

7/14/2016



July 13, 2016

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

Re: CHPRC SAF W16-006  
Work Order: 399582  
SDG: GEL399582

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 17, 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: 300071 - 7H  
Chain of Custody: W16-006-041  
Enclosures



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# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF W16-006  
SDG: GEL399582**

**July 13, 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 June 17, 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:

<b>Laboratory Identification</b>	<b>Sample Description</b>
399582001	B357P5
399582002	B357P3

**Case Narrative**

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

**Data Package**

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: General Chemistry and Metals.

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.

7/14/2016

*B. Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL399582**  
**Work Order #: 399582**

## **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 potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 399582001 (B357P5) and 399582002 (B357P3).

### **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.

### **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.

## **General Chemistry**

### **Cyanide, Total**

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.

### **Alkalinity**

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 blank associated with this data was slightly above the normal acceptance limits. The data for sample 1203572189 (MB) was deemed acceptable because the values for all reported samples were more than 10 times the value of the method blank.

**Miscellaneous Information**

**Additional Comments**

Less sample was used due to sample matrix . 399582002 (B357P3).

**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**

74 165

**CH2M Hill Plateau Remediation Company**

C.O.C.# **W16-006-041**  
Page 1 of 1

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

399582

Collector: Dan Woehle CHPRC  
 SAF No.: W16-006  
 Project Title: RCRA, JUNE 2016  
 Shipped To (Lab): GEL Laboratories, LLC  
 Protocol: RCRA

Contact/Requester: Karen Waters-Husted  
 Telephone No.: 509-376-4650  
 Purchase Order/Charge Code: 300071  
 Sampling Origin: Hanford Site  
 Logbook No.: HNF-N-506 86 / 31  
 Ice Chest No.: 605-506  
 Method of Shipment: Commercial Carrier  
 Bill of Lading/Air Bill No.: 7765 41517897  
 Priority: 30 Days **PRIORITY**  
 Offsite Property No.: 6738

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 \*\*\* 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  
 Hold Time:   
 Total Activity Exemption: Yes  No

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B357P5	Y	W	6-16-16	1026	1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B357P3	N	W			1x250-mL G/P	2320_ALKALINITY: COMMON	14 Days	Cool <=6C
B357P3	N	W			1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B357P3	N	W	6-16-16	1026	1x250-mL G/P	9012_CYANIDE: COMMON	14 Days	NaOH to pH >=12/Cool <=6C

Relinquished By: Dan Woehle CHPRC  
 Date/Time: JUN 16 2016 1255  
 Sign: [Signature]

Received By: [Signature] Sign  
 Date/Time: JUN 16 2016  
 Print: [Signature]

Relinquished By: [Signature]  
 Date/Time: JUN 16 2016 1400  
 Sign: [Signature]

Received By: FEDEX  
 Date/Time: [Blank]

Relinquished By: [Signature]  
 Date/Time: [Blank]

Received By: M. Kristow ml.kristow  
 Date/Time: 6-17-16 0900  
 Sign: [Signature]

Relinquished By: [Blank]  
 Date/Time: [Blank]

Received By: [Blank]  
 Date/Time: [Blank]

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

**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>399582</u>	
Received By: <u>MK</u>		Date Received: <u>6-17-16</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>cpm</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<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?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<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 checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" 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 checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Temperature Device Serial #: <u>130461961</u> Secondary Temperature Device Serial # (if Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" 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 checked="" type="checkbox"/>	<input checked="" 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 checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
16 Carrier and tracking number.				Circle Applicable: FedEx Air <u>7765</u> FedEx Ground <u>4151</u> UPS <u>7897</u> Field Services <u>7555</u> Courier <u>2c</u> Other <u>20c no ice</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials MS Date 6/17/16 Page 1 of 1

# **Data Review Qualifier Definitions**

## Project Specific Qualifier Definitions for GEL Client Code: CPRC

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The 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 13 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 #: GEL399582**  
**Work Order #: 399582**

**Product: Determination of Metals by ICP-MS****Analytical Method:** 6020\_METALS\_ICPMS**Analytical Procedure:** GL-MA-E-014 REV# 28**Analytical Batches:** 1575442 and 1580455**Product: Determination of Metals by ICP****Analytical Method:** 6010\_METALS\_ICP**Analytical Procedure:** GL-MA-E-013 REV# 26**Analytical Batch:** 1575459**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batches:** 1575441, 1575458 and 1580454

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
399582001	B357P5
399582002	B357P3
1203569791	Method Blank (MB) <b>ICP</b>
1203569792	Laboratory Control Sample (LCS)
1203569795	399580001(NonSDGL) Serial Dilution (SD)
1203569793	399580001(NonSDGS) Matrix Spike (MS)
1203569794	399580001(NonSDGSD) Matrix Spike Duplicate (MSD)
1203569744	Method Blank (MB) <b>ICP-MS</b>
1203581727	Method Blank (MB) <b>ICP-MS</b>
1203569745	Laboratory Control Sample (LCS)
1203581728	Laboratory Control Sample (LCS)
1203569748	399580001(NonSDGL) Serial Dilution (SD)
1203581731	399580001(NonSDGL) Serial Dilution (SD)
1203569746	399580001(NonSDGS) Matrix Spike (MS)
1203581729	399580001(NonSDGS) Matrix Spike (MS)
1203569747	399580001(NonSDGSD) Matrix Spike Duplicate (MSD)
1203581730	399580001(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 potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 399582001 (B357P5) and 399582002 (B357P3)-ICP.

**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: GEL399582 GEL Work Order: 399582

**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:** 14 JUL 2016

**Title:** Data Validator

# Sample Data Summary

**METALS**  
-1-  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: GEL399582

CONTRACT: CPRCOW16006

METHOD TYPE: SW846

SAMPLE ID: 399582001

BASIS: As Received

DATE COLLECTED 16-JUN-16

CLIENT ID: B357P5

LEVEL: Low

DATE RECEIVED 17-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	15	ug/L	U	15	50	50	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/08/16 12:41	160708-5	1575442
7440-38-2	Arsenic	5.67	ug/L		1.7	5	5	1	MS	PRB	07/06/16 19:04	160706-2	1575442
7440-39-3	Barium	64.6	ug/L		0.6	2	2	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/16 19:04	160706-2	1575442
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	06/24/16 07:45	062416-1	1575459
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7440-70-2	Calcium	132000	ug/L		50	200	200	1	P	HSC	06/24/16 07:45	062416-1	1575459
7440-47-3	Chromium	4.08	ug/L	B	2	10	10	1	MS	PRB	07/06/16 19:04	160706-2	1575442
7440-48-4	Cobalt	0.768	ug/L	B	0.1	1	1	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7440-50-8	Copper	2.18	ug/L		0.35	1	1	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	06/24/16 07:45	062416-1	1575459
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7439-95-4	Magnesium	36500	ug/L		110	300	300	1	P	HSC	06/24/16 07:45	062416-1	1575459
7439-96-5	Manganese	4.64	ug/L	B	1	5	5	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7439-98-7	Molybdenum	2.25	ug/L		0.165	0.5	0.5	1	MS	PRB	07/06/16 19:04	160706-2	1575442
7440-02-0	Nickel	20.1	ug/L		0.5	2	2	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7440-09-7	Potassium	9730	ug/L		50	150	150	1	P	HSC	06/24/16 07:45	062416-1	1575459
7782-49-2	Selenium	17.7	ug/L		1.5	5	5	1	MS	PRB	07/12/16 20:53	160712-4	1580455
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7440-23-5	Sodium	18800	ug/L		100	300	300	1	P	HSC	06/24/16 07:45	062416-1	1575459
7440-24-6	Strontium	647	ug/L		2	10	10	1	MS	PRB	07/06/16 19:04	160706-2	1575442
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7440-29-1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	PRB	07/07/16 18:35	160707-3	1575442
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7440-61-1	Uranium	3.86	ug/L		0.067	0.2	0.2	1	MS	SKJ	07/02/16 00:27	160701-6	1575442
7440-62-2	Vanadium	13.3	ug/L		1	5	5	1	P	HSC	06/24/16 07:45	062416-1	1575459
7440-66-6	Zinc	5.84	ug/L	B	3.5	10	10	1	MS	SKJ	07/02/16 00:27	160701-6	1575442

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1575442	1575441	SW846 3005A	50	mL	50	mL	06/17/16	JP1
1575459	1575458	SW846 3005A	50	mL	50	mL	06/17/16	JP1
1580455	1580454	SW846 3005A	25	mL	25	mL	07/08/16	JP1

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METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

\*Analytical Methods:

P	SW846 3005A/6010C
MS	SW846 3005A/6020A

**METALS**  
-1-  
**INORGANICS ANALYSIS DATA PACKAGE**

SDG No: GEL399582

CONTRACT: CPCR0W16006

METHOD TYPE: SW846

SAMPLE ID: 399582002

BASIS: As Received

DATE COLLECTED 16-JUN-16

CLIENT ID: B357P3

LEVEL: Low

DATE RECEIVED 17-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	15	ug/L	U	15	50	50	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/08/16 12:42	160708-5	1575442
7440-38-2	Arsenic	6.05	ug/L		1.7	5	5	1	MS	PRB	07/06/16 19:07	160706-2	1575442
7440-39-3	Barium	66	ug/L		0.6	2	2	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/16 19:07	160706-2	1575442
7440-42-8	Boron	15	ug/L	U	15	50	50	1	P	HSC	06/24/16 07:47	062416-1	1575459
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7440-70-2	Calcium	133000	ug/L		50	200	200	1	P	HSC	06/24/16 07:47	062416-1	1575459
7440-47-3	Chromium	43.4	ug/L		2	10	10	1	MS	PRB	07/06/16 19:07	160706-2	1575442
7440-48-4	Cobalt	0.997	ug/L	B	0.1	1	1	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7440-50-8	Copper	4.13	ug/L		0.35	1	1	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7439-89-6	Iron	157	ug/L		30	100	100	1	P	HSC	06/24/16 07:47	062416-1	1575459
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7439-95-4	Magnesium	36000	ug/L		110	300	300	1	P	HSC	06/24/16 07:47	062416-1	1575459
7439-96-5	Manganese	6.85	ug/L		1	5	5	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7439-98-7	Molybdenum	4.51	ug/L		0.165	0.5	0.5	1	MS	PRB	07/06/16 19:07	160706-2	1575442
7440-02-0	Nickel	24.8	ug/L		0.5	2	2	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7440-09-7	Potassium	9850	ug/L		50	150	150	1	P	HSC	06/24/16 07:47	062416-1	1575459
7782-49-2	Selenium	17.9	ug/L		1.5	5	5	1	MS	PRB	07/12/16 20:57	160712-4	1580455
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7440-23-5	Sodium	18700	ug/L		100	300	300	1	P	HSC	06/24/16 07:47	062416-1	1575459
7440-24-6	Strontium	653	ug/L		2	10	10	1	MS	PRB	07/06/16 19:07	160706-2	1575442
7440-28-0	Thallium	0.450	ug/L	U	0.45	2	2	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7440-29-1	Thorium	0.383	ug/L	U	0.383	2	2	1	MS	PRB	07/07/16 18:38	160707-3	1575442
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7440-61-1	Uranium	3.79	ug/L		0.067	0.2	0.2	1	MS	SKJ	07/02/16 00:31	160701-6	1575442
7440-62-2	Vanadium	15.2	ug/L		1	5	5	1	P	HSC	06/24/16 07:47	062416-1	1575459
7440-66-6	Zinc	4.99	ug/L	B	3.5	10	10	1	MS	SKJ	07/02/16 00:31	160701-6	1575442

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1575442	1575441	SW846 3005A	50	mL	50	mL	06/17/16	JP1
1575459	1575458	SW846 3005A	50	mL	50	mL	06/17/16	JP1
1580455	1580454	SW846 3005A	25	mL	25	mL	07/08/16	JP1

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METALS

-1-

INORGANICS ANALYSIS DATA PACKAGE

\*Analytical Methods:

P	SW846 3005A/6010C
MS	SW846 3005A/6020A

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: July 14, 2016

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 399582

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1575442										
QC1203569745	LCS										
Aluminum	2000			2030	ug/L		102	(80%-120%)	SKJ	07/01/16	23:40
Antimony	50.0			50.2	ug/L		100	(80%-120%)	PRB	07/08/16	12:31
Arsenic	50.0			49.0	ug/L		97.9	(80%-120%)		07/06/16	18:46
Barium	50.0			48.0	ug/L		96.1	(80%-120%)	SKJ	07/01/16	23:40
Beryllium	50.0			58.8	ug/L		118	(80%-120%)	PRB	07/06/16	18:46
Cadmium	50.0			50.8	ug/L		102	(80%-120%)	SKJ	07/01/16	23:40
Chromium	50.0			51.4	ug/L		103	(80%-120%)	PRB	07/06/16	18:46
Cobalt	50.0			49.6	ug/L		99.1	(80%-120%)	SKJ	07/01/16	23:40
Copper	50.0			50.7	ug/L		101	(80%-120%)			
Lead	50.0			53.1	ug/L		106	(80%-120%)			
Manganese	50.0			50.6	ug/L		101	(80%-120%)			
Molybdenum	50.0			50.7	ug/L		101	(80%-120%)	PRB	07/06/16	18:46
Nickel	50.0			51.0	ug/L		102	(80%-120%)	SKJ	07/01/16	23:40
Silver	50.0			51.9	ug/L		104	(80%-120%)			
Strontium	50.0			49.5	ug/L		99	(80%-120%)	PRB	07/06/16	18:46
Thallium	50.0			50.4	ug/L		101	(80%-120%)	SKJ	07/01/16	23:40
Thorium	50.0			49.4	ug/L		98.8	(80%-120%)	PRB	07/07/16	18:17
Tin	50.0			50.4	ug/L		101	(80%-120%)	SKJ	07/01/16	23:40
Uranium	50.0			53.8	ug/L		108	(80%-120%)			
Zinc	50.0			51.0	ug/L		102	(80%-120%)			

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**QC Summary**

Workorder: 399582

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1575442										
QC1203569744	MB										
Aluminum			U	15.0	ug/L				SKJ	07/01/16	23:36
Antimony			U	1.00	ug/L				PRB	07/08/16	12:30
Arsenic			U	1.70	ug/L					07/06/16	18:43
Barium			U	0.600	ug/L				SKJ	07/01/16	23:36
Beryllium			U	0.200	ug/L				PRB	07/06/16	18:43
Cadmium			U	0.110	ug/L				SKJ	07/01/16	23:36
Chromium			U	2.00	ug/L				PRB	07/06/16	18:43
Cobalt			U	0.100	ug/L				SKJ	07/01/16	23:36
Copper			U	0.350	ug/L						
Lead			U	0.500	ug/L						
Manganese			U	1.00	ug/L						
Molybdenum			U	0.165	ug/L				PRB	07/06/16	18:43
Nickel			U	0.500	ug/L				SKJ	07/01/16	23:36
Silver			U	0.200	ug/L						
Strontium			U	2.00	ug/L				PRB	07/06/16	18:43
Thallium			U	0.450	ug/L				SKJ	07/01/16	23:36
Thorium			U	0.383	ug/L				PRB	07/07/16	18:14
Tin			U	1.00	ug/L				SKJ	07/01/16	23:36
Uranium			U	0.067	ug/L						
Zinc			U	3.50	ug/L						
QC1203569746	399580001	MS									
Aluminum	2000	148		2090	ug/L		97.2	(75%-125%)		07/01/16	23:56

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 399582

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1575442										
Antimony	50.0	U	1.00	52.2	ug/L		104	(75%-125%)	PRB	07/08/16	12:34
Arsenic	50.0		8.30	58.1	ug/L		99.6	(75%-125%)		07/06/16	18:52
Barium	50.0		27.0	75.5	ug/L		97.1	(75%-125%)	SKJ	07/01/16	23:56
Beryllium	50.0	U	0.200	57.3	ug/L		115	(75%-125%)	PRB	07/06/16	18:52
Cadmium	50.0	U	0.110	51.1	ug/L		102	(75%-125%)	SKJ	07/01/16	23:56
Chromium	50.0	B	3.04	52.7	ug/L		99.3	(75%-125%)	PRB	07/06/16	18:52
Cobalt	50.0	B	0.416	49.2	ug/L		97.5	(75%-125%)	SKJ	07/01/16	23:56
Copper	50.0		1.89	51.4	ug/L		98.9	(75%-125%)			
Lead	50.0	B	0.513	50.4	ug/L		99.7	(75%-125%)			
Manganese	50.0		29.7	78.9	ug/L		98.5	(75%-125%)			
Molybdenum	50.0		7.28	58.6	ug/L		103	(75%-125%)	PRB	07/06/16	18:52
Nickel	50.0	B	1.11	51.0	ug/L		99.7	(75%-125%)	SKJ	07/01/16	23:56
Silver	50.0	U	0.200	48.5	ug/L		96.9	(75%-125%)			
Strontium	50.0		159	214	ug/L		109	(75%-125%)	PRB	07/06/16	18:52
Thallium	50.0	U	0.450	47.6	ug/L		94.7	(75%-125%)	SKJ	07/01/16	23:56
Thorium	50.0		0.144	50.6	ug/L		101	(75%-125%)	PRB	07/07/16	18:23
Tin	50.0	U	1.00	51.1	ug/L		102	(75%-125%)	SKJ	07/01/16	23:56
Uranium	50.0		2.34	54.5	ug/L		104	(75%-125%)			
Zinc	50.0	B	8.98	59.3	ug/L		101	(75%-125%)			
QC1203569747	399580001	MSD									
Aluminum	2000		148	2130	ug/L	1.53	98.9	(0%-20%)		07/02/16	00:00
Antimony	50.0	U	1.00	51.0	ug/L	2.38	101	(0%-20%)	PRB	07/08/16	12:36

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 399582

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1575442										
Arsenic	50.0	8.30		57.1	ug/L	1.83	97.5	(0%-20%)	PRB	07/06/16	18:55
Barium	50.0	27.0		77.0	ug/L	1.97	100	(0%-20%)	SKJ	07/02/16	00:00
Beryllium	50.0	U	0.200	55.8	ug/L	2.67	112	(0%-20%)	PRB	07/06/16	18:55
Cadmium	50.0	U	0.110	51.8	ug/L	1.32	104	(0%-20%)	SKJ	07/02/16	00:00
Chromium	50.0	B	3.04	52.6	ug/L	0.146	99.1	(0%-20%)	PRB	07/06/16	18:55
Cobalt	50.0	B	0.416	47.8	ug/L	2.89	94.7	(0%-20%)	SKJ	07/02/16	00:00
Copper	50.0		1.89	51.0	ug/L	0.67	98.3	(0%-20%)			
Lead	50.0	B	0.513	52.1	ug/L	3.26	103	(0%-20%)			
Manganese	50.0		29.7	77.2	ug/L	2.23	95.1	(0%-20%)			
Molybdenum	50.0		7.28	58.7	ug/L	0.215	103	(0%-20%)	PRB	07/06/16	18:55
Nickel	50.0	B	1.11	50.3	ug/L	1.29	98.4	(0%-20%)	SKJ	07/02/16	00:00
Silver	50.0	U	0.200	50.3	ug/L	3.59	100	(0%-20%)			
Strontium	50.0		159	206	ug/L	3.77	93.2	(0%-20%)	PRB	07/06/16	18:55
Thallium	50.0	U	0.450	50.1	ug/L	5.02	99.6	(0%-20%)	SKJ	07/02/16	00:00
Thorium	50.0		0.144	50.5	ug/L	0.113	101	(0%-20%)	PRB	07/07/16	18:26
Tin	50.0	U	1.00	50.4	ug/L	1.34	100	(0%-20%)	SKJ	07/02/16	00:00
Uranium	50.0		2.34	56.5	ug/L	3.61	108	(0%-20%)			
Zinc	50.0	B	8.98	60.0	ug/L	1.12	102	(0%-20%)			
QC1203569748	399580001	SDILT									
Aluminum		148	BD	32.0	ug/L	8.46		(0%-10%)		07/02/16	00:08
Antimony		U	0.283	DU	5.00	ug/L	N/A	(0%-10%)	PRB	07/08/16	12:38
Arsenic		8.30	BD	1.73	ug/L	3.9		(0%-10%)		07/06/16	18:58

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**QC Summary**

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1575442										
Barium		27.0	D	5.59	ug/L	3.57		(0%-10%)	SKJ	07/02/16	00:08
Beryllium	U	0.00	DU	1.00	ug/L	N/A		(0%-10%)	PRB	07/06/16	18:58
Cadmium	U	0.003	DU	0.550	ug/L	N/A		(0%-10%)	SKJ	07/02/16	00:08
Chromium	B	3.04	DU	10.0	ug/L	N/A		(0%-10%)	PRB	07/06/16	18:58
Cobalt	B	0.416	BD	0.116	ug/L	39.4		(0%-10%)	SKJ	07/02/16	00:08
Copper		1.89	BD	0.396	ug/L	4.65		(0%-10%)			
Lead	B	0.513	DU	2.50	ug/L	N/A		(0%-10%)			
Manganese		29.7	D	6.09	ug/L	2.64		(0%-10%)			
Molybdenum		7.28	D	1.45	ug/L	.261		(0%-10%)	PRB	07/06/16	18:58
Nickel	B	1.11	DU	2.50	ug/L	N/A		(0%-10%)	SKJ	07/02/16	00:08
Silver	U	0.022	DU	1.00	ug/L	N/A		(0%-10%)			
Strontium		159	D	31.9	ug/L	.0596		(0%-10%)	PRB	07/06/16	18:58
Thallium	U	0.282	DU	2.25	ug/L	N/A		(0%-10%)	SKJ	07/02/16	00:08
Thorium		0.144	DU	1.92	ug/L	N/A		(0%-10%)	PRB	07/07/16	18:29
Tin	U	0.292	DU	5.00	ug/L	N/A		(0%-10%)	SKJ	07/02/16	00:08
Uranium		2.34	D	0.513	ug/L	9.71		(0%-10%)			
Zinc	B	8.98	DU	17.5	ug/L	N/A		(0%-10%)			
Batch	1580455										
QC1203581728	LCS										
Selenium	50.0			48.0	ug/L		95.9	(80%-120%)	PRB	07/12/16	20:31
QC1203581727	MB										
Selenium			U	1.50	ug/L					07/12/16	20:28
QC1203581729	399580001 MS										
Selenium	50.0	U	1.50	49.0	ug/L		98	(75%-125%)		07/12/16	20:38

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 399582

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1580455										
QC1203581730	399580001	MSD									
Selenium	50.0	U	1.50	48.9	ug/L	0.202	97.8	(0%-20%)	PRB	07/12/16	20:41
QC1203581731	399580001	SDILT									
Selenium		U	-0.022	DU	7.50	ug/L	N/A	(0%-10%)		07/12/16	20:47
<b>Metals Analysis-ICP</b>											
Batch	1575459										
QC1203569792	LCS										
Boron	500			511	ug/L		102	(80%-120%)	HSC	06/24/16	07:39
Calcium	5000			5380	ug/L		108	(80%-120%)			
Iron	5000			5300	ug/L		106	(80%-120%)			
Magnesium	5000			5520	ug/L		110	(80%-120%)			
Potassium	5000			5120	ug/L		102	(80%-120%)			
Sodium	5000			5170	ug/L		103	(80%-120%)			
Vanadium	500			483	ug/L		96.6	(80%-120%)			
QC1203569791	MB										
Boron			U	15.0	ug/L					06/24/16	07:36
Calcium			U	50.0	ug/L						
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Potassium			U	50.0	ug/L						
Sodium			U	100	ug/L						
Vanadium			U	1.00	ug/L						
QC1203569793	399580001	MS									
Boron	500	U	15.0	495	ug/L		96.7	(75%-125%)		06/24/16	07:53
Calcium	5000		23600	28000	ug/L		N/A	(75%-125%)			

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 399582

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1575459										
Iron	5000	221		5020	ug/L		96	(75%-125%)			
Magnesium	5000	5400		10300	ug/L		97.1	(75%-125%)	HSC	06/24/16	07:53
Potassium	5000	4510		9320	ug/L		96.2	(75%-125%)			
Sodium	5000	84400		90600	ug/L		N/A	(75%-125%)			
Vanadium	500	21.4		506	ug/L		96.8	(75%-125%)			
QC1203569794 399580001 MSD											
Boron	500	U	15.0	501	ug/L	1.11	97.8	(0%-20%)		06/24/16	07:56
Calcium	5000	23600		28400	ug/L	1.38	N/A	(0%-20%)			
Iron	5000	221		5070	ug/L	1.09	97.1	(0%-20%)			
Magnesium	5000	5400		10400	ug/L	1.31	99.8	(0%-20%)			
Potassium	5000	4510		9330	ug/L	0.108	96.4	(0%-20%)			
Sodium	5000	84400		92700	ug/L	2.27	N/A	(0%-20%)			
Vanadium	500	21.4		511	ug/L	1.14	98	(0%-20%)			
QC1203569795 399580001 SDILT											
Boron		U	12.2	DU	75.0	ug/L	N/A	(0%-10%)		06/24/16	07:59
Calcium			23600	D	4740	ug/L	.441	(0%-10%)			
Iron			221	BD	42.4	ug/L	4.19	(0%-10%)			
Magnesium			5400	D	1110	ug/L	3.17	(0%-10%)			
Potassium			4510	D	928	ug/L	2.94	(0%-10%)			
Sodium			84400	D	17500	ug/L	3.73	(0%-10%)			
Vanadium			21.4	BD	3.04	ug/L	29.1	(0%-10%)			

**Notes:**

The Qualifiers in this report are defined as follows:

\* Duplicate analysis not within control limits

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 399582

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995										
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).										
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.										
D	Results are reported from a diluted aliquot of sample.										
E	Reported value is estimated due to interferences. See comment in narrative.										
M	Duplicate precision not met.										
N	Spike Sample recovery is outside control limits.										
S	Reported value determined by the Method of Standard Additions (MSA)										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

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 #: GEL399582  
Work Order #: 399582**

**Product:** Cyanide, Total

**Analytical Method:** 9012\_CYANIDE

**Analytical Procedure:** GL-GC-E-095 REV# 18

**Analytical Batches:** 1575284 and 1575283

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
399582002	B357P3
1203569384	Method Blank (MB)
1203569385	Laboratory Control Sample (LCS)
1203569714	399582002(B357P3) Sample Duplicate (DUP)
1203569716	399582002(B357P3) Matrix Spike (MS)

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

**Data Summary:**

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

**Product: Alkalinity****Analytical Method:** 2320\_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 12**Analytical Batch:** 1576390

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
399582002	B357P3
1203572189	Method Blank (MB)
1203572190	Laboratory Control Sample (LCS)
1203572191	399217001(NonSDG) Sample Duplicate (DUP)
1203572192	399279001(NonSDG) 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.

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

The method blank associated with this data was slightly above the normal acceptance limits. The data for sample 1203572189 (MB) was deemed acceptable because the values for all reported samples were more than 10 times the value of the method blank.

**Miscellaneous Information****Additional Comments**

Less sample was used due to sample matrix . 399582002 (B357P3).

**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: GEL399582 GEL Work Order: 399582

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

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.

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

**Review/Validation**

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 27 JUN 2016

Title: Analyst I

# Sample Data Summary



# Quality Control Summary

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**QC Summary**

Report Date: June 27, 2016

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 399582

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Flow Injection Analysis</b>											
Batch	1575284										
QC1203569714	399582002	DUP									
Cyanide, Total		U	1.67	U	1.67	ug/L	N/A		AXH3	06/22/16	10:55
QC1203569385	LCS										
Cyanide, Total	50.0				49.8	ug/L	99.6	(80%-120%)		06/22/16	10:47
QC1203569384	MB										
Cyanide, Total			U		1.67	ug/L				06/22/16	10:45
QC1203569716	399582002	MS									
Cyanide, Total	100	U	1.67		103	ug/L		103 (75%-125%)		06/22/16	11:00
<b>Titration and Ion Analysis</b>											
Batch	1576390										
QC1203572191	399217001	DUP									
Alkalinity, Total as CaCO3		C	141000		142000	ug/L	1.08	(0%-20%)	KLP1	06/23/16	13:59
QC1203572192	399279001	DUP									
Alkalinity, Total as CaCO3		C	110000		108000	ug/L	1.87	(0%-20%)		06/23/16	14:09
QC1203572190	LCS										
Alkalinity, Total as CaCO3	50000				52100	ug/L		104 (80%-120%)		06/23/16	13:46
QC1203572189	MB										
Alkalinity, Total as CaCO3					2040	ug/L				06/23/16	13:44

**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

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**QC Summary**

Workorder: 399582

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