

January 26, 2015

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

Re: CHPRC SAF S15-010
Work Order: 364509
SDG: GEL364509

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 08, 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,



Heather Shaffer
Project Manager

Purchase Order: 300071ES20 - 7H
Chain of Custody: S15-010-138 and S15-010-553
Enclosures



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Case Narrative

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S15-010
SDG: GEL364509

January 26, 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 January 08, 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:

Laboratory Identification	Sample Description
364509001	B2XVJ8
364509002	B2XVJ7
364509003	B2XVK0

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: GC/MS Volatile, 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 Manger (or designee) and the laboratory's client services representative as verified by their signatures on this report.



Heather Shaffer
Project Manager

Problem and Discrepancy Report

GEL

SDG GEL364509

02/18/15

1. The data package has the following issues:

- The electronic data is missing for SDG GEL364509.

Resolution: *Provide correction.*

Lab Response:

Please correct the issue and re-submit the electronic data package.

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **S15-010-138**
Page 1 of 1

Collector **CHRIS FULTON**
CHPRC
S15-010

Contact/Requester **Karen Waters-Husted**
Telephone No. **509-376-4650**

Project Title **SURV, OCT 2014**
Sampling Origin **Hanford Site**
Purchase Order/Charge Code **300071ES20**

Shipped To (Lab) **GEL Laboratories, LLC**
Logbook No. **HNF-N-506 74/16/17**
Ice Chest No. **605-092**

Protocol **SURV**
Method of Shipment **Commercial Carrier**
Bill of Lading/Air Bill No. **772494655370**

Priority: **30 Days**
Offsite Property No. **5314**

POSSIBLE SAMPLE HAZARDS/REMARKS
SPECIAL INSTRUCTIONS **HOLD TIME**
Do not batch FY14 and FY15 samples into the same SDG.
Total Activity Exemption: Yes No

Sample No.	Filter	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2XVJ7	N	JAN 06 2015	5:15	1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	None
B2XVJ7	N			4x40-mL aGs*	8260_VOA_GCMS: COMMON; 8260_VOA_GCMS: GW 01	14 Days	Cool <=6C
B2XVJ7	N			1x250-mL aG	9060_TOC: COMMON <i>NP</i>	28 Days	Cool <=6C
B2XVK0	Y			1x250-mL G/P	2320_ALKALINITY: GW 01	14 Days	Cool <=6C
B2XVK0	Y			1x500-mL G/P	6020_METALS_ICPMS: GW 01; 6010_METALS_ICP: GW 04	6 Months	None

Relinquished By **CHRIS FULTON** CHPRC
Date/Time **JAN 06 2015 1600**
Sign *[Signature]*

Received By **SSU-1**
Date/Time **JAN 06 2015 1600**
Sign *[Signature]*

Relinquished By **SSU-1**
Date/Time **JAN 07 2015 1000**
Sign *[Signature]*

Received By **LD. WALL** CHPRC
Date/Time **JAN 07 2015 1000**
Sign *[Signature]*

Relinquished By **LD. WALL** CHPRC
Date/Time **JAN 07 2015 1400**
Sign *[Signature]*

Received By **FEDEX**
Date/Time **JAN 07 2015 1400**
Sign *[Signature]*

Relinquished By **LD. WALL** CHPRC
Date/Time **JAN 07 2015 1400**
Sign *[Signature]*

Received By **Shanta Macie**
Date/Time **1/8/15 8:45**
Sign *[Signature]*

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

Disposed By *[Signature]*
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



Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>304809</u>
Received By: <u>SHANTA MACK</u>		Date Received: <u>1-8-15 8:45</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0 cpm</u>
Classified Radioactive II or III by RSO?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Ice bags Blue ice Dry ice None Other (describe) <u>2 C</u> *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>130462962</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: <u>see below for containers received unpreserved</u> If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14 Carrier and tracking number.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7724 9465 5337</u> 7724 9465 5370 7724 9465 4812 7725 0021 0579 7724 9465 3933 7725 0021 0220

Comments (Use Continuation Form if needed): B2XVJ7 metals container
B2XVJ7 To c container
B2XVK0 metals container

PM (or PMA) review: Initials HS Date 1/8/15 Page 1 of 1

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

Laboratory Certifications

List of current GEL Certifications as of 26 January 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	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-14-9
Utah NELAP	SC000122014-16
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12

Volatile Analysis

Case Narrative

ChemStation Case Narrative
 CH2MHill Plateau Remediation Company (CPRC)
 SDG GEL364509

Method/Analysis Information

Procedure: Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer

Analytical Method: SW846 8260C

Analytical Batch Number: 1449044

Sample Analysis

The following client and quality control samples were analyzed to complete this SDG using the methods referenced in the Analysis Information section:

Sample ID	Client ID
364509002	B2XVJ7
1203242229	Method Blank (MB)
1203242230	Laboratory Control Sample (LCS)
1203242231	364627001(B2YJJ0) Post Spike (PS)
1203242232	364627001(B2YJJ0) Post Spike Duplicate (PSD)
1203242243	364627001(B2YJJ0) Post Spike (PS)
1203242244	364627001(B2YJJ0) Post Spike Duplicate (PSD)
1203242988	Laboratory Control Sample (LCS)
1203242989	Method Blank (MB)
1203242990	Laboratory Control Sample (LCS)
1203242991	Laboratory Control Sample (LCS)

NOTE: For volatile organic analyses the matrix spike designations may be indicated as "PS" or "PSD". The "PS" designation (post spike) indicates that the matrix was fortified prior to analysis but after applying any prep factors, such as a dilution. The laboratory considers the MS/MSD and PS/PSD designations interchangeable.

The data results reported met all SOP and method criteria, unless otherwise discussed below.

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-OA-E-038 REV# 21.

Calibration Information

A complete list of the initial calibration data files with the correct dates and times of analysis are shown in the Calibration History report located in the Standard Data section of the data package. The surrogate compounds were calibrated using a minimum five-point calibration curve. The surrogates were added by the auto sampler at a concentration of 50 ug/L or 20 ug/L for low level analyses. GEL Laboratories LLC will not have surrogate recoveries reported for Dibromofluoromethane. This is due to increased regulations for this analyte and an industry shortage.

Initial Calibration

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

Continuing Calibration Verification Requirements

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

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

The blanks analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Surrogate recoveries in all client and quality control samples were within the acceptance limits.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 364627001 (B2YJJ0) was designated for spike analysis.

Matrix Spike (PS) Recovery Statement

The spike 1203242231 (B2YJJ0PS) recoveries were not all within the acceptance limits.

Matrix Spike Duplicate (PSD) Recovery Statement

The spike duplicate 1203242232 (B2YJJ0PSD) recoveries were not all within the acceptance limits.

Relative Percent Difference (RPD) Statement

The RPDs between the matrix spike pair met the acceptance limits.

Internal Standard (ISTD) Acceptance

The internal standard responses in all client and quality control samples met the required acceptance criteria.

Technical Information**Holding Time Specifications**

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. 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.

Sample Preservation and Integrity

Preservation was not indicated on the sample vial. Sample 364509002 (B2XVJ7) was analyzed within 7 days from collection.

Sample Dilutions/Methanol Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-analyses were not required for samples in this SDG.

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

The following DER was generated for this SDG: 1374010.

Manual Integrations

Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

TIC Comment

Tentatively identified compounds (TIC) were not required for this SDG.

Additional Comments

Additional comments were not required for this SDG.

Residual Chlorine

Residual Chlorine was not detected in any of the samples in this SDG.

System Configuration

The Volatile-GC/MS analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description	P & T Trap
VOA3.I	Agilent 6890/5973 GC/MS w/ OI 4560/Archon Autosampler	HP6890/HP5973	DB-624	J&W, 60m x 0.25mm x 1.4um	Trap 10

Certification Statement

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

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: GEL364509 GEL Work Order: 364509

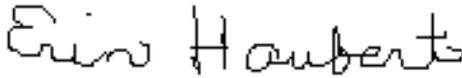
The Qualifiers in this report are defined as follows:

- T Spike and/or spike duplicate 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.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

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: Erin Haubert

Date: 30 JAN 2015

Title: Data Validator

Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-010**

Report Date: January 20, 2015

Client Sample ID:	B2XVJ7	Project:	CPRC0S15010
Sample ID:	364509002	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	06-JAN-15 15:15		
Receive Date:	08-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Volatile Organics										
<i>8260VOA_GCMS: COMMON + GW 01 "As Received"</i>										
1,1,1-Trichloroethane 71-55-6	U	0.00	0.300	5.00	ug/L	1	CDS1 01/13/15	1804	1449044	1
1,1,2-Trichloroethane 79-00-5	U	0.00	0.300	5.00	ug/L	1				
1,1-Dichloroethane 75-34-3	U	0.00	0.300	10.0	ug/L	1				
1,1-Dichloroethylene 75-35-4	U	0.00	0.300	10.0	ug/L	1				
1,2-Dichloroethane 107-06-2	U	0.00	0.300	5.00	ug/L	1				
1,4-Dichlorobenzene 106-46-7	U	0.00	0.300	5.00	ug/L	1				
2-Butanone 78-93-3	TU	0.00	3.00	10.0	ug/L	1				
4-Methyl-2-pentanone 108-10-1	U	0.00	3.00	10.0	ug/L	1				
Acetone 67-64-1	TU	0.00	3.00	20.0	ug/L	1				
Benzene 71-43-2	U	0.00	0.300	5.00	ug/L	1				
Carbon disulfide 75-15-0	U	0.00	1.60	10.0	ug/L	1				
Carbon tetrachloride 56-23-5	U	0.00	0.300	5.00	ug/L	1				
Chlorobenzene 108-90-7	U	0.00	0.300	5.00	ug/L	1				
Chloroform 67-66-3	U	0.00	0.300	5.00	ug/L	1				
Ethylbenzene 100-41-4	U	0.00	0.300	5.00	ug/L	1				
Methylene chloride 75-09-2	U	0.00	1.60	5.00	ug/L	1				
Propionitrile 107-12-0	U	0.00	3.00	10.0	ug/L	1				
Tetrachloroethylene 127-18-4	U	0.00	0.300	5.00	ug/L	1				

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-010**

Report Date: January 20, 2015

Client Sample ID: B2XVJ7 Project: CPRC0S15010
 Sample ID: 364509002 Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics											
<i>8260VOA_GCMS: COMMON + GW 01 "As Received"</i>											
Tetrahydrofuran	U	0.00	1.50	50.0	ug/L	1					
109-99-9											
Toluene	U	0.00	0.300	5.00	ug/L	1					
108-88-3											
Trichloroethylene	U	0.00	0.300	5.00	ug/L	1					
79-01-6											
Vinyl chloride	U	0.00	0.300	10.0	ug/L	1					
75-01-4											
Xylenes (total)	U	0.00	0.300	10.0	ug/L	1					
1330-20-7											
cis-1,2-Dichloroethylene	U	0.00	0.300	5.00	ug/L	1					
156-59-2											
n-Butyl alcohol	U	0.00	83.3	250	ug/L	1					
71-36-3											
trans-1,2-Dichloroethylene	U	0.00	0.300	5.00	ug/L	1					
156-60-5											

The following Analytical Methods were performed

Method	Description	Analyst	Comments
1	SW846 8260C		

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	8260VOA_GCMS: COMMON + GW 01 "As Received"	49.2 ug/L	50.0	98.5	(77%-123%)
Bromofluorobenzene	8260VOA_GCMS: COMMON + GW 01 "As Received"	48.6 ug/L	50.0	97.3	(80%-120%)
Toluene-d8	8260VOA_GCMS: COMMON + GW 01 "As Received"	46.8 ug/L	50.0	93.6	(80%-120%)

Quality Control Summary

March 05, 2015
GEL LABORATORIES LLC

REV 1

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

QC Summary

Report Date: January 20, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 364509

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1449044										
QC1203242230	LCS										
1,1,1-Trichloroethane	50.0			55.8	ug/L		112	(70%-130%)	CDS1	01/13/15	07:37
1,1,2-Trichloroethane	50.0			48.8	ug/L		97.6	(70%-130%)			
1,1-Dichloroethane	50.0			52.9	ug/L		106	(70%-130%)			
1,1-Dichloroethylene	50.0			53.4	ug/L		107	(70%-130%)			
1,2-Dichloroethane	50.0			49.7	ug/L		99.3	(70%-130%)			
1,4-Dichlorobenzene	50.0			47.0	ug/L		94.1	(70%-130%)			
2-Butanone	250			219	ug/L		87.6	(70%-130%)			
4-Methyl-2-pentanone	250			208	ug/L		83.3	(70%-130%)			
Acetone	250			216	ug/L		86.3	(70%-130%)			
Benzene	50.0			51.8	ug/L		104	(70%-130%)			
Carbon disulfide	250			267	ug/L		107	(70%-130%)			
Carbon tetrachloride	50.0			54.5	ug/L		109	(70%-130%)			
Chlorobenzene	50.0			49.7	ug/L		99.3	(70%-130%)			
Chloroform	50.0			52.5	ug/L		105	(70%-130%)			
Ethylbenzene	50.0			47.6	ug/L		95.2	(70%-130%)			
Methylene chloride	50.0			50.2	ug/L		100	(70%-130%)			
Tetrachloroethylene	50.0			48.1	ug/L		96.2	(70%-130%)			
Toluene	50.0			49.1	ug/L		98.2	(70%-130%)			
Trichloroethylene	50.0			53.8	ug/L		108	(70%-130%)			
Vinyl chloride	50.0			59.3	ug/L		119	(70%-130%)			

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Workorder: 364509

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1449044										
Xylenes (total)	150			143	ug/L		95.3	(70%-130%)	CDS1	01/13/15	07:37
cis-1,2-Dichloroethylene	50.0			52.1	ug/L		104	(70%-130%)			
n-Butyl alcohol	5000			4810	ug/L		96.3	(70%-130%)			
trans-1,2-Dichloroethylene	50.0			52.8	ug/L		106	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			46.3	ug/L		92.6	(77%-123%)			
**Bromofluorobenzene	50.0			50.1	ug/L		100	(80%-120%)			
**Toluene-d8	50.0			46.9	ug/L		93.7	(80%-120%)			
QC1203242988	LCS										
Propionitrile	250			223	ug/L		89.4	(70%-130%)		01/13/15	08:07
Tetrahydrofuran	250			219	ug/L		87.4	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			45.1	ug/L		90.1	(77%-123%)			
**Bromofluorobenzene	50.0			46.7	ug/L		93.4	(80%-120%)			
**Toluene-d8	50.0			48.6	ug/L		97.1	(80%-120%)			
QC1203242990	LCS										
1,1,1-Trichloroethane	50.0			49.5	ug/L		98.9	(70%-130%)		01/14/15	07:28
1,1,2-Trichloroethane	50.0			47.6	ug/L		95.2	(70%-130%)			
1,1-Dichloroethane	50.0			46.8	ug/L		93.6	(70%-130%)			
1,1-Dichloroethylene	50.0			46.4	ug/L		92.9	(70%-130%)			
1,2-Dichloroethane	50.0			51.1	ug/L		102	(70%-130%)			
1,4-Dichlorobenzene	50.0			46.4	ug/L		92.9	(70%-130%)			
2-Butanone	250			271	ug/L		108	(70%-130%)			
4-Methyl-2-pentanone	250			244	ug/L		97.4	(70%-130%)			
Acetone	250			276	ug/L		110	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1449044										
Benzene	50.0			46.6	ug/L		93.1	(70%-130%)	CDS1	01/14/15	07:28
Carbon disulfide	250			243	ug/L		97.2	(70%-130%)			
Carbon tetrachloride	50.0			48.6	ug/L		97.2	(70%-130%)			
Chlorobenzene	50.0			44.6	ug/L		89.1	(70%-130%)			
Chloroform	50.0			49.1	ug/L		98.2	(70%-130%)			
Ethylbenzene	50.0			43.0	ug/L		85.9	(70%-130%)			
Methylene chloride	50.0			47.1	ug/L		94.2	(70%-130%)			
Tetrachloroethylene	50.0			41.7	ug/L		83.4	(70%-130%)			
Toluene	50.0			43.5	ug/L		86.9	(70%-130%)			
Trichloroethylene	50.0			48.1	ug/L		96.2	(70%-130%)			
Vinyl chloride	50.0			50.9	ug/L		102	(70%-130%)			
Xylenes (total)	150			131	ug/L		87	(70%-130%)			
cis-1,2-Dichloroethylene	50.0			46.7	ug/L		93.4	(70%-130%)			
n-Butyl alcohol	5000			6180	ug/L		124	(70%-130%)			
trans-1,2-Dichloroethylene	50.0			45.0	ug/L		90	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			48.4	ug/L		96.8	(77%-123%)			
**Bromofluorobenzene	50.0			50.8	ug/L		102	(80%-120%)			
**Toluene-d8	50.0			45.4	ug/L		90.8	(80%-120%)			
QC1203242991	LCS										
Propionitrile	250			233	ug/L		93	(70%-130%)		01/14/15	07:58
Tetrahydrofuran	250			219	ug/L		87.4	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			46.0	ug/L		92	(77%-123%)			

QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1449044										
**Bromofluorobenzene	50.0			45.4	ug/L		90.8	(80%-120%)	CDS1	01/14/15	07:58
**Toluene-d8	50.0			46.4	ug/L		92.9	(80%-120%)			
QC1203242229	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					01/13/15	10:28
1,1,2-Trichloroethane			U	0.300	ug/L						
1,1-Dichloroethane			U	0.300	ug/L						
1,1-Dichloroethylene			U	0.300	ug/L						
1,2-Dichloroethane			U	0.300	ug/L						
1,4-Dichlorobenzene			U	0.300	ug/L						
2-Butanone			U	3.00	ug/L						
4-Methyl-2-pentanone			U	3.00	ug/L						
Acetone			U	3.00	ug/L						
Benzene			U	0.300	ug/L						
Carbon disulfide			U	1.60	ug/L						
Carbon tetrachloride			U	0.300	ug/L						
Chlorobenzene			U	0.300	ug/L						
Chloroform			U	0.300	ug/L						
Ethylbenzene			U	0.300	ug/L						
Methylene chloride			U	1.60	ug/L						
Propionitrile			U	3.00	ug/L						
Tetrachloroethylene			U	0.300	ug/L						
Tetrahydrofuran			U	1.50	ug/L						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1449044										
Toluene			U	0.300	ug/L				CDS1	01/13/15	10:28
Trichloroethylene			U	0.300	ug/L						
Vinyl chloride			U	0.300	ug/L						
Xylenes (total)			U	0.300	ug/L						
cis-1,2-Dichloroethylene			U	0.300	ug/L						
n-Butyl alcohol			U	83.3	ug/L						
trans-1,2-Dichloroethylene			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			48.6	ug/L		97.3	(77%-123%)			
**Bromofluorobenzene	50.0			49.3	ug/L		98.5	(80%-120%)			
**Toluene-d8	50.0			48.7	ug/L		97.5	(80%-120%)			
QC1203242989	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					01/14/15	08:28
1,1,2-Trichloroethane			U	0.300	ug/L						
1,1-Dichloroethane			U	0.300	ug/L						
1,1-Dichloroethylene			U	0.300	ug/L						
1,2-Dichloroethane			U	0.300	ug/L						
1,4-Dichlorobenzene			U	0.300	ug/L						
2-Butanone			U	3.00	ug/L						
4-Methyl-2-pentanone			U	3.00	ug/L						
Acetone			U	3.00	ug/L						
Benzene			U	0.300	ug/L						
Carbon disulfide			U	1.60	ug/L						

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1449044										
Carbon tetrachloride			U	0.300	ug/L				CDS1	01/14/15	08:28
Chlorobenzene			U	0.300	ug/L						
Chloroform			U	0.300	ug/L						
Ethylbenzene			U	0.300	ug/L						
Methylene chloride			U	1.60	ug/L						
Propionitrile			U	3.00	ug/L						
Tetrachloroethylene			U	0.300	ug/L						
Tetrahydrofuran			U	1.50	ug/L						
Toluene			U	0.300	ug/L						
Trichloroethylene			U	0.300	ug/L						
Vinyl chloride			U	0.300	ug/L						
Xylenes (total)			U	0.300	ug/L						
cis-1,2-Dichloroethylene			U	0.300	ug/L						
n-Butyl alcohol			U	83.3	ug/L						
trans-1,2-Dichloroethylene			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			49.8	ug/L		99.5	(77%-123%)			
**Bromofluorobenzene	50.0			47.1	ug/L		94.2	(80%-120%)			
**Toluene-d8	50.0			46.2	ug/L		92.5	(80%-120%)			
QC1203242231 364627001 PS											
1,1,1-Trichloroethane	50.0	U	0.00	53.7	ug/L		107	(70%-130%)		01/14/15	16:29
1,1,2-Trichloroethane	50.0	U	0.00	47.8	ug/L		95.6	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	50.8	ug/L		102	(70%-130%)			

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1449044										
1,1-Dichloroethylene	50.0	U	0.00		49.9	ug/L	99.8	(70%-130%)	CDS1	01/14/15	16:29
1,2-Dichloroethane	50.0	U	0.00		51.9	ug/L	104	(70%-130%)			
1,4-Dichlorobenzene	50.0	U	0.00		47.8	ug/L	95.5	(70%-130%)			
2-Butanone	250	TU	0.00	T	135	ug/L	54*	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00		210	ug/L	83.8	(70%-130%)			
Acetone	250	TU	0.00	T	96.1	ug/L	38.4*	(70%-130%)			
Benzene	50.0	U	0.00		50.5	ug/L	101	(70%-130%)			
Carbon disulfide	250	U	0.00		261	ug/L	105	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00		54.8	ug/L	110	(70%-130%)			
Chlorobenzene	50.0	U	0.00		48.7	ug/L	97.3	(70%-130%)			
Chloroform	50.0	U	0.00		52.5	ug/L	105	(70%-130%)			
Ethylbenzene	50.0	U	0.00		47.8	ug/L	95.6	(70%-130%)			
Methylene chloride	50.0	U	1.31		47.8	ug/L	93	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00		47.7	ug/L	95.3	(70%-130%)			
Toluene	50.0	U	0.00		45.9	ug/L	91.9	(70%-130%)			
Trichloroethylene	50.0	U	0.00		52.7	ug/L	105	(70%-130%)			
Vinyl chloride	50.0	U	0.00		55.3	ug/L	111	(70%-130%)			
Xylenes (total)	150	U	0.00		140	ug/L	93	(70%-130%)			
cis-1,2-Dichloroethylene	50.0	U	0.00		51.7	ug/L	103	(70%-130%)			
n-Butyl alcohol	5000	U	0.00		4650	ug/L	93.1	(70%-130%)			
trans-1,2-Dichloroethylene	50.0	U	0.00		51.3	ug/L	103	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1449044										
**1,2-Dichloroethane-d4	50.0	53.1		47.2	ug/L		94.4	(77%-123%)			
**Bromofluorobenzene	50.0	47.7		51.2	ug/L		102	(80%-120%)	CDS1	01/14/15	16:29
**Toluene-d8	50.0	46.3		44.9	ug/L		89.8	(80%-120%)			
QC1203242243 364627001 PS											
Propionitrile	250	U	0.00	246	ug/L		98.2	(70%-130%)		01/14/15	17:29
Tetrahydrofuran	250	U	0.00	248	ug/L		99.2	(70%-130%)			
**1,2-Dichloroethane-d4	50.0	53.1		46.5	ug/L		93.1	(77%-123%)			
**Bromofluorobenzene	50.0	47.7		45.7	ug/L		91.4	(80%-120%)			
**Toluene-d8	50.0	46.3		45.5	ug/L		91	(80%-120%)			
QC1203242232 364627001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	55.0	ug/L	2.41	110	(0%-20%)		01/14/15	16:59
1,1,2-Trichloroethane	50.0	U	0.00	48.1	ug/L	0.605	96.2	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	51.3	ug/L	0.803	103	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	50.6	ug/L	1.33	101	(0%-20%)			
1,2-Dichloroethane	50.0	U	0.00	51.9	ug/L	0.0193	104	(0%-20%)			
1,4-Dichlorobenzene	50.0	U	0.00	47.5	ug/L	0.609	95	(0%-20%)			
2-Butanone	250	TU	0.00	T 132	ug/L	2.23	52.8*	(0%-20%)			
4-Methyl-2-pentanone	250	U	0.00	201	ug/L	4.13	80.4	(0%-20%)			
Acetone	250	TU	0.00	T 96.5	ug/L	0.384	38.6*	(0%-20%)			
Benzene	50.0	U	0.00	51.0	ug/L	1.00	102	(0%-20%)			
Carbon disulfide	250	U	0.00	260	ug/L	0.518	104	(0%-20%)			
Carbon tetrachloride	50.0	U	0.00	53.5	ug/L	2.44	107	(0%-20%)			
Chlorobenzene	50.0	U	0.00	48.9	ug/L	0.574	97.9	(0%-20%)			
Chloroform	50.0	U	0.00	52.0	ug/L	0.918	104	(0%-20%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1449044										
Ethylbenzene	50.0	U	0.00	47.4	ug/L	0.819	94.8	(0%-20%)	CDS1	01/14/15	16:59
Methylene chloride	50.0	U	1.31	49.1	ug/L	2.66	95.6	(0%-20%)			
Tetrachloroethylene	50.0	U	0.00	46.4	ug/L	2.74	92.7	(0%-20%)			
Toluene	50.0	U	0.00	47.3	ug/L	2.98	94.7	(0%-20%)			
Trichloroethylene	50.0	U	0.00	52.4	ug/L	0.647	105	(0%-20%)			
Vinyl chloride	50.0	U	0.00	58.1	ug/L	4.99	116	(0%-20%)			
Xylenes (total)	150	U	0.00	144	ug/L	3.31	96.1	(0%-20%)			
cis-1,2-Dichloroethylene	50.0	U	0.00	52.1	ug/L	0.751	104	(0%-20%)			
n-Butyl alcohol	5000	U	0.00	4640	ug/L	0.259	92.8	(0%-20%)			
trans-1,2-Dichloroethylene	50.0	U	0.00	51.0	ug/L	0.607	102	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		53.1	46.7	ug/L		93.3	(77%-123%)			
**Bromofluorobenzene	50.0		47.7	49.5	ug/L		99.1	(80%-120%)			
**Toluene-d8	50.0		46.3	45.6	ug/L		91.2	(80%-120%)			
QC1203242244 364627001 PSD											
Propionitrile	250	U	0.00	228	ug/L	7.35	91.3	(0%-20%)		01/14/15	18:00
Tetrahydrofuran	250	U	0.00	220	ug/L	12.0	87.9	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		53.1	45.9	ug/L		91.7	(77%-123%)			
**Bromofluorobenzene	50.0		47.7	46.3	ug/L		92.5	(80%-120%)			
**Toluene-d8	50.0		46.3	47.0	ug/L		94	(80%-120%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
B	The analyte was detected in both the associated QC blank and in the sample.										
C	Analyte has been confirmed by GC/MS analysis										
D	Results are reported from a diluted aliquot of sample.										
E	Concentration exceeds the calibration range of the instrument										
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated										
N	Spike Sample recovery is outside control limits.										
P	Aroclor target analyte with greater than 25% difference between column analyses.										
T	Spike and/or spike duplicate 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										
o	Analyte failed to recover within LCS limits (Organics only)										

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

DATA EXCEPTION REPORT

Mo.Day Yr. 19-JAN-15	Division: Federal	Quality Criteria: SOP	Type: Process
Instrument Type: VOA GC/MS	Test / Method: 8260C	Matrix Type: Liquid	Client Code: CPRC001
Batch ID: 1449044	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 364498(GEL364498),364504(GEL364504),364509(GEL364509),364512(GEL364512),364591(GEL364591),364627(GEL364627),364632(GEL364632)</p> <p>Application Issues:</p> <p>Failed Recovery for MS/PS Failed Recovery for MSD/PSD</p>			
Specification and Requirements		DER Disposition:	
Exception Description:			
<p>1. The recoveries for Acetone and 2-Butanone were outside of acceptance limits in the MS and in the MSD performed on sample 364627001. The calculated relative percent differences between the MS and MSD were within the acceptance limits for all client requested compounds.</p>		<p>1. Narrate and report data.</p>	

Originator's Name:
Crystal Stacey 19-JAN-15

Data Validator/Group Leader:
Erin Haubert 20-JAN-15

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL364509
Work Order #: 364509

Sample ID	Client ID
364509002	B2XVJ7
364509003	B2XVK0
1203240052	Method Blank (MB)ICP
1203240053	Laboratory Control Sample (LCS)
1203240056	364511001(B2Y941L) Serial Dilution (SD)
1203240054	364511001(B2Y941S) Matrix Spike (MS)
1203240055	364511001(B2Y941SD) Matrix Spike Duplicate (MSD)
1203240161	Method Blank (MB)ICP-MS
1203240162	Laboratory Control Sample (LCS)
1203240165	364509002(B2XVJ7L) Serial Dilution (SD)
1203240163	364509002(B2XVJ7S) Matrix Spike (MS)
1203240164	364509002(B2XVJ7SD) Matrix Spike Duplicate (MSD)

Sample Analysis

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

Method/Analysis Information

Analytical Batch:	1448176 and 1448230
Prep Batch :	1448175 and 1448229
Standard Operating Procedures:	GL-MA-E-013 REV# 23, GL-MA-E-006 REV# 11 and GL-MA-E-014 REV# 25
Analytical Method:	SW846 3005A/6010C and SW846 3005A/6020A
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

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.

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 listed below. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 364509002 (B2XVJ7) and 364509003 (B2XVK0)-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. The analyte concentration was greater than the MDL in blank. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. Tin was flagged with a "B" flag. 1203240161 (MB)-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: 364511001 (B2Y941)-ICP and 364509002 (B2XVJ7)-ICP-MS.

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable analytes met the acceptance criteria.

Matrix Spike Duplicate (MSD) Recovery Statement

The percent recovery (%R) obtained from the MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All applicable analytes met the acceptance criteria.

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

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 25x the IDL/MDL for CVAA, 50X the IDL/MDL for ICP and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes 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

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples were diluted to ensure that the manganese concentrations were within the linear calibration range of the instrument. 364509002 (B2XVJ7) and 364509003 (B2XVK0)-ICP-MS.

Preparation Information

The samples in this SDG were prepared exactly 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

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Data exception reports were included behind the Case Narrative or in the Miscellaneous Data section of this data package. 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: GEL364509 GEL Work Order: 364509

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: 02 FEB 2015

Title: Data Validator

Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-010**

Report Date: February 2, 2015

Client Sample ID:	B2XVJ7	Project:	CPRC0S15010
Sample ID:	364509002	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	06-JAN-15 15:15		
Receive Date:	08-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP											
<i>6010_METALS_ICP:GW 04 (6 metals) "As Received"</i>											
Calcium		60600	+/-12100	50.0	200	ug/L	1	HSC	01/21/15	1459	1448176 1
7440-70-2											
Iron		907	+/-182	30.0	100	ug/L	1				
7439-89-6											
Magnesium		17300	+/-3460	110	300	ug/L	1				
7439-95-4											
Potassium		24500	+/-4900	50.0	150	ug/L	1				
7440-09-7											
Sodium		12700	+/-2550	100	300	ug/L	1				
7440-23-5											
Vanadium	B	3.89	+/-0.846	1.00	5.00	ug/L	1				
7440-62-2											
Metals Analysis-ICP-MS											
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>											
Aluminum	B	21.2	+/-6.56	15.0	50.0	ug/L	1	BAJ	01/27/15	1818	1448230 2
7429-90-5											
Antimony	U	0.428	+/-0.344	1.00	3.00	ug/L	1				
7440-36-0											
Arsenic	B	2.60	+/-0.769	1.70	5.00	ug/L	1				
7440-38-2											
Barium		76.9	+/-15.4	0.600	2.00	ug/L	1				
7440-39-3											
Boron		22.9	+/-4.77	4.00	15.0	ug/L	1				
7440-42-8											
Cadmium	U	0.010	+/-0.0367	0.110	1.00	ug/L	1				
7440-43-9											
Chromium	B	4.09	+/-1.06	2.00	10.0	ug/L	1				
7440-47-3											
Cobalt	B	0.811	+/-0.166	0.100	1.00	ug/L	1				
7440-48-4											
Copper		4.32	+/-0.871	0.350	1.00	ug/L	1				
7440-50-8											
Lead	U	0.276	+/-0.176	0.500	2.00	ug/L	1				
7439-92-1											
Molybdenum		3.24	+/-0.651	0.165	0.500	ug/L	1				

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-010**

Report Date: February 2, 2015

Client Sample ID: B2XVJ7 Project: CPRC0S15010
 Sample ID: 364509002 Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS											
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>											
7439-98-7											
Nickel		6.54	+/-1.32	0.500	2.00	ug/L					
7440-02-0											
Silver	U	0.012	+/-0.0667	0.200	1.00	ug/L					
7440-22-4											
Strontium		312	+/-62.5	2.00	10.0	ug/L					
7440-24-6											
Thallium	U	0.031	+/-0.150	0.450	2.00	ug/L					
7440-28-0											
Thorium	U	0.054	+/-0.128	0.383	2.00	ug/L					
7440-29-1											
Tin	U	0.536	+/-0.350	1.00	5.00	ug/L					
7440-31-5											
Uranium		1.42	+/-0.284	0.067	0.200	ug/L					
7440-61-1											
Zinc	U	2.92	+/-1.30	3.50	10.0	ug/L					
7440-66-6											
Manganese	D	2810	+/-563	50.0	250	ug/L	50	PRB	01/29/15	0948	1448230 3
7439-96-5											
Beryllium	U	0.024	+/-0.0668	0.200	0.500	ug/L	1	BAJ	01/28/15	1938	1448230 4
7440-41-7											
Selenium	U	0.388	+/-0.506	1.50	5.00	ug/L					
7782-49-2											

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	KXP3	01/09/15	0930	1448229
SW846 3005A	SW846 3005A for 6010C	KXP3	01/09/15	0930	1448175

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3005A/6010C	
2	SW846 3005A/6020A	
3	SW846 3005A/6020A	
4	SW846 3005A/6020A	

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-010**

Report Date: February 2, 2015

Client Sample ID:	B2XVK0	Project:	CPRC0S15010
Sample ID:	364509003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	06-JAN-15 15:15		
Receive Date:	08-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP											
<i>6010_METALS_ICP:GW 04 (6 metals) "As Received"</i>											
Calcium		60200	+/-12000	50.0	200	ug/L	1	HSC	01/21/15	1503	1448176 1
7440-70-2											
Iron		845	+/-169	30.0	100	ug/L	1				
7439-89-6											
Magnesium		17200	+/-3440	110	300	ug/L	1				
7439-95-4											
Potassium		24500	+/-4890	50.0	150	ug/L	1				
7440-09-7											
Sodium		12400	+/-2490	100	300	ug/L	1				
7440-23-5											
Vanadium	B	3.18	+/-0.718	1.00	5.00	ug/L	1				
7440-62-2											
Metals Analysis-ICP-MS											
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>											
Aluminum	U	5.95	+/-5.14	15.0	50.0	ug/L	1	BAJ	01/27/15	1830	1448230 2
7429-90-5											
Antimony	U	0.438	+/-0.345	1.00	3.00	ug/L	1				
7440-36-0											
Arsenic	B	2.28	+/-0.727	1.70	5.00	ug/L	1				
7440-38-2											
Barium		73.3	+/-14.7	0.600	2.00	ug/L	1				
7440-39-3											
Boron		21.9	+/-4.58	4.00	15.0	ug/L	1				
7440-42-8											
Cadmium	U	0.013	+/-0.0368	0.110	1.00	ug/L	1				
7440-43-9											
Chromium	U	1.52	+/-0.733	2.00	10.0	ug/L	1				
7440-47-3											
Cobalt		1.57	+/-0.316	0.100	1.00	ug/L	1				
7440-48-4											
Copper	B	0.737	+/-0.188	0.350	1.00	ug/L	1				
7440-50-8											
Lead	U	0.070	+/-0.167	0.500	2.00	ug/L	1				
7439-92-1											
Molybdenum		3.14	+/-0.630	0.165	0.500	ug/L	1				

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-010**

Report Date: February 2, 2015

Client Sample ID: B2XVK0 Project: CPRC0S15010
 Sample ID: 364509003 Client ID: CPRC001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS											
<i>6020_METALS_ICPMS: GW 01 "As Received"</i>											
7439-98-7											
Nickel		5.32	+/-1.08	0.500	2.00	ug/L					
7440-02-0											
Silver	U	0.003	+/-0.0667	0.200	1.00	ug/L					
7440-22-4											
Strontium		315	+/-63.1	2.00	10.0	ug/L					
7440-24-6											
Thallium	U	-0.002	+/-0.150	0.450	2.00	ug/L					
7440-28-0											
Thorium	U	0.033	+/-0.128	0.383	2.00	ug/L					
7440-29-1											
Tin	U	0.332	+/-0.340	1.00	5.00	ug/L					
7440-31-5											
Uranium		1.33	+/-0.268	0.067	0.200	ug/L					
7440-61-1											
Zinc	U	1.41	+/-1.20	3.50	10.0	ug/L					
7440-66-6											
Manganese	D	2720	+/-543	50.0	250	ug/L	50	PRB	01/29/15	0954	1448230 3
7439-96-5											
Beryllium	U	0.015	+/-0.0667	0.200	0.500	ug/L	1	BAJ	01/28/15	1954	1448230 4
7440-41-7											
Selenium	U	0.328	+/-0.504	1.50	5.00	ug/L					
7782-49-2											

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-MS 3005A PREP	KXP3	01/09/15	0930	1448229
SW846 3005A	SW846 3005A for 6010C	KXP3	01/09/15	0930	1448175

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3005A/6010C	
2	SW846 3005A/6020A	
3	SW846 3005A/6020A	
4	SW846 3005A/6020A	

Quality Control Summary

March 05, 2015

REV 1

GEL LABORATORIES LLC

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QC Summary

Report Date: February 2, 2015

Page 1 of 8

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 364509

Parmname	NOM	Sample Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS										
Batch	1448230									
QC1203240162	LCS									
Aluminum	2000		2100	ug/L		105	(80%-120%)	BAJ	01/27/15	18:11
Antimony	50.0		52.7	ug/L		105	(80%-120%)			
Arsenic	50.0		43.7	ug/L		87.4	(80%-120%)			
Barium	50.0		51.2	ug/L		102	(80%-120%)			
Beryllium	50.0		52.9	ug/L		106	(80%-120%)		01/28/15	19:35
Boron	100		109	ug/L		109	(80%-120%)		01/27/15	18:11
Cadmium	50.0		53.8	ug/L		108	(80%-120%)			
Chromium	50.0		53.5	ug/L		107	(80%-120%)			
Cobalt	50.0		53.0	ug/L		106	(80%-120%)			
Copper	50.0		54.0	ug/L		108	(80%-120%)			
Lead	50.0		51.7	ug/L		103	(80%-120%)			
Manganese	50.0		54.7	ug/L		109	(80%-120%)	PRB	01/29/15	09:44
Molybdenum	50.0		51.5	ug/L		103	(80%-120%)	BAJ	01/27/15	18:11
Nickel	50.0		53.3	ug/L		107	(80%-120%)			
Selenium	50.0		53.2	ug/L		106	(80%-120%)		01/28/15	19:35
Silver	50.0		53.8	ug/L		108	(80%-120%)		01/27/15	18:11
Strontium	50.0		51.9	ug/L		104	(80%-120%)			
Thallium	50.0		51.8	ug/L		104	(80%-120%)			
Thorium	50.0		51.7	ug/L		103	(80%-120%)			
Tin	50.0		54.6	ug/L		109	(80%-120%)			

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QC Summary

Workorder: 364509

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1448230										
Uranium	50.0			52.3	ug/L		105	(80%-120%)	BAJ	01/27/15	18:11
Zinc	50.0			55.6	ug/L		111	(80%-120%)			
QC1203240161	MB										
Aluminum			U	15.0	ug/L					01/27/15	18:09
Antimony			U	1.00	ug/L						
Arsenic			U	1.70	ug/L						
Barium			U	0.600	ug/L						
Beryllium			U	0.200	ug/L					01/28/15	19:31
Boron			U	4.00	ug/L					01/27/15	18:09
Cadmium			U	0.110	ug/L						
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				PRB	01/29/15	09:42
Molybdenum			U	0.165	ug/L				BAJ	01/27/15	18:09
Nickel			U	0.500	ug/L						
Selenium			U	1.50	ug/L					01/28/15	19:31
Silver			U	0.200	ug/L					01/27/15	18:09
Strontium			U	2.00	ug/L						
Thallium			U	0.450	ug/L						
Thorium			U	0.383	ug/L						

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QC Summary

Workorder: 364509

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1448230										
Tin			B	2.27	ug/L				BAJ	01/27/15	18:09
Uranium			U	0.067	ug/L						
Zinc			U	3.50	ug/L						
QC1203240163 364509002 MS											
Aluminum	2000	B	21.2	2070	ug/L		103	(75%-125%)		01/27/15	18:21
Antimony	50.0	U	1.00	52.1	ug/L		103	(75%-125%)			
Arsenic	50.0	B	2.60	46.5	ug/L		87.9	(75%-125%)			
Barium	50.0		76.9	126	ug/L		98.6	(75%-125%)			
Beryllium	50.0	U	0.200	49.7	ug/L		99.4	(75%-125%)		01/28/15	19:42
Boron	100		22.9	132	ug/L		109	(75%-125%)		01/27/15	18:21
Cadmium	50.0	U	0.110	51.2	ug/L		102	(75%-125%)			
Chromium	50.0	B	4.09	54.9	ug/L		102	(75%-125%)			
Cobalt	50.0	B	0.811	51.8	ug/L		102	(75%-125%)			
Copper	50.0		4.32	52.7	ug/L		96.7	(75%-125%)			
Lead	50.0	U	0.500	49.4	ug/L		98.3	(75%-125%)			
Manganese	50.0	D	2810	D 2870	ug/L		N/A	(75%-125%)	PRB	01/29/15	09:49
Molybdenum	50.0		3.24	54.6	ug/L		103	(75%-125%)	BAJ	01/27/15	18:21
Nickel	50.0		6.54	55.5	ug/L		97.9	(75%-125%)			
Selenium	50.0	U	1.50	54.6	ug/L		109	(75%-125%)		01/28/15	19:42
Silver	50.0	U	0.200	50.2	ug/L		100	(75%-125%)		01/27/15	18:21
Strontium	50.0		312	363	ug/L		N/A	(75%-125%)			
Thallium	50.0	U	0.450	49.9	ug/L		99.7	(75%-125%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 364509

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1448230										
Thorium	50.0	U	0.383	51.4	ug/L		103	(75%-125%)	BAJ	01/27/15	18:21
Tin	50.0	U	1.00	52.8	ug/L		105	(75%-125%)			
Uranium	50.0		1.42	52.9	ug/L		103	(75%-125%)			
Zinc	50.0	U	3.50	53.0	ug/L		100	(75%-125%)			
QC1203240164 364509002 MSD											
Aluminum	2000	B	21.2	2160	ug/L	4.02	107	(0%-20%)		01/27/15	18:23
Antimony	50.0	U	1.00	54.1	ug/L	3.87	107	(0%-20%)			
Arsenic	50.0	B	2.60	48.5	ug/L	4.13	91.8	(0%-20%)			
Barium	50.0		76.9	125	ug/L	0.739	96.7	(0%-20%)			
Beryllium	50.0	U	0.200	51.3	ug/L	3.18	103	(0%-20%)		01/28/15	19:46
Boron	100		22.9	135	ug/L	2.34	112	(0%-20%)		01/27/15	18:23
Cadmium	50.0	U	0.110	52.0	ug/L	1.58	104	(0%-20%)			
Chromium	50.0	B	4.09	56.9	ug/L	3.46	106	(0%-20%)			
Cobalt	50.0	B	0.811	52.4	ug/L	1.15	103	(0%-20%)			
Copper	50.0		4.32	55.9	ug/L	5.95	103	(0%-20%)			
Lead	50.0	U	0.500	49.9	ug/L	0.924	99.2	(0%-20%)			
Manganese	50.0	D	2810	D 2910	ug/L	1.42	N/A	(0%-20%)	PRB	01/29/15	09:51
Molybdenum	50.0		3.24	56.5	ug/L	3.27	106	(0%-20%)	BAJ	01/27/15	18:23
Nickel	50.0		6.54	57.1	ug/L	2.83	101	(0%-20%)			
Selenium	50.0	U	1.50	54.8	ug/L	0.216	109	(0%-20%)		01/28/15	19:46
Silver	50.0	U	0.200	52.0	ug/L	3.51	104	(0%-20%)		01/27/15	18:23
Strontium	50.0		312	369	ug/L	1.74	N/A	(0%-20%)			

March 05, 2015
GEL LABORATORIES LLC

REV 1

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QC Summary

Workorder: 364509

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1448230										
Thallium	50.0	U	0.450	50.2	ug/L	0.512	100	(0%-20%)	BAJ	01/27/15	18:23
Thorium	50.0	U	0.383	51.5	ug/L	0.144	103	(0%-20%)			
Tin	50.0	U	1.00	54.2	ug/L	2.53	107	(0%-20%)			
Uranium	50.0		1.42	53.5	ug/L	1.07	104	(0%-20%)			
Zinc	50.0	U	3.50	56.9	ug/L	7.15	108	(0%-20%)			
QC1203240165 364509002 SDILT											
Aluminum		B	21.2	DU	75.0	ug/L	N/A	(0%-10%)		01/27/15	18:28
Antimony		U	0.428	DU	5.00	ug/L	N/A	(0%-10%)			
Arsenic		B	2.60	DU	8.50	ug/L	N/A	(0%-10%)			
Barium			76.9	D	15.8	ug/L	2.66	(0%-10%)			
Beryllium		U	0.024	DU	1.00	ug/L	N/A	(0%-10%)		01/28/15	19:50
Boron			22.9	D	6.29	ug/L	37.3	(0%-10%)		01/27/15	18:28
Cadmium		U	0.010	DU	0.550	ug/L	N/A	(0%-10%)			
Chromium		B	4.09	DU	10.0	ug/L	N/A	(0%-10%)			
Cobalt		B	0.811	D	0.182	ug/L	12.2	(0%-10%)			
Copper			4.32	D	1.02	ug/L	18	(0%-10%)			
Lead		U	0.276	DU	2.50	ug/L	N/A	(0%-10%)			
Manganese		D	56.3	D	12.0	ug/L	6.42	(0%-10%)	PRB	01/29/15	09:52
Molybdenum			3.24	D	0.690	ug/L	6.42	(0%-10%)	BAJ	01/27/15	18:28
Nickel			6.54	D	1.45	ug/L	10.8	(0%-10%)			
Selenium		U	0.388	DU	7.50	ug/L	N/A	(0%-10%)		01/28/15	19:50
Silver		U	0.012	DU	1.00	ug/L	N/A	(0%-10%)		01/27/15	18:28

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QC Summary

Workorder: 364509

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1448230										
Strontium		312	D	62.1	ug/L	.631		(0%-10%)	BAJ	01/27/15	18:28
Thallium	U	0.031	DU	2.25	ug/L	N/A		(0%-10%)			
Thorium	U	0.054	DU	1.92	ug/L	N/A		(0%-10%)			
Tin	U	0.536	DU	5.00	ug/L	N/A		(0%-10%)			
Uranium		1.42	D	0.302	ug/L	6.71		(0%-10%)			
Zinc	U	2.92	DU	17.5	ug/L	N/A		(0%-10%)			
Metals Analysis-ICP											
Batch	1448176										
QC1203240053	LCS										
Calcium	5000			5050	ug/L		101	(80%-120%)	HSC	01/21/15	14:37
Iron	5000			5350	ug/L		107	(80%-120%)			
Magnesium	5000			5160	ug/L		103	(80%-120%)			
Potassium	5000			5100	ug/L		102	(80%-120%)			
Sodium	5000			5080	ug/L		102	(80%-120%)			
Vanadium	500			517	ug/L		103	(80%-120%)			
QC1203240052	MB										
Calcium			U	50.0	ug/L					01/21/15	14:34
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Potassium			U	50.0	ug/L						
Sodium			U	100	ug/L						
Vanadium			U	1.00	ug/L						
QC1203240054	364511001 MS										
Calcium	5000	22900		27800	ug/L		N/A	(75%-125%)		01/21/15	14:44

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QC Summary

Workorder: 364509

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1448176										
Iron	5000	U	30.0	5450	ug/L		109	(75%-125%)			
Magnesium	5000		5000	10200	ug/L		104	(75%-125%)	HSC	01/21/15	14:44
Potassium	5000		1880	7070	ug/L		104	(75%-125%)			
Sodium	5000		4530	9680	ug/L		103	(75%-125%)			
Vanadium	500		5.60	532	ug/L		105	(75%-125%)			
QC1203240055 364511001 MSD											
Calcium	5000		22900	27300	ug/L	1.80	N/A	(0%-20%)		01/21/15	14:47
Iron	5000	U	30.0	5260	ug/L	3.48	105	(0%-20%)			
Magnesium	5000		5000	9920	ug/L	2.62	98.4	(0%-20%)			
Potassium	5000		1880	6920	ug/L	2.21	101	(0%-20%)			
Sodium	5000		4530	9360	ug/L	3.38	96.7	(0%-20%)			
Vanadium	500		5.60	517	ug/L	2.92	102	(0%-20%)			
QC1203240056 364511001 SDILT											
Calcium			22900	D	4380	ug/L	4.65	(0%-10%)		01/21/15	14:50
Iron		U	15.0	DU	150	ug/L	N/A	(0%-10%)			
Magnesium			5000	D	950	ug/L	5.06	(0%-10%)			
Potassium			1880	D	340	ug/L	9.75	(0%-10%)			
Sodium			4530	D	893	ug/L	1.39	(0%-10%)			
Vanadium			5.60	D	1.19	ug/L	6.54	(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

**General Chemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL364509
Work Order #: 364509**

Method/Analysis Information

Product: Carbon and Total Organic
Analytical Batch: 1448314 **Method:** 9060_TOC: COMMON

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9060A:

Sample ID	Client ID
364509002	B2XVJ7
1203240364	Method Blank (MB)
1203240365	Laboratory Control Sample (LCS)
1203240366	364504002(B2YVW9) Sample Duplicate (DUP)
1203240367	364509002(B2XVJ7) Sample Duplicate (DUP)
1203240371	364504002(B2YVW9) Post Spike (PS)
1203240373	364509002(B2XVJ7) Post Spike (PS)

The samples in this SDG were 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-093 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 Carbon analysis was performed on a O-I Analytical Model 1010 Total Organic Carbon Analyzer.

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

The following samples were selected for QC analysis: 364504002 (B2YVW9) and 364509002 (B2XVJ7).

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

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

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 in this sample group were diluted due to matrix interference: 1203240367 (B2XVJ7DUP) and 364509002 (B2XVJ7).

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: Ion Chromatography
Analytical Batch: 1448186 **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
364509001	B2XVJ8
1203240073	Method Blank (MB)
1203240074	Laboratory Control Sample (LCS)
1203240075	364502001(B300J5) Sample Duplicate (DUP)
1203240076	364502001(B300J5) Post Spike (PS)

The samples in this SDG were 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# 23.

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-3000 Ion Chromatograph.

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.

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

The following sample was selected for QC analysis: 364502001 (B300J5).

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

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

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 in this sample group were diluted due to high concentration: 1203240075 (B300J5DUP), 1203240076 (B300J5PS) and 364509001 (B2XVJ8). The following samples in this sample group were diluted due to matrix interference: 1203240075 (B300J5DUP), 1203240076 (B300J5PS) and 364509001 (B2XVJ8).

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.

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1203240075 (B300J5DUP), 1203240076 (B300J5PS) and 364509001 (B2XVJ8).

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: 1449050 **Method:** 2320_ALKALINITY: GW 01

Sample Analysis

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

Sample ID	Client ID
364509003	B2XVK0
1203242249	Method Blank (MB)
1203242250	Laboratory Control Sample (LCS)
1203242252	364509003(B2XVK0) Sample Duplicate (DUP)
1203242254	364509003(B2XVK0) Matrix Spike (MS)

The samples in this SDG were 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# 11.

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

The following sample was selected for QC analysis: 364509003 (B2XVK0).

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

The MS/PS recovery for this sample set was within the required acceptance limits.

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

50mL of sample was used due to limited quantity. 1203242252 (B2XVK0DUP), 1203242254 (B2XVK0MS) and 364509003 (B2XVK0).

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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL364509 GEL Work Order: 364509

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: 02 FEB 2015

Title: Data Validator

Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-010**

Report Date: February 2, 2015

Client Sample ID:	B2XVJ8	Project:	CPRC0S15010
Sample ID:	364509001	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	06-JAN-15 15:15		
Receive Date:	08-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography										
<i>9056_ANIONS_IC: COMMON "As Received"</i>										
Fluoride	B	340	+/-15.8	33.0	500	ug/L	1	MXL201/08/15 1534	1448186	1
16984-48-8		808	+/-29.8	38.0	250	ug/L	1			
Nitrite-N										
14797-65-0										
Chloride	D	18000	+/-639	670	2000	ug/L	10	MXL201/08/15 1606	1448186	2
16887-00-6										
Nitrate-N	D	4020	+/-173	330	1000	ug/L	10			
14797-55-8										
Sulfate	D	109000	+/-3650	1330	4000	ug/L	10			
14808-79-8										

The following Analytical Methods were performed

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

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-010**

Report Date: February 2, 2015

Client Sample ID:	B2XVJ7	Project:	CPRC0S15010
Sample ID:	364509002	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	06-JAN-15 15:15		
Receive Date:	08-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Carbon Analysis										
<i>9060_TOC: COMMON "As Received"</i>										
Total Organic Carbon #1	D	7160	660	2000	ug/L	2	TSM	01/12/15 1523	1448314	1
Total Organic Carbon #2	D	7160	660	2000	ug/L	2				
Total Organic Carbon #3	D	7060	660	2000	ug/L	2				
Total Organic Carbon #4	D	7270	660	2000	ug/L	2				
Total Organic Carbon Average	D	7160	660	2000	ug/L	2				

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9060A	

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF S15-010**

Report Date: February 2, 2015

Client Sample ID:	B2XVK0	Project:	CPRC0S15010
Sample ID:	364509003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	06-JAN-15 15:15		
Receive Date:	08-JAN-15		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Titration and Ion Analysis										
<i>2320_ALKALINITY: GW 01 "As Received"</i>										
Alkalinity, Total as CaCO3		123000	1450	2000	ug/L		PX01 01/13/15	1656	1449050	1
ALKALINITY										
Bicarbonate alkalinity (CaCO3)		123000	1450	2000	ug/L					
71-52-3										
Carbonate alkalinity (CaCO3)	U	0.00	1450	2000	ug/L					
CO3ALKALINITY										
Hydroxide alkalinity as CaCO3	U	0.00	1450	2000	ug/L					
84625-61-6										

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SM 2320B	

Quality Control Summary

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GEL LABORATORIES LLC

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QC Summary

Report Date: February 2, 2015

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 364509

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1448314										
QC1203240366	364504002	DUP									
Total Organic Carbon Average	B	428	B	408	ug/L	4.78	^	(+/-1000)	TSM	01/09/15	19:16
QC1203240367	364509002	DUP									
Total Organic Carbon Average	D	7160	D	7190	ug/L	0.390		(0%-20%)		01/12/15	15:56
QC1203240365	LCS										
Total Organic Carbon Average	10000			9690	ug/L			(85%-115%)		01/09/15	18:35
QC1203240364	MB										
Total Organic Carbon Average			U	330	ug/L					01/09/15	18:26
QC1203240371	364504002	PS									
Total Organic Carbon Average	10.0	B	0.428	10.4	mg/L			(65%-120%)		01/09/15	19:36
QC1203240373	364509002	PS									
Total Organic Carbon Average	10.0	D	3.58	13.5	mg/L			(65%-120%)		01/12/15	16:16
Ion Chromatography											
Batch	1448186										
QC1203240075	364502001	DUP									
Chloride	D	14400	D	16200	ug/L	12.3		(0%-20%)	MXL2	01/08/15	20:21
Fluoride	B	336	B	334	ug/L	0.597	^	(+/-500)		01/08/15	18:14
Nitrate-N	D	11700	D	11700	ug/L	0.0769		(0%-20%)		01/08/15	20:21
Nitrite-N	U	38.0	U	38.0	ug/L	N/A				01/08/15	18:14
Sulfate	D	87300	D	87200	ug/L	0.152		(0%-20%)		01/08/15	20:21
QC1203240074	LCS										
Chloride	5000			4580	ug/L			(90%-110%)		01/08/15	22:29
Fluoride	2500			2320	ug/L			(90%-110%)			
Nitrate-N	2500			2330	ug/L			(90%-110%)			
Nitrite-N	2500			2340	ug/L			(90%-110%)			
Sulfate	10000			9440	ug/L			(90%-110%)			

QC Summary

Workorder: 364509

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1448186										
QC1203240073	MB										
Chloride			U	67.0	ug/L				MXL2	01/08/15	21:57
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						
QC1203240076	364502001	PS									
Chloride	5.00	D	1.44	D	6.37	mg/L	98.8	(90%-110%)		01/08/15	20:53
Fluoride	2.50	B	0.336		2.71	mg/L	94.8	(90%-110%)		01/08/15	18:46
Nitrate-N	2.50	D	1.17	D	3.67	mg/L	99.8	(90%-110%)		01/08/15	20:53
Nitrite-N	2.50	U	0.00		2.40	mg/L	95.9	(90%-110%)		01/08/15	18:46
Sulfate	10.0	D	8.73	D	19.2	mg/L	104	(90%-110%)		01/08/15	20:53
Titration and Ion Analysis											
Batch	1449050										
QC1203242252	364509003	DUP									
Alkalinity, Total as CaCO3				123000	124000	ug/L	0.784	(0%-20%)	PXO1	01/13/15	16:59
Bicarbonate alkalinity (CaCO3)				123000	124000	ug/L	0.784	(0%-20%)			
Carbonate alkalinity (CaCO3)		U	1450	U	1450	ug/L	N/A				
Hydroxide alkalinity as CaCO3		U	1450	U	1450	ug/L	N/A				
QC1203242250	LCS										
Alkalinity, Total as CaCO3	50000				49100	ug/L	98.2	(90%-110%)		01/13/15	16:48
QC1203242249	MB										
Alkalinity, Total as CaCO3			U		725	ug/L				01/13/15	16:42
Bicarbonate alkalinity (CaCO3)			U		725	ug/L					
Carbonate alkalinity (CaCO3)			U		725	ug/L					

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QC Summary

Workorder: 364509

Table with columns: Parmname, NOM, Sample, Qual, QC, Units, RPD%, REC%, Range, Anlst, Date, Time. Rows include Titration and Ion Analysis, Hydroxide alkalinity as CaCO3, and Alkalinity, Total as CaCO3.

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 >= 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.