ref: GL-OA-E-020
Run Date: 07/07/2016 14:15	Analyst: CXC1	Instrument: SP-39020004
Data File:		Count Time:
Prep Batch: 1579928		
Prep Date: 07/07/2016 14:15		

CAS No.	Parmname	Qual	Result	Units	Recovery%	Acceptable Limits	MDC
	Moisture		6.20	percent	+/-		
Surrogate/Tracer recovery			Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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: GEL400980	Client: CPRC001	Project: CPRC0F16043
Lab Sample ID: 400980002	Date Collected: 07/05/2016 07:45	Matrix: SOIL
	Date Received: 07/07/2016 09:05	%Moisture: 0
Client ID: B35XB8		Prep Basis: "As Received"
Batch ID: 1579928	Method: ASTM D 2216 (Modified)	SOP Ref: GL-OA-E-020
Run Date: 07/07/2016 14:15	Analyst: CXC1	Instrument: SP-39020004
Data File:		Count Time:
Prep Batch: 1579928		
Prep Date: 07/07/2016 14:15		

CAS No.	Parmname	Qual	Result	Units	MDC	
	Moisture		0.0244	percent	+/-	
Surrogate/Tracer recovery		Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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: GEL400980	Client: CPRC001	Project: CPRC0F16043
Lab Sample ID: 400980003	Date Collected: 07/05/2016 08:53	Matrix: SOIL
	Date Received: 07/07/2016 09:05	%Moisture: 3.3
Client ID: B35XB5		Prep Basis: "As Received"
Batch ID: 1579928	Method: ASTM D 2216 (Modified)	SOP Ref: GL-OA-E-020
Run Date: 07/07/2016 14:15	Analyst: CXC1	Instrument: SP-39020004
Data File:		Count Time:
Prep Batch: 1579928		
Prep Date: 07/07/2016 14:15		

CAS No.	Parmname	Qual	Result	Units	MDC	
	Moisture		3.28	percent	+/-	
Surrogate/Tracer recovery		Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 18, 2016

Page 1 of 1

Client : CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 400980

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Gravimetric Solids										
Batch	1579928									
QC1203580460	400980001	DUP								
Moisture		6.20		5.69	percent	RPD: 9	(0%-20%)	CXC1	07/07/16	14:15

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
- < 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.