



November 02, 2015

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

Re: CHPRC SAF X16-001  
Work Order: 383213  
SDG: GEL383213

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 14, 2015. 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,

Sarah Edwards for  
Heather Shaffer  
Project Manager

Purchase Order: 300071JDBA 7H  
Chain of Custody: X16-001-080  
Enclosures



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# Sample Issue Resolution

November 10, 2015

# SAMPLE ISSUE RESOLUTION

**SIR NUM** SIR16-028  
**REV NUM** 0  
**DATE INITIATED** 10/15/2015

## SAMPLE EVENT INFORMATION

**SAF NUM(S)** X16-001  
**OPERABLE UNIT(S)** 100-BC-5  
**PROJECT(S)** CERC16  
**SAMPLE EVENT TITLE(S)** CERC16  
**LABORATORY** GEL Laboratories, LLC

## SAMPLING INFORMATION

**NUMBER OF SAMPLES** 2  
**SAMPLE NUMBERS** B32V61, B32V64  
**SAMPLE MATRIX** WATER  
**COLLECTION DATE** -  
**SDG NUM** GEL383313

## ISSUE BACKGROUND

**CLASS** Field Sampling Issue  
**TYPE** Incorrect Sample Preservation  
**DESCRIPTION** The metals bottles for these two samples were received at a pH of 7.

## DISPOSITION

**DESCRIPTION** Proposed disposition: Add Nitric acid to lower the pH, analyze and narrate the excursion in the narrative.  
**JUSTIFICATION** Final Disposition: Accept proposed resolution.

SUBMITTED BY: Edie Kent DATE: 10/15/2015  
ACCEPTED BY: Scot Fitzgerald DATE: 10/15/2015

# Case Narrative

November 10, 2015

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF X16-001  
SDG: GEL383213

November 02, 2015

**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 October 14, 2015, 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. Please see the enclosed SIR for details.

**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>
383213001	B32V61
383213002	B32V64

**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.

This package, to the best of my knowledge, 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.

*Sarah M. Edwards*  
November 10, 2015

Sarah Edwards for  
Heather Shaffer  
Project Manager

# **Chain of Custody and Supporting Documentation**

November 10, 2015

72165

C.O.C. # **X16-001-080**

Page 1 of 1

**CH2M Hill Plateau Remediation Company** **383213**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

Collector: **S.W. King/CHPRC** Contact/Requester: **Karen Waters-Husted** Telephone No.: **509-376-4650**

SAF No.: **X16-001** Sampling Origin: **Hanford Site** Purchase Order/Charge Code: **303269**

Project Title: **100-BC-5 RI, OCTOBER 2015** Logbook No.: **HNF-N-506 78153** Ice Chest No.: **605-496**

Shipped To (Lab): **GEL Laboratories, LLC** Method of Shipment: **Commercial Carrier** Bill of Lading/Air Bill No.: **7747 3038 4596**

Protocol: **CERCLA** Priority: **30 Days** Offsite Property No.: **6040**

**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** Hold Time: **Total Activity Exemption: Yes  No**   
Submit deliverables & invoices to ^CPP Sample Management.

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B32V61	N		OCT 13 2015	0905	1x60-mL G/P	2320_ALKALINITY: COMMON	14 Days	Cool <=6C
B32V61	N		W	↓	1x60-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B32V64	Y		OCT 13 2015	0905	1x60-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2

Relinquished By <b>S.W. King/CHPRC</b>	Print <i>[Signature]</i>	Sign <i>[Signature]</i>	Date/Time <b>OCT 13 2015</b>	Date/Time <b>1200</b>	Received By <b>L.D. Wall CHPRC</b>	Print <i>[Signature]</i>	Sign <i>[Signature]</i>	Date/Time <b>OCT 13 2015</b>	Date/Time <b>1200</b>	Matrix *
Relinquished By <b>L.D. Wall CHPRC</b>	Print <i>[Signature]</i>	Sign <i>[Signature]</i>	Date/Time <b>OCT 13 2015</b>	Date/Time <b>1400</b>	Received By <b>FEDEX</b>	Print <b>FEDEX</b>	Sign <i>[Signature]</i>	Date/Time <b>10/14/15 0855</b>	Date/Time <b>10/14/15 0855</b>	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By <b>[Signature]</b>	Print <i>[Signature]</i>	Sign <i>[Signature]</i>	Date/Time <b>[Signature]</b>	Date/Time <b>[Signature]</b>	Received By <b>[Signature]</b>	Print <b>[Signature]</b>	Sign <i>[Signature]</i>	Date/Time <b>[Signature]</b>	Date/Time <b>[Signature]</b>	
Relinquished By <b>[Signature]</b>	Print <i>[Signature]</i>	Sign <i>[Signature]</i>	Date/Time <b>[Signature]</b>	Date/Time <b>[Signature]</b>	Received By <b>[Signature]</b>	Print <b>[Signature]</b>	Sign <i>[Signature]</i>	Date/Time <b>[Signature]</b>	Date/Time <b>[Signature]</b>	

Disposal Method (e.g., Return to customer, per lab procedure, used in process)

Disposed By

FINAL SAMPLE DISPOSITION

PRINTED ON 9/30/2015

FSR ID = FSR5635

A-6004-842 (REV 2)

November 10, 2015

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>383213</u>	
Received By: <u>MK</u>		Date Received: <u>10-14-15</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"/>	<input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>gmo</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>E409214931</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#: <u>* see below</u>
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7747 2503 5638 2C</u> <u>7747 3038 4769 2C</u> <u>3038 4198 1C</u> <u>3038 4716 2C</u> <u>3038 4964 1C</u> <u>3038 4380 2C</u> <u>3038 5537 2C</u> <u>3038 4596 1C</u>

Comments (Use Continuation Form if needed):  
\* METALS BOTTLES FOR B32V61 + B32V64 PH = 7

# **Data Review Qualifier Definitions**

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

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
U	Programmed	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.	Y			Includes MDA, TPU, count uncert.
J	Programmed	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	Y	Organics		Organics only
P	Programmed	Aroclor target analyte with greater than 25% difference between column analyses.	Y	Organics		PCB only
C	Manual	Analyte has been confirmed by GC/MS analysis	Y	Organics	Pesticide	IF GC/MS confirmation was attempted but unsuccessful do not qualify with C
B	Programmed	The analyte was detected in both the associated QC blank and in the sample.	Y	Organics		
E	Manual	Concentration exceeds the calibration range of the instrument	Y	Organics		Qualifier Uploaded
A	Manual	The TIC is a suspected aldol-condensation product	Y	Organics	Semi-Volatile	Uploaded with TIC
X	Programmed	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			Replaces H Hold Date In RAD replaces UI. Same usage as standard X as well.
N	Programmed	Spike Sample recovery is outside control limits.	Y			
*	Programmed	Duplicate analysis not within control limits	Y	Inorganics		
>	Programmed	Result greater than quantifiable range or greater than upper limit of the analysis range	Y	General Chemistry		
Z	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
B	Programmed	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).	Y	Inorganics	Metals	Replaces J Estimated Value
D	Programmed	Results are reported from a diluted aliquot of sample.	Y			Dilution
E	Programmed	Reported value is estimated due to interferences. See comment in narrative.	Y	Inorganics	Metals	GEL E
M	Manual	Duplicate precision not met.	Y	Inorganics	Metals	Replaces *
o	Programmed	Analyte failed to recover within LCS limits (Organics only)	Y	Organics		
S	Manual	Reported value determined by the Method of Standard Additions (MSA)	Y	Inorganics		Not coded B/C Rarely performed
T	Programmed	Spike and/or spike duplicate sample recovery is outside control limits.	Y	Organics		GC/MS only
W	Manual	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Y	Inorganics		No GFAA in house.
B	Programmed	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is $\geq$ MDA for this sample	Y	Radiological		
Y	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
+	Manual	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Y	Inorganics		
B	Programmed	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).	Y	General Chemistry		Replaces J Estimated Value
C	Programmed	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.	Y	Inorganics	Metals	Replaces B Blank Detection
C	Programmed	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.	Y	General Chemistry		Replaces B Blank Detection
<	Programmed	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	Y	General Chemistry		for Reactive CN/S

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

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
UX	Manual	Gamma Spectroscopy--Uncertain identification	Y	Radiological		

# Laboratory Certifications

**List of current GEL Certifications as of 19 October 2015**

<b>State</b>	<b>Certification</b>
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
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	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-19
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# Metals Analysis

# Case Narrative

November 10, 2015

Metals

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL383213

Work Order #: 383213

Sample ID	Client ID
383213001	B32V61
383213002	B32V64
1203413844	Method Blank (MB)ICP
1203413845	Laboratory Control Sample (LCS)
1203413848	383546001(B32RR1L) Serial Dilution (SD)
1203413846	383546001(B32RR1S) Matrix Spike (MS)
1203413847	383546001(B32RR1SD) Matrix Spike Duplicate (MSD)
1203413463	Method Blank (MB)ICP-MS
1203413464	Laboratory Control Sample (LCS)
1203413467	383212002(B33139L) Serial Dilution (SD)
1203413465	383212002(B33139S) Matrix Spike (MS)
1203413466	383212002(B33139SD) Matrix Spike Duplicate (MSD)

**Sample Analysis**

Samples 383213 001 and 002 in this SDG were analyzed for metals on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1515904 and 1515763
<b>Prep Batch :</b>	1515903 and 1515762
<b>Standard Operating Procedures:</b>	GL-MA-E-013 REV# 24, GL-MA-E-006 REV# 13 and GL-MA-E-014 REV# 26
<b>Analytical Method:</b>	6010_METALS_ICP and 6020_METALS_ICPMS
<b>Prep Method :</b>	SW846 3005A

**Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

**System Configuration**

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 9000 inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or

lutetium were utilized to cover the mass spectrum.

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 300X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

### **Calibration Information**

#### **Instrument Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

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

The CRDL/PQL standard recoveries met the referenced advisory control limits.

#### **ICSA/ICSAB Statement**

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

#### **Continuing Calibration Blanks (CCB) Requirements**

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

#### **Continuing Calibration Verification (CCV) Requirements**

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

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

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

The method blanks (MB) analyzed with this SDG did not meet all of the acceptance criteria. Antimony was greater than the MDL. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. ICP-MS.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Quality Control (QC) Sample Statement**

The following samples were selected as the quality control (QC) samples for this SDG: 383546001 (B32RR1)-ICP and 383212002 (B33139)-ICP-MS.

#### **Matrix Spike (MS/MSD) Recovery Statement**

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

#### **MS/MSD Relative Percent Difference (RPD) Statement**

The relative percent difference (RPD) obtained from the designated matrix spike duplicate (MSD) is evaluated based on acceptance criteria of 20%. The RPD values between qualifying analyte results in the MS and MSD were within the acceptance limits.

#### **Serial Dilution % Difference Statement**

All applicable analytes in the serial dilution (SDILT) demonstrated acceptable correlation to its associated sample and met the established acceptance percent difference criteria.

### **Technical Information**

#### **Holding Time Specifications**

November 10, 2015

GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Preparation Information**

The samples in this SDG were not diluted and prepared according to the cited SOP.

**Miscellaneous Information**

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**Data Exception (DER) Documentation**

A data exception report was not required for this SDG.

**Additional Comments**

Additional comments were not required for this SDG.

**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.

November 10, 2015

## 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: GEL383213 GEL Work Order: 383213

#### 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 NOV 2015

Title: Data Validator

# Sample Data Summary

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

SDG No: GEL383213

METHOD TYPE: SW846

SAMPLE ID: 383213001

CLIENT ID: B32V61

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 14-OCT-15

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7429-90-5	Aluminum	196	ug/L			MS	15	1	ICPMS11	151105-3
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS11	151105-3
7440-38-2	Arsenic	1.83	ug/L	B		MS	1.7	1	ICPMS11	151105-3
7440-39-3	Barium	42.2	ug/L			MS	0.6	1	ICPMS11	151105-3
7440-41-7	Beryllium	0.2	ug/L	U		MS	0.2	1	ICPMS7	151105-7
7440-42-8	Boron	15	ug/L	U		P	15	1	OPTIMA3	102315-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS11	151105-3
7440-70-2	Calcium	34500	ug/L			P	50	1	OPTIMA3	102315-1
7440-47-3	Chromium	5.42	ug/L	B		MS	2	1	ICPMS11	151105-3
7440-48-4	Cobalt	0.172	ug/L	B		MS	0.1	1	ICPMS11	151105-3
7440-50-8	Copper	1.83	ug/L			MS	0.35	1	ICPMS11	151105-3
7439-89-6	Iron	202	ug/L			P	30	1	OPTIMA3	102315-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS11	151105-3
7439-95-4	Magnesium	7900	ug/L			P	110	1	OPTIMA3	102315-1
7439-96-5	Manganese	4.52	ug/L	B		MS	1	1	ICPMS11	151105-3
7439-98-7	Molybdenum	1.68	ug/L			MS	0.165	1	ICPMS11	151105-3
7440-02-0	Nickel	0.652	ug/L	B		MS	0.5	1	ICPMS11	151105-3
7440-09-7	Potassium	3920	ug/L			P	50	1	OPTIMA3	102315-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS11	151105-3
7440-22-4	Silver	0.1	ug/L	U		MS	0.1	1	ICPMS11	151105-3
7440-23-5	Sodium	10600	ug/L			P	100	1	OPTIMA3	102815A-2
7440-24-6	Strontium	187	ug/L			MS	2	1	ICPMS11	151105-3
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS11	151105-3
7440-29-1	Thorium	0.383	ug/L	U		MS	0.383	1	ICPMS11	151105-6
7440-31-5	Tin	1	ug/L	U		MS	1	1	ICPMS11	151105-3
7440-61-1	Uranium	1.24	ug/L			MS	0.067	1	ICPMS11	151105-6

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

**SDG No:** GEL383213

**METHOD TYPE:** SW846

**SAMPLE ID:** 383213001

**CLIENT ID:** B32V61

**CONTRACT:** CPRC0X16001

**MATRIX:** WATER

**DATE RECEIVED** 14-OCT-15

**LEVEL:** Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-62-2	Vanadium	7.19	ug/L			P	1	1	OPTIMA3	102315-1
7440-66-6	Zinc	4.39	ug/L	B		MS	3.5	1	ICPMS11	151105-3

**\*Analytical Methods:**

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

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

SDG No: GEL383213

METHOD TYPE: SW846

SAMPLE ID: 383213002

CLIENT ID: B32V64

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 14-OCT-15

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7429-90-5	Aluminum	128	ug/L			MS	15	1	ICPMS11	151105-3
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS11	151105-3
7440-38-2	Arsenic	1.77	ug/L	B		MS	1.7	1	ICPMS11	151105-3
7440-39-3	Barium	41.8	ug/L			MS	0.6	1	ICPMS11	151105-3
7440-41-7	Beryllium	0.2	ug/L	U		MS	0.2	1	ICPMS7	151105-7
7440-42-8	Boron	37.9	ug/L	B		P	15	1	OPTIMA3	102315-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS11	151105-3
7440-70-2	Calcium	34400	ug/L			P	50	1	OPTIMA3	102315-1
7440-47-3	Chromium	4.83	ug/L	B		MS	2	1	ICPMS11	151105-3
7440-48-4	Cobalt	0.263	ug/L	B		MS	0.1	1	ICPMS11	151105-3
7440-50-8	Copper	0.687	ug/L	B		MS	0.35	1	ICPMS11	151105-3
7439-89-6	Iron	35.5	ug/L	B		P	30	1	OPTIMA3	102315-1
7439-92-1	Lead	0.54	ug/L	B		MS	0.5	1	ICPMS11	151105-3
7439-95-4	Magnesium	7800	ug/L			P	110	1	OPTIMA3	102315-1
7439-96-5	Manganese	1.29	ug/L	B		MS	1	1	ICPMS11	151105-3
7439-98-7	Molybdenum	1.68	ug/L			MS	0.165	1	ICPMS11	151105-3
7440-02-0	Nickel	0.819	ug/L	B		MS	0.5	1	ICPMS11	151105-3
7440-09-7	Potassium	3890	ug/L			P	50	1	OPTIMA3	102315-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS11	151105-3
7440-22-4	Silver	0.1	ug/L	U		MS	0.1	1	ICPMS11	151105-3
7440-23-5	Sodium	10700	ug/L			P	100	1	OPTIMA3	102815A-2
7440-24-6	Strontium	188	ug/L			MS	2	1	ICPMS11	151105-3
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS11	151105-3
7440-29-1	Thorium	0.383	ug/L	U		MS	0.383	1	ICPMS11	151105-6
7440-31-5	Tin	1	ug/L	U		MS	1	1	ICPMS11	151105-3
7440-61-1	Uranium	1.22	ug/L			MS	0.067	1	ICPMS11	151105-6

METALS  
-1-  
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL383213

METHOD TYPE: SW846

SAMPLE ID: 383213002

CLIENT ID: B32V64

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 14-OCT-15

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-62-2	Vanadium	6.68	ug/L			P	1	1	OPTIMA3	102315-1
7440-66-6	Zinc	3.5	ug/L	U		MS	3.5	1	ICPMS11	151105-3

\*Analytical Methods:

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

# Quality Control Summary

**November 10, 2015**  
**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: November 10, 2015

Page 1 of 8

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 383213

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1515763										
QC1203413464	LCS										
Aluminum	2000			2130	ug/L		106	(80%-120%)	PRB	11/05/15	18:03
Antimony	50.0			50.1	ug/L		100	(80%-120%)			
Arsenic	50.0			50.8	ug/L		102	(80%-120%)			
Barium	50.0			48.4	ug/L		96.7	(80%-120%)			
Beryllium	50.0			57.7	ug/L		115	(80%-120%)	SKJ	11/06/15	09:22
Cadmium	50.0			50.3	ug/L		101	(80%-120%)	PRB	11/05/15	18:03
Chromium	50.0			50.0	ug/L		100	(80%-120%)			
Cobalt	50.0			49.7	ug/L		99.4	(80%-120%)			
Copper	50.0			51.2	ug/L		102	(80%-120%)			
Lead	50.0			45.0	ug/L		90	(80%-120%)			
Manganese	50.0			48.4	ug/L		96.8	(80%-120%)			
Molybdenum	50.0			49.7	ug/L		99.3	(80%-120%)			
Nickel	50.0			50.9	ug/L		102	(80%-120%)			
Selenium	50.0			50.2	ug/L		100	(80%-120%)			
Silver	50.0			50.1	ug/L		100	(80%-120%)			
Strontium	50.0			49.5	ug/L		98.9	(80%-120%)			
Thallium	50.0			43.4	ug/L		86.8	(80%-120%)			
Thorium	50.0			49.2	ug/L		98.4	(80%-120%)		11/06/15	02:20
Tin	50.0			49.0	ug/L		98	(80%-120%)		11/05/15	18:03
Uranium	50.0			49.7	ug/L		99.4	(80%-120%)		11/06/15	02:20

**November 10, 2015**  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 383213

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1515763										
Zinc	50.0			49.1	ug/L		98.3	(80%-120%)	PRB	11/05/15	18:03
QC1203413463	MB										
Aluminum			U	15.0	ug/L					11/05/15	18:00
Antimony			B	1.03	ug/L						
Arsenic			U	1.70	ug/L						
Barium			U	0.600	ug/L						
Beryllium			U	0.200	ug/L				SKJ	11/06/15	09:21
Cadmium			U	0.110	ug/L				PRB	11/05/15	18:00
Chromium			U	2.00	ug/L						
Cobalt			U	0.100	ug/L						
Copper			U	0.350	ug/L						
Lead			U	0.500	ug/L						
Manganese			U	1.00	ug/L						
Molybdenum			U	0.165	ug/L						
Nickel			U	0.500	ug/L						
Selenium			U	1.50	ug/L						
Silver			U	0.100	ug/L						
Strontium			U	2.00	ug/L						
Thallium			U	0.450	ug/L						
Thorium			U	0.383	ug/L					11/06/15	02:17
Tin			U	1.00	ug/L					11/05/15	18:00
Uranium			U	0.067	ug/L					11/06/15	02:17

**November 10, 2015**  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 383213

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1515763										
Zinc			U	3.50	ug/L				PRB	11/05/15	18:00
QC1203413465 383212002 MS											
Aluminum	2000	U	15.0	2050	ug/L		102	(75%-125%)		11/05/15	18:10
Antimony	50.0	U	1.00	50.4	ug/L		98.9	(75%-125%)			
Arsenic	50.0		7.57	58.1	ug/L		101	(75%-125%)			
Barium	50.0		72.1	121	ug/L		98.5	(75%-125%)			
Beryllium	50.0	U	0.200	59.2	ug/L		118	(75%-125%)	SKJ	11/06/15	09:28
Cadmium	50.0	U	0.110	49.3	ug/L		98.5	(75%-125%)	PRB	11/05/15	18:10
Chromium	50.0		33.6	84.3	ug/L		101	(75%-125%)			
Cobalt	50.0	B	0.134	49.6	ug/L		98.9	(75%-125%)			
Copper	50.0	B	0.862	50.3	ug/L		98.9	(75%-125%)			
Lead	50.0	U	0.500	48.7	ug/L		97.3	(75%-125%)			
Manganese	50.0	B	1.18	48.7	ug/L		95	(75%-125%)			
Molybdenum	50.0		6.84	58.2	ug/L		103	(75%-125%)			
Nickel	50.0		5.66	55.0	ug/L		98.6	(75%-125%)			
Selenium	50.0		6.14	56.3	ug/L		100	(75%-125%)			
Silver	50.0	U	0.100	48.8	ug/L		97.5	(75%-125%)			
Strontium	50.0		388	439	ug/L		N/A	(75%-125%)			
Thallium	50.0	U	0.450	46.4	ug/L		92.7	(75%-125%)			
Thorium	50.0	U	0.383	49.8	ug/L		99.5	(75%-125%)		11/06/15	02:26
Tin	50.0	U	1.00	49.9	ug/L		99.5	(75%-125%)		11/05/15	18:10
Uranium	50.0		4.11	54.3	ug/L		100	(75%-125%)		11/06/15	02:26

**November 10, 2015**  
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**QC Summary**

Workorder: 383213

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1515763										
Zinc	50.0	U	3.50	47.8	ug/L		92.7	(75%-125%)	PRB	11/05/15	18:10
QC1203413466 383212002 MSD											
Aluminum	2000	U	15.0	2030	ug/L	1.17	101	(0%-20%)		11/05/15	18:13
Antimony	50.0	U	1.00	50.3	ug/L	0.197	98.7	(0%-20%)			
Arsenic	50.0		7.57	57.6	ug/L	0.805	100	(0%-20%)			
Barium	50.0		72.1	120	ug/L	0.843	96.5	(0%-20%)			
Beryllium	50.0	U	0.200	58.4	ug/L	1.41	117	(0%-20%)	SKJ	11/06/15	09:29
Cadmium	50.0	U	0.110	50.3	ug/L	2.06	101	(0%-20%)	PRB	11/05/15	18:13
Chromium	50.0		33.6	84.9	ug/L	0.674	103	(0%-20%)			
Cobalt	50.0	B	0.134	49.4	ug/L	0.275	98.6	(0%-20%)			
Copper	50.0	B	0.862	49.6	ug/L	1.5	97.4	(0%-20%)			
Lead	50.0	U	0.500	47.7	ug/L	2.07	95.3	(0%-20%)			
Manganese	50.0	B	1.18	49.1	ug/L	0.935	95.9	(0%-20%)			
Molybdenum	50.0		6.84	58.4	ug/L	0.309	103	(0%-20%)			
Nickel	50.0		5.66	55.5	ug/L	0.968	99.7	(0%-20%)			
Selenium	50.0		6.14	58.5	ug/L	3.72	105	(0%-20%)			
Silver	50.0	U	0.100	49.2	ug/L	0.879	98.3	(0%-20%)			
Strontium	50.0		388	441	ug/L	0.607	N/A	(0%-20%)			
Thallium	50.0	U	0.450	45.9	ug/L	1.14	91.6	(0%-20%)			
Thorium	50.0	U	0.383	49.8	ug/L	0.0903	99.4	(0%-20%)		11/06/15	02:29
Tin	50.0	U	1.00	49.6	ug/L	0.533	99	(0%-20%)		11/05/15	18:13
Uranium	50.0		4.11	54.2	ug/L	0.223	100	(0%-20%)		11/06/15	02:29

**November 10, 2015**  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 383213

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1515763										
Zinc	50.0	U	3.50		47.8	ug/L	0.0293	92.7	(0%-20%)	PRB	11/05/15 18:13
QC1203413467 383212002 SDILT											
Aluminum		U	5.63	DU	75.0	ug/L	N/A		(0%-10%)		11/05/15 18:19
Antimony		U	0.973	DU	5.00	ug/L	N/A		(0%-10%)		
Arsenic			7.57	DU	8.50	ug/L	N/A		(0%-10%)		
Barium			72.1	D	14.5	ug/L	.626		(0%-10%)		
Beryllium		U	0.041	DU	1.00	ug/L	N/A		(0%-10%)	SKJ	11/06/15 09:32
Cadmium		U	0.042	DU	0.550	ug/L	N/A		(0%-10%)	PRB	11/05/15 18:19
Chromium			33.6	D	6.96	ug/L	3.6		(0%-10%)		
Cobalt		B	0.134	DU	0.500	ug/L	N/A		(0%-10%)		
Copper		B	0.862	DU	1.75	ug/L	N/A		(0%-10%)		
Lead		U	0.089	DU	2.50	ug/L	N/A		(0%-10%)		
Manganese		B	1.18	DU	5.00	ug/L	N/A		(0%-10%)		
Molybdenum			6.84	D	1.34	ug/L	2.16		(0%-10%)		
Nickel			5.66	D	1.28	ug/L	12.7		(0%-10%)		
Selenium			6.14	DU	7.50	ug/L	N/A		(0%-10%)		
Silver		U	0.068	DU	0.500	ug/L	N/A		(0%-10%)		
Strontium			388	D	76.4	ug/L	1.49		(0%-10%)		
Thallium		U	0.044	DU	2.25	ug/L	N/A		(0%-10%)		
Thorium		U	0.109	DU	1.92	ug/L	N/A		(0%-10%)		11/06/15 02:35
Tin		U	0.141	DU	5.00	ug/L	N/A		(0%-10%)		11/05/15 18:19
Uranium			4.11	D	0.841	ug/L	2.21		(0%-10%)		11/06/15 02:35

**November 10, 2015**  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 383213

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1515763										
Zinc		U	1.44	DU	17.5	ug/L	N/A	(0%-10%)	PRB	11/05/15	18:19

<b>Metals Analysis-ICP</b>											
Batch	1515904										
QC1203413845	LCS										
Boron	500				502	ug/L		100	(80%-120%)	HSC	10/23/15 12:28
Calcium	5000				4820	ug/L		96.4	(80%-120%)		
Iron	5000				5220	ug/L		104	(80%-120%)		
Magnesium	5000				5100	ug/L		102	(80%-120%)		
Potassium	5000				5060	ug/L		101	(80%-120%)		
Sodium	5000				4950	ug/L		98.9	(80%-120%)		10/28/15 09:12
Vanadium	500				506	ug/L		101	(80%-120%)		10/23/15 12:28
QC1203413844	MB										
Boron				U	15.0	ug/L					10/23/15 12:25
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					10/28/15 09:09
Vanadium				U	1.00	ug/L					10/23/15 12:25
QC1203413846	383546001 MS										
Boron	500	U	15.0		517	ug/L		101	(75%-125%)		10/23/15 12:34
Calcium	5000		19000		23700	ug/L		94.7	(75%-125%)		
Iron	5000		1380		6500	ug/L		102	(75%-125%)		
Magnesium	5000		9710		14700	ug/L		99.8	(75%-125%)		

**November 10, 2015**  
**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 383213

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1515904										
Potassium	5000	4490		9540	ug/L		101	(75%-125%)			
Sodium	5000	19400		24000	ug/L		92	(75%-125%)	HSC	10/28/15	09:18
Vanadium	500	11.1		516	ug/L		101	(75%-125%)		10/23/15	12:34
QC1203413847	383546001	MSD									
Boron	500	U	15.0	518	ug/L	0.153	101	(0%-20%)		10/23/15	12:37
Calcium	5000	19000		23600	ug/L	0.376	92.9	(0%-20%)			
Iron	5000	1380		6590	ug/L	1.38	104	(0%-20%)			
Magnesium	5000	9710		14700	ug/L	0.163	100	(0%-20%)			
Potassium	5000	4490		9540	ug/L	0.0314	101	(0%-20%)			
Sodium	5000	19400		24400	ug/L	1.57	99.6	(0%-20%)		10/28/15	09:22
Vanadium	500	11.1		517	ug/L	0.285	101	(0%-20%)		10/23/15	12:37
QC1203413848	383546001	SDILT									
Boron		U	13.7	DU	75.0	ug/L	N/A	(0%-10%)		10/23/15	12:41
Calcium			19000	D	3680	ug/L	3.18	(0%-10%)			
Iron			1380	D	274	ug/L	.717	(0%-10%)			
Magnesium			9710	D	1920	ug/L	1.23	(0%-10%)			
Potassium			4490	D	903	ug/L	.463	(0%-10%)			
Sodium			19400	D	3940	ug/L	1.56	(0%-10%)		10/28/15	09:25
Vanadium			11.1	D	1.90	ug/L	14.6	(0%-10%)		10/23/15	12:41

**Notes:**

The Qualifiers in this report are defined as follows:

- \* Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured



# General Chem Analysis

# Case Narrative

**General Chemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL383213  
Work Order #: 383213**

**Method/Analysis Information**

**Product:** Alkalinity  
**Analytical Batch:** 1515141      **Method:** 2320\_ALKALINITY: COMMON (Alkalinity only)

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in 2320\_ALKALINITY:

<b>Sample ID</b>	<b>Client ID</b>
383213001	B32V61
1203411948	Method Blank (MB)
1203411945	Laboratory Control Sample (LCS)
1203412678	383220006(B32LT6) Sample Duplicate (DUP)

Sample 383213 001 in this SDG was analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 12.

**Preparation/Analytical Method Verification**

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

**Calibration Information**

The Titration and Ion analysis was performed on a manually operated buret.

**Initial Standardization**

The titrant was properly standardized

**Quality Control (QC) Information**

**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recovery met the acceptance limits.

**Quality Control (QC) Designation**

Sample 383220006 (B32LT6) was selected for QC analysis.

**Duplicate Relative Percent Difference (RPD) Statement**

The RPD between the sample and its duplicate met the acceptance limits.

**Technical Information**

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

**Holding Times**

All samples in this SDG met the specified holding time.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-analysis**

The samples in this SDG did not require re-analysis.

**Miscellaneous Information**

**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Additional Comments**

75 mL of sample was analyzed because insufficient sample was provided. 383213001 (B32V61).

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

**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.

November 10, 2015

**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: GEL383213 GEL Work Order: 383213

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

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

**Review/Validation**

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

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

**Signature:** 

**Name:** Thomas Lewis

**Date:** 06 NOV 2015

**Title:** Data Validator

# Sample Data Summary

**Certificate of Analysis**

Report Date: November 6, 2015

Company : CH2MHill Plateau Remediation Company  
 Address : MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
 Contact: Mr. Scot Fitzgerald  
 Project: CHPRC SAF X16-001

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Client Sample ID: B32V61	Project: CPRC0X16001
Sample ID: 383213001	Client ID: CPRC001
Matrix: WATER	
Collect Date: 13-OCT-15 09:05	
Receive Date: 14-OCT-15	
Collector: Client	

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Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Titration and Ion Analysis										
2320_ALKALINITY: COMMON (Alkalinity only) "As Received"										
Alkalinity, Total as CaCO3		103000	967	1330	ug/L		AMB	10/15/15	1731 1515141	1

The following Analytical Methods were performed:

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Method	Description	Analyst Comments
1	2320_ALKALINITY	

**Notes:**

# Quality Control Summary

**November 10, 2015**  
**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: November 6, 2015

Page 1 of 1

**CH2MHill Plateau Remediation Company**

**MSIN R3-50 CHPRC**

**PO Box 1600**

**Richland, Washington**

**Contact: Mr. Scot Fitzgerald**

**Workorder: 383213**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1515141										
QC1203412678	383220006	DUP									
Alkalinity, Total as CaCO3		99500		100000	ug/L	1.01		(0%-20%)	AMB	10/15/15	17:36
QC1203411945	LCS										
Alkalinity, Total as CaCO3	50000			53500	ug/L		107	(90%-110%)		10/15/15	16:32
QC1203411948	MB										
Alkalinity, Total as CaCO3			U	725	ug/L					10/15/15	16:32

**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.