

July 27, 2018

Rev 0



July 26, 2018

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

Re: CHCPRC SAF S18-006
Work Order: 453729
SDG: GEL453729

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 30, 2018. 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,


Anna Dupree for
Heather Shaffer
Project Manager

Purchase Order: 300071-7H
Chain of Custody: S18-006-131, S18-006-132, S18-006-134 and S18-006-449
Enclosures



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Sample Issue Resolution

SAMPLE ISSUE RESOLUTION (SIR) REPORT**SIR Number:** SIR18-0794**Rev. Number:** 0**Date Initiated:** 07/02/2018**SAMPLE EVENT INFORMATION****SAF NUM(S):** S18-006**LABORATORY:** GEL**SAMPLING INFORMATION****NUMBER OF SAMPLES:** 1**SAMPLE NUMBERS:** B3JBX5**SAMPLE MATRIX:** WATER**SDG NUM(S):** GEL453729**ISSUE BACKGROUND****CLASS:** Field Sampling Issue**TYPE:** Insufficient Sample Volume Collected**DESCRIPTION:** For sample ID B3JBX5, one of the five vials were received with headspace.**RESOLUTION****PROPOSED RESOLUTION:** The lab will avoid using the vials with headspace.**FINAL RESOLUTION:** Accept proposed resolution and proceed with analysis.**SUBMITTED BY:**

DUPREE, ANNA

07/02/2018

ACCEPTED BY:

CUTSFORTH, EC

07/02/2018

Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHCPRC SAF S18-006
SDG: GEL453729**

July 26, 2018

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 30, 2018, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. Please see the enclosed SIR for further details 453729001 (B3JBX5).

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.

Sample Identification

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
453729001	B3JBX5
453729002	B3JBY3
453729003	B3J9L4
453729004	B3J9L7
453729005	B3JJJ9

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: Diesel Range Organics, GC Volatiles (GRO), GC/MS Volatile, General Chemistry, Metals and Radiochemistry.

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.



Anna Dupree for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL453729
Work Order #: 453729

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.

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.

Sample	Analyte	Value
1204063579 (Non SDG 453859001PS)	2-Butanone	62* (70%-130%)
	Acetone	52* (70%-130%)
1204063580 (Non SDG 453859001PSD)	2-Butanone	62* (70%-130%)
	Acetone	46* (70%-130%)

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 1204063921 (LCS), 1204063922 (B3J9L4MS) and 1204063923 (B3J9L4MSD) required manual integration to correctly position the baseline as set in the calibration standard injections.

GC Volatiles (GRO)

Volatile Total Petroleum Hydrocarbons 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.

Technical Information

Sample Preservation and Integrity

Sample vial 453729005 (B3JJJ9) contained head-space >/= pea size. The PM was notified.

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 calcium and potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 453729003 (B3J9L4) and 453729004 (B3J9L7).

Quality Control (QC) Information

Method Blank (MB) Statement

The samples in this SDG contained analytes at concentrations more than ten times the negative value reported in the method blank, therefore the data was not adversely affected.

Sample	Analyte	Value
1204062119 (MB)	Calcium	See applicable report

Determination of Metals by ICP-MS

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.

General Chemistry

n-Hexane Extractable Material

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.

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.

Radiochemistry

SRISO_SEP_PRECIP_GPC: COMMON

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

Recounts

Sample 1204062549 (Non SDG 453730005DUP) was verified by recounting at least five days from the separation date. The recount is reported.

9310_ALPHABETA_GPC: Gross Beta

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

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Sample 1204062554 (B3J9L4MSD) was recounted due to low recovery. The recount is reported.

TRITIUM_DIST_LSC: COMMON

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

Additional Comments

The matrix spike, 1204061870 (Non SDG 453616001MS), aliquot was reduced to conserve sample volume.

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.# S18-006-131 Page 1 of 1			
Collector: Malcom Chunn CHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650			
SAF No.: S18-006		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071			
Project Title: Surv, June 2018		Logbook No.: HNF-N-506 -99-66		Ice Chest No.: 6605-688			
Shipped To (Lab): GEL Laboratories, LLC		Method of Shipment: Commercial Carrier		Bill of Lading/Air Bill No.: 72400607238			
Protocol: SURV		Priority: 30 Days		Offsite Property No.: 9664			
POSSIBLE SAMPLE HAZARDS/REMARK ** ** 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 N/A					
Sample No.	Filter	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3JBX5	N	6-29-18	1037	1x250-mL G/P	2320_ALKALINITY: COMMON	14 Days	COOL <=6C
B3JBX5	N	6-29-18	1037	5x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2 / COOL <=6C
B3JBX5	N	6-29-18	1037	1x1-L P	9310_ALPHABETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B3JBX5	N	6-29-18	1037	1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B3JBX5	N	6-29-18	1037	1x250-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Relinquished By: Malcom Chunn CHPRC	Signature: <i>M. Chunn</i>	Date/Time: JUN 29 2018 1055
Received By: Jeff Lucas CHPRC	Signature: <i>Jeff Lucas</i>	Date/Time: JUN 29 2018 1055
Relinquished By: Jeff Lucas CHPRC	Signature: <i>Jeff Lucas</i>	Date/Time: JUN 29 2018 1400
Received By: FEDEX	Signature: <i>[Signature]</i>	Date/Time: 6/30/18
Relinquished By: Chakeris Tarplin GEL Laboratories	Signature: <i>[Signature]</i>	Date/Time: 6/30/18
Received By:	Signature:	Date/Time:
Relinquished By:	Signature:	Date/Time:
Received By:	Signature:	Date/Time:

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Date/Time:
Printed On: 4/11/2018	FSR ID = FSR60519	A-6004-842 (REV 3)

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 453729		C.O.C.# S18-006-132 Page 1 of 1
Collector: Malcom Chum CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650		
SAF No.: S18-006	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071		
Project Title: Surv, June 2018	Logbook No.: HNF-N-506-99-66	Ice Chest No.: 6WS-683		
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 7726 060728		
Protocol: SURV	Priority: 30 Days	Offsite Property No.: 91041		
POSSIBLE SAMPLE HAZARDS/REMARK ** ** 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 N/A		
Sample No. B3JBY3	Filter N	Date 6-29-18 0832	No/Type Container 4x1-L G	Sample Analysis 1664A_OILGREASE: COMMON
Sample No. B3JBY3	Filter N	Date 6-29-18 0832	No/Type Container 1x1-L P	Sample Analysis 9310_ALPHABETA_GPC: Gross Beta
			Holding Time 28 Days	Preservative HCl to pH <2 / Cool <=6C
			Holding Time 6 Months	Preservative HNO3 to pH <2

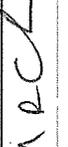
Relinquished By: Malcom Chum CHPRC ME cl.	Signature [Signature]	Date/Time JUN 29 2018 1400	Received By: Janelle Zunker Signature [Signature]	Date/Time 0855	Matrix* S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By: Janelle Zunker CHPRC Fed Ex	Signature [Signature]	Date/Time JUN 29 2018 1400	Received By: FEDEX Signature [Signature]	Date/Time 0630/18	DS = Drum Solids DL = Drum Liquid T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: Signature [Signature]	Signature [Signature]	Date/Time [Date/Time]	Received By: Signature [Signature]	Date/Time [Date/Time]	
Relinquished By: Signature [Signature]	Signature [Signature]	Date/Time [Date/Time]	Received By: Signature [Signature]	Date/Time [Date/Time]	
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 453729		C.O.C.# S18-006-449 Page 1 of 1
Collector: Malcom Chunn CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650		
SAF No.: S18-006	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071		
Project Title: Surv, June 2018	Logbook No.: HNF-N-506 -99-66	Ice Chest No.: 605-685		
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 7200007238		
Protocol: SURV	Priority: 30 Days	Offsite Property No.: 91041		

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3JJJ9	N	W	6-29-18	1037	4x1-L G	1664A_OILGREASE: COMMON	28 Days	HCl to pH <2 / COOL <=6C
B3JJJ9	N	W	6-29-18	1037	4x1-L aG	WTPH_DIESEL: COMMON; WTPH_MOTOR OIL: COMMON	14/40 Days	HCl to pH <2 / COOL <=6C
B3JJJ9	N	W	6-29-18	1037	5x40-mL aGs*	WTPH_GASOLINE: COMMON	14 Days	HCl to pH <2 / COOL <=6C

SPECIAL INSTRUCTIONS
N/A

POSSIBLE SAMPLE HAZARDS/REMARK
 ** ** 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

Relinquished By: Malcom Chunn CHPRC	Signature 	JUN 29 2018 Date/Time	Received By: Jeff Lucas CHPRC	Signature 	JUN 29 2018 1055 Date/Time	Matrix * S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drum Solids DL = Drum Liquid T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: Jeff Lucas CHPRC	Signature 	JUN 29 2018 1400 Date/Time	Received By: FEDEX	Signature 	JUN 29 2018 1055 Date/Time	
Relinquished By: Fed Ex	Signature 	JUN 29 2018 1400 Date/Time	Received By: Chakeris Tappin CHPRC	Signature 	JUN 29 2018 1055 Date/Time	
Relinquished By: (Blank)	Signature (Blank)	Date/Time (Blank)	Received By: (Blank)	Signature (Blank)	Date/Time (Blank)	
Relinquished By: (Blank)	Signature (Blank)	Date/Time (Blank)	Received By: (Blank)	Signature (Blank)	Date/Time (Blank)	
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):		Disposed By:	Signature (Blank)	Date/Time:	A-6004-842 (REV 3)



SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPEC</u>		SDG/AR/COC/Work Order: <u>453729</u>	
Received By: <u>C. TARPLIN</u>		Date Received: <u>06-30-2018</u> HS	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>7726 0033 3336</u> <u>7726 0607 2789 (2)</u>	
Suspected Hazard Information		Yes	No
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked or classified as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is package, COC, and/or Samples marked HAZ?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation. Hazard Class Shipped: _____ UN#: _____ Maximum Net Counts Observed (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: <u>Rad 1</u> Rad 2 Rad 3 If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____			
Sample Receipt Criteria	Yes	NA	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: <u>1°C</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR4-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No <input checked="" type="checkbox"/> N/A ___ Sample ID's and containers affected: <u>all B3018 1085 B3018 1085</u> <u>B3018 1085 N/A</u>
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: <u>as 7/2/18</u>
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Comments (Use Continuation Form if needed):			

PM (or PMA) review: Initials asj Date 7/2/18 Page 1 of 1

Data Review Qualifier Definitions

GEL LABORATORIES LLC

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

Report Date: 26-JUL-18

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 analyte was detected in the associated method blank \geq MDC or $>$ 5% sample activity.	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	
o	Analyte failed to recover within LCS limits	Radiological	Rad

Laboratory Certifications

List of current GEL Certifications as of 26 July 2018

State	Certification
Alaska	17-018
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	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
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
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-26
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 #: GEL453729
Work Order #: 453729**

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

Analytical Method: SW846 8260C

Analytical Procedure: GL-OA-E-038 REV# 26

Analytical Batch: 1779566

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453729001	B3JBX5
1204063579	453859001(NonSDG) Post Spike (PS)
1204063580	453859001(NonSDG) Post Spike Duplicate (PSD)
1204063756	Method Blank (MB)
1204063758	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.

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.

Sample	Analyte	Value
1204063579 (Non SDG 453859001PS)	2-Butanone	62* (70%-130%)
	Acetone	52* (70%-130%)
1204063580 (Non SDG 453859001PSD)	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: GEL453729 GEL Work Order: 453729

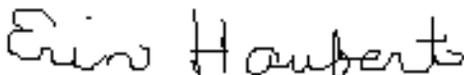
The Qualifiers in this report are defined as follows:

- 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
- 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: 23 JUL 2018

Title: Data Validator

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

SDG Number: GEL453729
 Lab Sample ID: 453729001
 Client ID: B3JBX5
 Batch ID: 1779566
 Run Date: 07/06/2018 14:57
 Prep Date: 07/06/2018 14:57
 Data File: 070618V3\3O509.D

Date Collected: 06/29/2018 10:37
 Date Received: 06/30/2018 09:15
 Client: CPRC001
 Method: SW846 8260C
 Inst: VOA3.I
 Analyst: JP1
 Column: DB-624

Matrix: WATER
 Project: CPRC0S18006
 SOP Ref: GL-OA-E-038
 Dilution: 1
 Purge Vol: 5 mL

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	J	3.12	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	U	0.300	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

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 10, 2018

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 453729

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS										
Batch	1779566									
QC1204063758	LCS									
1,1,1-Trichloroethane	50.0		52.8	ug/L		106	(70%-130%)	JP1	07/06/18	11:51
1,1,2-Trichloroethane	50.0		46.6	ug/L		93	(70%-130%)			
1,1-Dichloroethane	50.0		50.8	ug/L		102	(70%-130%)			
1,1-Dichloroethylene	50.0		54.7	ug/L		109	(70%-130%)			
1,2-Dichloroethane	50.0		53.1	ug/L		106	(70%-130%)			
2-Butanone	250		231	ug/L		92	(70%-130%)			
4-Methyl-2-pentanone	250		220	ug/L		88	(70%-130%)			
Acetone	250		241	ug/L		96	(70%-130%)			
Benzene	50.0		48.5	ug/L		97	(70%-130%)			
Carbon disulfide	250		276	ug/L		110	(70%-130%)			
Carbon tetrachloride	50.0		53.9	ug/L		108	(70%-130%)			
Chlorobenzene	50.0		46.3	ug/L		93	(70%-130%)			
Chloroform	50.0		52.7	ug/L		105	(70%-130%)			

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1779566										
Ethylbenzene	50.0			46.6	ug/L		93	(70%-130%)	JP1	07/06/18	11:51
Methylene chloride	50.0			53.9	ug/L		108	(70%-130%)			
Tetrachloroethylene	50.0			43.4	ug/L		87	(70%-130%)			
Toluene	50.0			46.8	ug/L		94	(70%-130%)			
Trichloroethylene	50.0			51.3	ug/L		103	(70%-130%)			
Vinyl chloride	50.0			45.5	ug/L		91	(70%-130%)			
Xylenes (total)	150			140	ug/L		93	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			53.2	ug/L		106	(70%-130%)			
**Bromofluorobenzene	50.0			51.0	ug/L		102	(70%-130%)			
**Toluene-d8	50.0			49.0	ug/L		98	(70%-130%)			
QC1204063756 MB											
1,1,1-Trichloroethane			U	0.300	ug/L					07/06/18	13:24
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						

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QC Summary

Workorder: 453729

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1779566										
2-Butanone			U	3.00	ug/L				JP1	07/06/18	13:24
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						
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						

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1779566										
**1,2-Dichloroethane-d4	50.0			53.6	ug/L		107	(70%-130%)	JP1	07/06/18	13:24
**Bromofluorobenzene	50.0			48.9	ug/L		98	(70%-130%)			
**Toluene-d8	50.0			48.1	ug/L		96	(70%-130%)			
QC1204063579 453859001 PS											
1,1,1-Trichloroethane	50.0	U	0.00	58.5	ug/L		117	(70%-130%)		07/06/18	21:12
1,1,2-Trichloroethane	50.0	U	0.00	46.2	ug/L		92	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	53.0	ug/L		106	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	57.2	ug/L		114	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	61.8	ug/L		124	(70%-130%)			
2-Butanone	250	T	18.1	T	172	ug/L	62 *	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00	212	ug/L		85	(70%-130%)			
Acetone	250	T	49.7	T	180	ug/L	52 *	(70%-130%)			
Benzene	50.0	U	0.00	50.0	ug/L		100	(70%-130%)			
Carbon disulfide	250	U	0.00	272	ug/L		109	(70%-130%)			
Carbon tetrachloride	50.0	J	0.390	60.9	ug/L		121	(70%-130%)			
Chlorobenzene	50.0	U	0.00	45.3	ug/L		91	(70%-130%)			

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1779566										
Chloroform	50.0	95.6	E	155	ug/L		118	(70%-130%)	JP1	07/06/18	21:12
Ethylbenzene	50.0	U	0.00	49.2	ug/L		98	(70%-130%)			
Methylene chloride	50.0	U	0.00	52.6	ug/L		105	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00	42.0	ug/L		84	(70%-130%)			
Toluene	50.0	U	0.00	44.5	ug/L		89	(70%-130%)			
Trichloroethylene	50.0	U	0.00	53.0	ug/L		106	(70%-130%)			
Vinyl chloride	50.0	U	0.00	43.6	ug/L		87	(70%-130%)			
Xylenes (total)	150	U	0.00	143	ug/L		95	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		59.1	57.4	ug/L		115	(70%-130%)			
**Bromofluorobenzene	50.0		53.1	48.9	ug/L		98	(70%-130%)			
**Toluene-d8	50.0		48.0	46.0	ug/L		92	(70%-130%)			
QC1204063580 453859001 PSD											
1,1,1-Trichloroethane	50.0	U	0.00	52.5	ug/L	11	105	(0%-20%)		07/06/18	21:43
1,1,2-Trichloroethane	50.0	U	0.00	48.1	ug/L	4	96	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00	49.3	ug/L	7	99	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00	51.9	ug/L	10	104	(0%-20%)			

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1779566										
1,2-Dichloroethane	50.0	U	0.00		55.5	ug/L	11	111	(0%-20%)	JP1	07/06/18 21:43
2-Butanone	250	T	18.1	T	174	ug/L	1	62*	(0%-20%)		
4-Methyl-2-pentanone	250	U	0.00		225	ug/L	6	90	(0%-20%)		
Acetone	250	T	49.7	T	164	ug/L	9	46*	(0%-20%)		
Benzene	50.0	U	0.00		47.1	ug/L	6	94	(0%-20%)		
Carbon disulfide	250	U	0.00		257	ug/L	6	103	(0%-20%)		
Carbon tetrachloride	50.0	J	0.390		53.8	ug/L	12	107	(0%-20%)		
Chlorobenzene	50.0	U	0.00		48.5	ug/L	7	97	(0%-20%)		
Chloroform	50.0		95.6	E	142	ug/L	8	93	(0%-20%)		
Ethylbenzene	50.0	U	0.00		50.1	ug/L	2	100	(0%-20%)		
Methylene chloride	50.0	U	0.00		51.2	ug/L	3	102	(0%-20%)		
Tetrachloroethylene	50.0	U	0.00		45.1	ug/L	7	90	(0%-20%)		
Toluene	50.0	U	0.00		46.2	ug/L	4	92	(0%-20%)		
Trichloroethylene	50.0	U	0.00		47.6	ug/L	11	95	(0%-20%)		
Vinyl chloride	50.0	U	0.00		43.7	ug/L	0	87	(0%-20%)		

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1779566										
Xylenes (total)	150	U	0.00		146	ug/L	2	97	(0%-20%)	JP1	07/06/18 21:43
**1,2-Dichloroethane-d4	50.0		59.1		54.1	ug/L		108	(70%-130%)		
**Bromofluorobenzene	50.0		53.1		49.9	ug/L		100	(70%-130%)		
**Toluene-d8	50.0		48.0		49.3	ug/L		99	(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.
- 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: GEL453729

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1204063758	LCS for batch 1779566	106	98	102
1204063756	MB for batch 1779566	107	96	98
453729001	B3JBX5	107	92	100
1204063579	B3K387PS	115	92	98
1204063580	B3K387PSD	108	99	100

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

FID Diesel Range Organics Analysis

Case Narrative

**Diesel Range Organics
Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL453729
Work Order #: 453729**

Product: Analysis of Diesel Range Organics by Flame Ionization Detector

Analytical Method: NWTPH-Dx

Analytical Procedure: GL-OA-E-003 REV# 30

Analytical Batch: 1779751

Preparation Method: SW846 3535A

Preparation Procedure: GL-OA-E-013 REV# 32

Preparation Batch: 1779750

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453729003	B3J9L4
453729005	B3JJJ9
1204063920	Method Blank (MB)
1204063921	Laboratory Control Sample (LCS)
1204063922	453729003(B3J9L4) Matrix Spike (MS)
1204063923	453729003(B3J9L4) Matrix Spike Duplicate (MSD)
1204063937	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.

Miscellaneous Information

Manual Integrations

Samples 1204063921 (LCS), 1204063922 (B3J9L4MS) and 1204063923 (B3J9L4MSD) 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.

GEL LABORATORIES LLC

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL453729 GEL Work Order: 453729

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.

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: 12 JUL 2018

Title: Data Validator

Sample Data Summary

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

SDG Number: GEL453729	Date Collected: 06/29/2018 09:40	Matrix: WATER
Lab Sample ID: 453729003	Date Received: 06/30/2018 09:15	
Client ID: B3J9L4	Client: CPRC001	Project: CPRC0S18006
Batch ID: 1779751	Method: NWTPH-Dx	SOP Ref: GL-OA-E-003
Run Date: 07/10/2018 03:31	Inst: FID7.I	Dilution: 1
Prep Date: 07/06/2018 09:00	Analyst: LXA1	Inj. Vol: 1 uL
Data File: 070918-KERO-MO\7g0926.D	Aliquot: 1000 mL	Final Volume: 1 mL
	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	U	75.0	ug/L	75.0	200
	Motor Oil	U	75.0	ug/L	75.0	200

FID Diesel Range Organics
 Certificate of Analysis
 Sample Summary

SDG Number: GEL453729	Date Collected: 06/29/2018 10:37	Matrix: WATER
Lab Sample ID: 453729005	Date Received: 06/30/2018 09:15	
Client ID: B3JJJ9	Client: CPRC001	Project: CPRC0S18006
Batch ID: 1779751	Method: NWTPH-Dx	SOP Ref: GL-OA-E-003
Run Date: 07/10/2018 05:27	Inst: FID7.I	Dilution: 1
Prep Date: 07/06/2018 09:00	Analyst: LXA1	Inj. Vol: 1 uL
Data File: 070918-KERO-MO\7g0929.D	Aliquot: 1060 mL	Final Volume: 1 mL
	Column: DB-5ms	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
68334-30-5	Diesel Range Organics	U	70.8	ug/L	70.8	189
	Motor Oil	U	70.8	ug/L	70.8	189

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 12, 2018

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 453729

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1779751										
QC1204063921	LCS										
Diesel Range Organics	2000			1630	ug/L		82	(70%-130%)	LXA1	07/09/18	22:22
Motor Oil	2000			1880	ug/L		94	(70%-130%)			
**o-Terphenyl	20.0			16.3	ug/L		81	(60%-140%)			
QC1204063920	MB										
Diesel Range Organics			U	75.0	ug/L					07/09/18	21:43
Motor Oil			U	75.0	ug/L						
**o-Terphenyl	20.0			14.3	ug/L		71	(60%-140%)			
QC1204063922	453729003	MS									
Diesel Range Organics	2000	U	75.0	1890	ug/L		94	(70%-130%)		07/10/18	04:10
Motor Oil	2000	U	75.0	2120	ug/L		106	(70%-130%)			
**o-Terphenyl	20.0		15.1	19.0	ug/L		95	(60%-140%)			
QC1204063923	453729003	MSD									
Diesel Range Organics	2000	U	75.0	1690	ug/L	11	84	(0%-20%)		07/10/18	04:48
Motor Oil	2000	U	75.0	1820	ug/L	15	91	(0%-20%)			
**o-Terphenyl	20.0		15.1	16.5	ug/L		83	(60%-140%)			

Notes:

GEL LABORATORIES LLC

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QC Summary

Workorder: 453729

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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- 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: GEL453729

Matrix Type: LIQUID

Sample ID	Client ID	OTP %REC
1204063920	MB for batch 1779750	71
1204063921	LCS for batch 1779750	81
453729003	B3J9L4	76
1204063922	B3J9L4MS	95
1204063923	B3J9L4MSD	83
453729005	B3JJJ9	92

Surrogate

OTP = o-Terphenyl

Acceptance Limits

(60%-140%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

GC Volatiles (GRO) Analysis

Case Narrative

GC Volatiles (GRO)
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL453729
Work Order #: 453729

Product: Volatile Total Petroleum Hydrocarbons by Flame Ionization Detector

Analytical Method: NWTPH-Gx

Analytical Procedure: GL-OA-E-004 REV# 27

Analytical Batch: 1779606

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453729003	B3J9L4
453729005	B3JJJ9
1204063676	Method Blank (MB)
1204063677	Laboratory Control Sample (LCS)
1204063678	453859004(NonSDG) Post Spike (PS)
1204063679	453859004(NonSDG) Post Spike Duplicate (PSD)

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 Preservation and Integrity

Sample vial 453729005 (B3JJJ9) contained head-space >= pea size. The PM was notified.

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: GEL453729 GEL Work Order: 453729

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.

DL Indicates that sample is diluted.

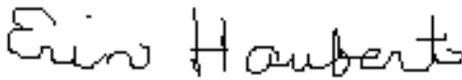
RA Indicates that sample is re-analyzed without re-extraction.

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: 20 JUL 2018

Title: Data Validator

Sample Data Summary

**GC Volatiles (GRO)
Certificate of Analysis
Sample Summary**

SDG Number: GEL453729	Date Collected: 06/29/2018 09:40	Matrix: WATER
Lab Sample ID: 453729003	Date Received: 06/30/2018 09:15	
Client ID: B3J9L4	Client: CPRC001	Project: CPRC0S18006
Batch ID: 1779606	Method: NWTPH-Gx	SOP Ref: GL-OA-E-004
Run Date: 07/05/2018 18:08	Inst: VOC4A.I	Dilution: 1
Prep Date: 07/05/2018 18:08	Analyst: RXY1	Inj. Vol: 1 uL
Data File: 070518\4M416.D	Column: DB-MTBE	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
TPHGASOLINE 8006-61-9	Gasoline Range Organics	U	16.7	ug/L	16.7	50.0

**GC Volatiles (GRO)
Certificate of Analysis
Sample Summary**

SDG Number: GEL453729	Date Collected: 06/29/2018 10:37	Matrix: WATER
Lab Sample ID: 453729005	Date Received: 06/30/2018 09:15	
Client ID: B3JJJ9	Client: CPRC001	Project: CPRC0S18006
Batch ID: 1779606	Method: NWTPH-Gx	SOP Ref: GL-OA-E-004
Run Date: 07/05/2018 18:36	Inst: VOC4A.I	Dilution: 1
Prep Date: 07/05/2018 18:36	Analyst: RXY1	Inj. Vol: 1 uL
Data File: 070518\4M417.D	Column: DB-MTBE	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
TPHGASOLINE 8006-61-9	Gasoline Range Organics	U	16.7	ug/L	16.7	50.0

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: July 9, 2018

Page 1 of 2

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 453729

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatiles GRO Organics											
Batch	1779606										
QC1204063677	LCS										
Gasoline Range Organics	500			541	ug/L		108	(70%-130%)	RXY1	07/05/18	12:06
**Bromofluorobenzene	50.0			45.8	ug/L		92	(50%-150%)			
QC1204063676	MB										
Gasoline Range Organics			U	16.7	ug/L					07/05/18	13:01
**Bromofluorobenzene	50.0			43.8	ug/L		88	(50%-150%)			
QC1204063678	453859004	PS									
Gasoline Range Organics	500	104		592	ug/L		98	(70%-130%)		07/05/18	20:01
**Bromofluorobenzene	50.0	48.1		45.7	ug/L		91	(50%-150%)			
QC1204063679	453859004	PSD									
Gasoline Range Organics	500	104		620	ug/L	5	103	(0%-20%)		07/05/18	20:29
**Bromofluorobenzene	50.0	48.1		50.0	ug/L		100	(50%-150%)			

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.

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QC Summary

Workorder: 453729

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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: GEL453729

Matrix Type: LIQUID

Sample ID	Client ID	BFB %REC
1204063677	LCS for batch 1779606	92
1204063676	MB for batch 1779606	88
453729003	B3J9L4	93
453729005	B3JJJ9	87
1204063678	B3K391PS	91
1204063679	B3K391PSD	100

Surrogate

BFB = Bromofluorobenzene

Acceptance Limits

(50%-150%)

* 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 #: GEL453729
Work Order #: 453729

Product: Determination of Metals by ICP**Analytical Method:** SW846 3005A/6010D**Analytical Procedure:** GL-MA-E-013 REV# 30**Analytical Batch:** 1778920**Product: Determination of Metals by ICP-MS****Analytical Method:** SW846 3005A/6020B**Analytical Procedure:** GL-MA-E-014 REV# 32**Analytical Batch:** 1778932**Preparation Method:** SW846 3005A**Preparation Procedure:** GL-MA-E-006 REV# 14**Preparation Batches:** 1778919 and 1778931

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453729003	B3J9L4
453729004	B3J9L7
1204062119	Method Blank (MB) ICP
1204062120	Laboratory Control Sample (LCS)
1204062123	453729003(B3J9L4L) Serial Dilution (SD)
1204062121	453729003(B3J9L4S) Matrix Spike (MS)
1204062122	453729003(B3J9L4SD) Matrix Spike Duplicate (MSD)
1204062149	Method Blank (MB) ICP-MS
1204062150	Laboratory Control Sample (LCS)
1204062153	453616007(NonSDGL) Serial Dilution (SD)
1204062151	453616007(NonSDGS) Matrix Spike (MS)
1204062152	453616007(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 calcium and potassium. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 453729003 (B3J9L4) and 453729004 (B3J9L7)-ICP.

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Quality Control (QC) Information

Method Blank (MB) Statement

The samples in this SDG contained analytes at concentrations more than ten times the negative value reported in the method blank, therefore the data was not adversely affected.

Sample	Analyte	Value
1204062119 (MB)	Calcium	See applicable report

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: GEL453729 GEL Work Order: 453729

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: 12 JUL 2018****Title: Data Validator**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL453729

CONTRACT: CPRC0S18006

METHOD TYPE: SW846

SAMPLE ID:453729003

BASIS: As Received

DATE COLLECTED 29-JUN-18

CLIENT ID: B3J9L4

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	28	ug/L	B	19.3	50	50	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-38-2	Arsenic	5.26	ug/L		2	5	5	1	MS	PRB	07/06/18 10:36	180706-3	1778932
7440-39-3	Barium	54	ug/L		0.67	2	2	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/18 10:36	180706-3	1778932
7440-42-8	Boron	72.7	ug/L		15	50	50	1	P	HSC	07/05/18 19:36	070518-1	1778920
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-70-2	Calcium	38000	ug/L		50	200	200	1	P	HSC	07/05/18 19:36	070518-1	1778920
7440-47-3	Chromium	6.01	ug/L	B	3	10	10	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-48-4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-50-8	Copper	0.634	ug/L	B	0.3	1	1	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7439-89-6	Iron	63	ug/L	B	30	100	100	1	P	HSC	07/05/18 19:36	070518-1	1778920
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7439-95-4	Magnesium	7710	ug/L		110	300	300	1	P	HSC	07/05/18 19:36	070518-1	1778920
7439-96-5	Manganese	1.11	ug/L	B	1	5	5	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7439-98-7	Molybdenum	4.55	ug/L		0.2	0.5	0.5	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-02-0	Nickel	0.683	ug/L	B	0.6	2	2	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7723-14-0	Phosphorous	60	ug/L	U	60	150	150	1	P	HSC	07/05/18 19:36	070518-1	1778920
7440-09-7	Potassium	4520	ug/L		50	150	150	1	P	HSC	07/05/18 19:36	070518-1	1778920
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-23-5	Sodium	68100	ug/L		100	300	300	1	P	HSC	07/05/18 19:36	070518-1	1778920
7440-24-6	Strontium	227	ug/L		2	10	10	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	PRB	07/06/18 10:36	180706-3	1778932
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-61-1	Uranium	2.9	ug/L		0.067	0.2	0.2	1	MS	PRB	07/06/18 02:20	180705-2	1778932
7440-62-2	Vanadium	10.5	ug/L		1	5	5	1	P	HSC	07/05/18 19:36	070518-1	1778920
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	MS	PRB	07/06/18 02:20	180705-2	1778932

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778920	1778919	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778932	1778931	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

***Analytical Methods:**

P	SW846 3005A/6010D
MS	SW846 3005A/6020B

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL453729

CONTRACT: CPRC0S18006

METHOD TYPE: SW846

SAMPLE ID: 453729004

BASIS: As Received

DATE COLLECTED 29-JUN-18

CLIENT ID: B3J9L7

LEVEL: Low

DATE RECEIVED 30-JUN-18

MATRIX: WATER

%SOLIDS: 0

CAS	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7429-90-5	Aluminum	19.3	ug/L	U	19.3	50	50	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-36-0	Antimony	1	ug/L	U	1	3	3	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-38-2	Arsenic	5.09	ug/L		2	5	5	1	MS	PRB	07/06/18 10:38	180706-3	1778932
7440-39-3	Barium	54.7	ug/L		0.67	2	2	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-41-7	Beryllium	0.20	ug/L	U	0.2	0.5	0.5	1	MS	PRB	07/06/18 10:38	180706-3	1778932
7440-42-8	Boron	69.7	ug/L		15	50	50	1	P	HSC	07/05/18 19:52	070518-1	1778920
7440-43-9	Cadmium	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-70-2	Calcium	37000	ug/L		50	200	200	1	P	HSC	07/05/18 19:52	070518-1	1778920
7440-47-3	Chromium	5.56	ug/L	B	3	10	10	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-48-4	Cobalt	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-50-8	Copper	0.302	ug/L	B	0.3	1	1	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7439-89-6	Iron	30	ug/L	U	30	100	100	1	P	HSC	07/05/18 19:52	070518-1	1778920
7439-92-1	Lead	0.50	ug/L	U	0.5	2	2	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7439-95-4	Magnesium	7570	ug/L		110	300	300	1	P	HSC	07/05/18 19:52	070518-1	1778920
7439-96-5	Manganese	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7439-98-7	Molybdenum	4.54	ug/L		0.2	0.5	0.5	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-02-0	Nickel	0.623	ug/L	B	0.6	2	2	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7723-14-0	Phosphorous	62.9	ug/L	B	60	150	150	1	P	HSC	07/05/18 19:52	070518-1	1778920
7440-09-7	Potassium	4420	ug/L		50	150	150	1	P	HSC	07/05/18 19:52	070518-1	1778920
7782-49-2	Selenium	2	ug/L	U	2	5	5	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-22-4	Silver	0.30	ug/L	U	0.3	1	1	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-23-5	Sodium	66700	ug/L		100	300	300	1	P	HSC	07/05/18 19:52	070518-1	1778920
7440-24-6	Strontium	226	ug/L		2	10	10	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-28-0	Thallium	0.60	ug/L	U	0.6	2	2	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-29-1	Thorium	0.70	ug/L	U	0.7	2	2	1	MS	PRB	07/06/18 10:38	180706-3	1778932
7440-31-5	Tin	1	ug/L	U	1	5	5	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-61-1	Uranium	2.9	ug/L		0.067	0.2	0.2	1	MS	PRB	07/06/18 02:23	180705-2	1778932
7440-62-2	Vanadium	10.4	ug/L		1	5	5	1	P	HSC	07/05/18 19:52	070518-1	1778920
7440-66-6	Zinc	3.3	ug/L	U	3.3	10	10	1	MS	PRB	07/06/18 02:23	180705-2	1778932

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1778920	1778919	SW846 3005A	50	mL	50	mL	07/03/18	SXW1
1778932	1778931	SW846 3005A	50	mL	50	mL	07/03/18	SXW1

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

***Analytical Methods:**

P	SW846 3005A/6010D
MS	SW846 3005A/6020B

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 12, 2018

Page 1 of 11

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 453729

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
QC1204062150	LCS										
Aluminum	2000			2250	ug/L		112	(80%-120%)	PRB	07/06/18	01:48
Antimony	50.0			50.2	ug/L		100	(80%-120%)			
Arsenic	50.0			48.3	ug/L		96.6	(80%-120%)		07/06/18	10:17
Barium	50.0			50.1	ug/L		100	(80%-120%)		07/06/18	01:48
Beryllium	50.0			56.8	ug/L		114	(80%-120%)		07/06/18	10:17
Cadmium	50.0			52.1	ug/L		104	(80%-120%)		07/06/18	01:48
Chromium	50.0			50.8	ug/L		102	(80%-120%)			
Cobalt	50.0			49.7	ug/L		99.4	(80%-120%)			
Copper	50.0			49.9	ug/L		99.9	(80%-120%)			
Lead	50.0			51.9	ug/L		104	(80%-120%)			
Manganese	50.0			48.8	ug/L		97.6	(80%-120%)			
Molybdenum	50.0			51.5	ug/L		103	(80%-120%)			
Nickel	50.0			49.4	ug/L		98.9	(80%-120%)			

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Selenium	50.0			48.2	ug/L		96.4	(80%-120%)	PRB	07/06/18	01:48
Silver	50.0			51.7	ug/L		103	(80%-120%)			
Strontium	50.0			51.2	ug/L		102	(80%-120%)			
Thallium	50.0			47.3	ug/L		94.6	(80%-120%)			
Thorium	50.0			46.6	ug/L		93.2	(80%-120%)		07/06/18	10:17
Tin	50.0			50.7	ug/L		101	(80%-120%)		07/06/18	01:48
Uranium	50.0			51.0	ug/L		102	(80%-120%)			
Zinc	50.0			52.6	ug/L		105	(80%-120%)			
QC1204062149	MB										
Aluminum			U	19.3	ug/L					07/06/18	01:44
Antimony			U	1.00	ug/L						
Arsenic			U	2.00	ug/L					07/06/18	10:15
Barium			U	0.670	ug/L					07/06/18	01:44
Beryllium			U	0.200	ug/L					07/06/18	10:15
Cadmium			U	0.300	ug/L					07/06/18	01:44
Chromium			U	3.00	ug/L						

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Cobalt			U	0.300	ug/L				PRB	07/06/18	01:44
Copper			U	0.300	ug/L						
Lead			U	0.500	ug/L						
Manganese			U	1.00	ug/L						
Molybdenum			U	0.200	ug/L						
Nickel			U	0.600	ug/L						
Selenium			U	2.00	ug/L						
Silver			U	0.300	ug/L						
Strontium			U	2.00	ug/L						
Thallium			U	0.600	ug/L						
Thorium			U	0.700	ug/L					07/06/18	10:15
Tin			U	1.00	ug/L					07/06/18	01:44
Uranium			U	0.067	ug/L						
Zinc			U	3.30	ug/L						
QC1204062151 453616007 MS											
Aluminum	2000	279		2470	ug/L		109	(75%-125%)		07/06/18	01:54

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QC Summary

Workorder: 453729

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Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS												
Batch	1778932											
Antimony	50.0	U	1.00		51.1	ug/L		102	(75%-125%)	PRB	07/06/18	01:54
Arsenic	50.0	U	2.00		51.8	ug/L		100	(75%-125%)		07/06/18	10:21
Barium	50.0		44.4		91.0	ug/L		93.2	(75%-125%)		07/06/18	01:54
Beryllium	50.0	U	0.200		53.9	ug/L		108	(75%-125%)		07/06/18	10:21
Cadmium	50.0	U	0.300		51.5	ug/L		103	(75%-125%)		07/06/18	01:54
Chromium	50.0	B	3.84		56.4	ug/L		105	(75%-125%)			
Cobalt	50.0	B	0.833		51.1	ug/L		100	(75%-125%)			
Copper	50.0		1.19		50.7	ug/L		99	(75%-125%)			
Lead	50.0	U	0.500		50.3	ug/L		100	(75%-125%)			
Manganese	50.0		52.0		99.3	ug/L		94.5	(75%-125%)			
Molybdenum	50.0		2.29		55.7	ug/L		107	(75%-125%)			
Nickel	50.0		3.84		53.3	ug/L		98.9	(75%-125%)			
Selenium	50.0	B	3.17		52.2	ug/L		98.2	(75%-125%)			
Silver	50.0	U	0.300		50.1	ug/L		100	(75%-125%)			
Strontium	50.0		267		306	ug/L		N/A	(75%-125%)			

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Thallium	50.0	U	0.600	46.1	ug/L		92.1	(75%-125%)	PRB	07/06/18	01:54
Thorium	50.0	B	0.700	49.4	ug/L		97.4	(75%-125%)		07/06/18	10:21
Tin	50.0	U	1.00	52.5	ug/L		105	(75%-125%)		07/06/18	01:54
Uranium	50.0		1.55	50.9	ug/L		98.8	(75%-125%)			
Zinc	50.0		112	155	ug/L		85.1	(75%-125%)			
QC1204062152 453616007 MSD											
Aluminum	2000		279	2710	ug/L	9.43	122	(0%-20%)		07/06/18	01:57
Antimony	50.0	U	1.00	51.2	ug/L	0.346	102	(0%-20%)			
Arsenic	50.0	U	2.00	53.0	ug/L	2.3	102	(0%-20%)		07/06/18	10:23
Barium	50.0		44.4	92.6	ug/L	1.83	96.6	(0%-20%)		07/06/18	01:57
Beryllium	50.0	U	0.200	55.0	ug/L	2.15	110	(0%-20%)		07/06/18	10:23
Cadmium	50.0	U	0.300	51.4	ug/L	0.241	103	(0%-20%)		07/06/18	01:57
Chromium	50.0	B	3.84	62.5	ug/L	10.2	117	(0%-20%)			
Cobalt	50.0	B	0.833	51.8	ug/L	1.49	102	(0%-20%)			
Copper	50.0		1.19	51.9	ug/L	2.46	102	(0%-20%)			
Lead	50.0	U	0.500	51.3	ug/L	1.8	102	(0%-20%)			

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QC Summary

Workorder: 453729

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1778932										
Manganese	50.0	52.0		104	ug/L	4.6	104	(0%-20%)	PRB	07/06/18	01:57
Molybdenum	50.0	2.29		56.6	ug/L	1.65	109	(0%-20%)			
Nickel	50.0	3.84		57.0	ug/L	6.74	106	(0%-20%)			
Selenium	50.0	B	3.17	52.1	ug/L	0.222	97.9	(0%-20%)			
Silver	50.0	U	0.300	50.3	ug/L	0.253	101	(0%-20%)			
Strontium	50.0		267	308	ug/L	0.708	N/A	(0%-20%)			
Thallium	50.0	U	0.600	47.2	ug/L	2.39	94.4	(0%-20%)			
Thorium	50.0	B	0.700	49.9	ug/L	1.05	98.5	(0%-20%)		07/06/18	10:23
Tin	50.0	U	1.00	52.2	ug/L	0.6	104	(0%-20%)		07/06/18	01:57
Uranium	50.0		1.55	52.1	ug/L	2.26	101	(0%-20%)			
Zinc	50.0		112	155	ug/L	0.579	86.9	(0%-20%)			
QC1204062153 453616007 SDILT											
Aluminum		279	BD	46.1	ug/L	17.4		(0%-20%)		07/06/18	02:04
Antimony		U	0.127	DU	5.00	ug/L	N/A	(0%-20%)			
Arsenic		U	1.83	DU	10.0	ug/L	N/A	(0%-20%)		07/06/18	10:26
Barium			44.4	D	7.58	ug/L	14.5	(0%-20%)		07/06/18	02:04

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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	1778932										
Beryllium	U	0.057	DU	1.00	ug/L	N/A		(0%-20%)	PRB	07/06/18	10:26
Cadmium	U	0.013	DU	1.50	ug/L	N/A		(0%-20%)		07/06/18	02:04
Chromium	B	3.84	DU	15.0	ug/L	N/A		(0%-20%)			
Cobalt	B	0.833	DU	1.50	ug/L	N/A		(0%-20%)			
Copper		1.19	DU	1.50	ug/L	N/A		(0%-20%)			
Lead	U	0.291	DU	2.50	ug/L	N/A		(0%-20%)			
Manganese		52.0	D	9.16	ug/L	12		(0%-20%)			
Molybdenum		2.29	BD	0.404	ug/L	11.8		(0%-20%)			
Nickel		3.84	BD	0.664	ug/L	13.5		(0%-20%)			
Selenium	B	3.17	DU	10.0	ug/L	N/A		(0%-20%)			
Silver	U	0.010	DU	1.50	ug/L	N/A		(0%-20%)			
Strontium		267	D	44.6	ug/L	16.5		(0%-20%)			
Thallium	U	0.048	DU	3.00	ug/L	N/A		(0%-20%)			
Thorium	B	0.700	DU	3.50	ug/L	N/A		(0%-20%)		07/06/18	10:26
Tin	U	0.097	DU	5.00	ug/L	N/A		(0%-20%)		07/06/18	02:04

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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	1778932										
Uranium		1.55	D	0.275	ug/L	11		(0%-20%)	PRB	07/06/18	02:04
Zinc		112	D	24.5	ug/L	9.58		(0%-20%)			
Metals Analysis-ICP											
Batch	1778920										
QC1204062120	LCS										
Boron	500			509	ug/L		102	(80%-120%)	HSC	07/05/18	19:34
Calcium	5000			4970	ug/L		99.5	(80%-120%)			
Iron	5000			4960	ug/L		99.2	(80%-120%)			
Magnesium	5000			5000	ug/L		99.9	(80%-120%)			
Phosphorous	500			490	ug/L		98.1	(80%-120%)			
Potassium	5000			4840	ug/L		96.8	(80%-120%)			
Sodium	5000			4880	ug/L		97.7	(80%-120%)			
Vanadium	500			500	ug/L		99.9	(80%-120%)			
QC1204062119	MB										
Boron			U	15.0	ug/L					07/05/18	19:31
Calcium			B	-66.9	ug/L						
Iron			U	30.0	ug/L						
Magnesium			U	110	ug/L						

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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-ICP											
Batch	1778920										
Phosphorous			U	60.0	ug/L				HSC	07/05/18	19:31
Potassium			U	50.0	ug/L						
Sodium			U	100	ug/L						
Vanadium			U	1.00	ug/L						
QC1204062121 453729003 MS											
Boron	500		72.7	591	ug/L		104	(75%-125%)		07/05/18	19:39
Calcium	5000		38000	42500	ug/L		N/A	(75%-125%)			
Iron	5000	B	63.0	4960	ug/L		98	(75%-125%)			
Magnesium	5000		7710	12600	ug/L		97.1	(75%-125%)			
Phosphorous	500	U	60.0	551	ug/L		99.2	(75%-125%)			
Potassium	5000		4520	9300	ug/L		95.7	(75%-125%)			
Sodium	5000		68100	73900	ug/L		N/A	(75%-125%)			
Vanadium	500		10.5	512	ug/L		100	(75%-125%)			
QC1204062122 453729003 MSD											
Boron	500		72.7	582	ug/L	1.63	102	(0%-20%)		07/05/18	19:42
Calcium	5000		38000	40500	ug/L	4.63	N/A	(0%-20%)			
Iron	5000	B	63.0	4870	ug/L	1.94	96.1	(0%-20%)			

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1778920										
Magnesium	5000	7710		12200	ug/L	3.25	89.1	(0%-20%)	HSC	07/05/18	19:42
Phosphorous	500	U	60.0	540	ug/L	2.01	97	(0%-20%)			
Potassium	5000	4520		9020	ug/L	3.06	90.1	(0%-20%)			
Sodium	5000	68100		71700	ug/L	3	N/A	(0%-20%)			
Vanadium	500	10.5		502	ug/L	2.07	98.3	(0%-20%)			
QC1204062123 453729003 SDILT											
Boron		72.7	BD	15.5	ug/L	6.65		(0%-20%)		07/05/18	19:44
Calcium		38000	D	7490	ug/L	1.45		(0%-20%)			
Iron		B	63.0	DU	150	ug/L	N/A	(0%-20%)			
Magnesium		7710	D	1570	ug/L	1.64		(0%-20%)			
Phosphorous		U	55.4	DU	300	ug/L	N/A	(0%-20%)			
Potassium		4520	D	864	ug/L	4.34		(0%-20%)			
Sodium		68100	D	14200	ug/L	4.56		(0%-20%)			
Vanadium		10.5	BD	2.54	ug/L	21.1		(0%-20%)			

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

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
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.										
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 #: GEL453729
 Work Order #: 453729**

Product: n-Hexane Extractable Material
Analytical Method: EPA 1664A/1664B
Analytical Procedure: GL-GC-E-094 REV# 16
Analytical Batch: 1779339

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453729002	B3JBY3
453729003	B3J9L4
453729005	B3JJJ9
1204063102	Method Blank (MB)
1204063103	Laboratory Control Sample (LCS)
1204063104	453729002(B3JBY3) Matrix Spike (MS)
1204063105	Laboratory Control Sample Duplicate (LCSD)
1204063106	453729002(B3JBY3) 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.

Product: Alkalinity**Analytical Method:** 2320_ALKALINITY**Analytical Procedure:** GL-GC-E-033 REV# 13**Analytical Batch:** 1779460

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453729001	B3JBX5
1204063332	Laboratory Control Sample (LCS)
1204063333	453485003(B3J9H4) Sample Duplicate (DUP)
1204063334	453485001(B3J9H3) 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

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**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL453729 GEL Work Order: 453729

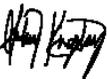
The Qualifiers in this report are defined as follows:

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 2018

Title: Data Validator

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: July 12, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHCPRC SAF S18-006

Client Sample ID: B3JBX5	Project: CPROC0S18006
Sample ID: 453729001	Client ID: CPROC001
Matrix: WATER	
Collect Date: 29-JUN-18 10:37	
Receive Date: 30-JUN-18	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Titration and Ion Analysis												
2320_ALKALINITY: COMMON "As Received"												
Alkalinity, Total as CaCO3		133000	1450	4000	ug/L			RXB5	07/10/18	1658	1779460	1

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: July 12, 2018

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHCPRC SAF S18-006

Client Sample ID: B3JJJ9 Project: CPRC0S18006
 Sample ID: 453729005 Client ID: CPRC001
 Matrix: WATER
 Collect Date: 29-JUN-18 10:37
 Receive Date: 30-JUN-18
 Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Oil & Grease Analysis												
1664A_OILGREASE: COMMON "As Received"												
Oil and Grease	U	1.32	1.32	4.72	mg/L			DXB7	07/04/18	0424	1779339	1

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	EPA 1664A/1664B		

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

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

QC Summary

Report Date: July 12, 2018

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 453729

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Oil & Grease Analysis											
Batch	1779339										
QC1204063106	453729002	DUP									
Oil and Grease		U	1.32	U	1.32	mg/L	N/A		DXB7	07/04/18	04:24
QC1204063103	LCS										
Oil and Grease	40.0				38.2	mg/L	95.5	(80%-120%)		07/04/18	04:24
QC1204063105	LCSD										
Oil and Grease	40.0				38.5	mg/L	0.782	96.3	(0%-20%)	07/04/18	04:24
QC1204063102	MB										
Oil and Grease			U		1.40	mg/L				07/04/18	04:24
QC1204063104	453729002	MS									
Oil and Grease	38.1	U	1.32		37.1	mg/L		95.5	(75%-125%)	07/04/18	04:24

Titration and Ion Analysis

Batch	1779460										
QC1204063333	453485003	DUP									
Alkalinity, Total as CaCO3			103000		102000	ug/L	0.78	(0%-20%)	RXB5	07/10/18	16:37
QC1204063334	453485001	DUP									
Alkalinity, Total as CaCO3		U	1450	U	1450	ug/L	N/A			07/10/18	16:33
QC1204063332	LCS										
Alkalinity, Total as CaCO3	100000				112000	ug/L		112	(80%-120%)	07/10/18	16:26

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

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).										
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is >= EQL or is > 5% of the measured concentration and/or decision level for associated samples.										
D	Results are reported from a diluted aliquot of sample.										
N	Spike Sample recovery is outside control limits.										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										

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

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

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

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

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

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL453729
Work Order #: 453729

Product: SRISO_SEP_PRECIP_GPC: COMMON

Analytical Method: SRISO_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 20

Analytical Batch: 1779094

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453729001	B3JBX5
1204062548	Method Blank (MB)
1204062549	453730005(NonSDG) Sample Duplicate (DUP)
1204062550	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.

Technical Information

Recounts

Sample 1204062549 (Non SDG 453730005DUP) was verified by recounting at least five days from the separation date. The recount is reported.

Product: 9310_ALPHABETA_GPC: Gross Beta

Analytical Method: 9310_ALPHABETA_GPC

Analytical Procedure: GL-RAD-A-001 REV# 20

Analytical Batch: 1779095

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453729001	B3JBX5
453729002	B3JBY3
453729003	B3J9L4
1204062551	Method Blank (MB)
1204062552	453729003(B3J9L4) Sample Duplicate (DUP)
1204062553	453729003(B3J9L4) Matrix Spike (MS)
1204062554	453729003(B3J9L4) Matrix Spike Duplicate (MSD)
1204062555	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.

Technical Information

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Sample 1204062554 (B3J9L4MSD) was recounted due to low recovery. The recount is reported.

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

Analytical Procedure: GL-RAD-A-002 REV# 22

Analytical Batch: 1778811

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
453729001	B3JBX5
1204061868	Method Blank (MB)
1204061869	453616001(NonSDG) Sample Duplicate (DUP)
1204061870	453616001(NonSDG) Matrix Spike (MS)
1204061871	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.

Miscellaneous Information

Additional Comments

The matrix spike, 1204061870 (Non SDG 453616001MS), aliquot was reduced to conserve sample volume.

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: GEL453729 GEL Work Order: 453729

The Qualifiers in this report are defined as follows:

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: Heather McCarty

Date: 26 JUL 2018

Title: Analyst II

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL453729	Client: CPRC001	Project: CPRC0S18006
Lab Sample ID: 453729001	Date Collected: 06/29/2018 10:37	Matrix: WATER
	Date Received: 06/30/2018 09:15	
Client ID: B3JBX5	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1779094	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 07/11/2018 14:07	Aliquot: 300 mL	Instrument: PIC13A
Data File: S1779094r1.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1779094		
Prep Date: 07/10/2018 10:36		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	-0.156	pCi/L	+/-0.628	0.628	1.29	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	3.90	4.19	mg	93.1	(40%-110%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL453729	Client: CPRC001	Project: CPRC0S18006
Lab Sample ID: 453729001	Date Collected: 06/29/2018 10:37	Matrix: WATER
	Date Received: 06/30/2018 09:15	
Client ID: B3JBX5		Prep Basis: "As Received"
Batch ID: 1779095	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 07/10/2018 12:46	Analyst: BXG2	Instrument: PIC13A
Data File: AB1779095r1.xls	Aliquot: 125 mL	Count Time: 60 min
Prep Batch: 1779095	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 07/10/2018 08:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		11.3	pCi/L	+/-2.72	3.29	2.63	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error. TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma). The MDC is a sample specific MDC.

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL453729
Lab Sample ID: 453729001

Client: CPRC001
Date Collected: 06/29/2018 10:37
Date Received: 06/30/2018 09:15

Project: CPRC0S18006
Matrix: WATER

Client ID: B3JBX5
Batch ID: 1778811
Run Date: 07/03/2018 18:51
Data File: T1778811.xls
Prep Batch: 1778811
Prep Date: 07/03/2018 09:42

Method: TRITIUM_DIST_LSC
Analyst: MXH8
Aliquot: 50 mL
Prep Method: EPA 906.0 Modified

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-002
Instrument: LSCSILVER
Count Time: 50 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1140	pCi/L	+/-197	296	253	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
The MDC is a sample specific MDC.

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL453729
Lab Sample ID: 453729002

Client: CPRC001
Date Collected: 06/29/2018 08:32
Date Received: 06/30/2018 09:15

Project: CPRC0S18006
Matrix: WATER

Client ID: B3JBY3
Batch ID: 1779095
Run Date: 07/10/2018 12:46
Data File: AB1779095r1.xls
Prep Batch: 1779095
Prep Date: 07/10/2018 08:41

Method: 9310_ALPHABETA_GPC
Analyst: BXG2
Aliquot: 125 mL
Prep Method: EPA 900.0/SW846 9310

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-001
Instrument: PIC10C
Count Time: 60 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		8.13	pCi/L	+/-2.45	2.80	2.65	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
The MDC is a sample specific MDC.

**Rad
Certificate of Analysis
Sample Summary**

SDG Number: GEL453729	Client: CPRC001	Project: CPRC0S18006
Lab Sample ID: 453729003	Date Collected: 06/29/2018 09:40	Matrix: WATER
	Date Received: 06/30/2018 09:15	
Client ID: B3J9L4		Prep Basis: "As Received"
Batch ID: 1779095	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 07/10/2018 12:46	Analyst: BXG2	Instrument: PIC13B
Data File: AB1779095r1.xls	Aliquot: 125 mL	Count Time: 60 min
Prep Batch: 1779095	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 07/10/2018 08:41		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		81.1	pCi/L	+/-6.43	14.6	2.48	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

N Spike Sample recovery is outside control limits.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Quality Control Summary

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QC Summary

Report Date: July 26, 2018
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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 453729

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1779094								
QC1204062548	MB								
Strontium-90			U	0.173	pCi/L			LXB3	07/11/1814:07
				Uncert: +/-0.713					
				TPU: +/-0.714					
**Strontium Carrier		4.19		3.40	mg	REC: 81	(40%-110%)		
QC1204062549	453730005	DUP							
Strontium-90		214		198	pCi/L				07/16/1811:15
				Uncert: +/-6.22		RPD: 8	(0%-20%)		
				TPU: +/-34.1		RER: 0.691	(0-2)		
**Strontium Carrier		4.19	2.80	3.10	mg	REC: 74	(40%-110%)		
QC1204062550	LCS								
Strontium-90		77.8		84.2	pCi/L	REC: 108	(80%-120%)		07/11/1814:07
				Uncert: +/-4.90					
				TPU: +/-14.6					
**Strontium Carrier		4.19		3.50	mg	REC: 84	(40%-110%)		
Batch	1779095								
QC1204062551	MB								
Beta			U	0.590	pCi/L			BXG2	07/10/1812:45
				Uncert: +/-1.37					
				TPU: +/-1.37					
QC1204062552	453729003	DUP							
Beta		81.1		81.2	pCi/L				07/10/1812:45
				Uncert: +/-6.43		RPD: 0	(0%-20%)		
				TPU: +/-14.6		RER: 0.0122	(0-2)		
QC1204062553	453729003	MS							
Beta		373	81.1	506	pCi/L	REC: 114	(75%-125%)		07/10/1812:45
				Uncert: +/-6.43					
				TPU: +/-14.6					
QC1204062554	453729003	MSD							
Beta		373	81.1	461	pCi/L	REC: 102	(75%-125%)		07/10/1814:20
				Uncert: +/-6.43		RPD: 9	(0%-20%)		
				TPU: +/-14.6		RER: 0.773	(0-2)		
QC1204062555	LCS								
Beta		311		311	pCi/L	REC: 100	(80%-120%)		07/10/1812:45
				Uncert: +/-11.1					
				TPU: +/-53.1					
Rad Liquid Scintillation									
Batch	1778811								
QC1204061868	MB								
Tritium			U	84.9	pCi/L			MXH8	07/03/1819:43
				Uncert: +/-153					
				TPU: +/-154					
QC1204061869	453616001	DUP							
Tritium		U	88.0	U	148	pCi/L			07/03/1820:35

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QC Summary

Workorder: 453729

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1778811									
		Uncert:	+/-148	+/-150						
		TPU:	+/-149	+/-153		RPD:	0	N/A		
						RER:	0.55	(0-2)		
QC1204061870	453616001	MS								
Tritium	5060	U	88.0	4880	pCi/L	REC:	96.4	(75%-125%)	07/03/1821:27	
		Uncert:	+/-148	+/-483						
		TPU:	+/-149	+/-1060						
QC1204061871	LCS									
Tritium	2530			2670	pCi/L	REC:	106	(80%-120%)	07/03/1822:19	
		Uncert:		+/-256						
		TPU:		+/-576						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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
- < 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
- A The TIC is a suspected aldol-condensation product
- 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).
- B The analyte was detected in both the associated QC blank and in the sample.
- B The analyte was detected in the associated method blank >= MDC or >5% sample activity.
- C Analyte has been confirmed by GC/MS analysis
- 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 Concentration exceeds the calibration range of the instrument
- E Reported value is estimated due to interferences. See comment in narrative.
- 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
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- P Aroclor target analyte with greater than 25% difference between column analyses.
- S Reported value determined by the Method of Standard Additions (MSA)
- 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.
- UX Gamma Spectroscopy--Uncertain identification
- 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
- o Analyte failed to recover within LCS limits
- o Analyte failed to recover within LCS limits (Organics only)

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QC Summary

Workorder: 453729

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	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.

** Indicates analyte is a surrogate compound.

^ 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.

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.