

8/10/2016



August 10, 2016

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

Re: CHPRC SAF W16-007  
Work Order: 401518  
SDG: GEL401518

Dear Mr. Fitzgerald:

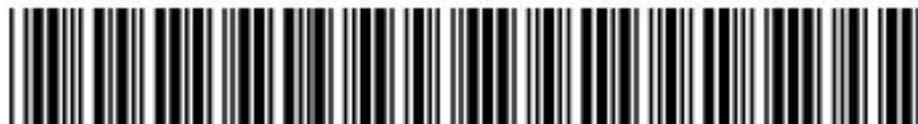
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 14, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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: 300072 - 7H  
Chain of Custody: W16-007-091 and W16-007-092  
Enclosures



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# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF W16-007  
SDG: GEL401518**

**August 10, 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 14, 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><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
401518001	B35NN1
401518002	B35PJ3
401518003	B35PJ4
401518004	B35NM9
401518005	B35PJ5
401518006	B35PK1
401518007	B35NN8
401518008	B35PK0
401518009	B35PJ9
401518010	B35NP0

**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.

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL401518**  
**Work Order #: 401518**

## **Metals**

### **Determination of Metals by ICP**

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

### **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.

#### **Calibration Information**

##### **CRDL/PQL Requirements**

The CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of molybdenum. Client sample concentrations were greater than two times the PQL; therefore the data were not adversely affected.

#### **Quality Control (QC) Information**

##### **Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of molybdenum, zinc, and arsenic. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203585093 (MB).

## **General Chemistry**

### **Carbon, Total Organic**

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 MB 1203586711 (MB) analyzed with this SDG met the acceptance criteria. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

**Total Organic Halogens (TOX)**

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**

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

C.O.C.# **W16-007-091**  
Page 1 of 1

Collector **J.R. Aguilar/CHPRC** Telephone No. **509-376-4650**  
 Contact/Requester **Karen Waters-Husted** Purchase Order/Charge Code **300071**  
 Sampling Origin **Hanford Site**  
 SAF No. **W16-007**  
 Project Title **RCRA, JULY 2016** Ice Chest No. **GWS-518**  
 Shipped To (Lab) **GEL Laboratories, LLC** Bill of Lading/Air Bill No. **776739993840**  
 Protocol **RCRA** Priority: **30 Days** Priority **PRIORITY** Offsite Property No. **6824**  
 SPECIAL INSTRUCTIONS **HOLD TIME** Total Activity Exemption: Yes  No   
 N/A Special Handling: N/A

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

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35NN1	Y	W JUL 13 2016	1023	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B35PJ3	N	W		1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35PJ3	N	W		1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35PJ4	N	W		1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35PJ4	N	W		1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35NM9	N	W		1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B35NM9	N	W		1x500-mL G/P	6010_METALS_ICP: COMMON; 6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B35NM9	N	W		1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35NM9	N	W		1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35PJ5	N	W		1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35PJ5	N	W JUL 13 2016	1023	1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C

Relinquished By **J.R. Aguilar/CHPRC** Print Sign **JUL 13 2016 1130** Received By **Troy Bacon** Print Sign **JUL 13 2016 1130**  
 Relinquished By **Troy Bacon** Print Sign **JUL 13 2016 1400** Received By **FEDEX**  
 Relinquished By **FK** Date/Time **7-14-16 0905** Received By **M. Kinslow** Date/Time **7-14-16 0905**  
 Relinquished By \_\_\_\_\_ Date/Time \_\_\_\_\_ Received By \_\_\_\_\_ Date/Time \_\_\_\_\_

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 Disposal Method (e.g., Return to customer, per lab procedure, used in process) \_\_\_\_\_ Date/Time \_\_\_\_\_  
 DISPOSITION \_\_\_\_\_ Disposed By \_\_\_\_\_

PRINTED ON 5/26/2016 FSR ID = FSR32462 A-6004-842 (REV 2)

85165  
401518

**CH2M Hill Plateau Remediation Company**  
**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**  
 C.O.C.# **W16-007-092**  
 Page 1 of 1

Collector **J.R. Aguilera/CHPRC** Telephone No. **509-376-4650**  
 SAF No. **W16-007** Purchase Order/Charge Code **300071**  
 Project Title **RCRA, JULY 2016** Ice Chest No. **GWS-518**  
 Shipped To (Lab) **GEL Laboratories, LLC** Bill of Lading/Air Bill No. **776739993840**  
 Protocol **RCRA** Offsite Property No. **6824**

**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

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35PK1	N	W	JUL 13 2016	1141	1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35PK1	N	W			1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35NN8	N	W			1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B35NN8	N	W			1x500-mL G/P	6010_METALS_ICP: COMMON; 6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B35NN8	N	W			1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35NN8	N	W			1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35PK0	N	W			1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35PK0	N	W			1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35NP0	Y	W			1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B35PJ9	N	W			1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35PJ9	N	W	JUL 13 2016	1141	1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
J.R. Aguilera/CHPRC			JUL 13 2016	Troy Bacon/CHPRC			JUL 13 2016	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
Troy Bacon/CHPRC			JUL 13 2016 1400	FEDEX			JUL 13 2016	
				M. Finstow			7/14/16 0905	

**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>CPRC</u>		SDG/AR/COC/Work Order:	
Received By: <u>MLK</u>		Date Received: <u>7-14-16</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?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>CPMD</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
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>130462962</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"/>	

Circle Applicable:

PedEx Air  PedEx Ground  UPS  Field Services  Courier  Other

16 Carrier and tracking number.

7767 3999 3840 20  
3689 20  
3932 10

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 10 August 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 #: GEL401518**  
**Work Order #: 401518**

**Product: Determination of Metals by ICP****Analytical Method:** 6010\_METALS\_ICP**Analytical Procedure:** GL-MA-E-013 REV# 26**Analytical Batch:** 1581757**Product: Determination of Metals by ICP-MS****Analytical Method:** 6020\_METALS\_ICPMS**Analytical Procedure:** GL-MA-E-014 REV# 28**Analytical Batch:** 1581828**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batches:** 1581756 and 1581826

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>
401518001	B35NN1
401518004	B35NM9
401518007	B35NN8
401518010	B35NP0
1203584935	Method Blank (MB) <b>ICP</b>
1203584936	Laboratory Control Sample (LCS)
1203584939	401514001(NonSDGL) Serial Dilution (SD)
1203584937	401514001(NonSDGS) Matrix Spike (MS)
1203584938	401514001(NonSDGSD) Matrix Spike Duplicate (MSD)
1203585093	Method Blank (MB) <b>ICP-MS</b>
1203585094	Laboratory Control Sample (LCS)
1203585097	401514001(NonSDGL) Serial Dilution (SD)
1203585095	401514001(NonSDGS) Matrix Spike (MS)
1203585096	401514001(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 CRDL standard recoveries for SW846 6020A/6020B met the advisory control limits with the exception of molybdenum. Client sample concentrations were greater than two times the PQL; therefore the data were not adversely affected. ICP-MS.

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of molybdenum, zinc, and arsenic. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203585093 (MB)-ICP-MS.

**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: GEL401518 GEL Work Order: 401518

**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:** 10 AUG 2016

**Title:** Data Validator

# Sample Data Summary

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

SDG No: GEL401518

CONTRACT: CPRCOW16007

METHOD TYPE: SW846

SAMPLE ID: 401518001

BASIS: As Received

DATE COLLECTED 13-JUL-16

CLIENT ID: B35NN1

LEVEL: Low

DATE RECEIVED 14-JUL-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	3.5	ug/L	U	3.5	10	10	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-38-2	Arsenic	5	ug/L	U	5	30	30	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-39-3	Barium	66.4	ug/L		1	5	5	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-70-2	Calcium	59400	ug/L		50	200	200	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-47-3	Chromium	7.08	ug/L		1	5	5	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	07/21/16 14:27	072116-1	1581757
7439-89-6	Iron	38.3	ug/L	B	30	100	100	1	P	HSC	07/21/16 14:27	072116-1	1581757
7439-95-4	Magnesium	19500	ug/L		110	300	300	1	P	HSC	07/21/16 14:27	072116-1	1581757
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-02-0	Nickel	5.81	ug/L		1.5	5	5	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-09-7	Potassium	7410	ug/L		50	150	150	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-23-5	Sodium	34500	ug/L		100	300	300	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-62-2	Vanadium	14.4	ug/L		1	5	5	1	P	HSC	07/21/16 14:27	072116-1	1581757
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	07/21/16 14:27	072116-1	1581757

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1581757	1581756	SW846 3005A	50	mL	50	mL	07/15/16	SXW1

**\*Analytical Methods:**

P SW846 3005A/6010C

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

SDG No: GEL401518

CONTRACT: CPRC0W16007

METHOD TYPE: SW846

SAMPLE ID: 401518004

BASIS: As Received

DATE COLLECTED 13-JUL-16

CLIENT ID: B35NM9

LEVEL: Low

DATE RECEIVED 14-JUL-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	3.5	ug/L	U	3.5	10	10	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-38-2	Arsenic	5	ug/L	U	5	30	30	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-39-3	Barium	65.6	ug/L		1	5	5	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-70-2	Calcium	58900	ug/L		50	200	200	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-47-3	Chromium	22.5	ug/L		1	5	5	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	07/21/16 14:30	072116-1	1581757
7439-89-6	Iron	105	ug/L		30	100	100	1	P	HSC	07/21/16 14:30	072116-1	1581757
7439-95-4	Magnesium	19200	ug/L		110	300	300	1	P	HSC	07/21/16 14:30	072116-1	1581757
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-02-0	Nickel	11	ug/L		1.5	5	5	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-09-7	Potassium	7320	ug/L		50	150	150	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-23-5	Sodium	34200	ug/L		100	300	300	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-61-1	Uranium	4.31	ug/L		0.067	0.2	15	1	MS	SKJ	08/04/16 18:08	160804-2	1581828
7440-62-2	Vanadium	14.5	ug/L		1	5	5	1	P	HSC	07/21/16 14:30	072116-1	1581757
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	07/21/16 14:30	072116-1	1581757

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1581757	1581756	SW846 3005A	50	mL	50	mL	07/15/16	SXW1
1581828	1581826	SW846 3005A	50	mL	50	mL	07/15/16	SXW1

**\*Analytical Methods:**

P SW846 3005A/6010C

MS SW846 3005A/6020A

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

SDG No: GEL401518

CONTRACT: CPRCOW16007

METHOD TYPE: SW846

SAMPLE ID: 401518007

BASIS: As Received

DATE COLLECTED 13-JUL-16

CLIENT ID: B35NN8

LEVEL: Low

DATE RECEIVED 14-JUL-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	3.5	ug/L	U	3.5	10	10	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-38-2	Arsenic	5	ug/L	U	5	30	30	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-39-3	Barium	40	ug/L		1	5	5	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-70-2	Calcium	38600	ug/L		50	200	200	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-47-3	Chromium	12.6	ug/L		1	5	5	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	07/21/16 14:33	072116-1	1581757
7439-89-6	Iron	39.9	ug/L	B	30	100	100	1	P	HSC	07/21/16 14:33	072116-1	1581757
7439-95-4	Magnesium	12600	ug/L		110	300	300	1	P	HSC	07/21/16 14:33	072116-1	1581757
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-02-0	Nickel	4.64	ug/L	B	1.5	5	5	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-09-7	Potassium	6230	ug/L		50	150	150	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-23-5	Sodium	23400	ug/L		100	300	300	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-61-1	Uranium	11.3	ug/L		0.067	0.2	15	1	MS	SKJ	08/04/16 18:12	160804-2	1581828
7440-62-2	Vanadium	16.7	ug/L		1	5	5	1	P	HSC	07/21/16 14:33	072116-1	1581757
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	07/21/16 14:33	072116-1	1581757

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1581757	1581756	SW846 3005A	50	mL	50	mL	07/15/16	SXW1
1581828	1581826	SW846 3005A	50	mL	50	mL	07/15/16	SXW1

**\*Analytical Methods:**

P SW846 3005A/6010C

MS SW846 3005A/6020A

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

SDG No: GEL401518

CONTRACT: CPRCOW16007

METHOD TYPE: SW846

SAMPLE ID: 401518010

BASIS: As Received

DATE COLLECTED 13-JUL-16

CLIENT ID: B35NP0

LEVEL: Low

DATE RECEIVED 14-JUL-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	3.5	ug/L	U	3.5	10	10	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-38-2	Arsenic	5	ug/L	U	5	30	30	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-39-3	Barium	39.6	ug/L		1	5	5	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-70-2	Calcium	38600	ug/L		50	200	200	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-47-3	Chromium	4.37	ug/L	B	1	5	5	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	07/21/16 14:37	072116-1	1581757
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/21/16 14:37	072116-1	1581757
7439-95-4	Magnesium	12500	ug/L		110	300	300	1	P	HSC	07/21/16 14:37	072116-1	1581757
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-02-0	Nickel	2.36	ug/L	B	1.5	5	5	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-09-7	Potassium	6190	ug/L		50	150	150	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-23-5	Sodium	23600	ug/L		100	300	300	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-62-2	Vanadium	16.4	ug/L		1	5	5	1	P	HSC	07/21/16 14:37	072116-1	1581757
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	07/21/16 14:37	072116-1	1581757

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1581757	1581756	SW846 3005A	50	mL	50	mL	07/15/16	SXW1

**\*Analytical Methods:**

P SW846 3005A/6010C

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: August 10, 2016

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 401518

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1581828										
QC1203585094		LCS									
Uranium	50.0			51.1	ug/L		102	(80%-120%)	SKJ	08/04/16	18:00
QC1203585093		MB									
Uranium			U	0.067	ug/L					08/04/16	17:56
QC1203585095		401514001	MS								
Uranium	50.0		0.398	54.6	ug/L		108	(75%-125%)		08/04/16	18:28
QC1203585096		401514001	MSD								
Uranium	50.0		0.398	53.5	ug/L	1.95	106	(0%-20%)		08/04/16	18:32
QC1203585097		401514001	SDILT								
Uranium			0.398	BD	0.082	ug/L	3.02	(0%-10%)		08/04/16	18:39
<b>Metals Analysis-ICP</b>											
Batch	1581757										
QC1203584936		LCS									
Antimony	500			506	ug/L		101	(80%-120%)	HSC	07/21/16	14:00
Arsenic	500			476	ug/L		95.3	(80%-120%)			
Barium	500			499	ug/L		99.9	(80%-120%)			
Cadmium	500			492	ug/L		98.4	(80%-120%)			
Calcium	5000			5090	ug/L		102	(80%-120%)			
Chromium	500			497	ug/L		99.3	(80%-120%)			
Cobalt	500			501	ug/L		100	(80%-120%)			
Copper	500			509	ug/L		102	(80%-120%)			
Iron	5000			5270	ug/L		105	(80%-120%)			
Magnesium	5000			5180	ug/L		104	(80%-120%)			
Manganese	500			486	ug/L		97.2	(80%-120%)			
Nickel	500			505	ug/L		101	(80%-120%)			

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 401518

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1581757										
Potassium	5000			4960	ug/L		99.1	(80%-120%)	HSC	07/21/16	14:00
Silver	500			500	ug/L		100	(80%-120%)			
Sodium	5000			5340	ug/L		107	(80%-120%)			
Vanadium	500			511	ug/L		102	(80%-120%)			
Zinc	500			485	ug/L		96.9	(80%-120%)			
QC1203584935	MB										
Antimony			U	3.50	ug/L					07/21/16	13:56
Arsenic			U	5.00	ug/L						
Barium			U	1.00	ug/L						
Cadmium			U	1.00	ug/L						
Calcium			U	50.0	ug/L						
Chromium			U	1.00	ug/L						
Cobalt			U	1.00	ug/L						
Copper			U	3.00	ug/L						
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Manganese			U	2.00	ug/L						
Nickel			U	1.50	ug/L						
Potassium			U	50.0	ug/L						
Silver			U	1.00	ug/L						
Sodium			U	100	ug/L						
Vanadium			U	1.00	ug/L						

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 401518

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1581757										
Zinc			U	3.30	ug/L				HSC	07/21/16	13:56
QC1203584937 401514001 MS											
Antimony	500	B	4.23	520	ug/L		103	(75%-125%)		07/21/16	14:07
Arsenic	500	U	5.00	488	ug/L		97.5	(75%-125%)			
Barium	500		48.3	539	ug/L		98.1	(75%-125%)			
Cadmium	500	U	1.00	478	ug/L		95.6	(75%-125%)			
Calcium	5000		20800	26200	ug/L		N/A	(75%-125%)			
Chromium	500	U	1.00	475	ug/L		95	(75%-125%)			
Cobalt	500	U	1.00	490	ug/L		97.7	(75%-125%)			
Copper	500	U	3.00	528	ug/L		105	(75%-125%)			
Iron	5000		177	5380	ug/L		104	(75%-125%)			
Magnesium	5000		5620	10800	ug/L		103	(75%-125%)			
Manganese	500		361	843	ug/L		96.5	(75%-125%)			
Nickel	500	U	1.50	490	ug/L		97.7	(75%-125%)			
Potassium	5000		9800	14900	ug/L		101	(75%-125%)			
Silver	500	U	1.00	487	ug/L		97.5	(75%-125%)			
Sodium	5000		99400	111000	ug/L		N/A	(75%-125%)			
Vanadium	500	B	1.88	512	ug/L		102	(75%-125%)			
Zinc	500	U	3.30	486	ug/L		96.7	(75%-125%)			
QC1203584938 401514001 MSD											
Antimony	500	B	4.23	523	ug/L	0.577	104	(0%-20%)		07/21/16	14:10
Arsenic	500	U	5.00	492	ug/L	0.88	98.4	(0%-20%)			
Barium	500		48.3	543	ug/L	0.779	98.9	(0%-20%)			

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 401518

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1581757										
Cadmium	500	U	1.00	483	ug/L	1.04	96.6	(0%-20%)	HSC	07/21/16	14:10
Calcium	5000		20800	26600	ug/L	1.34	N/A	(0%-20%)			
Chromium	500	U	1.00	480	ug/L	1	95.9	(0%-20%)			
Cobalt	500	U	1.00	494	ug/L	0.929	98.7	(0%-20%)			
Copper	500	U	3.00	533	ug/L	0.952	106	(0%-20%)			
Iron	5000		177	5430	ug/L	0.781	105	(0%-20%)			
Magnesium	5000		5620	10800	ug/L	0.518	105	(0%-20%)			
Manganese	500		361	849	ug/L	0.689	97.7	(0%-20%)			
Nickel	500	U	1.50	494	ug/L	0.874	98.6	(0%-20%)			
Potassium	5000		9800	15100	ug/L	1.25	105	(0%-20%)			
Silver	500	U	1.00	492	ug/L	0.939	98.4	(0%-20%)			
Sodium	5000		99400	111000	ug/L	0.307	N/A	(0%-20%)			
Vanadium	500	B	1.88	517	ug/L	0.91	103	(0%-20%)			
Zinc	500	U	3.30	488	ug/L	0.556	97.2	(0%-20%)			
QC1203584939	401514001	SDILT									
Antimony		B	4.23	DU	17.5	ug/L	N/A	(0%-10%)		07/21/16	14:13
Arsenic		U	-0.43	DU	25.0	ug/L	N/A	(0%-10%)			
Barium			48.3	D	9.71	ug/L	.555	(0%-10%)			
Cadmium		U	-0.0246	DU	5.00	ug/L	N/A	(0%-10%)			
Calcium			20800	D	4210	ug/L	1.11	(0%-10%)			
Chromium		U	0.284	DU	5.00	ug/L	N/A	(0%-10%)			
Cobalt		U	0.962	DU	5.00	ug/L	N/A	(0%-10%)			

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 401518

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1581757										
Copper	U	1.09	DU	15.0	ug/L	N/A		(0%-10%)	HSC	07/21/16	14:13
Iron		177	BD	38.4	ug/L	8.57		(0%-10%)			
Magnesium		5620	D	1190	ug/L	5.43		(0%-10%)			
Manganese		361	D	73.2	ug/L	1.37		(0%-10%)			
Nickel	U	1.16	DU	7.50	ug/L	N/A		(0%-10%)			
Potassium		9800	D	1870	ug/L	4.86		(0%-10%)			
Silver	U	-0.478	DU	5.00	ug/L	N/A		(0%-10%)			
Sodium		99400	D	20100	ug/L	.872		(0%-10%)			
Vanadium	B	1.88	DU	5.00	ug/L	N/A		(0%-10%)			
Zinc	U	2.23	DU	16.5	ug/L	N/A		(0%-10%)			

**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

**GEL LABORATORIES LLC**

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

**QC Summary**

Workorder: 401518

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.  
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.  
\* Indicates that a Quality Control parameter was not within specifications.  
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

# General Chem Analysis

# Case Narrative

**General Chemistry  
 Technical Case Narrative  
 CH2MHill Plateau Remediation Company (CPRC)  
 SDG #: GEL401518  
 Work Order #: 401518**

**Product: Carbon, Total Organic**

**Analytical Method: SW846 9060A**

**Analytical Procedure: GL-GC-E-093 REV# 14**

**Analytical Batch: 1582489**

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>
401518002	B35PJ3
401518003	B35PJ4
401518004	B35NM9
401518005	B35PJ5
401518006	B35PK1
401518007	B35NN8
401518008	B35PK0
401518009	B35PJ9
1203586711	Method Blank (MB)
1203586712	Laboratory Control Sample (LCS)
1203586713	401681002(NonSDG) Sample Duplicate (DUP)
1203586714	401518007(B35NN8) Sample Duplicate (DUP)
1203586716	401681002(NonSDG) Post Spike (PS)
1203586717	401518007(B35NN8) Post Spike (PS)

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

**Data Summary:**

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

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB 1203586711 (MB) analyzed with this SDG met the acceptance criteria. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

**Product: Total Organic Halogens (TOX)**

**Analytical Method: 9020\_TOX**

**Analytical Procedure: GL-GC-E-007 REV# 14**

**Analytical Batch: 1583276**

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>
401518002	B35PJ3
401518003	B35PJ4
401518004	B35NM9
401518005	B35PJ5
401518006	B35PK1
401518007	B35NN8
401518008	B35PK0
401518009	B35PJ9
1203588550	Method Blank (MB)
1203588551	Laboratory Control Sample (LCS)
1203588552	401518009(B35PJ9) Sample Duplicate (DUP)
1203588553	401518009(B35PJ9) Post Spike (PS)

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

#### **Data Summary:**

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

#### **Miscellaneous Information**

##### **Additional Comments**

A pair of nitrate wash blanks is analyzed at the start of the batch. Although they are designated as ICB, they are performed for calculating purposes only. The value of the nitrate wash blanks are averaged and subtracted from all samples. Neither of these values should exceed 0.6 ug Cl. The PQL limit typically applied to ICB results does not apply in this application, since the results are used only to determine background concentrations and are subtracted from all calculated results.

##### **Breakthrough effect**

Breakthrough effect: If the value for a sample is greater than the reporting limit (10 ug/L), the result for the second slug should not be greater than 25% of the combined value of the first and second slug. Results which do not meet these criteria are designated with a "Fail" comment in the Breakthrough effect column on the Logbook page; however, the "fail" designation is not applicable for samples with a result of less than 10 ug/L.

**Product: Alkalinity****Analytical Method:** 2320\_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 12**Analytical Batch:** 1583508

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>
401518004	B35NM9
401518007	B35NN8
1203589088	Method Blank (MB)
1203589089	Laboratory Control Sample (LCS)
1203589090	401514002(NonSDG) Sample Duplicate (DUP)

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

**Data Summary:**

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

**Certification Statement**

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

**GEL LABORATORIES LLC**

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL401518 GEL Work Order: 401518

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

- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- 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: **02 AUG 2016**

Title: **Analyst I**

# Sample Data Summary

8/10/2016

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## Certificate of Analysis

Report Date: August 2, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF W16-007

Client Sample ID:	B35PJ3	Project:	CPRCOW16007
Sample ID:	401518002	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	13-JUL-16 10:23		
Receive Date:	14-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
9060_TOX: COMMON "As Received"												
Total Organic Carbon #1	BC	622	330	1000	ug/L		1	TSM	07/18/16	1640	1582489	1
Total Organic Carbon #2	BC	611	330	1000	ug/L		1					
Total Organic Carbon #3	BC	621	330	1000	ug/L		1					
Total Organic Carbon #4	BC	621	330	1000	ug/L		1					
Total Organic Carbon Average	BC	619	330	1000	ug/L		1					

Halogen Analysis												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	U	3.33	3.33	10.0	ug/L		1	RMJ	07/25/16	2030	1583276	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060A	
2	9020_TOX	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

8/10/2016

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: August 2, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF W16-007

Client Sample ID:	B35PJ4	Project:	CPRCOW16007
Sample ID:	401518003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	13-JUL-16 10:23		
Receive Date:	14-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
9060_TOX: COMMON "As Received"												
Total Organic Carbon #1	BC	635	330	1000	ug/L		1	TSM	07/18/16	1722	1582489	1
Total Organic Carbon #2	BC	637	330	1000	ug/L		1					
Total Organic Carbon #3	BC	624	330	1000	ug/L		1					
Total Organic Carbon #4	BC	632	330	1000	ug/L		1					
Total Organic Carbon Average	BC	632	330	1000	ug/L		1					

Halogen Analysis												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	U	3.33	3.33	10.0	ug/L		1	RMJ	07/25/16	2141	1583276	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060A	
2	9020_TOX	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

8/10/2016

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**Certificate of Analysis**

Report Date: August 2, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF W16-007

Client Sample ID: B35NM9 Project: CPRCOW16007  
 Sample ID: 401518004 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 13-JUL-16 10:23  
 Receive Date: 14-JUL-16  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Carbon Analysis</b>												
9060_TOX: COMMON "As Received"												
Total Organic Carbon #1	BC	592	330	1000	ug/L		1	TSM	07/18/16	1804	1582489	1
Total Organic Carbon #2	BC	613	330	1000	ug/L		1					
Total Organic Carbon #3	BC	623	330	1000	ug/L		1					
Total Organic Carbon #4	BC	616	330	1000	ug/L		1					
Total Organic Carbon Average	BC	611	330	1000	ug/L		1					
<b>Halogen Analysis</b>												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	U	3.33	3.33	10.0	ug/L		1	RMJ	07/25/16	2223	1583276	2
<b>Titration and Ion Analysis</b>												
2320_ALKALINITY: GW 01 "As Received"												
Alkalinity, Total as CaCO3		117000	330	1000	ug/L		1	RXB5	07/22/16	2106	1583508	3
Bicarbonate alkalinity (CaCO3)		117000	330	1000	ug/L		1					
Carbonate alkalinity (CaCO3)	U	330	330	1000	ug/L		1					
Hydroxide alkalinity as CaCO3	U	330	330	1000	ug/L		1					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060A	
2	9020_TOX	
3	2320_ALKALINITY	

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor                      Lc/LC: Critical Level  
 DL: Detection Limit                      PF: Prep Factor  
 MDA: Minimum Detectable Activity      RL: Reporting Limit  
 MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

8/10/2016

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## Certificate of Analysis

Report Date: August 2, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF W16-007

Client Sample ID:	B35PJ5	Project:	CPRCOW16007
Sample ID:	401518005	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	13-JUL-16 10:23		
Receive Date:	14-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Carbon Analysis</b>												
9060_TOX: COMMON "As Received"												
Total Organic Carbon #1	BC	559	330	1000	ug/L		1	TSM	07/18/16	1846	1582489	1
Total Organic Carbon #2	BC	552	330	1000	ug/L		1					
Total Organic Carbon #3	BC	554	330	1000	ug/L		1					
Total Organic Carbon #4	BC	567	330	1000	ug/L		1					
Total Organic Carbon Average	BC	558	330	1000	ug/L		1					
<b>Halogen Analysis</b>												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	U	3.33	3.33	10.0	ug/L		1	RMJ	07/25/16	2329	1583276	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060A	
2	9020_TOX	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



8/10/2016

**GEL LABORATORIES LLC**

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

**Certificate of Analysis**

Report Date: August 2, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF W16-007

Client Sample ID: B35NN8 Project: CPRCOW16007  
 Sample ID: 401518007 Client ID: CPRC001  
 Matrix: WATER  
 Collect Date: 13-JUL-16 11:41  
 Receive Date: 14-JUL-16  
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>Carbon Analysis</b>												
9060_TOX: COMMON "As Received"												
Total Organic Carbon #1	BC	555	330	1000	ug/L		1	TSM	07/18/16	2011	1582489	1
Total Organic Carbon #2	BC	547	330	1000	ug/L		1					
Total Organic Carbon #3	BC	553	330	1000	ug/L		1					
Total Organic Carbon #4	BC	551	330	1000	ug/L		1					
Total Organic Carbon Average	BC	551	330	1000	ug/L		1					
<b>Halogen Analysis</b>												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	U	3.33	3.33	10.0	ug/L		1	RMJ	07/26/16	0113	1583276	2
<b>Titration and Ion Analysis</b>												
2320_ALKALINITY: GW 01 "As Received"												
Alkalinity, Total as CaCO3		122000	330	1000	ug/L		1	RXB5	07/22/16	2112	1583508	3
Bicarbonate alkalinity (CaCO3)		122000	330	1000	ug/L		1					
Carbonate alkalinity (CaCO3)	U	330	330	1000	ug/L		1					
Hydroxide alkalinity as CaCO3	U	330	330	1000	ug/L		1					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060A	
2	9020_TOX	
3	2320_ALKALINITY	

**Notes:**

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level  
 DL: Detection Limit PF: Prep Factor  
 MDA: Minimum Detectable Activity RL: Reporting Limit  
 MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit



8/10/2016

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: August 2, 2016

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF W16-007

Client Sample ID: B35PJ9	Project: CPRCOW16007
Sample ID: 401518009	Client ID: CPRC001
Matrix: WATER	
Collect Date: 13-JUL-16 11:41	
Receive Date: 14-JUL-16	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
9060_TOX: COMMON "As Received"												
Total Organic Carbon #1	BC	517	330	1000	ug/L		1	TSM	07/18/16	2323	1582489	1
Total Organic Carbon #2	BC	525	330	1000	ug/L		1					
Total Organic Carbon #3	BC	518	330	1000	ug/L		1					
Total Organic Carbon #4	BC	535	330	1000	ug/L		1					
Total Organic Carbon Average	BC	524	330	1000	ug/L		1					

Halogen Analysis												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	U	3.33	3.33	10.0	ug/L		1	RMJ	07/25/16	1845	1583276	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060A	
2	9020_TOX	

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# Quality Control Summary

**GEL LABORATORIES LLC**

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**QC Summary**

Report Date: August 2, 2016

Page 1 of 2

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 401518

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1582489										
QC1203586713	401681002	DUP									
Total Organic Carbon Average	C	1190		1210	ug/L	1.58 ^		(+/-1000)	TSM	07/19/16	08:14
QC1203586714	401518007	DUP									
Total Organic Carbon Average	BC	551	B	553	ug/L	0.362 ^		(+/-1000)		07/18/16	20:53
QC1203586712	LCS										
Total Organic Carbon Average	10000			10700	ug/L		107	(80%-120%)		07/18/16	16:26
QC1203586711	MB										
Total Organic Carbon Average			B	376	ug/L					07/18/16	16:16
QC1203586716	401681002	PS									
Total Organic Carbon Average	10.0	C	1.19	11.3	mg/L		102	(75%-125%)		07/19/16	08:57
QC1203586717	401518007	PS									
Total Organic Carbon Average	10.0	BC	0.551	11.0	mg/L		105	(75%-125%)		07/18/16	21:35
<b>Halogen Analysis</b>											
Batch	1583276										
QC1203588552	401518009	DUP									
Total Organic Halogens		U	3.33	U	3.33	ug/L	N/A		RMJ	07/25/16	19:06
QC1203588551	LCS										
Total Organic Halogens	100			102	ug/L		102	(80%-120%)		07/25/16	18:24
QC1203588550	MB										
Total Organic Halogens			U	3.33	ug/L					07/25/16	17:50
QC1203588553	401518009	PS									
Total Organic Halogens	100	U	1.36	105	ug/L		104	(75%-125%)		07/25/16	19:49
<b>Titration and Ion Analysis</b>											
Batch	1583508										
QC1203589090	401514002	DUP									
Alkalinity, Total as CaCO3			136000	136000	ug/L	0.133		(0%-20%)	RXB5	07/22/16	21:00
QC1203589089	LCS										
Alkalinity, Total as CaCO3	50000			53900	ug/L		108	(80%-120%)		07/22/16	20:48
QC1203589088	MB										
Alkalinity, Total as CaCO3			U	330	ug/L					07/22/16	20:43

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**QC Summary**

Workorder: 401518

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1583508										
Bicarbonate alkalinity (CaCO3)			U	330	ug/L				RXB5	07/22/16	20:43
Carbonate alkalinity (CaCO3)			U	330	ug/L						
Hydroxide alkalinity as CaCO3			U	330	ug/L						

**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.