



November 16, 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: 383999  
SDG: GEL383999

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 24, 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: X16-001-078  
Enclosures



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# Case Narrative

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF X16-001  
SDG: GEL383999

November 16, 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 24, 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. There are no additional comments concerning sample receipt.

**Items of Note** All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative and DER.

**Sample Identification**

The laboratory received the following samples:

<b>Laboratory Identification</b>	<b>Sample Description</b>
383999001	B32V38
383999002	B32V35

**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.

NOVEMBER 20, 2015



Sarah Edwards for  
Heather Shaffer  
Project Manager

# **Chain of Custody and Supporting Documentation**

CH2M Hill Plateau Remediation Company  
**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**  
 C.O.C.# X16-001-078  
 Page 1 of 1

Collector: K.C. Patterson/CHPRC  
 Contact/Requester: Karen Waters-Husted  
 Telephone No. 509-376-4650  
 SAF No. X16-001  
 Sampling Origin: Hanford Site  
 Purchase Order/Charge Code: 303271  
 Project Title: 100-BC-5 RI, OCTOBER 2015  
 Logbook No. HNF-N-506 8/1/1  
 Ice Chest No. GWS-509  
 Shipped To (Lab): GEL Laboratories, LLC  
 Method of Shipment: Commercial Carrier  
 Bill of Lading/Air Bill No. 774815171722  
 Protocol: CERCLA  
 Priority: 30 Days  
 Offsite Property No. 6077

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 SPECIAL INSTRUCTIONS: Hold Time  
 Submit deliverables & invoices to ^CPP Sample Management.  
 Total Activity Exemption: Yes  No

Sample No.	Filter	*	Date	Time	No./Type Container	Sample Analysis	Holding Time	Preservative
B32V38	Y	W	OCT 23 2015	0838	1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B32V35	N	W			1x250-mL G/P	2320_ALKALINITY: COMMON	14 Days	Cool <=6C
B32V35	N	W			1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B32V35	N	W	OCT 23 2015	0838	1x250-mL aG	9060_TOC: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C

Received By: L.D. Wall CHPRC  
 Received By: FEDEX  
 Received By: M. Knobel ml knobel 102475 0855

Print Sign  
 Date/Time: OCT 23 2015 1110  
 Date/Time: 1110  
 Date/Time: 1400  
 Date/Time: 0855

Relinquished By: K.C. Patterson/CHPRC  
 Relinquished By: L.D. Wall CHPRC  
 Relinquished By: FedEx

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

7 of 4  
 PRINTED ON 9/14/2015  
 FSR ID = FSR5948  
 A-6004-842 (REV 2)

SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order:	
Received By: <u>M/K</u>		Date Received: <u>10-24-15</u>	
Inspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>open 0</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 containing radium 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"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>1c 2c</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>24092024932</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<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"/>			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"/>			Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>			(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16 Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7748 0447 4402 2c FRI</u> <u>7748 1517 1722 2c</u> <u>7748 1213 1167 1c</u> <u>7748 1213 1351 1c</u>

Comments (Use Continuation Form if needed):

# **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

NOVEMBER 20, 2015

**GEL LABORATORIES LLC**

2040 Savage Road Charleston, SC 29407 (843) 556-8171

Report Date: 16-NOV-15

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

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

# Laboratory Certifications

**List of current GEL Certifications as of 16 November 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	P330-15-00283, P330-15-00253
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
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

**Metals**  
**Technical Case Narrative**  
**CH2MHill Plateau Remediation Company (CPRC)**  
**SDG #: GEL383999**  
**Work Order #: 383999**

<b>Sample ID</b>	<b>Client ID</b>
383999001	B32V38
383999002	B32V35
1203418806	Method Blank (MB)ICP
1203418807	Laboratory Control Sample (LCS)
1203418810	384004001(B32NM5L) Serial Dilution (SD)
1203418808	384004001(B32NM5S) Matrix Spike (MS)
1203418809	384004001(B32NM5SD) Matrix Spike Duplicate (MSD)
1203418821	Method Blank (MB)ICP-MS
1203418822	Laboratory Control Sample (LCS)
1203418825	384004001(B32NM5L) Serial Dilution (SD)
1203418823	384004001(B32NM5S) Matrix Spike (MS)
1203418824	384004001(B32NM5SD) Matrix Spike Duplicate (MSD)

**Sample Analysis**

Samples 383999 001 and 002 in this SDG were analyzed for metals on an "as received" basis.

**Method/Analysis Information**

<b>Analytical Batch:</b>	1517791 and 1517797
<b>Prep Batch :</b>	1517790 and 1517796
<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 350X 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 PQL standard recoveries for SW846 6010C met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 383999001 (B32V38) and 383999002 (B32V35)-ICP.

#### **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 met the acceptance criteria with the exception of sodium. However, (analyte) 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. 1203418806 (MB)-ICP.

#### **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: 384004001 (B32NM5)-ICP and 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**

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.

**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: GEL383999 GEL Work Order: 383999

**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:** 20 NOV 2015

**Title:** Data Validator

# Sample Data Summary

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

SDG No: GEL383999

METHOD TYPE: SW846

SAMPLE ID: 383999001

CLIENT ID: B32V38

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 24-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	15	ug/L	U		MS	15	1	ICPMS12	151118-4
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS12	151117-3
7440-38-2	Arsenic	3.83	ug/L	B		MS	1.7	1	ICPMS12	151117-2
7440-39-3	Barium	7.02	ug/L			MS	0.6	1	ICPMS12	151117-2
7440-41-7	Beryllium	0.2	ug/L	U		MS	0.2	1	ICPMS7	151119-5
7440-42-8	Boron	16.1	ug/L	B		P	15	1	OPTIMA3	110315-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS12	151117-2
7440-70-2	Calcium	33000	ug/L			P	50	1	OPTIMA3	110315-1
7440-47-3	Chromium	8.23	ug/L	B		MS	2	1	ICPMS12	151117-2
7440-48-4	Cobalt	0.1	ug/L	U		MS	0.1	1	ICPMS12	151117-2
7440-50-8	Copper	0.35	ug/L	U		MS	0.35	1	ICPMS12	151117-2
7439-89-6	Iron	34.1	ug/L	B		P	30	1	OPTIMA3	110315-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS12	151117-2
7439-95-4	Magnesium	10800	ug/L			P	110	1	OPTIMA3	110315-1
7439-96-5	Manganese	1.82	ug/L	B		MS	1	1	ICPMS12	151117-2
7439-98-7	Molybdenum	2.68	ug/L			MS	0.165	1	ICPMS12	151117-2
7440-02-0	Nickel	0.5	ug/L	U		MS	0.5	1	ICPMS12	151117-2
7440-09-7	Potassium	6230	ug/L			P	50	1	OPTIMA3	110315-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS12	151118-4
7440-22-4	Silver	0.1	ug/L	U		MS	0.1	1	ICPMS12	151117-2
7440-23-5	Sodium	13100	ug/L			P	100	1	OPTIMA3	110315-1
7440-24-6	Strontium	139	ug/L			MS	2	1	ICPMS12	151117-2
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS12	151117-2
7440-29-1	Thorium	0.383	ug/L	U		MS	0.383	1	ICPMS12	151117-2
7440-31-5	Tin	1	ug/L	U		MS	1	1	ICPMS12	151117-2
7440-61-1	Uranium	1.2	ug/L			MS	0.067	1	ICPMS12	151117-2

METALS  
-1-  
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL383999

METHOD TYPE: SW846

SAMPLE ID: 383999001

CLIENT ID: B32V38

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 24-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	17.7	ug/L			P	1	1	OPTIMA3	110315-1
7440-66-6	Zinc	7.91	ug/L	B		MS	3.5	1	ICPMS12	151117-2

## \*Analytical Methods:

P SW846 3005A/6010C

MS SW846 3005A/6020A

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

SDG No: GEL383999

METHOD TYPE: SW846

SAMPLE ID: 383999002

CLIENT ID: B32V35

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 24-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	15	ug/L	U		MS	15	1	ICPMS12	151118-4
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS12	151117-3
7440-38-2	Arsenic	3.66	ug/L	B		MS	1.7	1	ICPMS12	151117-2
7440-39-3	Barium	8.29	ug/L			MS	0.6	1	ICPMS12	151117-2
7440-41-7	Beryllium	0.2	ug/L	U		MS	0.2	1	ICPMS7	151119-5
7440-42-8	Boron	16.8	ug/L	B		P	15	1	OPTIMA3	110315-1
7440-43-9	Cadmium	0.11	ug/L	U		MS	0.11	1	ICPMS12	151117-2
7440-70-2	Calcium	33200	ug/L			P	50	1	OPTIMA3	110315-1
7440-47-3	Chromium	8.98	ug/L	B		MS	2	1	ICPMS12	151117-2
7440-48-4	Cobalt	0.1	ug/L	U		MS	0.1	1	ICPMS12	151117-2
7440-50-8	Copper	0.35	ug/L	U		MS	0.35	1	ICPMS12	151117-2
7439-89-6	Iron	1190	ug/L			P	30	1	OPTIMA3	110315-1
7439-92-1	Lead	0.5	ug/L	U		MS	0.5	1	ICPMS12	151117-2
7439-95-4	Magnesium	10800	ug/L			P	110	1	OPTIMA3	110315-1
7439-96-5	Manganese	77.9	ug/L			MS	1	1	ICPMS12	151117-2
7439-98-7	Molybdenum	1.87	ug/L			MS	0.165	1	ICPMS12	151117-2
7440-02-0	Nickel	0.511	ug/L	B		MS	0.5	1	ICPMS12	151117-2
7440-09-7	Potassium	6250	ug/L			P	50	1	OPTIMA3	110315-1
7782-49-2	Selenium	1.5	ug/L	U		MS	1.5	1	ICPMS12	151118-4
7440-22-4	Silver	0.1	ug/L	U		MS	0.1	1	ICPMS12	151117-2
7440-23-5	Sodium	13000	ug/L			P	100	1	OPTIMA3	110315-1
7440-24-6	Strontium	139	ug/L			MS	2	1	ICPMS12	151117-2
7440-28-0	Thallium	0.45	ug/L	U		MS	0.45	1	ICPMS12	151117-2
7440-29-1	Thorium	0.383	ug/L	U		MS	0.383	1	ICPMS12	151117-2
7440-31-5	Tin	1	ug/L	U		MS	1	1	ICPMS12	151117-2
7440-61-1	Uranium	1.21	ug/L			MS	0.067	1	ICPMS12	151117-2

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

SDG No: GEL383999

METHOD TYPE: SW846

SAMPLE ID: 383999002

CLIENT ID: B32V35

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 24-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	19.5	ug/L			P	1	1	OPTIMA3	110315-1
7440-66-6	Zinc	5.13	ug/L	B		MS	3.5	1	ICPMS12	151117-2

## \*Analytical Methods:

P SW846 3005A/6010C

MS SW846 3005A/6020A

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: November 20, 2015

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 383999

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1517797										
QC1203418822	LCS										
Aluminum	2000			2010	ug/L		101	(80%-120%)	BAJ	11/18/15	18:09
Antimony	50.0			51.5	ug/L		103	(80%-120%)		11/17/15	23:10
Arsenic	50.0			53.8	ug/L		108	(80%-120%)		11/17/15	19:26
Barium	50.0			52.0	ug/L		104	(80%-120%)			
Beryllium	50.0			53.5	ug/L		107	(80%-120%)	SKJ	11/19/15	15:42
Cadmium	50.0			52.1	ug/L		104	(80%-120%)	BAJ	11/17/15	19:26
Chromium	50.0			53.1	ug/L		106	(80%-120%)			
Cobalt	50.0			52.3	ug/L		105	(80%-120%)			
Copper	50.0			53.6	ug/L		107	(80%-120%)			
Lead	50.0			51.7	ug/L		103	(80%-120%)			
Manganese	50.0			51.2	ug/L		102	(80%-120%)			
Molybdenum	50.0			52.2	ug/L		104	(80%-120%)			
Nickel	50.0			52.1	ug/L		104	(80%-120%)			
Selenium	50.0			52.4	ug/L		105	(80%-120%)		11/18/15	18:09
Silver	50.0			53.4	ug/L		107	(80%-120%)		11/17/15	19:26
Strontium	50.0			50.4	ug/L		101	(80%-120%)			
Thallium	50.0			51.3	ug/L		103	(80%-120%)			
Thorium	50.0			51.2	ug/L		102	(80%-120%)			
Tin	50.0			52.1	ug/L		104	(80%-120%)			
Uranium	50.0			51.5	ug/L		103	(80%-120%)			

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**QC Summary**

Workorder: 383999

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1517797										
Zinc	50.0			55.7	ug/L		111	(80%-120%)	BAJ	11/17/15	19:26
QC1203418821	MB										
Aluminum			U	15.0	ug/L					11/18/15	18:08
Antimony			U	1.00	ug/L					11/17/15	23:08
Arsenic			U	1.70	ug/L					11/17/15	19:24
Barium			U	0.600	ug/L						
Beryllium			U	0.200	ug/L				SKJ	11/19/15	15:40
Cadmium			U	0.110	ug/L				BAJ	11/17/15	19:24
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					11/18/15	18:08
Silver			U	0.100	ug/L					11/17/15	19:24
Strontium			U	2.00	ug/L						
Thallium			U	0.450	ug/L						
Thorium			U	0.383	ug/L						
Tin			U	1.00	ug/L						
Uranium			U	0.067	ug/L						

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**QC Summary**

Workorder: 383999

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1517797										
Zinc			U	3.50	ug/L				BAJ	11/17/15	19:24
QC1203418823 384004001 MS											
Aluminum	2000	B	15.6	2130	ug/L		106	(75%-125%)		11/18/15	18:16
Antimony	50.0	U	1.00	50.8	ug/L		101	(75%-125%)		11/17/15	23:17
Arsenic	50.0	B	1.85	53.5	ug/L		103	(75%-125%)		11/17/15	19:37
Barium	50.0		40.4	90.2	ug/L		99.6	(75%-125%)			
Beryllium	50.0	U	0.200	54.4	ug/L		109	(75%-125%)	SKJ	11/19/15	15:49
Cadmium	50.0	U	0.110	50.6	ug/L		101	(75%-125%)	BAJ	11/17/15	19:37
Chromium	50.0	B	5.94	56.4	ug/L		101	(75%-125%)			
Cobalt	50.0	B	0.182	50.0	ug/L		99.6	(75%-125%)			
Copper	50.0	B	0.497	49.3	ug/L		97.5	(75%-125%)			
Lead	50.0	U	0.500	48.5	ug/L		96.7	(75%-125%)			
Manganese	50.0	B	3.08	51.3	ug/L		96.4	(75%-125%)			
Molybdenum	50.0		2.04	55.0	ug/L		106	(75%-125%)			
Nickel	50.0		2.46	53.3	ug/L		102	(75%-125%)			
Selenium	50.0	U	1.50	50.7	ug/L		101	(75%-125%)		11/18/15	18:16
Silver	50.0	U	0.100	51.9	ug/L		104	(75%-125%)		11/17/15	19:37
Strontium	50.0		112	162	ug/L		99.7	(75%-125%)			
Thallium	50.0	U	0.450	48.3	ug/L		96.5	(75%-125%)			
Thorium	50.0	U	0.383	50.4	ug/L		101	(75%-125%)			
Tin	50.0	U	1.00	52.5	ug/L		105	(75%-125%)			
Uranium	50.0	U	0.067	50.0	ug/L		100	(75%-125%)			

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**QC Summary**

Workorder: 383999

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1517797										
Zinc	50.0	U	3.50	50.9	ug/L		99.7	(75%-125%)	BAJ	11/17/15	19:37
QC1203418824 384004001 MSD											
Aluminum	2000	B	15.6	1920	ug/L	10.5	95.1	(0%-20%)		11/18/15	18:18
Antimony	50.0	U	1.00	51.8	ug/L	1.93	103	(0%-20%)		11/17/15	23:18
Arsenic	50.0	B	1.85	53.5	ug/L	0.103	103	(0%-20%)		11/17/15	19:39
Barium	50.0		40.4	89.9	ug/L	0.33	99	(0%-20%)			
Beryllium	50.0	U	0.200	55.1	ug/L	1.26	110	(0%-20%)	SKJ	11/19/15	15:50
Cadmium	50.0	U	0.110	51.4	ug/L	1.62	103	(0%-20%)	BAJ	11/17/15	19:39
Chromium	50.0	B	5.94	56.7	ug/L	0.523	102	(0%-20%)			
Cobalt	50.0	B	0.182	50.5	ug/L	1.02	101	(0%-20%)			
Copper	50.0	B	0.497	49.7	ug/L	0.911	98.4	(0%-20%)			
Lead	50.0	U	0.500	50.0	ug/L	3.15	99.8	(0%-20%)			
Manganese	50.0	B	3.08	51.7	ug/L	0.884	97.3	(0%-20%)			
Molybdenum	50.0		2.04	56.1	ug/L	1.99	108	(0%-20%)			
Nickel	50.0		2.46	52.7	ug/L	1.15	100	(0%-20%)			
Selenium	50.0	U	1.50	49.9	ug/L	1.73	99.4	(0%-20%)		11/18/15	18:18
Silver	50.0	U	0.100	51.6	ug/L	0.538	103	(0%-20%)		11/17/15	19:39
Strontium	50.0		112	164	ug/L	0.76	102	(0%-20%)			
Thallium	50.0	U	0.450	49.6	ug/L	2.68	99.2	(0%-20%)			
Thorium	50.0	U	0.383	51.7	ug/L	2.54	103	(0%-20%)			
Tin	50.0	U	1.00	53.3	ug/L	1.5	106	(0%-20%)			
Uranium	50.0	U	0.067	50.6	ug/L	1.18	101	(0%-20%)			

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**QC Summary**

Workorder: 383999

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1517797										
Zinc	50.0	U	3.50		52.2	ug/L	2.48	102	(0%-20%)	BAJ	11/17/15 19:39
QC1203418825 384004001 SDILT											
Aluminum		B	15.6	DU	75.0	ug/L	N/A		(0%-10%)		11/18/15 18:21
Antimony		U	0.102	DU	5.00	ug/L	N/A		(0%-10%)		11/17/15 23:22
Arsenic		B	1.85	DU	8.50	ug/L	N/A		(0%-10%)		11/17/15 19:44
Barium			40.4	D	8.30	ug/L	2.71		(0%-10%)		
Beryllium		U	0.039	DU	1.00	ug/L	N/A		(0%-10%)	SKJ	11/19/15 15:53
Cadmium		U	-0.024	DU	0.550	ug/L	N/A		(0%-10%)	BAJ	11/17/15 19:44
Chromium		B	5.94	DU	10.0	ug/L	N/A		(0%-10%)		
Cobalt		B	0.182	DU	0.500	ug/L	N/A		(0%-10%)		
Copper		B	0.497	DU	1.75	ug/L	N/A		(0%-10%)		
Lead		U	0.105	DU	2.50	ug/L	N/A		(0%-10%)		
Manganese		B	3.08	DU	5.00	ug/L	N/A		(0%-10%)		
Molybdenum			2.04	D	0.435	ug/L	6.62		(0%-10%)		
Nickel			2.46	D	0.580	ug/L	18.1		(0%-10%)		
Selenium		U	0.177	DU	7.50	ug/L	N/A		(0%-10%)		11/18/15 18:21
Silver		U	-0.002	DU	0.500	ug/L	N/A		(0%-10%)		11/17/15 19:44
Strontium			112	D	21.4	ug/L	4.75		(0%-10%)		
Thallium		U	-0.001	DU	2.25	ug/L	N/A		(0%-10%)		
Thorium		U	-0.03	DU	1.92	ug/L	N/A		(0%-10%)		
Tin		U	0.080	DU	5.00	ug/L	N/A		(0%-10%)		
Uranium		U	-0.002	DU	0.335	ug/L	N/A		(0%-10%)		

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**QC Summary**

Workorder: 383999

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1517797										
Zinc		U	1.07	DU	17.5	ug/L	N/A	(0%-10%)	BAJ	11/17/15	19:44
<b>Metals Analysis-ICP</b>											
Batch	1517791										
QC1203418807	LCS										
Boron	500				516	ug/L		103 (80%-120%)	HSC	11/03/15	16:23
Calcium	5000				4950	ug/L		99 (80%-120%)			
Iron	5000				5000	ug/L		100 (80%-120%)			
Magnesium	5000				5190	ug/L		104 (80%-120%)			
Potassium	5000				5130	ug/L		103 (80%-120%)			
Sodium	5000				4680	ug/L		93.6 (80%-120%)			
Vanadium	500				508	ug/L		102 (80%-120%)			
QC1203418806	MB										
Boron			U		15.0	ug/L				11/03/15	16:20
Calcium			U		50.0	ug/L					
Iron			U		30.0	ug/L					
Magnesium			U		110	ug/L					
Potassium			U		50.0	ug/L					
Sodium			B		120	ug/L					
Vanadium			U		1.00	ug/L					
QC1203418808	384004001 MS										
Boron	500	U	15.0		520	ug/L		102 (75%-125%)		11/03/15	16:30
Calcium	5000		10100		15000	ug/L		98 (75%-125%)			
Iron	5000		142		5040	ug/L		97.9 (75%-125%)			
Magnesium	5000		672		5690	ug/L		100 (75%-125%)			

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**QC Summary**

Workorder: 383999

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1517791										
Potassium	5000	24900		30000	ug/L		N/A	(75%-125%)			
Sodium	5000	20200		24700	ug/L		N/A	(75%-125%)	HSC	11/03/15	16:30
Vanadium	500	U 1.00		505	ug/L		101	(75%-125%)			
QC1203418809	384004001	MSD									
Boron	500	U 15.0		522	ug/L	0.388	103	(0%-20%)		11/03/15	16:33
Calcium	5000	10100		14700	ug/L	2.47	90.7	(0%-20%)			
Iron	5000	142		5100	ug/L	1.19	99.1	(0%-20%)			
Magnesium	5000	672		5670	ug/L	0.399	100	(0%-20%)			
Potassium	5000	24900		29100	ug/L	3.08	N/A	(0%-20%)			
Sodium	5000	20200		24400	ug/L	0.929	N/A	(0%-20%)			
Vanadium	500	U 1.00		507	ug/L	0.31	101	(0%-20%)			
QC1203418810	384004001	SDILT									
Boron		U 8.27	DU	75.0	ug/L	N/A		(0%-10%)		11/03/15	16:36
Calcium		10100	D	2000	ug/L	1.25		(0%-10%)			
Iron		142	DU	150	ug/L	N/A		(0%-10%)			
Magnesium		672	D	112	ug/L	16.8		(0%-10%)			
Potassium		24900	D	4880	ug/L	2.09		(0%-10%)			
Sodium		20200	D	4020	ug/L	.37		(0%-10%)			
Vanadium		U 0.125	DU	5.00	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 >= EQL or is > 5% of the measured



# General Chem Analysis

# Case Narrative



**Initial Calibration**

All initial calibration requirements have been met for this SDG.

**Continuing Calibration Blanks**

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

**Calibration Verification Information (CCV)**

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

**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**

Samples 383805001 (B32ML9), 383890003 (B32TJ5) and 384108009 (B32NY6) were selected for QC analysis.

**Matrix Spike (MS)/Post Spike (PS) Recovery Statement**

The MS/PS recoveries for this sample set were within the required acceptance limits where applicable.

**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 Preservation/Integrity**

All the samples from this sample group met the preservation and integrity requirements of the method.

**Sample Dilutions**

The following samples were diluted because target analyte concentrations exceeded the calibration range. 1203428636 (Non SDG 384108009DUP) and 1203428639 (Non SDG 384108009PS).

**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**

Additional comments were not required for this SDG.

**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.

**Method/Analysis Information****Product:** Alkalinity**Analytical Batch:** 1518361      **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>
383999002	B32V35
1203420475	Method Blank (MB)
1203420472	Laboratory Control Sample (LCS)
1203420482	384004001(B32NM5) Sample Duplicate (DUP)

Sample 383999 002 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 384004001 (B32NM5) 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**

Less sample was used for this analysis because insufficient sample was provided. 1203420482 (Non SDG 384004001DUP).

**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.

**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: GEL383999 GEL Work Order: 383999

**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).

D Results are reported from a diluted aliquot of sample.

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:** 19 NOV 2015

**Title:** Data Validator

# Sample Data Summary



# Quality Control Summary

**GEL LABORATORIES LLC**

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**QC Summary**

Report Date: November 19, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 383999

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Carbon Analysis</b>											
Batch	1521438										
QC1203428634	383805001	DUP									
Total Organic Carbon Average	B	338	B	370	ug/L	9.04	^	(+/-1000)	TSM	11/10/15	01:24
QC1203428635	383890003	DUP									
Total Organic Carbon Average	B	374	B	380	ug/L	1.59	^	(+/-1000)		11/10/15	08:08
QC1203428636	384108009	DUP									
Total Organic Carbon Average	D	31000	D	30600	ug/L	1.4		(0%-20%)		11/11/15	12:13
QC1203428633	LCS										
Total Organic Carbon Average	10000			9660	ug/L			(85%-115%)		11/09/15	23:01
QC1203428632	MB										
Total Organic Carbon Average			U	330	ug/L					11/09/15	22:47
QC1203428637	383805001	PS									
Total Organic Carbon Average	10.0	B	0.338	9.88	mg/L			(65%-120%)		11/10/15	02:06
QC1203428638	383890003	PS									
Total Organic Carbon Average	10.0	B	0.374	9.99	mg/L			(65%-120%)		11/10/15	08:50
QC1203428639	384108009	PS									
Total Organic Carbon Average	10.0	D	6.20	15.4	mg/L			(65%-120%)		11/11/15	12:58
<b>Titration and Ion Analysis</b>											
Batch	1518361										
QC1203420482	384004001	DUP									
Alkalinity, Total as CaCO3		51400		47900	ug/L	7.18		(0%-20%)	AMB	10/30/15	14:45
QC1203420472	LCS										
Alkalinity, Total as CaCO3	50000			54000	ug/L			(90%-110%)		10/30/15	13:46
QC1203420475	MB										
Alkalinity, Total as CaCO3			U	725	ug/L					10/30/15	13:45

**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).

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**QC Summary**

Workorder: 383999

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