

8/17/2016



August 17, 2016

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

Re: CHPRC SAF W16-007
Work Order: 402058
SDG: GEL402058

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 21, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,

Heather Shaffer
Project Manager

Purchase Order: 300072 - 7H
Chain of Custody: W16-007-085
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF W16-007
SDG: GEL402058**

August 17, 2016

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on July 21, 2016, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

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

Sample Identification

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
402058001	B35PDO
402058002	B35PC4
402058003	B35NF4
402058004	B35PC7
402058005	B35NF8

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.

We certify that this package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.



Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL402058
Work Order #: 402058

GC/MS Volatile

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

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

Calibration Information

Initial Calibration

Calibration verification requirements were met for all client requested compounds, however calibration verification requirements may not have been met for all calibrated compounds.

Quality Control (QC) Information

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The recoveries were similar. It is believed possible matrix interference has been demonstrated.

Sample	Analyte	Value
1203591538 (Non SDG 401519001PS)	Acetone	52* (70%-130%)
1203591539 (Non SDG 401519001PSD)	2-Butanone	62* (70%-130%)
	Acetone	46* (70%-130%)

Metals

Determination of Metals by ICP

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

Calibration Information

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 402058003 (B35NF4) and 402058005 (B35NF8).

General Chemistry

Carbon, Total Organic

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

Technical Information

Sample Re-analysis

Samples 1203590173 (MB), 1203590174 (LCS), 1203590176 (B35PC7DUP), 1203590179 (B35PC7PS), 402058001 (B35PD0), 402058002 (B35PC4), 402058003 (B35NF4) and 402058004 (B35PC7) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

Total Organic Halogens (TOX)

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

Total Organic Halogens (TOX)

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

Technical Information

Sample Re-analysis

Sample 402058003 (B35NF4) was re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

Total Organic Halogens (TOX)

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

Technical Information

Sample Re-analysis

Sample 402058004 (B35PC7) was re-analyzed due to CCV failure. The reanalysis data with passing instrument

QC was reported.

Alkalinity

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

Quality Control (QC) Information

Method Blank (MB) Statement

The MB 1203593627 (MB) analyzed with this SDG met the acceptance criteria. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

Certification Statement

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

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # W16-007-085
Page 1 of 2

Collector: J.R. Aguilar/CHPRC
Contact/Requester: Karen Waters-Husted
Telephone No.: 509-376-4650
SAF No.: W16-007
Sampling Origin: Hanford Site
Purchase Order/Charge Code: 300071
Project Title: RCRA, JULY 2016
Logbook No.: HNF-N-506 87 / 5
Shipped To (Lab): GEL Laboratories, LLC
Method of Shipment: Commercial Carrier
Ice Chest No.: GWS-527
Bill of Lading/Air Bill No.: 77680465 7496
Protocol: RCRA
Priority: 30 Days
Offsite Property No.: 0849

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
B35PD0	N	W JUL 20 2016	0917	4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35PD0	N			1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35PD0	N			1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35PC4	N			4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35PC4	N			1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35PC4	N			1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35NF4	N			1x250-mL G/P	2320_ALKALINITY: COMMON	14 Days	Cool <=6C
B35NF4	N			1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2
B35NF4	N			4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35NF4	N			1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35NF4	N			1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35PC7	N			4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool <=6C
B35PC7	N			1x1-L aGs*	9020_TOX: COMMON	28 Days	H2SO4 to pH <2/Cool <=6C
B35PC7	N	W JUL 20 2016	0917	1x250-mL aG	9060_TOX: COMMON	28 Days	HCl or H2SO4 to pH <2/Cool <=6C

Relinquished By: J.R. Aguilar/CHPRC
Date/Time: JUL 20 2016 1125
Signature: [Signature]

Received By: Troy Bacon/CHPRC
Date/Time: JUL 20 2016 1125
Signature: [Signature]

Relinquished By: [Signature]
Date/Time: JUL 20 2016 1400

Received By: FEDEX
Date/Time: [Blank]

Relinquished By: [Signature]
Date/Time: [Blank]

Received By: M. Kriston [Signature]
Date/Time: 7/21/16 0830

Relinquished By: [Signature]
Date/Time: [Blank]

Received By: [Signature]
Date/Time: [Blank]

FINAL SAMPLE DISPOSITION

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

Disposed By

Date/Time

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# **W16-007-085**
Page 2 of 2

Collector: **J.R. Aguilar/CHPRC** Telephone No. **509-376-4650**

SAF No. **W16-007** Purchase Order/Charge Code **300071**

Project Title: **RCRA, JULY 2016** Ice Chest No. **GWS-527**

Shipped To (Lab): **GEL Laboratories, LLC** Bill of Lading/Air Bill No. **7768 0465 7496**

Protocol: **RCRA** Priority: **30 Days** Offsite Property No. **6849**

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

SPECIAL INSTRUCTIONS: **HOLD TIME** Total Activity Exemption: Yes No
 N/A
 Special Handling: N/A

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35NF8	Y	W JUL 20 2016	0917	1x500-mL G/P	6010_METALS_ICP: COMMON	6 Months	HNO3 to pH <2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
J.R. Aguilar/CHPRC			JUL 20 2016 1125	Troy Bacon/CHPRC	Troy L. Bacon		JUL 20 2016 1125	DS = Drum Solids
Troy Bacon/CHPRC	Troy L. Bacon		JUL 20 2016 1426	FEDEX			JUL 20 2016 1426	DL = Drum Liquids
			JUL 20 2016 1426	M. K.../...			JUL 21 2016 0850	T = Tissue
			JUL 20 2016 1426				JUL 21 2016 0850	WI = Wipe
			JUL 20 2016 1426				JUL 21 2016 0850	L = Liquid
			JUL 20 2016 1426				JUL 21 2016 0850	V = Vegetation
			JUL 20 2016 1426				JUL 21 2016 0850	A = Air
			JUL 20 2016 1426				JUL 21 2016 0850	X = Other

FINAL SAMPLE DISPOSITION

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

Disposed By

Date/Time

PRINTED ON 7/19/2016

FSR ID = FSR34210

A-6004-842 (REV 2)

SAMPLE RECEIPT & REVIEW FORM

Client:	<u>CPRC</u>	SDG/AR/COC/Work Order:	
Received By:	<u>MC</u>	Date Received:	<u>7-21-16</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?			Maximum Net Counts Observed* (Observed Counts - Area Background Counts) <u>0</u>
Classified Radioactive II or III by RSO?			If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?			
Package, COC and/or Samples marked as beryllium or asbestos containing?			If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?			Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?			

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
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>13046196L</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>			(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16 Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7768 0253 6871 1c</u> <u>7768 0465 7496 2c</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials DS Date 7/23/16 Page 1 of 1

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	General Chemistry	
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Inorganics	Metals
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.	General Chemistry	
<	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	General Chemistry	
UX	Gamma Spectroscopy--Uncertain identification	Radiological	

Laboratory Certifications

List of current GEL Certifications as of 17 August 2016

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Volatile Analysis

Case Narrative

**GC/MS Volatile
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL402058
Work Order #: 402058**

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

Analytical Method: SW846 8260C

Analytical Procedure: GL-OA-E-038 REV# 22

Analytical Batch: 1584453

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
402058001	B35PD0
402058002	B35PC4
402058003	B35NF4
402058004	B35PC7
1203591536	Method Blank (MB)
1203591537	Laboratory Control Sample (LCS)
1203591538	401519001(NonSDG) Post Spike (PS)
1203591539	401519001(NonSDG) Post Spike Duplicate (PSD)
1203593221	Method Blank (MB)
1203593222	Laboratory Control Sample (LCS)

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

Data Summary:

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

Calibration Information

Initial Calibration

Calibration verification requirements were met for all client requested compounds, however calibration verification requirements may not have been met for all calibrated compounds.

Quality Control (QC) Information

Matrix Spike/Matrix Spike Duplicate Recovery Statement

The spike and/or spike duplicate (See Below) recoveries were not all within the acceptance limits. The recoveries were similar. It is believed possible matrix interference has been demonstrated.

Sample	Analyte	Value
1203591538 (Non SDG 401519001PS)	Acetone	52* (70%-130%)
1203591539 (Non SDG 401519001PSD)	2-Butanone	62* (70%-130%)
	Acetone	46* (70%-130%)

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: GEL402058 GEL Work Order: 402058

The Qualifiers in this report are defined as follows:

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

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.

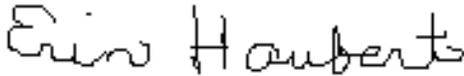
RA Indicates that sample is re-analyzed without re-extraction.

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: 16 AUG 2016

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

SDG Number: GEL402058	Date Collected: 07/20/2016 09:17	Matrix: WATER
Lab Sample ID: 402058001	Date Received: 07/21/2016 08:50	
Client ID: B35PD0	Client: CPRC001	Project: CPRC0W16007
Batch ID: 1584453	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 07/27/2016 10:27	Inst: VOA3.I	Dilution: 1
Prep Date: 07/27/2016 10:27	Analyst: CDS1	Purge Vol: 5 mL
Data File: 072716V3\3T306.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	2.00	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	2.00	5.00
75-15-0	Carbon disulfide	U	1.60	ug/L	1.60	10.0	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	2.00	5.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	2.00	5.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	2.00	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	5.00
75-09-2	Methylene chloride	U	1.60	ug/L	1.60	5.00	5.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	2.00	5.00
108-88-3	Toluene	J	1.15	ug/L	0.300	2.00	5.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	2.00	5.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	2.00	10.0
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	2.00	10.0
78-93-3	2-Butanone	TU	3.00	ug/L	3.00	10.0	10.0
108-10-1	4-Methyl-2-pentanone	U	3.00	ug/L	3.00	10.0	10.0
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	2.00	10.0
1330-20-7	Xylenes (total)	U	0.300	ug/L	0.300	6.00	10.0
67-64-1	Acetone	TU	3.00	ug/L	3.00	10.0	20.0

Volatile
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: GEL402058	Date Collected: 07/20/2016 09:17	Matrix: WATER
Lab Sample ID: 402058002	Date Received: 07/21/2016 08:50	
Client ID: B35PC4	Client: CPRC001	Project: CPRC0W16007
Batch ID: 1584453	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 07/27/2016 10:57	Inst: VOA3.I	Dilution: 1
Prep Date: 07/27/2016 10:57	Analyst: CDS1	Purge Vol: 5 mL
Data File: 072716V3\3T307.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	2.00	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	2.00	5.00
75-15-0	Carbon disulfide	U	1.60	ug/L	1.60	10.0	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	2.00	5.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	2.00	5.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	2.00	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	5.00
75-09-2	Methylene chloride	U	1.60	ug/L	1.60	5.00	5.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	2.00	5.00
108-88-3	Toluene	J	1.00	ug/L	0.300	2.00	5.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	2.00	5.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	2.00	10.0
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	2.00	10.0
78-93-3	2-Butanone	TU	3.00	ug/L	3.00	10.0	10.0
108-10-1	4-Methyl-2-pentanone	U	3.00	ug/L	3.00	10.0	10.0
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	2.00	10.0
1330-20-7	Xylenes (total)	U	0.300	ug/L	0.300	6.00	10.0
67-64-1	Acetone	TU	3.00	ug/L	3.00	10.0	20.0

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: GEL402058	Date Collected: 07/20/2016 09:17	Matrix: WATER
Lab Sample ID: 402058003	Date Received: 07/21/2016 08:50	
Client ID: B35NF4	Client: CPRC001	Project: CPRC0W16007
Batch ID: 1584453	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 07/27/2016 11:28	Inst: VOA3.I	Dilution: 1
Prep Date: 07/27/2016 11:28	Analyst: CDS1	Purge Vol: 5 mL
Data File: 072716V3\3T308.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	2.00	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	2.00	5.00
75-15-0	Carbon disulfide	U	1.60	ug/L	1.60	10.0	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	2.00	5.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	2.00	5.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	2.00	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	5.00
75-09-2	Methylene chloride	U	1.60	ug/L	1.60	5.00	5.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	2.00	5.00
108-88-3	Toluene	J	1.15	ug/L	0.300	2.00	5.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	2.00	5.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	2.00	10.0
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	2.00	10.0
78-93-3	2-Butanone	TU	3.00	ug/L	3.00	10.0	10.0
108-10-1	4-Methyl-2-pentanone	U	3.00	ug/L	3.00	10.0	10.0
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	2.00	10.0
1330-20-7	Xylenes (total)	U	0.300	ug/L	0.300	6.00	10.0
67-64-1	Acetone	TU	3.00	ug/L	3.00	10.0	20.0

Volatile
Certificate of Analysis
Sample Summary

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SDG Number: GEL402058	Date Collected: 07/20/2016 09:17	Matrix: WATER
Lab Sample ID: 402058004	Date Received: 07/21/2016 08:50	
Client ID: B35PC7	Client: CPRC001	Project: CPRC0W16007
Batch ID: 1584453	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 07/27/2016 11:58	Inst: VOA3.I	Dilution: 1
Prep Date: 07/27/2016 11:58	Analyst: CDS1	Purge Vol: 5 mL
Data File: 072716V3\3T309.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
79-00-5	1,1,2-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
107-06-2	1,2-Dichloroethane	U	0.300	ug/L	0.300	2.00	5.00
71-43-2	Benzene	U	0.300	ug/L	0.300	2.00	5.00
75-15-0	Carbon disulfide	U	1.60	ug/L	1.60	10.0	5.00
56-23-5	Carbon tetrachloride	U	0.300	ug/L	0.300	2.00	5.00
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	2.00	5.00
67-66-3	Chloroform	U	0.300	ug/L	0.300	2.00	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	5.00
75-09-2	Methylene chloride	U	1.60	ug/L	1.60	5.00	5.00
127-18-4	Tetrachloroethylene	U	0.300	ug/L	0.300	2.00	5.00
108-88-3	Toluene	J	1.08	ug/L	0.300	2.00	5.00
79-01-6	Trichloroethylene	U	0.300	ug/L	0.300	2.00	5.00
75-34-3	1,1-Dichloroethane	U	0.300	ug/L	0.300	2.00	10.0
75-35-4	1,1-Dichloroethylene	U	0.300	ug/L	0.300	2.00	10.0
78-93-3	2-Butanone	TU	3.00	ug/L	3.00	10.0	10.0
108-10-1	4-Methyl-2-pentanone	U	3.00	ug/L	3.00	10.0	10.0
75-01-4	Vinyl chloride	U	0.300	ug/L	0.300	2.00	10.0
1330-20-7	Xylenes (total)	U	0.300	ug/L	0.300	6.00	10.0
67-64-1	Acetone	TU	3.00	ug/L	3.00	10.0	20.0

Quality Control Summary

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QC Summary

Report Date: August 3, 2016

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 402058

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1584453										
QC1203591537	LCS										
1,1,1-Trichloroethane	50.0			58.3	ug/L		117	(70%-130%)	CDS1	07/25/16	08:32
1,1,2-Trichloroethane	50.0			51.5	ug/L		103	(70%-130%)			
1,1-Dichloroethane	50.0			52.4	ug/L		105	(70%-130%)			
1,1-Dichloroethylene	50.0			54.5	ug/L		109	(70%-130%)			
1,2-Dichloroethane	50.0			50.4	ug/L		101	(70%-130%)			
2-Butanone	250			239	ug/L		96	(70%-130%)			
4-Methyl-2-pentanone	250			226	ug/L		90	(70%-130%)			
Acetone	250			234	ug/L		94	(70%-130%)			
Benzene	50.0			54.3	ug/L		109	(70%-130%)			
Carbon disulfide	250			277	ug/L		111	(70%-130%)			
Carbon tetrachloride	50.0			56.1	ug/L		112	(70%-130%)			
Chlorobenzene	50.0			54.5	ug/L		109	(70%-130%)			
Chloroform	50.0			52.6	ug/L		105	(70%-130%)			
Ethylbenzene	50.0			51.9	ug/L		104	(70%-130%)			
Methylene chloride	50.0			48.1	ug/L		96	(70%-130%)			
Tetrachloroethylene	50.0			55.1	ug/L		110	(70%-130%)			
Toluene	50.0			53.5	ug/L		107	(70%-130%)			
Trichloroethylene	50.0			54.7	ug/L		109	(70%-130%)			
Vinyl chloride	50.0			46.8	ug/L		94	(70%-130%)			
Xylenes (total)	150			159	ug/L		106	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1584453										
**1,2-Dichloroethane-d4	50.0			48.8	ug/L		98	(70%-130%)	CDS1	07/25/16	08:32
**Bromofluorobenzene	50.0			51.4	ug/L		103	(70%-130%)			
**Toluene-d8	50.0			48.4	ug/L		97	(70%-130%)			
QC1203593222	LCS										
1,1,1-Trichloroethane	50.0			53.3	ug/L		107	(70%-130%)		07/27/16	08:53
1,1,2-Trichloroethane	50.0			50.2	ug/L		100	(70%-130%)			
1,1-Dichloroethane	50.0			51.7	ug/L		103	(70%-130%)			
1,1-Dichloroethylene	50.0			50.5	ug/L		101	(70%-130%)			
1,2-Dichloroethane	50.0			48.6	ug/L		97	(70%-130%)			
2-Butanone	250			217	ug/L		87	(70%-130%)			
4-Methyl-2-pentanone	250			216	ug/L		86	(70%-130%)			
Acetone	250			207	ug/L		83	(70%-130%)			
Benzene	50.0			50.1	ug/L		100	(70%-130%)			
Carbon disulfide	250			263	ug/L		105	(70%-130%)			
Carbon tetrachloride	50.0			52.2	ug/L		104	(70%-130%)			
Chlorobenzene	50.0			50.7	ug/L		101	(70%-130%)			
Chloroform	50.0			50.7	ug/L		101	(70%-130%)			
Ethylbenzene	50.0			48.5	ug/L		97	(70%-130%)			
Methylene chloride	50.0			47.1	ug/L		94	(70%-130%)			
Tetrachloroethylene	50.0			49.4	ug/L		99	(70%-130%)			
Toluene	50.0			49.2	ug/L		98	(70%-130%)			
Trichloroethylene	50.0			50.8	ug/L		102	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1584453										
Vinyl chloride	50.0			42.9	ug/L		86	(70%-130%)	CDS1	07/27/16	08:53
Xylenes (total)	150			146	ug/L		97	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			50.5	ug/L		101	(70%-130%)			
**Bromofluorobenzene	50.0			51.5	ug/L		103	(70%-130%)			
**Toluene-d8	50.0			48.9	ug/L		98	(70%-130%)			
QC1203591536	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					07/25/16	09:38
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						
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						
Tetrachloroethylene			U	0.300	ug/L						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1584453										
Toluene			U	0.300	ug/L				CDS1	07/25/16	09:38
Trichloroethylene			U	0.300	ug/L						
Vinyl chloride			U	0.300	ug/L						
Xylenes (total)			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			52.9	ug/L		106	(70%-130%)			
**Bromofluorobenzene	50.0			48.8	ug/L		98	(70%-130%)			
**Toluene-d8	50.0			51.8	ug/L		104	(70%-130%)			
QC1203593221	MB										
1,1,1-Trichloroethane			U	0.300	ug/L					07/27/16	09:57
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						
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						

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1584453										
Methylene chloride			U	1.60	ug/L				CDS1	07/27/16	09:57
Tetrachloroethylene			U	0.300	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						
**1,2-Dichloroethane-d4	50.0			49.1	ug/L		98	(70%-130%)			
**Bromofluorobenzene	50.0			50.2	ug/L		100	(70%-130%)			
**Toluene-d8	50.0			50.7	ug/L		101	(70%-130%)			
QC1203591538 401519001 PS											
1,1,1-Trichloroethane	50.0	U	0.00	59.8	ug/L		120	(70%-130%)		07/25/16	18:15
1,1,2-Trichloroethane	50.0	U	0.00	51.8	ug/L		104	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	55.3	ug/L		111	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	57.1	ug/L		114	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	51.6	ug/L		103	(70%-130%)			
2-Butanone	250	TU	0.00	175	ug/L		70	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	242	ug/L		97	(70%-130%)			
Acetone	250	TU	0.00	T 131	ug/L		52 *	(70%-130%)			
Benzene	50.0	U	0.00	54.4	ug/L		109	(70%-130%)			
Carbon disulfide	250	U	0.00	285	ug/L		114	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00	57.8	ug/L		116	(70%-130%)			
Chlorobenzene	50.0	U	0.00	53.4	ug/L		107	(70%-130%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1584453										
Chloroform	50.0	U	0.00	54.0	ug/L		108	(70%-130%)	CDS1	07/25/16	18:15
Ethylbenzene	50.0	U	0.00	51.9	ug/L		104	(70%-130%)			
Methylene chloride	50.0	J	3.11	51.7	ug/L		97	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	53.1	ug/L		106	(70%-130%)			
Toluene	50.0	U	0.00	51.8	ug/L		104	(70%-130%)			
Trichloroethylene	50.0	U	0.00	52.8	ug/L		106	(70%-130%)			
Vinyl chloride	50.0	U	0.00	39.6	ug/L		79	(70%-130%)			
Xylenes (total)	150	U	0.00	154	ug/L		103	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		51.6	48.9	ug/L		98	(70%-130%)			
**Bromofluorobenzene	50.0		46.8	50.4	ug/L		101	(70%-130%)			
**Toluene-d8	50.0		49.4	49.0	ug/L		98	(70%-130%)			
QC1203591539 401519001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	61.4	ug/L	3	123	(0%-20%)		07/25/16	18:45
1,1,2-Trichloroethane	50.0	U	0.00	49.8	ug/L	4	100	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	57.2	ug/L	3	114	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	57.8	ug/L	1	116	(0%-20%)			
1,2-Dichloroethane	50.0	U	0.00	51.7	ug/L	0	103	(0%-20%)			
2-Butanone	250	TU	0.00	T 154	ug/L	13	62*	(0%-20%)			
4-Methyl-2-pentanone	250	U	0.00	214	ug/L	12	86	(0%-20%)			
Acetone	250	TU	0.00	T 116	ug/L	12	46*	(0%-20%)			
Benzene	50.0	U	0.00	55.1	ug/L	1	110	(0%-20%)			
Carbon disulfide	250	U	0.00	289	ug/L	1	116	(0%-20%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1584453										
Carbon tetrachloride	50.0	U	0.00	59.2	ug/L	2	118	(0%-20%)	CDS1	07/25/16	18:45
Chlorobenzene	50.0	U	0.00	53.1	ug/L	1	106	(0%-20%)			
Chloroform	50.0	U	0.00	55.3	ug/L	2	111	(0%-20%)			
Ethylbenzene	50.0	U	0.00	53.2	ug/L	3	106	(0%-20%)			
Methylene chloride	50.0	J	3.11	52.9	ug/L	2	100	(0%-20%)			
Tetrachloroethylene	50.0	U	0.00	53.9	ug/L	1	108	(0%-20%)			
Toluene	50.0	U	0.00	52.9	ug/L	2	106	(0%-20%)			
Trichloroethylene	50.0	U	0.00	56.3	ug/L	6	113	(0%-20%)			
Vinyl chloride	50.0	U	0.00	39.4	ug/L	0	79	(0%-20%)			
Xylenes (total)	150	U	0.00	158	ug/L	3	106	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		51.6	48.9	ug/L		98	(70%-130%)			
**Bromofluorobenzene	50.0		46.8	51.6	ug/L		103	(70%-130%)			
**Toluene-d8	50.0		49.4	48.2	ug/L		96	(70%-130%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- 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.

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QC Summary

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

Volatile

Surrogate Recovery Report

SDG Number: GEL402058

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203591537	LCS for batch 1584453	98	97	103
1203591536	MB for batch 1584453	106	104	98
1203591538	B365V4PS	98	98	101
1203591539	B365V4PSD	98	96	103
1203593222	LCS for batch 1584453	101	98	103
1203593221	MB for batch 1584453	98	101	100
402058001	B35PD0	100	100	93
402058002	B35PC4	104	98	96
402058003	B35NF4	98	104	96
402058004	B35PC7	101	100	94

Surrogate

DCED4 = 1,2-Dichloroethane-d4

TOL = Toluene-d8

BFB = Bromofluorobenzene

Acceptance Limits

(70%-130%)

(70%-130%)

(70%-130%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL402058
Work Order #: 402058

Product: Determination of Metals by ICP**Analytical Method:** 6010_METALS_ICP**Analytical Procedure:** GL-MA-E-013 REV# 26**Analytical Batch:** 1583854**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 13**Preparation Batch:** 1583853

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
402058003	B35NF4
402058005	B35NF8
1203590048	Method Blank (MB)ICP
1203590049	Laboratory Control Sample (LCS)
1203590052	402046001(NonSDGL) Serial Dilution (SD)
1203590050	402046001(NonSDGS) Matrix Spike (MS)
1203590051	402046001(NonSDGSD) Matrix Spike Duplicate (MSD)

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

Data Summary:

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

Calibration Information**CRDL/PQL Requirements**

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of sodium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 402058003 (B35NF4) and 402058005 (B35NF8).

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: GEL402058 GEL Work Order: 402058

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: 17 AUG 2016

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL402058

CONTRACT: CPRCOW16007

METHOD TYPE: SW846

SAMPLE ID: 402058003

BASIS: As Received

DATE COLLECTED 20-JUL-16

CLIENT ID: B35NF4

LEVEL: Low

DATE RECEIVED 21-JUL-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	3.5	ug/L	U	3.5	10	10	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-38-2	Arsenic	5	ug/L	U	5	30	30	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-39-3	Barium	64.4	ug/L		1	5	5	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-70-2	Calcium	82700	ug/L		50	200	200	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-47-3	Chromium	1.26	ug/L	B	1	5	5	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7439-89-6	Iron	53.4	ug/L	B	30	100	100	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7439-95-4	Magnesium	25600	ug/L		110	300	300	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7439-96-5	Manganese	2.12	ug/L	B	2	10	10	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-02-0	Nickel	4.02	ug/L	B	1.5	5	5	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-09-7	Potassium	9800	ug/L		50	150	150	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-23-5	Sodium	34900	ug/L		100	300	300	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-62-2	Vanadium	18.2	ug/L		1	5	5	1	P	HSC	08/01/16 18:00	080116B-1	1583854
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	08/01/16 18:00	080116B-1	1583854

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1583854	1583853	SW846 3005A	50	mL	50	mL	07/22/16	SXW1

***Analytical Methods:**

P SW846 3005A/6010C

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL402058

CONTRACT: CPRCOW16007

METHOD TYPE: SW846

SAMPLE ID: 402058005

BASIS: As Received

DATE COLLECTED 20-JUL-16

CLIENT ID: B35NF8

LEVEL: Low

DATE RECEIVED 21-JUL-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-36-0	Antimony	3.5	ug/L	U	3.5	10	10	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-38-2	Arsenic	6.36	ug/L	B	5	30	30	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-39-3	Barium	64.4	ug/L		1	5	5	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-43-9	Cadmium	1	ug/L	U	1	5	5	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-70-2	Calcium	82500	ug/L		50	200	200	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-47-3	Chromium	1	ug/L	U	1	5	5	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-48-4	Cobalt	1	ug/L	U	1	5	5	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-50-8	Copper	3	ug/L	U	3	10	10	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7439-95-4	Magnesium	25500	ug/L		110	300	300	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7439-96-5	Manganese	2	ug/L	U	2	10	10	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-02-0	Nickel	3.79	ug/L	B	1.5	5	5	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-09-7	Potassium	9720	ug/L		50	150	150	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-22-4	Silver	1	ug/L	U	1	5	5	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-23-5	Sodium	34800	ug/L		100	300	300	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-62-2	Vanadium	18.2	ug/L		1	5	5	1	P	HSC	08/01/16 18:03	080116B-1	1583854
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	P	HSC	08/01/16 18:03	080116B-1	1583854

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1583854	1583853	SW846 3005A	50	mL	50	mL	07/22/16	SXW1

***Analytical Methods:**

P SW846 3005A/6010C

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: August 17, 2016

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 402058

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1583854										
QC1203590049	LCS										
Antimony	500			492	ug/L		98.4	(80%-120%)	HSC	08/01/16	17:31
Arsenic	500			498	ug/L		99.6	(80%-120%)			
Barium	500			502	ug/L		100	(80%-120%)			
Cadmium	500			503	ug/L		101	(80%-120%)			
Calcium	5000			5040	ug/L		101	(80%-120%)			
Chromium	500			484	ug/L		96.9	(80%-120%)			
Cobalt	500			496	ug/L		99.3	(80%-120%)			
Copper	500			497	ug/L		99.4	(80%-120%)			
Iron	5000			4860	ug/L		97.1	(80%-120%)			
Magnesium	5000			5090	ug/L		102	(80%-120%)			
Manganese	500			493	ug/L		98.7	(80%-120%)			
Nickel	500			489	ug/L		97.8	(80%-120%)			
Potassium	5000			5040	ug/L		101	(80%-120%)			
Silver	500			496	ug/L		99.2	(80%-120%)			
Sodium	5000			4990	ug/L		99.8	(80%-120%)			
Vanadium	500			503	ug/L		101	(80%-120%)			
Zinc	500			485	ug/L		97	(80%-120%)			
QC1203590048	MB										
Antimony			U	3.50	ug/L					08/01/16	17:28
Arsenic			U	5.00	ug/L						

GEL LABORATORIES LLC

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QC Summary

Workorder: 402058

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1583854										
Barium			U	1.00	ug/L						
Cadmium			U	1.00	ug/L				HSC	08/01/16	17:28
Calcium			U	50.0	ug/L						
Chromium			U	1.00	ug/L						
Cobalt			U	1.00	ug/L						
Copper			U	3.00	ug/L						
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Manganese			U	2.00	ug/L						
Nickel			U	1.50	ug/L						
Potassium			U	50.0	ug/L						
Silver			U	1.00	ug/L						
Sodium			U	100	ug/L						
Vanadium			U	1.00	ug/L						
Zinc			U	3.30	ug/L						
QC1203590050 402046001 MS											
Antimony	500	U	3.50	507	ug/L		101	(75%-125%)		08/01/16	17:37
Arsenic	500	B	6.36	504	ug/L		99.6	(75%-125%)			
Barium	500		43.8	540	ug/L		99.2	(75%-125%)			
Cadmium	500	U	1.00	498	ug/L		99.6	(75%-125%)			
Calcium	5000		27500	32900	ug/L		N/A	(75%-125%)			
Chromium	500	B	4.15	488	ug/L		96.8	(75%-125%)			
Cobalt	500	U	1.00	488	ug/L		97.6	(75%-125%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 402058

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1583854										
Copper	500	55.2		566	ug/L		102	(75%-125%)	HSC	08/01/16	17:37
Iron	5000	134		4990	ug/L		97.1	(75%-125%)			
Magnesium	5000	6270		11200	ug/L		99.2	(75%-125%)			
Manganese	500	115		603	ug/L		97.7	(75%-125%)			
Nickel	500	U	1.50	486	ug/L		97	(75%-125%)			
Potassium	5000	4760		9920	ug/L		103	(75%-125%)			
Silver	500	U	1.00	492	ug/L		98.4	(75%-125%)			
Sodium	5000	85000		89500	ug/L		N/A	(75%-125%)			
Vanadium	500	12.3		525	ug/L		102	(75%-125%)			
Zinc	500	40.2		533	ug/L		98.5	(75%-125%)			
QC1203590051 402046001 MSD											
Antimony	500	U	3.50	492	ug/L	2.96	98.4	(0%-20%)		08/01/16	17:39
Arsenic	500	B	6.36	501	ug/L	0.73	98.9	(0%-20%)			
Barium	500		43.8	536	ug/L	0.829	98.3	(0%-20%)			
Cadmium	500	U	1.00	492	ug/L	1.22	98.4	(0%-20%)			
Calcium	5000	27500		32100	ug/L	2.34	N/A	(0%-20%)			
Chromium	500	B	4.15	483	ug/L	0.945	95.8	(0%-20%)			
Cobalt	500	U	1.00	484	ug/L	0.737	96.8	(0%-20%)			
Copper	500	55.2		561	ug/L	0.974	101	(0%-20%)			
Iron	5000	134		4970	ug/L	0.41	96.7	(0%-20%)			
Magnesium	5000	6270		11200	ug/L	0.688	97.7	(0%-20%)			
Manganese	500	115		597	ug/L	1.12	96.4	(0%-20%)			

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QC Summary

Workorder: 402058

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1583854										
Nickel	500	U	1.50	481	ug/L	1.06	95.9	(0%-20%)	HSC	08/01/16	17:39
Potassium	5000		4760	9720	ug/L	2.05	99.2	(0%-20%)			
Silver	500	U	1.00	485	ug/L	1.42	97	(0%-20%)			
Sodium	5000		85000	88800	ug/L	0.857	N/A	(0%-20%)			
Vanadium	500		12.3	520	ug/L	0.988	101	(0%-20%)			
Zinc	500		40.2	522	ug/L	2.12	96.3	(0%-20%)			
QC1203590052 402046001 SDILT											
Antimony		U	-0.345	DU	17.5	ug/L	N/A	(0%-10%)		08/01/16	17:42
Arsenic		B	6.36	DU	25.0	ug/L	N/A	(0%-10%)			
Barium			43.8	D	8.98	ug/L	2.44	(0%-10%)			
Cadmium		U	-0.259	DU	5.00	ug/L	N/A	(0%-10%)			
Calcium			27500	D	5590	ug/L	1.54	(0%-10%)			
Chromium		B	4.15	BD	1.16	ug/L	39.5	(0%-10%)			
Cobalt		U	-0.183	DU	5.00	ug/L	N/A	(0%-10%)			
Copper			55.2	D	10.8	ug/L	2.56	(0%-10%)			
Iron			134	BD	51.6	ug/L	92.3	(0%-10%)			
Magnesium			6270	D	1320	ug/L	5.68	(0%-10%)			
Manganese			115	D	23.5	ug/L	2.54	(0%-10%)			
Nickel		U	0.909	DU	7.50	ug/L	N/A	(0%-10%)			
Potassium			4760	D	941	ug/L	1.2	(0%-10%)			
Silver		U	-0.294	DU	5.00	ug/L	N/A	(0%-10%)			
Sodium			85000	D	17300	ug/L	1.52	(0%-10%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 402058

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1583854										
Vanadium		12.3	BD	2.67	ug/L	8.71		(0%-10%)	HSC	08/01/16	17:42
Zinc		40.2	BD	8.19	ug/L	1.85		(0%-10%)			

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $>$ 5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

General Chem Analysis

Case Narrative

**General Chemistry
 Technical Case Narrative
 CH2MHill Plateau Remediation Company (CPRC)
 SDG #: GEL402058
 Work Order #: 402058**

Product: Carbon, Total Organic

Analytical Method: SW846 9060A

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

Analytical Batch: 1583773

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
402058001	B35PD0
402058002	B35PC4
402058003	B35NF4
402058004	B35PC7
1203590173	Method Blank (MB)
1203590174	Laboratory Control Sample (LCS)
1203590176	402058004(B35PC7) Sample Duplicate (DUP)
1203590179	402058004(B35PC7) Post Spike (PS)

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

Data Summary:

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

Technical Information

Sample Re-analysis

Samples 1203590173 (MB), 1203590174 (LCS), 1203590176 (B35PC7DUP), 1203590179 (B35PC7PS), 402058001 (B35PD0), 402058002 (B35PC4), 402058003 (B35NF4) and 402058004 (B35PC7) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

Product: Total Organic Halogens (TOX)

Analytical Method: 9020_TOX

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

Analytical Batches: 1584969, 1589910 and 1590285

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
402058001	B35PD0
402058002	B35PC4
402058003	B35NF4
402058004	B35PC7
1203592843	Method Blank (MB)
1203592844	Laboratory Control Sample (LCS)
1203592845	402058001(B35PD0) Sample Duplicate (DUP)
1203592846	402058001(B35PD0) Post Spike (PS)
1203605343	Method Blank (MB)
1203605344	Laboratory Control Sample (LCS)
1203605347	402058003(B35NF4) Sample Duplicate (DUP)
1203605348	402058003(B35NF4) Post Spike (PS)
1203606340	Method Blank (MB)
1203606341	Laboratory Control Sample (LCS)
1203606342	402058004(B35PC7) Sample Duplicate (DUP)
1203606343	402058004(B35PC7) Post Spike (PS)

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

Data Summary:

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

Technical Information

Sample Re-analysis

Samples 402058003 (B35NF4) and 402058004 (B35PC7) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

Miscellaneous Information

Additional Comments

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

Breakthrough effect

Breakthrough effect: If the value for a sample is greater than the reporting limit (10 ug/L), the result for the second

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

Product: Alkalinity**Analytical Method:** 2320_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 12**Analytical Batch:** 1585315

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
402058003	B35NF4
1203593627	Method Blank (MB)
1203593628	Laboratory Control Sample (LCS)
1203593629	402046001(NonSDG) Sample Duplicate (DUP)

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

Data Summary:

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

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

The MB 1203593627 (MB) analyzed with this SDG met the acceptance criteria. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data.

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: GEL402058 GEL Work Order: 402058

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).

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: Kristen Mizzell

Date: 16 AUG 2016

Title: Analyst I

Sample Data Summary

8/17/2016

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 16, 2016

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

Client Sample ID:	B35PD0	Project:	CPRCOW16007
Sample ID:	402058001	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	20-JUL-16 09:17		
Receive Date:	21-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
9060_TOX: COMMON "As Received"												
Total Organic Carbon Average	B	799	330	1000	ug/L		1	TSM	07/25/16	2138	1583773	1
Halogen Analysis												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	B	5.12	3.33	10.0	ug/L		1	RMJ	08/05/16	1802	1584969	2

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 9060A		
2	9020_TOX		

Notes:

Column headers are defined as follows:

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

8/17/2016

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 16, 2016

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

Client Sample ID:	B35PC4	Project:	CPRCOW16007
Sample ID:	402058002	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	20-JUL-16 09:17		
Receive Date:	21-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
9060_TOX: COMMON "As Received"												
Total Organic Carbon #1	B	746	330	1000	ug/L		1	TSM	07/25/16	2219	1583773	1
Total Organic Carbon #2	B	810	330	1000	ug/L		1					
Total Organic Carbon #3	B	786	330	1000	ug/L		1					
Total Organic Carbon #4	B	795	330	1000	ug/L		1					
Total Organic Carbon Average	B	784	330	1000	ug/L		1					

Halogen Analysis												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	B	5.64	3.33	10.0	ug/L		1	RMJ	08/05/16	1950	1584969	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060A	
2	9020_TOX	

Notes:

Column headers are defined as follows:

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

8/17/2016

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: August 16, 2016

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

Client Sample ID: B35NF4 Project: CPRCOW16007
 Sample ID: 402058003 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 20-JUL-16 09:17
 Receive Date: 21-JUL-16
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
9060_TOX: COMMON "As Received"												
Total Organic Carbon #1	B	809	330	1000	ug/L		1	TSM	07/25/16	2259	1583773	1
Total Organic Carbon #2	B	876	330	1000	ug/L		1					
Total Organic Carbon #3	B	868	330	1000	ug/L		1					
Total Organic Carbon #4	B	876	330	1000	ug/L		1					
Total Organic Carbon Average	B	857	330	1000	ug/L		1					
Halogen Analysis												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	U	3.33	3.33	10.0	ug/L		1	RMJ	08/11/16	2006	1589910	2
Titration and Ion Analysis												
2320_ALKALINITY: COMMON (Alkalinity only) "As Received"												
Alkalinity, Total as CaCO3		85300	330	1000	ug/L		1	RXB5	07/27/16	2206	1585315	3

The following Analytical Methods were performed:

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

Notes:

Column headers are defined as follows:

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

8/17/2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: August 16, 2016

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

Client Sample ID:	B35PC7	Project:	CPRCOW16007
Sample ID:	402058004	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	20-JUL-16 09:17		
Receive Date:	21-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
9060_TOX: COMMON "As Received"												
Total Organic Carbon #1	B	764	330	1000	ug/L		1	TSM	07/25/16	2340	1583773	1
Total Organic Carbon #2	B	805	330	1000	ug/L		1					
Total Organic Carbon #3	B	802	330	1000	ug/L		1					
Total Organic Carbon #4	B	795	330	1000	ug/L		1					
Total Organic Carbon Average	B	791	330	1000	ug/L		1					

Halogen Analysis												
9020_TOX: COMMON "As Received"												
Total Organic Halogens	B	3.54	3.33	10.0	ug/L		1	RMJ	08/12/16	1950	1590285	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9060A	
2	9020_TOX	

Notes:

Column headers are defined as follows:

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

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: August 16, 2016

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 402058

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch	1583773										
QC1203590176	402058004	DUP									
Total Organic Carbon Average	B	791	B	804	ug/L	1.63	^	(+/-1000)	TSM	07/26/16	00:21
QC1203590174	LCS										
Total Organic Carbon Average	10000			10000	ug/L			(80%-120%)		07/25/16	15:38
QC1203590173	MB										
Total Organic Carbon Average			U	330	ug/L					07/25/16	15:28
QC1203590179	402058004	PS									
Total Organic Carbon Average	10.0	B	0.791	10.9	mg/L			(75%-125%)		07/26/16	01:02
Halogen Analysis											
Batch	1584969										
QC1203592845	402058001	DUP									
Total Organic Halogens	B	5.12	B	4.52	ug/L	12.4	^	(+/-10.0)	RMJ	08/05/16	18:23
QC1203592844	LCS										
Total Organic Halogens	100			112	ug/L			(80%-120%)		08/05/16	17:42
QC1203592843	MB										
Total Organic Halogens			U	3.33	ug/L					08/05/16	17:19
QC1203592846	402058001	PS									
Total Organic Halogens	100	B	5.12	110	ug/L			(75%-125%)		08/05/16	19:08
Batch	1589910										
QC1203605347	402058003	DUP									
Total Organic Halogens			U	3.33	ug/L	N/A		(+/-10.0)	RMJ	08/11/16	20:25
QC1203605344	LCS										
Total Organic Halogens	100			105	ug/L			(80%-120%)		08/11/16	18:24
QC1203605343	MB										
Total Organic Halogens			U	3.33	ug/L					08/11/16	17:33
QC1203605348	402058003	PS									
Total Organic Halogens	100			80.8	ug/L			(75%-125%)		08/11/16	20:47
Batch	1590285										
QC1203606342	402058004	DUP									
Total Organic Halogens	B	3.54	B	3.82	ug/L	7.61	^	(+/-10.0)	RMJ	08/12/16	20:10

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QC Summary

Workorder: 402058

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Halogen Analysis											
Batch	1590285										
QC1203606341	LCS										
Total Organic Halogens	100			103	ug/L		103	(80%-120%)	RMJ	08/12/16	19:30
QC1203606340	MB										
Total Organic Halogens			U	3.33	ug/L					08/12/16	19:02
QC1203606343	402058004 PS										
Total Organic Halogens	100	B	3.54	113	ug/L		110	(75%-125%)		08/12/16	21:04
Titration and Ion Analysis											
Batch	1585315										
QC1203593629	402046001 DUP										
Alkalinity, Total as CaCO3			135000	136000	ug/L	0.471		(0%-20%)	RXB5	07/27/16	21:54
QC1203593628	LCS										
Alkalinity, Total as CaCO3	50000			51000	ug/L		102	(80%-120%)		07/27/16	21:42
QC1203593627	MB										
Alkalinity, Total as CaCO3			B	475	ug/L					07/27/16	21:36

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

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QC Summary

Workorder: 402058

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