

November 17, 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: 383312
SDG: GEL383312

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 15, 2015. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. Per client P&D, this package was revised to include the Chain of Custody.

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,



Heather Shaffer
Project Manager

Purchase Order: 300071JDBA 7H
Chain of Custody: X16-001-081 and X16-001-082
Enclosures



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Problem and Discrepancy Report

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Problem and Discrepancy Report

GEL

SDG GEL383312

11/17/15

The data package has the following issues:

The COCs are missing from the report.

Resolution: *Provide correction.*

Lab Response:

The lab will correct and submit a revision.

Provide a resolution to each issue noted on the report

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Sample Issue Resolution

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SAMPLE ISSUE RESOLUTION

SIR NUM	SIR16-027
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	B32V82, B32V85
SAMPLE MATRIX	WATER
COLLECTION DATE	-
SDG NUM	GEL383312

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

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Per client P&D, this package was revised to include the Chain of Custody.

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF X16-001
SDG: GEL383312**

November 17, 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 15, 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 enclosed SIR for further 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:

Laboratory Identification	Sample Description
383312001	B32V85
383312002	B32V82
383312003	B32V83

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.

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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.



Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

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CH2M Hill Plateau Remediation Company
383312
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST
 C.O.C.# **X16-001-081**
 Page 1 of 1

Contact/Requester: **Karen Waters-Husted** Telephone No. **509-376-4650**
 Sampling Origin: **Hanford Site** Purchase Order/Charge Code: **303269**
 Logbook No. **HNF-N-50678/55** Ice Chest No. **6005-447**
 Method of Shipment: **Commercial Carrier** Bill of Lading/Air Bill No. **774739838256**
 Priority: **30 Days** Offsite Property No. **6043**

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

POSSIBLE SAMPLE HAZARDS/REMARKS
 *** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

Sample No.	Filter	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B32V85	Y	OCT 14 2015	0803	1x60-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2
B32V82	N	Y	Y	1x60-mL G/P	2320_ALKALINITY: COMMON	14 Days	Cool <=6C
B32V82	N	OCT 14 2015	0803	1x60-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	HNO3 to pH <2

Relinquished By	Print	Sign	Received By	Print	Sign	Date/Time	Matrix *
S.W. King/CHPRC			F.M. HAUCHPRC			OCT 14 2015 1115	S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other
F.M. HAUCHPRC			FEDEX			OCT 14 2015 1400	
1 of 5			M. K. Spaw			OCT 14 2015 0855	
Relinquished By							

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

PRINTED ON 9/30/2015
 FSR ID = FSR5640
 A-6004-842 (REV 2)

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CH2M Hill Plateau Remediation Company		C.O.C. # X16-001-082	
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-50678156	Ice Chest No. 605-447
Shipped To (Lab) GEL Laboratories, LLC		Method of Shipment Commercial Carrier	Bill of Lading/Air Bill No. 7747 3983 8256
Protocol CERCLA		Priority: 30 Days	Offsite Property No. 6043
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 Submit deliverables & invoices to ^CPP Sample Management.	
Sample No.	Filter	* Date	Time
B32V83	N	OCT 14 2015	0803
No/Type Container	1x20-mL G/P	9056_ANIONS_IC: COMMON	Sample Analysis
Holding Time	28 Days/48 Hours	Preservative	Cool <=6C

Relinquished By S.W. King/CHPRC	Print <i>[Signature]</i>	Received By F.M. Hall/CHPRC	Sign <i>[Signature]</i>	Date/Time OCT 14 2015	Date/Time 11/5	Matrix *
Relinquished By F.M. Hall/CHPRC	Print <i>[Signature]</i>	Received By FEDEX	Sign <i>[Signature]</i>	Date/Time OCT 14 2015	Date/Time 11/5	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 [Signature]	Print <i>[Signature]</i>	Received By [Signature]	Sign <i>[Signature]</i>	Date/Time 10-15-0855	Date/Time	
Relinquished By		Received By		Date/Time		
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process)		Disposed By		Date/Time

FRS ID = FRS5640

PRINTED ON 9/30/2015

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SAMPLE RECEIPT & REVIEW FORM

Client: <u>OPRC</u>		SDG/AR/COC/Work Order: <u>383312</u>	
Received By: <u>MK</u>		Date Received: <u>10-15-15</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"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>CPM-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 beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			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>2C</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>EV091024932</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#: <u>* see Below</u>
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>7747 3624 7130 2C</u> <u>7747 3983 8256 2C</u>

Comments (Use Continuation Form if needed):

* Metals Bottles for B32V82 + B32V85 PH = 7

Data Review Qualifier Definitions

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

Revision #117-NOV-2015

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		

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Laboratory Certifications

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List of current GEL Certifications as of 17 November 2015

State	Certification
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

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Metals**Technical Case Narrative****CH2MHill Plateau Remediation Company (CPRC)****SDG #: GEL383312****Work Order #: 383312**

Sample ID	Client ID
383312001	B32V85
383312002	B32V82
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 383312 001 and 002 in this SDG were analyzed for metals on an "as received" basis.

Method/Analysis Information

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

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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

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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.

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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: GEL383312 GEL Work Order: 383312

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: 11 NOV 2015****Title: Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL383312

METHOD TYPE: SW846

SAMPLE ID: 383312001

CLIENT ID: B32V85

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 15-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	31	ug/L	B		MS	15	1	ICPMS11	151105-3
7440-36-0	Antimony	1	ug/L	U		MS	1	1	ICPMS11	151105-3
7440-38-2	Arsenic	1.7	ug/L	U		MS	1.7	1	ICPMS11	151105-3
7440-39-3	Barium	30.7	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	30800	ug/L			P	50	1	OPTIMA3	102315-1
7440-47-3	Chromium	22.7	ug/L			MS	2	1	ICPMS11	151105-3
7440-48-4	Cobalt	0.1	ug/L	U		MS	0.1	1	ICPMS11	151105-3
7440-50-8	Copper	0.743	ug/L	B		MS	0.35	1	ICPMS11	151105-3
7439-89-6	Iron	30	ug/L	U		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	7980	ug/L			P	110	1	OPTIMA3	102315-1
7439-96-5	Manganese	1.35	ug/L	B		MS	1	1	ICPMS11	151105-3
7439-98-7	Molybdenum	0.599	ug/L			MS	0.165	1	ICPMS11	151105-3
7440-02-0	Nickel	0.726	ug/L	B		MS	0.5	1	ICPMS11	151105-3
7440-09-7	Potassium	3500	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	9440	ug/L			P	100	1	OPTIMA3	102815A-2
7440-24-6	Strontium	202	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	1.29	ug/L			MS	0.067	1	ICPMS11	151105-6

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL383312

METHOD TYPE: SW846

SAMPLE ID: 383312001

CLIENT ID: B32V85

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 15-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	4.99	ug/L	B		P	1	1	OPTIMA3	102315-1
7440-66-6	Zinc	4.2	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: GEL383312

METHOD TYPE: SW846

SAMPLE ID: 383312002

CLIENT ID: B32V82

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 15-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	51.1	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	1.7	ug/L	U		MS	1.7	1	ICPMS11	151105-3
7440-39-3	Barium	29.4	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	32500	ug/L			P	50	1	OPTIMA3	102315-1
7440-47-3	Chromium	23.2	ug/L			MS	2	1	ICPMS11	151105-3
7440-48-4	Cobalt	0.1	ug/L	U		MS	0.1	1	ICPMS11	151105-3
7440-50-8	Copper	0.701	ug/L	B		MS	0.35	1	ICPMS11	151105-3
7439-89-6	Iron	36.1	ug/L	B		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	7870	ug/L			P	110	1	OPTIMA3	102315-1
7439-96-5	Manganese	1	ug/L	U		MS	1	1	ICPMS11	151105-3
7439-98-7	Molybdenum	0.62	ug/L			MS	0.165	1	ICPMS11	151105-3
7440-02-0	Nickel	0.5	ug/L	U		MS	0.5	1	ICPMS11	151105-3
7440-09-7	Potassium	3460	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	8860	ug/L			P	100	1	OPTIMA3	102815A-2
7440-24-6	Strontium	202	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	1.35	ug/L			MS	0.067	1	ICPMS11	151105-6

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL383312

METHOD TYPE: SW846

SAMPLE ID: 383312002

CLIENT ID: B32V82

CONTRACT: CPRC0X16001

MATRIX: WATER

DATE RECEIVED 15-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	5.03	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

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QC Summary

Report Date: November 11, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 383312

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

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

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

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

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

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

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

November 17, 2015

Rev 1

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL383312
Work Order #: 383312**

Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1515409 **Method:** 9056_ANIONS_IC: COMMON

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9056A:

Sample ID	Client ID
383312003	B32V83
1203412571	Method Blank (MB)
1203412572	Laboratory Control Sample (LCS)
1203412573	383312003(B32V83) Sample Duplicate (DUP)
1203412574	383312003(B32V83) Post Spike (PS)

Sample 383312 003 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-086 REV# 24.

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 Ion Chromatography analysis was performed on a Dionex ICS-1600 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

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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.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

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 383312003 (B32V83) was selected for QC analysis.

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

The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The spike recovery falls outside of the GEL acceptance limits but within the client specified limits.

Analyte	Sample	Value
Chloride	1203412574 (B32V83PS)	113* (90%-110%)

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 following samples were diluted because target analyte concentrations exceeded the calibration range. 1203412573 (B32V83DUP), 1203412574 (B32V83PS) and 383312003 (B32V83).

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Analyte	383312
	003
Sulfate	10X

Sample Re-analysis

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

Miscellaneous Information**Data Exception (DER) Documentation**

A data exception report (DER) 1457911 was generated for sample 1203412574 (B32V83PS) in this SDG/batch.

Manual Integrations

Samples 1203412573 (B32V83DUP), 1203412574 (B32V83PS) and 383312003 (B32V83) were manually integrated to correctly position the baseline as set in the calibration standards.

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.

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Method/Analysis Information**Product:** Alkalinity**Analytical Batch:** 1516586 **Method:** 2320_ALKALINITY: COMMON (Alkalinity only)**Sample Analysis**

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

Sample ID	Client ID
383312002	B32V82
1203415661	Method Blank (MB)
1203415662	Laboratory Control Sample (LCS)
1203415663	383590001(B32NN7) Sample Duplicate (DUP)

Sample 383312 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.

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Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 383590001 (B32NN7) 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

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.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of

the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL383312 GEL Work Order: 383312

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: 11 NOV 2015****Title: Data Validator**

Sample Data Summary

Certificate of Analysis

Report Date: November 11, 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

Client Sample ID: B32V82	Project: CPRC0X16001
Sample ID: 383312002	Client ID: CPRC001
Matrix: WATER	
Collect Date: 14-OCT-15 08:53	
Receive Date: 15-OCT-15	
Collector: Client	

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		92400	1040	1430	ug/L		AMB	10/27/15	1415 1516586	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	2320_ALKALINITY	

Notes:

Certificate of Analysis

Report Date: November 11, 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

Client Sample ID: B32V83	Project: CPRC0X16001
Sample ID: 383312003	Client ID: CPRC001
Matrix: WATER	
Collect Date: 14-OCT-15 08:53	
Receive Date: 15-OCT-15	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time Batch	Method
Ion Chromatography										
9056_ANIONS_IC: COMMON "As Received"										
Chloride		7770	67.0	200	ug/L	1	MXL2	10/15/15	1554 1515409	1
Fluoride	B	73.3	33.0	500	ug/L	1				
Nitrate-N		2120	33.0	250	ug/L	1				
Nitrite-N	U	38.0	38.0	250	ug/L	1				
Sulfate	D	35900	1330	4000	ug/L	10	MXL2	10/15/15	1733 1515409	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	
2	SW846 9056A	

Notes:

Quality Control Summary

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QC Summary

Report Date: November 11, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 383312

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1515409										
QC1203412573	383312003	DUP									
Chloride		7770		7730	ug/L	0.449		(0%-20%)	MXL2	10/15/15	16:27
Fluoride	B	73.3	B	76.6	ug/L	4.4	^	(+/-500)			
Nitrate-N		2120		2110	ug/L	0.218		(0%-20%)			
Nitrite-N	U	38.0	U	38.0	ug/L	N/A					
Sulfate	D	35900	D	35900	ug/L	0.131		(0%-20%)		10/15/15	18:06
QC1203412572	LCS										
Chloride	5000			5410	ug/L		108	(90%-110%)		10/15/15	15:21
Fluoride	2500			2670	ug/L		107	(90%-110%)			
Nitrate-N	2500			2610	ug/L		105	(90%-110%)			
Nitrite-N	2500			2680	ug/L		107	(90%-110%)			
Sulfate	10000			10600	ug/L		106	(90%-110%)			
QC1203412571	MB										
Chloride			U	67.0	ug/L					10/15/15	14:48
Fluoride			U	33.0	ug/L						
Nitrate-N			U	33.0	ug/L						
Nitrite-N			U	38.0	ug/L						
Sulfate			U	133	ug/L						
QC1203412574	383312003	PS									
Chloride	5.00	7.77		13.4	mg/L		113*	(90%-110%)		10/15/15	17:00
Fluoride	2.50	B	0.0733	2.55	mg/L		99.1	(90%-110%)			
Nitrate-N	2.50		2.12	4.72	mg/L		104	(90%-110%)			

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QC Summary

Workorder: 383312

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1515409										
Nitrite-N	2.50	U	0.00		2.61	mg/L	105	(90%-110%)			
Sulfate	10.0	D	3.59	D	14.0	mg/L	105	(90%-110%)	MXL2	10/15/15	18:39
Titration and Ion Analysis											
Batch	1516586										
QC1203415663	383590001	DUP									
Alkalinity, Total as CaCO3			132000		134000	ug/L	1.53	(0%-20%)	AMB	10/27/15	14:41
QC1203415662	LCS										
Alkalinity, Total as CaCO3	50000				53500	ug/L	107	(90%-110%)		10/27/15	14:08
QC1203415661	MB										
Alkalinity, Total as CaCO3			U		725	ug/L				10/27/15	14:05

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.

Miscellaneous

November 17, 2015

DATA EXCEPTION REPORT

Mo.Day Yr. 16-OCT-15	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: IC	Test / Method: SW846 9056A	Matrix Type: Liquid	Client Code: CPRC
Batch ID: 1515409	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 383312(GEL383312)			
Application Issues: Failed Recovery for MS/MSD, or PS/PSD			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed Recovery for MS/MSD, or PS/PSD: QC 1203412574PS		1. The spike recovery falls outside of the GEL acceptance limits but within the client specified limits. Chloride 1203412574 (B32V83PS) [113* (90%-110%)].	

Originator's Name:

Marcy Lamb 16-OCT-15

Data Validator/Group Leader:

Mary Sherwood 27-OCT-15