

July 25, 2016



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July 25, 2016

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

Re: CHPRC SAF F16-042  
Work Order: 400197  
SDG: GEL400197

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 28, 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,

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Purchase Order: 304070 - 7H  
Chain of Custody: F16-042-099, F16-042-100 and F16-042-113  
Enclosures



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# Case Narrative

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F16-042  
SDG: GEL400197

July 25, 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 June 28, 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:

<b><u>Laboratory Identification</u></b>	<b><u>Sample Description</u></b>
400197001	B35YF3
400197002	B35YF7
400197003	B35YF4

**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.

July 25, 2016

**Data Package**

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Diesel Range Organics, FID Flame Ionization Detector, 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.

  
Brielle Luthman for  
Heather Shaffer  
Project Manager

Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL400197  
Work Order #: 400197

## GC/MS Volatile

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

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.

## FID Flame Ionization Detector

### **Washington Method for the Determination of Extractable Petroleum Hydrocarbons**

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 Dilutions**

QC samples 1203579052 (LCS) and 1203579414 (LCSD) were diluted at 1:2 to get the concentration of the spiked analytes within the calibration range.

## Diesel Range Organics

### **Analysis of Diesel Range Organics by Flame Ionization Detector**

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.

### Miscellaneous Information

#### **Manual Integrations**

Samples 1203576873 (LCS), 1203576874 (B35YF3MS) and 1203576875 (B35YF3MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

## 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. 400197002 (B35YF7).

**Quality Control (QC) Information**

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

The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203575907 (Non SDG 400183001MS)	Sodium	57.7* (75%-125%)

**Post Spike (PS) Recovery Statement**

The PS did not meet the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the presence of matrix interferences.

Sample	Analyte	Value
1203580616 (Non SDG 400183001PS)	Sodium	76.5* (80%-120%)

**Serial Dilution % Difference Statement**

Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Sample	Analyte	Value
1203575909 (Non SDG 400183001SDILT)	Sodium	15.8 *(0%-10%)

**Determination of Metals by ICP-MS**

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 Dilutions**

Sample 400197002 (B35YF7) was diluted to ensure that the analyte concentration was within the linear calibration range of the instrument.

Analyte	400197
	002
Strontium	5X

**General Chemistry**

**Alkalinity**

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.

**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		F16-042-113	PAGE 1 OF 1
COLLECTOR CHRIS FULTON CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9402, I-007	PROJECT DESIGNATION 100-NR-2 Drilling - Water		SAF NO. F16-042	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. C25-492	FIELD LOGBOOK NO. H2FN-645-2-89.2	ACTUAL SAMPLE DEPTH 90.7	COA 304070	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 6776		BILL OF LADING/AIR BILL NO. 7766 1408 9939		

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SC=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1. NA	HNO3 to pH <2	6 Months	G/P	1	500ml	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
	PRESERVATION						
	HOLDING TIME						
	TYPE OF CONTAINER						
	NO. OF CONTAINER(S)						
	VOLUME						
	SAMPLE ANALYSIS						
SAMPLE NO. B35YF7	MATRIX* WATER	SAMPLE DATE JUN 27 2016	SAMPLE TIME 0855				

400197

FLITER

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM CHRIS FULTON CHPRC		RECEIVED BY/STORED IN FDEP	DATE/TIME JUN 27 2016	RECEIVED BY/STORED IN M. K. ...	DATE/TIME 6-28-16 09:20
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME	DISPOSED BY	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD				

SPECIAL INSTRUCTIONS  
(1) 6020\_METALS\_ICPMS: COMMON {Aluminum, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Selenium};  
6020\_METALS\_ICPMS: COMMON (Add-on) {Antimony, Arsenic, Manganese, Nickel, Silver, Strontium, Vanadium, Zinc};  
6010\_METALS\_ICP: COMMON {Calcium, Iron, Magnesium, Potassium, Sodium}; 6010\_METALS\_ICP: COMMON (Add-on) {Phosphorus};

FLITER

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CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-042-100	PAGE 1 OF 1
COLLECTOR FULTON CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9402, I-007	PROJECT DESIGNATION 100-NR-2 Drilling - Water	FIELD LOGBOOK NO. HNF-N-6454/Pg. 2	ACTUAL SAMPLE DEPTH 90.7 FT	SAF NO. F16-042	AIR QUALITY <input type="checkbox"/>
ICE CHEST NO. GWS-492	OFFSITE PROPERTY NO. 6774	COA 304070	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL	
SHIPPED TO GEL Laboratories, LLC					
BILL OF LADING/AIR BILL NO. 7766 1408 9939					

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	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. NA	HCl or H2SO4 to pH <2/Cool 14 Days	agS*	4	40ml	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SPECIAL HANDLING AND/OR STORAGE		PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME
SAMPLE NO. B35YF4	MATRIX* WATER	SAMPLE DATE JUN 27 2016	SAMPLE TIME 0855	✓		

400197

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM CHRIS FULTON CHPRC	DATE/TIME JUN 27 2016 1900	RECEIVED BY/STORED IN FEDEX	DATE/TIME JUN 27 2016	** All VOA samples will be collected using EPA Method 5035A and will include 5 bottles for low level analysis.** The laboratory is to use one of the low level VOA bottles for moisture content determination.** VOA bottles will be labeled with an appended suffix of K, L, M, N, or P. These suffixes are for the purpose of providing bottle weights to the laboratories. These suffixes should not be included as part of the sample ID reported in the final data packages. (1) 8260_VOA_GCMS: COMMON {Chloroform, Ethylbenzene};	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME		
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME		

**SAMPLE RECEIPT & REVIEW FORM**

Client: <i>OPRE MK</i>		SDG/AR/COC/Work Order:
Received By:		Date Received: <i>6-29-16</i>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" 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 checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <i>Opno</i>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<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) *all temperatures are recorded in Celsius <i>2°C</i>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <i>130462961</i> Secondary Temperature Device Serial # (if Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(if unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(if yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

16 Carrier and tracking number.	Circle Applicable:	
	<input checked="" type="checkbox"/> FedEx Air	FedEx Ground UPS Field Services Courier Other
	<i>7766 1135 4885</i>	<i>2°C</i>
	<i>7766 1408 9939</i>	<i>2°C</i>

Comments (Use Continuation Form if needed):

# 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 25 July 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 #: GEL400197  
Work Order #: 400197

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

**Analytical Method:** SW846 8260C

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

**Analytical Batch:** 1578083

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400197003	B35YF4
1203576188	Method Blank (MB)
1203576189	Laboratory Control Sample (LCS)
1203576190	400183001(NonSDG) Post Spike (PS)
1203576191	400183001(NonSDG) Post Spike Duplicate (PSD)

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

**Data Summary:**

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.

**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: GEL400197 GEL Work Order: 400197

**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.

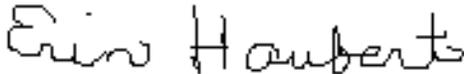
RA Indicates that sample is re-analyzed without re-extraction.

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:** 19 JUL 2016

**Title:** Data Validator

# Sample Data Summary

Volatile  
Certificate of Analysis  
Sample Summary

Page 1 of 1

SDG Number:	GEL400197	Date Collected:	06/27/2016 08:55	Matrix:	WATER
Lab Sample ID:	400197003	Date Received:	06/28/2016 09:10	Client:	CPRC001
Client ID:	B35YF4	Method:	SW846 8260C	Project:	CPRC0F16042
Batch ID:	1578083	Inst:	VOA3.I	SOP Ref:	GL-OA-E-038
Run Date:	06/29/2016 11:05	Analyst:	CDS1	Dilution:	1
Prep Date:	06/29/2016 11:05	Column:	DB-624	Purge Vol:	5 mL
Data File:	062916V3\3P309.D				

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
67-66-3	Chloroform	J	4.24	ug/L	0.300	2.00	5.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	5.00

# Quality Control Summary

July 25, 2016

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: July 1, 2016

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1578083										
QC1203576189	LCS										
Chloroform	50.0			53.3	ug/L		107	(70%-130%)	CDS1	06/29/16	08:03
Ethylbenzene	50.0			52.1	ug/L		104	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			46.3	ug/L		93	(70%-130%)			
**Bromofluorobenzene	50.0			50.4	ug/L		101	(70%-130%)			
**Toluene-d8	50.0			46.3	ug/L		93	(70%-130%)			
QC1203576188	MB										
Chloroform			U	0.300	ug/L					06/29/16	09:04
Ethylbenzene			U	0.300	ug/L						
**1,2-Dichloroethane-d4	50.0			51.1	ug/L		102	(70%-130%)			
**Bromofluorobenzene	50.0			48.6	ug/L		97	(70%-130%)			
**Toluene-d8	50.0			50.9	ug/L		102	(70%-130%)			
QC1203576190	400183001 PS										
Chloroform	50.0	J	0.370	51.5	ug/L		102	(70%-130%)		06/29/16	16:09
Ethylbenzene	50.0	U	0.00	50.6	ug/L		101	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		52.7	47.6	ug/L		95	(70%-130%)			
**Bromofluorobenzene	50.0		46.9	50.3	ug/L		101	(70%-130%)			
**Toluene-d8	50.0		50.1	49.2	ug/L		98	(70%-130%)			
QC1203576191	400183001 PSD										
Chloroform	50.0	J	0.370	49.9	ug/L	3	99	(0%-20%)		06/29/16	16:39
Ethylbenzene	50.0	U	0.00	49.3	ug/L	3	99	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		52.7	49.8	ug/L		100	(70%-130%)			

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**QC Summary**

Workorder: 400197

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Volatile-GC/MS</b>											
Batch	1578083										
**Bromofluorobenzene	50.0	46.9		50.6	ug/L		101	(70%-130%)			
**Toluene-d8	50.0	50.1		48.5	ug/L		97	(70%-130%)	CDS1	06/29/16	16:39

**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.
- 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.

## Surrogate Recovery Report

SDG Number: GEL400197

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203576189	LCS for batch 1578083	93	93	101
1203576188	MB for batch 1578083	102	102	97
400197003	B35YF4	107	106	93
1203576190	B35M16PS	95	98	101
1203576191	B35M16PSD	100	97	101

**Surrogate****Acceptance Limits**

DCED4 = 1,2-Dichloroethane-d4

(70%-130%)

TOL = Toluene-d8

(70%-130%)

BFB = Bromofluorobenzene

(70%-130%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

# Flame Ionization Detector Analysis

# Case Narrative

FID Flame Ionization Detector  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL400197  
Work Order #: 400197

**Product:** Washington Method for the Determination of Extractable Petroleum Hydrocarbons

**Analytical Method:** WA EPH

**Analytical Procedure:** GL-OA-E-075 REV# 0

**Analytical Batches:** 1579204 and 1579202

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400197001	B35YF3
1203579051	Method Blank (MB)
1203579052	Laboratory Control Sample (LCS)
1203579414	Laboratory Control Sample Duplicate (LCSD)

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 Dilutions**

QC samples 1203579052 (LCS) and 1203579414 (LCSD) were diluted at 1:2 to get the concentration of the spiked analytes within the calibration range.

**Certification Statement**

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

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400197 GEL Work Order: 400197

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

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.

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: Jimin Cao

Date: 18 JUL 2016

Title: Data Validator

# Sample Data Summary

**Flame Ionization Detector  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> GEL400197	<b>Date Collected:</b> 06/27/2016 08:55	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 400197001	<b>Date Received:</b> 06/28/2016 09:20	
<b>Client ID:</b> B35YF3	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F16042
<b>Batch ID:</b> 1579204	<b>Method:</b> WA EPH	<b>SOP Ref:</b> GL-OA-E-075
<b>Run Date:</b> 07/07/2016 16:49	<b>Inst:</b> FID5.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 07/07/2016 08:45	<b>Analyst:</b> JMB3	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> 070716_WA\F5g0708.D	<b>Aliquot:</b> 1000 mL	<b>Final Volume:</b> 2 mL
	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
	Aliphatic Hydrocarbons >C10-C12	U	15.0	ug/L	15.0	40.0
	Aliphatic Hydrocarbons >C12-C16	U	15.0	ug/L	15.0	40.0
	Aliphatic Hydrocarbons >C16-C21	U	15.0	ug/L	15.0	40.0
	Aliphatic Hydrocarbons >C21-C34	U	15.0	ug/L	15.0	40.0
	Aliphatic Hydrocarbons C8-C10	U	15.0	ug/L	15.0	40.0
	Aromatic Hydrocarbons >C10-C12	U	15.0	ug/L	15.0	40.0
	Aromatic Hydrocarbons >C12-C16	U	15.0	ug/L	15.0	40.0
	Aromatic Hydrocarbons >C16-C21	U	15.0	ug/L	15.0	40.0
	Aromatic Hydrocarbons >C21-C34	U	15.0	ug/L	15.0	40.0
	Aromatic Hydrocarbons C8-C10	U	15.0	ug/L	15.0	40.0

# Quality Control Summary

**GEL LABORATORIES LLC**

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**QC Summary**

Report Date: July 8, 2016

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>GC-FID</b>											
Batch	1579204										
QC1203579052 LCS											
Aliphatic Hydrocarbons >C10-C12	400		D	390	ug/L		97	(70%-130%)	JMB3	07/07/16	19:47
Aliphatic Hydrocarbons >C12-C16	400		D	430	ug/L		108	(70%-130%)			
Aliphatic Hydrocarbons >C16-C21	400		D	411	ug/L		103	(70%-130%)			
Aliphatic Hydrocarbons >C21-C34	600		D	633	ug/L		105	(70%-130%)			
Aliphatic Hydrocarbons C8-C10	200		D	197	ug/L		99	(70%-130%)			
Aromatic Hydrocarbons >C10-C12	400		D	343	ug/L		86	(70%-130%)			
Aromatic Hydrocarbons >C12-C16	200		D	206	ug/L		103	(70%-130%)			
Aromatic Hydrocarbons >C16-C21	800		D	721	ug/L		90	(70%-130%)			
Aromatic Hydrocarbons >C21-C34	400		D	390	ug/L		97	(70%-130%)			
Aromatic Hydrocarbons C8-C10	200		D	174	ug/L		87	(70%-130%)			
**1-Chlorooctadecane	40.0			37.3	ug/L		93	(60%-140%)			
**o-Terphenyl	40.0			36.6	ug/L		92	(60%-140%)			
QC1203579414 LCSD											
Aliphatic Hydrocarbons >C10-C12	400		D	375	ug/L	4	94	(0%-20%)		07/07/16	20:46
Aliphatic Hydrocarbons >C12-C16	400		D	420	ug/L	2	105	(0%-20%)			
Aliphatic Hydrocarbons >C16-C21	400		D	400	ug/L	3	100	(0%-20%)			
Aliphatic Hydrocarbons >C21-C34	600		D	615	ug/L	3	102	(0%-20%)			
Aliphatic Hydrocarbons C8-C10	200		D	185	ug/L	6	93	(0%-20%)			
Aromatic Hydrocarbons >C10-C12	400		D	330	ug/L	4	83	(0%-20%)			
Aromatic Hydrocarbons >C12-C16	200		D	202	ug/L	2	101	(0%-20%)			

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**QC Summary**

Workorder: 400197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>GC-FID</b>											
Batch	1579204										
Aromatic Hydrocarbons >C16-C21	800		D	702	ug/L	3	88	(0%-20%)			
Aromatic Hydrocarbons >C21-C34	400		D	378	ug/L	3	94	(0%-20%)	JMB3	07/07/16	20:46
Aromatic Hydrocarbons C8-C10	200		D	163	ug/L	6	82	(0%-20%)			
**1-Chlorooctadecane	40.0			36.0	ug/L		90	(60%-140%)			
**o-Terphenyl	40.0			35.6	ug/L		89	(60%-140%)			
QC1203579051 MB											
Aliphatic Hydrocarbons >C10-C12			U	15.0	ug/L					07/07/16	17:19
Aliphatic Hydrocarbons >C12-C16			U	15.0	ug/L						
Aliphatic Hydrocarbons >C16-C21			U	15.0	ug/L						
Aliphatic Hydrocarbons >C21-C34			U	15.0	ug/L						
Aliphatic Hydrocarbons C8-C10			U	15.0	ug/L						
Aromatic Hydrocarbons >C10-C12			U	15.0	ug/L						
Aromatic Hydrocarbons >C12-C16			U	15.0	ug/L						
Aromatic Hydrocarbons >C16-C21			U	15.0	ug/L						
Aromatic Hydrocarbons >C21-C34			U	15.0	ug/L						
Aromatic Hydrocarbons C8-C10			U	15.0	ug/L						
**1-Chlorooctadecane	40.0			36.9	ug/L		92	(60%-140%)			
**o-Terphenyl	40.0			36.6	ug/L		92	(60%-140%)			

**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.

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**QC Summary**

Workorder: 400197

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

Flame Ionization Detector  
Surrogate Recovery Report

SDG Number: GEL400197

Matrix Type: LIQUID

Sample ID	Client ID	COD %REC	OTP %REC
400197001	B35YF3	85	90
1203579051	MB for batch 1579202	92	92
1203579052	LCS for batch 1579202	93 D	92 D
1203579414	LCSD for batch 1579202	90 D	89 D

**Surrogate**

COD = 1-Chlorooctadecane

OTP = o-Terphenyl

**Acceptance Limits**

(60%-140%)

(60%-140%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

# **FID Diesel Range Organics Analysis**

# Case Narrative

Diesel Range Organics  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL400197  
Work Order #: 400197

**Product:** Analysis of Diesel Range Organics by Flame Ionization Detector

**Analytical Method:** NWTPH-Dx

**Analytical Procedure:** GL-OA-E-003 REV# 26

**Analytical Batch:** 1578323

**Preparation Method:** SW846 3535A

**Preparation Procedure:** GL-OA-E-013 REV# 29

**Preparation Batch:** 1578322

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400197001	B35YF3
1203576872	Method Blank (MB)
1203576873	Laboratory Control Sample (LCS)
1203576874	400197001(B35YF3) Matrix Spike (MS)
1203576875	400197001(B35YF3) 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.

**Miscellaneous Information**

**Manual Integrations**

Samples 1203576873 (LCS), 1203576874 (B35YF3MS) and 1203576875 (B35YF3MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

**Certification Statement**

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

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400197 GEL Work Order: 400197

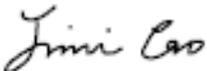
**The Qualifiers in this report are defined as follows:**

- 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.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- 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: Jimin Cao

Date: 15 JUL 2016

Title: Data Validator

# Sample Data Summary

**FID Diesel Range Organics  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> GEL400197	<b>Date Collected:</b> 06/27/2016 08:55	<b>Matrix:</b> WATER
<b>Lab Sample ID:</b> 400197001	<b>Date Received:</b> 06/28/2016 09:20	
<b>Client ID:</b> B35YF3	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F16042
<b>Batch ID:</b> 1578323	<b>Method:</b> NWTPH-Dx	<b>SOP Ref:</b> GL-OA-E-003
<b>Run Date:</b> 07/07/2016 19:15	<b>Inst:</b> FID7.I	<b>Dilution:</b> 1
<b>Prep Date:</b> 06/30/2016 09:50	<b>Analyst:</b> LXA1	<b>Inj. Vol:</b> 1 uL
<b>Data File:</b> 070716DRO-MO\7g0709.D	<b>Aliquot:</b> 1050 mL	<b>Final Volume:</b> 1 mL
	<b>Column:</b> DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	U	47.6	ug/L	47.6	190
	Motor Oil	U	47.6	ug/L	47.6	190

# Quality Control Summary

July 25, 2016

# GEL LABORATORIES LLC

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## QC Summary

Report Date: July 14, 2016

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Diesel Range Organics</b>											
Batch	1578323										
QC1203576873	LCS										
Diesel Range Organics	2000			1610	ug/L		80	(70%-130%)	LXA1	07/01/16	11:53
Motor Oil	2000			1920	ug/L		96	(70%-130%)			
**o-Terphenyl	20.0			15.6	ug/L		78	(60%-140%)			
QC1203576872	MB										
Diesel Range Organics			U	50.0	ug/L					07/07/16	18:36
Motor Oil			U	50.0	ug/L						
**o-Terphenyl	20.0			12.7	ug/L		63	(60%-140%)			
QC1203576874	400197001	MS									
Diesel Range Organics	1900	U	47.6	1390	ug/L		73	(70%-130%)		07/01/16	13:10
Motor Oil	1900	U	47.6	1540	ug/L		81	(70%-130%)			
**o-Terphenyl	19.0		11.5	12.3	ug/L		65	(60%-140%)			
QC1203576875	400197001	MSD									
Diesel Range Organics	1900	U	47.6	1370	ug/L	2	72	(0%-20%)		07/01/16	13:49
Motor Oil	1900	U	47.6	1510	ug/L	2	79	(0%-20%)			
**o-Terphenyl	19.0		11.5	12.1	ug/L		64	(60%-140%)			

### 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

**GEL LABORATORIES LLC**

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**QC Summary**

Workorder: 400197

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

FID Diesel Range Organics  
Surrogate Recovery Report

SDG Number: GEL400197

Matrix Type: LIQUID

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Sample ID	Client ID	OTP %REC
1203576873	LCS for batch 1578322	78
1203576874	B35YF3MS	65
1203576875	B35YF3MSD	64
1203576872	MB for batch 1578322	63
400197001	B35YF3	60

**Surrogate**

OTP = o-Terphenyl

**Acceptance Limits**

(60%-140%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

# Metals Analysis

# Case Narrative

Metals  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL400197  
Work Order #: 400197

**Product:** Determination of Metals by ICP-MS  
**Analytical Method:** 6020\_METALS\_ICPMS  
**Analytical Procedure:** GL-MA-E-014 REV# 28  
**Analytical Batch:** 1577897

**Product:** Determination of Metals by ICP  
**Analytical Method:** 6010\_METALS\_ICP  
**Analytical Procedure:** GL-MA-E-013 REV# 26  
**Analytical Batch:** 1577901

**Preparation Method:** SW846 3005A  
**Preparation Procedure:** GL-MA-E-006 REV# 13  
**Preparation Batches:** 1577894 and 1577899

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400197002	B35YF7
1203575905	Method Blank (MB)ICP
1203575906	Laboratory Control Sample (LCS)
1203575909	400183001(NonSDGL) Serial Dilution (SD)
1203575907	400183001(NonSDGS) Matrix Spike (MS)
1203575908	400183001(NonSDGSD) Matrix Spike Duplicate (MSD)
1203580616	400183001(NonSDGPS) Post Spike (PS)
1203575900	Method Blank (MB)ICP-MS
1203575901	Laboratory Control Sample (LCS)
1203575904	400190001(NonSDGL) Serial Dilution (SD)
1203575902	400190001(NonSDGS) Matrix Spike (MS)
1203575903	400190001(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. 400197002 (B35YF7)-ICP.

**Quality Control (QC) Information**

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

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS/MSD (See Below) did not meet the recommended quality control acceptance criteria for percent recoveries for the following applicable analyte. The post spike recovery was within the required control limits. This verifies the absence of a matrix interference in the post-spike digested sample. The recovery may be attributed to possible sample matrix interference and/or non-homogeneity.

Sample	Analyte	Value
1203575907 (Non SDG 400183001MS)	Sodium	57.7* (75%-125%)

**Post Spike (PS) Recovery Statement**

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS did not meet the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the presence of matrix interferences.

Sample	Analyte	Value
1203580616 (Non SDG 400183001PS)	Sodium	76.5* (80%-120%)

**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. Not all the applicable analytes were within the established acceptance criteria. Matrix suppression may be suspected. The data has been qualified.

Sample	Analyte	Value
1203575909 (Non SDG 400183001SDILT)	Sodium	15.8 *(0%-10%)

**Technical Information**

**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. Sample 400197002 (B35YF7)-ICP-MS was diluted to ensure that the analyte concentration was within the linear calibration range of the instrument.

Analyte	<b>400197</b>
	<b>002</b>
Strontium	5X

**Certification Statement**

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

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**Qualifier Definition Report  
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL400197 GEL Work Order: 400197

**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.
- M Duplicate precision not met.
- 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: 25 JUL 2016**

**Title: Data Validator**

# Sample Data Summary

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

**SDG No:** GEL400197

**CONTRACT:** CPRC0F16042

**METHOD TYPE:** SW846

**SAMPLE ID:**400197002

**BASIS:** As Received

**DATE COLLECTED** 27-JUN-16

**CLIENT ID:** B35YF7

**LEVEL:** Low

**DATE RECEIVED** 28-JUN-16

**MATRIX:** WATER

**%SOLIDS:** 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	55.1	ug/L		15	50	50	1	MS	SKJ	07/22/16 17:32	160722-8	1577897
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/21/16 02:31	160720-7	1577897
7440-38-2	Arsenic	5.6	ug/L		1.7	5	5	1	MS	BAJ	07/25/16 09:41	160725-3	1577897
7440-39-3	Barium	37.8	ug/L		0.6	2	2	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7440-43-9	Cadmium	0.110	ug/L	U	0.11	1	1	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7440-70-2	Calcium	36900	ug/L		50	200	200	1	P	HSC	07/05/16 16:22	070516A-2	1577901
7440-47-3	Chromium	7.21	ug/L	B	2	10	10	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7440-48-4	Cobalt	0.154	ug/L	B	0.1	1	1	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7440-50-8	Copper	1.78	ug/L		0.35	1	1	1	MS	SKJ	07/22/16 17:32	160722-8	1577897
7439-89-6	Iron	105	ug/L		30	100	100	1	P	HSC	07/05/16 16:22	070516A-2	1577901
7439-92-1	Lead	0.590	ug/L	B	0.5	2	2	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7439-95-4	Magnesium	9510	ug/L		110	300	300	1	P	HSC	07/05/16 16:22	070516A-2	1577901
7439-96-5	Manganese	18.7	ug/L		1	5	5	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7439-98-7	Molybdenum	9.25	ug/L		0.165	0.5	0.5	1	MS	SKJ	07/22/16 17:32	160722-8	1577897
7440-02-0	Nickel	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7723-14-0	Phosphorous	60	ug/L	U	60	150	150	1	P	HSC	07/05/16 16:22	070516A-2	1577901
7440-09-7	Potassium	5760	ug/L		50	150	150	1	P	HSC	07/05/16 16:22	070516A-2	1577901
7782-49-2	Selenium	2.14	ug/L	B	1.5	5	5	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7440-22-4	Silver	0.20	ug/L	U	0.2	1	1	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7440-23-5	Sodium	102000	ug/L		100	300	300	1	P	HSC	07/05/16 16:22	070516A-2	1577901
7440-24-6	Strontium	263	ug/L	D	10	50	50	5	MS	SKJ	07/22/16 17:18	160722-8	1577897
7440-62-2	Vanadium	18.7	ug/L		4.5	10	10	1	MS	PRB	07/20/16 20:03	160720-4	1577897
7440-66-6	Zinc	8.92	ug/L	B	3.5	10	10	1	MS	SKJ	07/22/16 17:32	160722-8	1577897

**Prep Information:**

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1577897	1577894	SW846 3005A	50	mL	50	mL	06/28/16	JP1
1577901	1577899	SW846 3005A	50	mL	50	mL	06/28/16	JP1

**\*Analytical Methods:**

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

# Quality Control Summary

July 25, 2016

# GEL LABORATORIES LLC

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## QC Summary

Report Date: July 25, 2016

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CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400197

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1577897										
QC1203575901	LCS										
Aluminum	2000			1900	ug/L		95	(80%-120%)	SKJ	07/22/16	16:42
Antimony	50.0			51.6	ug/L		103	(80%-120%)	PRB	07/21/16	02:10
Arsenic	50.0			47.0	ug/L		94	(80%-120%)	BAJ	07/25/16	09:18
Barium	50.0			49.7	ug/L		99.3	(80%-120%)	PRB	07/20/16	19:12
Cadmium	50.0			50.6	ug/L		101	(80%-120%)			
Chromium	50.0			55.6	ug/L		111	(80%-120%)			
Cobalt	50.0			49.9	ug/L		99.7	(80%-120%)			
Copper	50.0			48.3	ug/L		96.6	(80%-120%)	SKJ	07/22/16	16:42
Lead	50.0			48.4	ug/L		96.8	(80%-120%)	PRB	07/20/16	19:12
Manganese	50.0			50.4	ug/L		101	(80%-120%)			
Molybdenum	50.0			47.4	ug/L		94.8	(80%-120%)	SKJ	07/22/16	16:42
Nickel	50.0			52.7	ug/L		105	(80%-120%)	PRB	07/20/16	19:12
Selenium	50.0			49.8	ug/L		99.5	(80%-120%)			
Silver	50.0			48.6	ug/L		97.3	(80%-120%)			
Strontium	50.0			48.3	ug/L		96.7	(80%-120%)	SKJ	07/22/16	16:42
Vanadium	50.0			54.9	ug/L		110	(80%-120%)	PRB	07/20/16	19:12
Zinc	50.0			51.4	ug/L		103	(80%-120%)	SKJ	07/22/16	16:42
QC1203575900	MB										
Aluminum			U	15.0	ug/L					07/22/16	16:39
Antimony			U	1.00	ug/L				PRB	07/21/16	02:08

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1577897										
Arsenic			U	1.70	ug/L				BAJ	07/25/16	09:16
Barium			U	0.600	ug/L				PRB	07/20/16	19:08
Cadmium			U	0.110	ug/L						
Chromium			U	2.00	ug/L						
Cobalt			U	0.100	ug/L						
Copper			U	0.350	ug/L				SKJ	07/22/16	16:39
Lead			U	0.500	ug/L				PRB	07/20/16	19:08
Manganese			U	1.00	ug/L						
Molybdenum			U	0.165	ug/L				SKJ	07/22/16	16:39
Nickel			U	0.500	ug/L				PRB	07/20/16	19:08
Selenium			U	1.50	ug/L						
Silver			U	0.200	ug/L						
Strontium			U	2.00	ug/L				SKJ	07/22/16	16:39
Vanadium			U	4.50	ug/L				PRB	07/20/16	19:08
Zinc			U	3.50	ug/L				SKJ	07/22/16	16:39
QC1203575902 400190001 MS											
Aluminum	2000	B	20.5	2090	ug/L		103	(75%-125%)		07/22/16	16:51
Antimony	50.0	U	1.00	49.6	ug/L		98.5	(75%-125%)	PRB	07/21/16	02:13
Arsenic	50.0		10.6	60.4	ug/L		99.6	(75%-125%)	BAJ	07/25/16	09:21
Barium	50.0		17.0	65.3	ug/L		96.5	(75%-125%)	PRB	07/20/16	19:24
Cadmium	50.0	U	0.110	47.5	ug/L		95	(75%-125%)			
Chromium	50.0	B	2.51	55.1	ug/L		105	(75%-125%)			
Cobalt	50.0	U	0.100	46.9	ug/L		93.8	(75%-125%)			

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## QC Summary

Workorder: 400197

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1577897										
Copper	50.0		1.25	51.3	ug/L		100	(75%-125%)	SKJ	07/22/16	16:51
Lead	50.0	U	0.500	45.2	ug/L		90.3	(75%-125%)	PRB	07/20/16	19:24
Manganese	50.0	U	1.00	48.3	ug/L		95.4	(75%-125%)			
Molybdenum	50.0		5.48	59.6	ug/L		108	(75%-125%)	SKJ	07/22/16	16:51
Nickel	50.0	U	0.500	46.1	ug/L		91.9	(75%-125%)	PRB	07/20/16	19:24
Selenium	50.0	B	1.52	48.8	ug/L		94.6	(75%-125%)			
Silver	50.0	U	0.200	45.4	ug/L		90.7	(75%-125%)			
Strontium	50.0		72.4	124	ug/L		104	(75%-125%)	SKJ	07/22/16	16:51
Vanadium	50.0		42.8	89.9	ug/L		94.2	(75%-125%)	PRB	07/20/16	19:24
Zinc	50.0	U	3.50	54.3	ug/L		104	(75%-125%)	SKJ	07/22/16	16:51
QC1203575903 400190001 MSD											
Aluminum	2000	B	20.5	2080	ug/L	0.214	103	(0%-20%)		07/22/16	16:54
Antimony	50.0	U	1.00	50.3	ug/L	1.5	100	(0%-20%)	PRB	07/21/16	02:14
Arsenic	50.0		10.6	58.1	ug/L	3.88	95	(0%-20%)	BAJ	07/25/16	09:23
Barium	50.0		17.0	65.4	ug/L	0.291	96.9	(0%-20%)	PRB	07/20/16	19:28
Cadmium	50.0	U	0.110	50.4	ug/L	5.81	101	(0%-20%)			
Chromium	50.0	B	2.51	57.0	ug/L	3.42	109	(0%-20%)			
Cobalt	50.0	U	0.100	47.8	ug/L	1.74	95.5	(0%-20%)			
Copper	50.0		1.25	50.6	ug/L	1.22	98.8	(0%-20%)	SKJ	07/22/16	16:54
Lead	50.0	U	0.500	44.0	ug/L	2.69	87.9	(0%-20%)	PRB	07/20/16	19:28
Manganese	50.0	U	1.00	48.3	ug/L	0.0952	95.5	(0%-20%)			
Molybdenum	50.0		5.48	60.1	ug/L	0.934	109	(0%-20%)	SKJ	07/22/16	16:54

July 25, 2016

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## QC Summary

Workorder: 400197

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1577897										
Nickel	50.0	U	0.500		48.9	ug/L	6.03	97.7	(0%-20%)	PRB	07/20/16 19:28
Selenium	50.0	B	1.52		48.0	ug/L	1.67	93	(0%-20%)		
Silver	50.0	U	0.200		48.3	ug/L	6.25	96.5	(0%-20%)		
Strontium	50.0		72.4		126	ug/L	1.59	108	(0%-20%)	SKJ	07/22/16 16:54
Vanadium	50.0		42.8		94.8	ug/L	5.31	104	(0%-20%)	PRB	07/20/16 19:28
Zinc	50.0	U	3.50		55.0	ug/L	1.21	106	(0%-20%)	SKJ	07/22/16 16:54
QC1203575904 400190001 SDILT											
Aluminum		B	20.5	DU	75.0	ug/L	N/A		(0%-10%)		07/22/16 16:59
Antimony		U	0.341	DU	5.00	ug/L	N/A		(0%-10%)	PRB	07/21/16 02:18
Arsenic			10.6	BD	2.49	ug/L	17.2		(0%-10%)	BAJ	07/25/16 09:25
Barium			17.0	D	3.58	ug/L	5.42		(0%-10%)	PRB	07/20/16 19:34
Cadmium		U	0.010	BD	0.162	ug/L	N/A		(0%-10%)		
Chromium		B	2.51	DU	10.0	ug/L	N/A		(0%-10%)		
Cobalt		U	0.027	BD	0.225	ug/L	N/A		(0%-10%)		
Copper			1.25	DU	1.75	ug/L	N/A		(0%-10%)	SKJ	07/22/16 16:59
Lead		U	0.044	DU	2.50	ug/L	N/A		(0%-10%)	PRB	07/20/16 19:34
Manganese		U	0.571	DU	5.00	ug/L	N/A		(0%-10%)		
Molybdenum			5.48	D	1.21	ug/L	10.1		(0%-10%)	SKJ	07/22/16 16:59
Nickel		U	0.083	DU	2.50	ug/L	N/A		(0%-10%)	PRB	07/20/16 19:34
Selenium		B	1.52	DU	7.50	ug/L	N/A		(0%-10%)		
Silver		U	0.044	DU	1.00	ug/L	N/A		(0%-10%)		
Strontium			72.4	D	15.3	ug/L	5.39		(0%-10%)	SKJ	07/22/16 16:59

July 25, 2016

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QC Summary

Workorder: 400197

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis - ICPMS</b>											
Batch	1577897										
Vanadium		42.8	D	12.4	ug/L	44.6		(0%-10%)	PRB	07/20/16	19:34
Zinc	U	2.12	BD	5.67	ug/L	N/A		(0%-10%)	SKJ	07/22/16	16:59
<b>Metals Analysis-ICP</b>											
Batch	1577901										
QC1203575906	LCS										
Calcium	5000			4940	ug/L		98.8	(80%-120%)	HSC	07/05/16	15:34
Iron	5000			4990	ug/L		99.8	(80%-120%)			
Magnesium	5000			4960	ug/L		99.2	(80%-120%)			
Phosphorous	500			460	ug/L		91.9	(80%-120%)			
Potassium	5000			4830	ug/L		96.6	(80%-120%)			
Sodium	5000			4710	ug/L		94.1	(80%-120%)			
QC1203575905	MB										
Calcium			U	50.0	ug/L					07/05/16	15:30
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						
Phosphorous			U	60.0	ug/L						
Potassium			U	50.0	ug/L						
Sodium			U	100	ug/L						
QC1203575907	400183001	MS									
Calcium	5000	60400		63000	ug/L		N/A	(75%-125%)		07/05/16	15:40
Iron	5000	U	30.0	4760	ug/L		95	(75%-125%)			
Magnesium	5000		12100	16200	ug/L		82.4	(75%-125%)			
Phosphorous	500	U	60.0	516	ug/L		93.5	(75%-125%)			
Potassium	5000		4360	9210	ug/L		97	(75%-125%)			

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**QC Summary**

Workorder: 400197

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Metals Analysis-ICP</b>											
Batch	1577901										
Sodium	5000	MN	16900	N	19700	ug/L	57.7*	(75%-125%)			
QC1203575908	400183001	MSD									
Calcium	5000		60400		62300	ug/L	1.05	N/A	(0%-20%)	HSC	07/05/16 15:44
Iron	5000	U	30.0		4830	ug/L	1.43	96.4	(0%-20%)		
Magnesium	5000		12100		16200	ug/L	0.315	83.4	(0%-20%)		
Phosphorous	500	U	60.0		509	ug/L	1.39	92.1	(0%-20%)		
Potassium	5000		4360		8900	ug/L	3.39	90.9	(0%-20%)		
Sodium	5000	MN	16900		20900	ug/L	5.89	81.7	(0%-20%)		
QC1203580616	400183001	PS									
Sodium	5000	MN	16900		20700	ug/L	76.5*	(80%-120%)			07/08/16 14:16
QC1203575909	400183001	SDILT									
Calcium			60400	D	11800	ug/L	2.56		(0%-10%)		07/05/16 15:47
Iron		U	12.9	DU	150	ug/L	N/A		(0%-10%)		
Magnesium			12100	D	2350	ug/L	2.54		(0%-10%)		
Phosphorous		U	48.1	DU	300	ug/L	N/A		(0%-10%)		
Potassium			4360	D	791	ug/L	9.14		(0%-10%)		
Sodium		MN	16900	DM	2840	ug/L	15.8*		(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 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.

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QC Summary

Workorder: 400197

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
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 #: GEL400197  
Work Order #: 400197

**Product:** Alkalinity

**Analytical Method:** 2320\_ALKALINITY

**Analytical Procedure:** GL-GC-E-033 REV# 12

**Analytical Batch:** 1577877

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
400197001	B35YF3
1203575846	Method Blank (MB)
1203575847	Laboratory Control Sample (LCS)
1203575850	400183001(NonSDG) Sample Duplicate (DUP)

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

**Data Summary:**

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.

**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: GEL400197 GEL Work Order: 400197

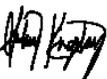
**The Qualifiers in this report are defined as follows:**

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

**Review/Validation**

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

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

Signature: 

Name: Aubrey Kingsbury

Date: 12 JUL 2016

Title: Analyst I

# Sample Data Summary

July 25, 2016

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 12, 2016

Company : CH2MHill Plateau Remediation Company
Address : MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF F16-042

Client Sample ID: B35YF3 Project: CPRC0F16042
Sample ID: 400197001 Client ID: CPRC001
Matrix: WATER
Collect Date: 27-JUN-16 08:55
Receive Date: 28-JUN-16
Collector: Client

Table with 11 columns: Parameter, Qualifier, Result, DL, RL, Units, DF, Analyst, Date, Time Batch, Method. Row 1: 2320\_ALKALINITY: COMMON "As Received", 141000, 725, 1000, ug/L, RXB5, 06/28/16, 1827, 1577877, 1.

The following Analytical Methods were performed:

Table with 3 columns: Method, Description, Analyst Comments. Row 1: 1, 2320\_ALKALINITY.

Notes:

# Quality Control Summary

**GEL LABORATORIES LLC**

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

**QC Summary**

Report Date: July 12, 2016

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 400197

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Titration and Ion Analysis</b>											
Batch	1577877										
QC1203575850	400183001	DUP									
Alkalinity, Total as CaCO3		123000		123000	ug/L	0		(0%-20%)	RXB5	06/28/16	16:53
QC1203575847	LCS										
Alkalinity, Total as CaCO3	50000			53000	ug/L		106	(80%-120%)		06/28/16	16:37
QC1203575846	MB										
Alkalinity, Total as CaCO3			U	725	ug/L					06/28/16	16:02

**Notes:**

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank. The associated blank concentration is  $\geq$  EQL or is  $>$  5% of the measured concentration and/or decision level for associated samples.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

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

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

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

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

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