

March 30, 2018

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

Re: CHPRC SAF S18-003
Work Order: 445711
SDG: GEL445711

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 13, 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,



Heather Shaffer
Project Manager

Purchase Order: 300071 - 7H
Chain of Custody: S18-003-144, S18-003-146, S18-003-148 and S18-003-157
Enclosures



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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S18-003
SDG: GEL445711**

March 30, 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 March 13, 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. There are no additional comments concerning sample receipt.

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

Sample Identification

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
445711001	B3HF79
445711002	B3HF96
445711003	B3HHN9
445711004	B3HFV6

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: GC/MS Volatile 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.



Heather Shaffer
Project Manager

Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL445711
Work Order #: 445711

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. The recoveries were similar. It is believed possible matrix interference has been demonstrated.

Sample	Analyte	Value
1203991255 (Non SDG 445658001PS)	Acetone	60* (70%-130%)
1203991257 (Non SDG 445658001PSD)	Acetone	58* (70%-130%)

Radiochemistry

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.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203988767 (B3HHN9MS) and 1203988768 (B3HHN9MSD), aliquots were reduced to conserve sample volume.

TC99_EIE_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.

Technical Information**Recounts**

Samples 1203989891 (Non SDG 445848001DUP), 445711001 (B3HF79) and 445711002 (B3HF96) were recounted to verify sample results. Recounts are reported.

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

CH2MHill Plateau Remediation Company	56/162 CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 445711	C.O.C.# S18-003-144 Page 1 of 2 Feb 3-12-18
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Collector: CHRIS FULTON CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650
SAF No.: S18-003	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071
Project Title: CERCLA, MARCH 2018	Logbook No.: HNF-N-506 98 / 54	Ice Chest No.: GWS-660
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 789991215711
Protocol: CERCLA	Priority: 30 Days	Offsite Property No.: 9145

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
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Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3HF79	N	W	MAR 09 2018	1140	1x1-L P	9310_ALPHABETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B3HF79	N	W	MAR 09 2018	1140	1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2

04/06/2018

Relinquished By: CHRIS FULTON Print First and Last Name Signature Date/Time MAR 09 2018 1150	Received By: Ed Kauer Print First and Last Name Signature Date/Time MAR 09 2018 1150	Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other
Relinquished By: Ed Kauer Print First and Last Name Signature Date/Time MAR 09 2018 1250	Received By: SSU-1 Print First and Last Name Signature Date/Time MAR 09 2018 1250	
Relinquished By: SSU-1 Print First and Last Name Signature Date/Time MAR 12 2018 0755	Received By: Troy Bacon Print First and Last Name Signature Date/Time MAR 12 2018 0755	
Relinquished By: Troy Bacon Print First and Last Name Signature Date/Time MAR 12 2018 1400	Received By: FEDEX Print First and Last Name Signature Date/Time	

REV. 0

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:
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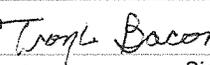
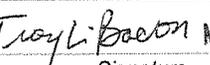
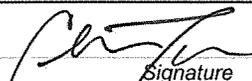
CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 445711	C.O.C.# S18-003-146 Page 1 of 1
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Collector: CHRIS FULTON CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650
SAF No.: S18-003	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071
Project Title: CERCLA, MARCH 2018	Logbook No.: HNF-N-506 98/54	Ice Chest No.: GWS-660
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 17809991215711
Protocol: CERCLA	Priority: 30 Days	Offsite Property No.: 9145

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
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Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3HF96	N	W	MAR 09 2018	1218	1x1-L P	9310_ALPHABETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B3HF96	N	W	MAR 09 2018	↓	1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2

04/06/2018

Relinquished By: CHRIS FULTON Print First and Last Name Signature:  Date/Time: MAR 09 2018 1255	Received By: SSU-1 Print First and Last Name Signature: _____ Date/Time: MAR 09 2018 1255	Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other
Relinquished By: SSU-1 Print First and Last Name Signature: _____ Date/Time: MAR 12 2018 0755	Received By: Troy Bacon Print First and Last Name Signature:  Date/Time: MAR 12 2018 0755	
Relinquished By: Troy Bacon Print First and Last Name Signature:  Date/Time: MAR 12 2018 1400	Received By: FEDEX Print First and Last Name Signature: _____ Date/Time: _____	
Relinquished By: Fed Ex Print First and Last Name Signature: _____ Date/Time: _____	Received By: Chakeris Tsipin Print First and Last Name Signature:  Date/Time: 3/13/18 0905	

REV. 0

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:
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CH2M Hill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C.# S18-003-148
		Page 1 of ² _{TLB}

445711

Collector: Juan Aguilar ICHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650
SAF No.: S18-003	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071
Project Title: CERCLA, MARCH 2018	Logbook No.: HNF-N-506-99112	Ice Chest No.: GWS-660
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 9899 91215711
Protocol: CERCLA	Priority: 30 Days	Offsite Property No.: 9145

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
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Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3HHN9	N	W	3-9-18	1024	1x1-L P	9310_ALPHABETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B3HHN9	N	W	3-9-18	1024	1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2

04/06/2018

Relinquished By: Juan Aguilar ICHPRC Print First and Last Name Signature Date/Time MAR 09 2018 1200	Received By: Ed Kauer ICHPRC Print First and Last Name Signature Date/Time MAR 09 2018 1200	Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other
Relinquished By: Ed Kauer ICHPRC Print First and Last Name Signature Date/Time MAR 09 2018 1250	Received By: SSU-1 Print First and Last Name Signature Date/Time MAR 09 2018 1250	
Relinquished By: SSU-1 Print First and Last Name Signature Date/Time MAR 12 2018 0755	Received By: Troy Bacon CHPRC Print First and Last Name Signature Date/Time MAR 12 2018 0755	
Relinquished By: Troy Bacon CHPRC Print First and Last Name Signature Date/Time MAR 12 2018 1400	Received By: FEDEX Print First and Last Name Signature Date/Time	

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:
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445711

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST (continued)

C.O.C. No. S18-003-148
Page 2 of 2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
	Print	Fed Ex		Chakeris Tarplin/ GEL Laboratories		<i>[Signature]</i>	3/13/18 0900
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
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Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time

04/06/2018

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CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # S18-003-157
		Page 1 of 1

445711

Collector: Kathy Turner /CHPRC	Contact/Requester: Karen Waters-Husted	Telephone No.: 509-376-4650
SAF No.: S18-003	Sampling Origin: Hanford Site	Purchase Order/Charge Code: 300071
Project Title: CERCLA, MARCH 2018	Logbook No.: HNF-N-506 - 97-72	Ice Chest No.: GWS-731
Shipped To (Lab): GEL Laboratories, LLC	Method of Shipment: Commercial Carrier	Bill of Lading/Air Bill No.: 1800 0386 8140
Protocol: CERCLA	Priority: 30 Days	Offsite Property No.: 9147

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
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Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3HFV6	N	W	MAR 12 2018	1131	5x40-mL aGs*	8260_VOA_GCMS_IX: COMMON REV 1	14 Days	HCl or H2SO4 to pH <2 / Cool <=6C

04/06/2018

Relinquished By: Kathy Turner /CHPRC Print First and Last Name Signature Date/Time	Received By: CHRIS FULTON /CHPRC Print First and Last Name Signature Date/Time	Matrix * S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other		
Relinquished By: CHRIS FULTON /CHPRC Print First and Last Name Signature Date/Time	Received By: FEDEX Print First and Last Name Signature Date/Time			
Relinquished By: Fed Ex Print First and Last Name Signature Date/Time	Received By: Chakeris Tarpel /GEL Laboratories Print First and Last Name Signature Date/Time			
Relinquished By: Print First and Last Name Signature Date/Time	Received By: Print First and Last Name Signature Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:

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SAMPLE RECEIPT & REVIEW FORM

HS

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>445711</u>		
Received By: <u>Chakeris Tarplin</u>		Date Received: <u>03.13.2018</u>		
Carrier and Tracking Number		Circle Applicable: <u>FedEx Express</u> FedEx Ground UPS Field Services Courier Other		
		<u>780003868931</u> <u>780003868140</u> <u>789991215711</u>		
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.		
Shipped as a DOT Hazardous?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____		
COC/Samples marked or classified as radioactive?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	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		
Is package, COC, and/or Samples marked HAZ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	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	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: <u>2°C</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" 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"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?	<input checked="" 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 <input checked="" type="checkbox"/> No ___ N/A ___ Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
Comments (Use Continuation Form if needed):				

PM (or PMA) review: Initials CSJ Date 3/14/18 Page 1 of 1

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 30 March 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 #: GEL445711
Work Order #: 445711**

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

Analytical Method: SW846 8260C

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

Analytical Batch: 1747916

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445711004	B3HFV6
1203991255	445658001(NonSDG) Post Spike (PS)
1203991257	445658001(NonSDG) Post Spike Duplicate (PSD)
1203992152	Method Blank (MB)
1203992153	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. The recoveries were similar. It is believed possible matrix interference has been demonstrated.

Sample	Analyte	Value
1203991255 (Non SDG 445658001PS)	Acetone	60* (70%-130%)
1203991257 (Non SDG 445658001PSD)	Acetone	58* (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: GEL445711 GEL Work Order: 445711

The Qualifiers in this report are defined as follows:

J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated

T Spike and/or spike duplicate sample recovery is outside control limits.

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

DL Indicates that sample is diluted.

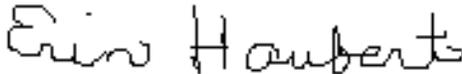
RA Indicates that sample is re-analyzed without re-extraction.

RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: 

Name: Erin Haubert

Date: 05 APR 2018

Title: Data Validator

Sample Data Summary

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Certificate of Analysis
Sample Summary

SDG Number: GEL445711	Date Collected: 03/12/2018 11:31	Matrix: WATER
Lab Sample ID: 445711004	Date Received: 03/13/2018 09:05	
Client ID: B3HFV6	Client: CPRC001	Project: CPRC0S18003
Batch ID: 1747916	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 03/19/2018 16:19	Inst: VOA3.I	Dilution: 1
Prep Date: 03/19/2018 16:19	Analyst: JP1	Purge Vol: 5 mL
Data File: 031918V3\3A111.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
630-20-6	1,1,1,2-Tetrachloroethane	U	0.300	ug/L	0.300	2.00	1.7
56-23-5	Carbon tetrachloride		23.6	ug/L	0.300	2.00	3.00
106-46-7	1,4-Dichlorobenzene	U	0.300	ug/L	0.300	2.00	4.00
100-41-4	Ethylbenzene	U	0.300	ug/L	0.300	2.00	4.00
71-55-6	1,1,1-Trichloroethane	U	0.300	ug/L	0.300	2.00	5.00
79-34-5	1,1,2,2-Tetrachloroethane	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
96-18-4	1,2,3-Trichloropropane	U	0.300	ug/L	0.300	2.00	5.00
96-12-8	1,2-Dibromo-3-chloropropane	U	0.500	ug/L	0.500	2.00	5.00
106-93-4	1,2-Dibromoethane	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
78-87-5	1,2-Dichloropropane	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
75-27-4	Bromodichloromethane	U	0.300	ug/L	0.300	2.00	5.00
75-25-2	Bromoform	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
108-90-7	Chlorobenzene	U	0.300	ug/L	0.300	2.00	5.00
67-66-3	Chloroform	J	0.680	ug/L	0.300	2.00	5.00
124-48-1	Dibromochloromethane	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
100-42-5	Styrene	U	0.300	ug/L	0.300	2.00	5.00
127-18-4	Tetrachloroethylene	J	0.440	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
156-59-2	cis-1,2-Dichloroethylene	U	0.300	ug/L	0.300	2.00	5.00
10061-01-5	cis-1,3-Dichloropropylene	U	0.300	ug/L	0.300	2.00	5.00
156-60-5	trans-1,2-Dichloroethylene	U	0.300	ug/L	0.300	2.00	5.00
10061-02-6	trans-1,3-Dichloropropylene	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	U	3.00	ug/L	3.00	10.0	10.0
126-99-8	2-Chloro-1,3-butadiene	U	0.300	ug/L	0.300	2.00	10.0
108-10-1	4-Methyl-2-pentanone	U	3.00	ug/L	3.00	10.0	10.0
107-05-1	Allyl chloride	U	3.00	ug/L	3.00	10.0	10.0
74-83-9	Bromomethane	U	0.300	ug/L	0.300	2.00	10.0
75-00-3	Chloroethane	U	0.300	ug/L	0.300	2.00	10.0
74-87-3	Chloromethane	U	0.300	ug/L	0.300	2.00	10.0
74-95-3	Dibromomethane	U	0.300	ug/L	0.300	2.00	10.0

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Certificate of Analysis
Sample Summary

SDG Number: GEL445711	Date Collected: 03/12/2018 11:31	Matrix: WATER
Lab Sample ID: 445711004	Date Received: 03/13/2018 09:05	
Client ID: B3HJV6	Client: CPRC001	Project: CPRC0S18003
Batch ID: 1747916	Method: SW846 8260C	SOP Ref: GL-OA-E-038
Run Date: 03/19/2018 16:19	Inst: VOA3.I	Dilution: 1
Prep Date: 03/19/2018 16:19	Analyst: JP1	Purge Vol: 5 mL
Data File: 031918V3\3A111.D	Column: DB-624	

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	RDL
75-71-8	Dichlorodifluoromethane	U	0.300	ug/L	0.300	2.00	10.0
97-63-2	Ethyl methacrylate	U	3.00	ug/L	3.00	10.0	10.0
74-88-4	Iodomethane	U	3.00	ug/L	3.00	10.0	10.0
126-98-7	Methacrylonitrile	U	3.00	ug/L	3.00	10.0	10.0
80-62-6	Methyl methacrylate	U	3.00	ug/L	3.00	10.0	10.0
107-12-0	Propionitrile	U	3.00	ug/L	3.00	10.0	10.0
75-69-4	Trichlorofluoromethane	U	0.300	ug/L	0.300	2.00	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
591-78-6	2-Hexanone	U	3.00	ug/L	3.00	10.0	20.0
67-64-1	Acetone	JT	3.27	ug/L	3.00	10.0	20.0
108-05-4	Vinyl acetate	U	1.60	ug/L	1.60	5.00	50.0
110-57-6	trans-1,4-Dichloro-2-butene	U	1.50	ug/L	1.50	10.0	50.0
75-05-8	Acetonitrile	U	16.7	ug/L	16.7	50.0	100
107-02-8	Acrolein	U	3.00	ug/L	3.00	10.0	100
107-13-1	Acrylonitrile	U	3.00	ug/L	3.00	10.0	100
78-83-1	Isobutyl alcohol	U	33.0	ug/L	33.0	100	500

Quality Control Summary

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QC Summary

Report Date: April 5, 2018

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CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 445711

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
QC1203992153	LCS										
1,1,1,2-Tetrachloroethane	50.0			46.2	ug/L		92	(70%-130%)	JP1	03/19/18	12:05
1,1,1-Trichloroethane	50.0			47.8	ug/L		96	(70%-130%)			
1,1,2,2-Tetrachloroethane	50.0			47.0	ug/L		94	(70%-130%)			
1,1,2-Trichloroethane	50.0			46.4	ug/L		93	(70%-130%)			
1,1-Dichloroethane	50.0			46.0	ug/L		92	(70%-130%)			
1,1-Dichloroethylene	50.0			47.3	ug/L		95	(70%-130%)			
1,2,3-Trichloropropane	50.0			48.0	ug/L		96	(70%-130%)			
1,2-Dibromo-3-chloropropane	50.0			53.0	ug/L		106	(70%-130%)			
1,2-Dibromoethane	50.0			46.1	ug/L		92	(70%-130%)			
1,2-Dichloroethane	50.0			48.4	ug/L		97	(70%-130%)			
1,2-Dichloropropane	50.0			45.0	ug/L		90	(70%-130%)			
1,4-Dichlorobenzene	50.0			46.3	ug/L		93	(70%-130%)			
2-Butanone	250			254	ug/L		102	(70%-130%)			

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
2-Hexanone	250			268	ug/L		107	(70%-130%)	JP1	03/19/18	12:05
4-Methyl-2-pentanone	250			249	ug/L		100	(70%-130%)			
Acetone	250			239	ug/L		95	(70%-130%)			
Acetonitrile	1250			1240	ug/L		100	(70%-130%)			
Benzene	50.0			44.3	ug/L		89	(70%-130%)			
Bromodichloromethane	50.0			45.3	ug/L		91	(70%-130%)			
Bromoform	50.0			47.6	ug/L		95	(70%-130%)			
Bromomethane	50.0			48.5	ug/L		97	(70%-130%)			
Carbon disulfide	250			229	ug/L		92	(70%-130%)			
Carbon tetrachloride	50.0			47.3	ug/L		95	(70%-130%)			
Chlorobenzene	50.0			44.5	ug/L		89	(70%-130%)			
Chloroethane	50.0			50.9	ug/L		102	(70%-130%)			
Chloroform	50.0			43.9	ug/L		88	(70%-130%)			
Chloromethane	50.0			51.3	ug/L		103	(70%-130%)			
Dibromochloromethane	50.0			47.7	ug/L		95	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
Dibromomethane	50.0			44.0	ug/L		88	(70%-130%)	JP1	03/19/18	12:05
Dichlorodifluoromethane	50.0			53.8	ug/L		108	(70%-130%)			
Ethylbenzene	50.0			47.1	ug/L		94	(70%-130%)			
Iodomethane	250			219	ug/L		88	(70%-130%)			
Methylene chloride	50.0			41.9	ug/L		84	(70%-130%)			
Styrene	50.0			47.0	ug/L		94	(70%-130%)			
Tetrachloroethylene	50.0			44.1	ug/L		88	(70%-130%)			
Toluene	50.0			44.4	ug/L		89	(70%-130%)			
Trichloroethylene	50.0			45.8	ug/L		92	(70%-130%)			
Trichlorofluoromethane	50.0			53.8	ug/L		108	(70%-130%)			
Vinyl acetate	250			278	ug/L		111	(70%-130%)			
Vinyl chloride	50.0			53.8	ug/L		108	(70%-130%)			
Xylenes (total)	150			144	ug/L		96	(70%-130%)			
cis-1,2-Dichloroethylene	50.0			46.3	ug/L		93	(70%-130%)			
cis-1,3-Dichloropropylene	50.0			44.7	ug/L		89	(70%-130%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
trans-1,2-Dichloroethylene	50.0			48.2	ug/L		96	(70%-130%)	JP1	03/19/18	12:05
trans-1,3-Dichloropropylene	50.0			48.7	ug/L		97	(70%-130%)			
**1,2-Dichloroethane-d4	50.0			55.3	ug/L		111	(70%-130%)			
**Bromofluorobenzene	50.0			47.8	ug/L		96	(70%-130%)			
**Toluene-d8	50.0			49.2	ug/L		98	(70%-130%)			
QC1203992152 MB											
1,1,1,2-Tetrachloroethane			U	0.300	ug/L					03/19/18	14:12
1,1,1-Trichloroethane			U	0.300	ug/L						
1,1,2,2-Tetrachloroethane			U	0.300	ug/L						
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						
1,2,3-Trichloropropane			U	0.300	ug/L						
1,2-Dibromo-3-chloropropane			U	0.500	ug/L						
1,2-Dibromoethane			U	0.300	ug/L						
1,2-Dichloroethane			U	0.300	ug/L						

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QC Summary

Workorder: 445711

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
1,2-Dichloropropane			U	0.300	ug/L				JP1	03/19/18	14:12
1,4-Dichlorobenzene			U	0.300	ug/L						
2-Butanone			U	3.00	ug/L						
2-Chloro-1,3-butadiene			U	0.300	ug/L						
2-Hexanone			U	3.00	ug/L						
4-Methyl-2-pentanone			U	3.00	ug/L						
Acetone			U	3.00	ug/L						
Acetonitrile			U	16.7	ug/L						
Acrolein			U	3.00	ug/L						
Acrylonitrile			U	3.00	ug/L						
Allyl chloride			U	3.00	ug/L						
Benzene			U	0.300	ug/L						
Bromodichloromethane			U	0.300	ug/L						
Bromoform			U	0.300	ug/L						
Bromomethane			U	0.300	ug/L						

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
Carbon disulfide			U	1.60	ug/L				JP1	03/19/18	14:12
Carbon tetrachloride			U	0.300	ug/L						
Chlorobenzene			U	0.300	ug/L						
Chloroethane			U	0.300	ug/L						
Chloroform			U	0.300	ug/L						
Chloromethane			U	0.300	ug/L						
Dibromochloromethane			U	0.300	ug/L						
Dibromomethane			U	0.300	ug/L						
Dichlorodifluoromethane			U	0.300	ug/L						
Ethyl methacrylate			U	3.00	ug/L						
Ethylbenzene			U	0.300	ug/L						
Iodomethane			U	3.00	ug/L						
Isobutyl alcohol			U	33.0	ug/L						
Methacrylonitrile			U	3.00	ug/L						
Methyl methacrylate			U	3.00	ug/L						

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
Methylene chloride			U	1.60	ug/L				JP1	03/19/18	14:12
Propionitrile			U	3.00	ug/L						
Styrene			U	0.300	ug/L						
Tetrachloroethylene			U	0.300	ug/L						
Toluene			U	0.300	ug/L						
Trichloroethylene			U	0.300	ug/L						
Trichlorofluoromethane			U	0.300	ug/L						
Vinyl acetate			U	1.60	ug/L						
Vinyl chloride			U	0.300	ug/L						
Xylenes (total)			U	0.300	ug/L						
cis-1,2-Dichloroethylene			U	0.300	ug/L						
cis-1,3-Dichloropropylene			U	0.300	ug/L						
trans-1,2-Dichloroethylene			U	0.300	ug/L						
trans-1,3-Dichloropropylene			U	0.300	ug/L						
trans-1,4-Dichloro-2-butene			U	1.50	ug/L						

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QC Summary

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Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
**1,2-Dichloroethane-d4	50.0			56.0	ug/L		112	(70%-130%)	JP1	03/19/18	14:12
**Bromofluorobenzene	50.0			50.4	ug/L		101	(70%-130%)			
**Toluene-d8	50.0			50.2	ug/L		100	(70%-130%)			
QC1203991255 445658001 PS											
1,1,1,2-Tetrachloroethane	50.0	U	0.00	45.6	ug/L		91	(70%-130%)		03/19/18	21:40
1,1,1-Trichloroethane	50.0	U	0.00	46.3	ug/L		93	(70%-130%)			
1,1,2,2-Tetrachloroethane	50.0	U	0.00	47.8	ug/L		96	(70%-130%)			
1,1,2-Trichloroethane	50.0	U	0.00	43.8	ug/L		88	(70%-130%)			
1,1-Dichloroethane	50.0	U	0.00	45.1	ug/L		90	(70%-130%)			
1,1-Dichloroethylene	50.0	U	0.00	45.7	ug/L		91	(70%-130%)			
1,2,3-Trichloropropane	50.0	U	0.00	48.4	ug/L		97	(70%-130%)			
1,2-Dibromo-3-chloropropane	50.0	U	0.00	53.1	ug/L		106	(70%-130%)			
1,2-Dibromoethane	50.0	U	0.00	45.3	ug/L		91	(70%-130%)			
1,2-Dichloroethane	50.0	U	0.00	46.3	ug/L		93	(70%-130%)			
1,2-Dichloropropane	50.0	U	0.00	43.8	ug/L		88	(70%-130%)			
1,4-Dichlorobenzene	50.0	U	0.00	44.0	ug/L		88	(70%-130%)			

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QC Summary

Workorder: 445711

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch	1747916											
2-Butanone	250	U	0.00		190	ug/L		76	(70%-130%)	JP1	03/19/18	21:40
2-Hexanone	250	U	0.00		234	ug/L		94	(70%-130%)			
4-Methyl-2-pentanone	250	U	0.00		243	ug/L		97	(70%-130%)			
Acetone	250	JT	3.86	T	153	ug/L		60*	(70%-130%)			
Acetonitrile	1250	U	0.00		1200	ug/L		96	(70%-130%)			
Benzene	50.0	U	0.00		42.0	ug/L		84	(70%-130%)			
Bromodichloromethane	50.0	U	0.00		43.9	ug/L		88	(70%-130%)			
Bromoform	50.0	U	0.00		47.9	ug/L		96	(70%-130%)			
Bromomethane	50.0	U	0.00		48.3	ug/L		97	(70%-130%)			
Carbon disulfide	250	U	0.00		221	ug/L		88	(70%-130%)			
Carbon tetrachloride	50.0	U	0.00		46.9	ug/L		94	(70%-130%)			
Chlorobenzene	50.0	U	0.00		42.2	ug/L		84	(70%-130%)			
Chloroethane	50.0	U	0.00		48.8	ug/L		98	(70%-130%)			
Chloroform	50.0	U	0.00		43.9	ug/L		88	(70%-130%)			
Chloromethane	50.0	U	0.00		47.0	ug/L		94	(70%-130%)			

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QC Summary

Workorder: 445711

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Parname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch	1747916											
Dibromochloromethane	50.0	U	0.00		45.3	ug/L		91	(70%-130%)	JP1	03/19/18	21:40
Dibromomethane	50.0	U	0.00		43.3	ug/L		87	(70%-130%)			
Dichlorodifluoromethane	50.0	U	0.00		49.0	ug/L		98	(70%-130%)			
Ethylbenzene	50.0	U	0.00		45.8	ug/L		92	(70%-130%)			
Iodomethane	250	U	0.00		213	ug/L		85	(70%-130%)			
Methylene chloride	50.0	U	0.00		40.6	ug/L		81	(70%-130%)			
Styrene	50.0	U	0.00		47.7	ug/L		95	(70%-130%)			
Tetrachloroethylene	50.0	U	0.00		43.6	ug/L		87	(70%-130%)			
Toluene	50.0	U	0.00		43.4	ug/L		87	(70%-130%)			
Trichloroethylene	50.0	U	0.00		43.2	ug/L		86	(70%-130%)			
Trichlorofluoromethane	50.0	U	0.00		51.8	ug/L		104	(70%-130%)			
Vinyl acetate	250	U	0.00		266	ug/L		107	(70%-130%)			
Vinyl chloride	50.0	U	0.00		49.7	ug/L		99	(70%-130%)			
Xylenes (total)	150	U	0.00		140	ug/L		93	(70%-130%)			
cis-1,2-Dichloroethylene	50.0	U	0.00		43.6	ug/L		87	(70%-130%)			

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GEL LABORATORIES LLC

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QC Summary

Workorder: 445711

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Parname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch	1747916											
cis-1,3-Dichloropropylene	50.0	U	0.00		42.0	ug/L		84	(70%-130%)	JP1	03/19/18	21:40
trans-1,2-Dichloroethylene	50.0	U	0.00		46.3	ug/L		93	(70%-130%)			
trans-1,3-Dichloropropylene	50.0	U	0.00		48.8	ug/L		98	(70%-130%)			
**1,2-Dichloroethane-d4	50.0		57.4		55.4	ug/L		111	(70%-130%)			
**Bromofluorobenzene	50.0		54.0		48.7	ug/L		97	(70%-130%)			
**Toluene-d8	50.0		51.0		52.3	ug/L		105	(70%-130%)			
QC1203991257 445658001 PSD												
1,1,1,2-Tetrachloroethane	50.0	U	0.00		46.7	ug/L	3	93	(0%-20%)		03/19/18	22:12
1,1,1-Trichloroethane	50.0	U	0.00		44.2	ug/L	4	88	(0%-20%)			
1,1,2,2-Tetrachloroethane	50.0	U	0.00		44.5	ug/L	7	89	(0%-20%)			
1,1,2-Trichloroethane	50.0	U	0.00		46.2	ug/L	5	92	(0%-20%)			
1,1-Dichloroethane	50.0	U	0.00		42.0	ug/L	7	84	(0%-20%)			
1,1-Dichloroethylene	50.0	U	0.00		44.2	ug/L	3	88	(0%-20%)			
1,2,3-Trichloropropane	50.0	U	0.00		48.5	ug/L	0	97	(0%-20%)			
1,2-Dibromo-3-chloropropane	50.0	U	0.00		49.2	ug/L	8	98	(0%-20%)			
1,2-Dibromoethane	50.0	U	0.00		46.8	ug/L	3	94	(0%-20%)			

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GEL LABORATORIES LLC

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QC Summary

Workorder: 445711

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
1,2-Dichloroethane	50.0	U	0.00	45.4	ug/L	2	91	(0%-20%)	JP1	03/19/18	22:12
1,2-Dichloropropane	50.0	U	0.00	42.7	ug/L	3	85	(0%-20%)			
1,4-Dichlorobenzene	50.0	U	0.00	41.2	ug/L	7	82	(0%-20%)			
2-Butanone	250	U	0.00	186	ug/L	2	74	(0%-20%)			
2-Hexanone	250	U	0.00	250	ug/L	7	100	(0%-20%)			
4-Methyl-2-pentanone	250	U	0.00	249	ug/L	2	100	(0%-20%)			
Acetone	250	JT	3.86	T	149	ug/L	3	58*	(0%-20%)		
Acetonitrile	1250	U	0.00	1180	ug/L	2	94	(0%-20%)			
Benzene	50.0	U	0.00	41.7	ug/L	1	83	(0%-20%)			
Bromodichloromethane	50.0	U	0.00	42.5	ug/L	3	85	(0%-20%)			
Bromoform	50.0	U	0.00	44.2	ug/L	8	88	(0%-20%)			
Bromomethane	50.0	U	0.00	49.3	ug/L	2	99	(0%-20%)			
Carbon disulfide	250	U	0.00	210	ug/L	5	84	(0%-20%)			
Carbon tetrachloride	50.0	U	0.00	44.6	ug/L	5	89	(0%-20%)			
Chlorobenzene	50.0	U	0.00	43.7	ug/L	4	87	(0%-20%)			

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QC Summary

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Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch	1747916											
Chloroethane	50.0	U	0.00		49.9	ug/L	2	100	(0%-20%)	JP1	03/19/18	22:12
Chloroform	50.0	U	0.00		42.1	ug/L	4	84	(0%-20%)			
Chloromethane	50.0	U	0.00		47.4	ug/L	1	95	(0%-20%)			
Dibromochloromethane	50.0	U	0.00		47.7	ug/L	5	95	(0%-20%)			
Dibromomethane	50.0	U	0.00		40.5	ug/L	7	81	(0%-20%)			
Dichlorodifluoromethane	50.0	U	0.00		49.6	ug/L	1	99	(0%-20%)			
Ethylbenzene	50.0	U	0.00		46.9	ug/L	2	94	(0%-20%)			
Iodomethane	250	U	0.00		204	ug/L	4	82	(0%-20%)			
Methylene chloride	50.0	U	0.00		39.1	ug/L	4	78	(0%-20%)			
Styrene	50.0	U	0.00		47.8	ug/L	0	96	(0%-20%)			
Tetrachloroethylene	50.0	U	0.00		43.7	ug/L	0	87	(0%-20%)			
Toluene	50.0	U	0.00		45.4	ug/L	4	91	(0%-20%)			
Trichloroethylene	50.0	U	0.00		42.0	ug/L	3	84	(0%-20%)			
Trichlorofluoromethane	50.0	U	0.00		51.6	ug/L	0	103	(0%-20%)			
Vinyl acetate	250	U	0.00		259	ug/L	3	104	(0%-20%)			

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch	1747916										
Vinyl chloride	50.0	U	0.00	51.3	ug/L	3	103	(0%-20%)	JP1	03/19/18	22:12
Xylenes (total)	150	U	0.00	145	ug/L	3	97	(0%-20%)			
cis-1,2-Dichloroethylene	50.0	U	0.00	42.7	ug/L	2	85	(0%-20%)			
cis-1,3-Dichloropropylene	50.0	U	0.00	41.1	ug/L	2	82	(0%-20%)			
trans-1,2-Dichloroethylene	50.0	U	0.00	45.3	ug/L	2	91	(0%-20%)			
trans-1,3-Dichloropropylene	50.0	U	0.00	48.3	ug/L	1	97	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		57.4	52.8	ug/L		106	(70%-130%)			
**Bromofluorobenzene	50.0		54.0	47.7	ug/L		95	(70%-130%)			
**Toluene-d8	50.0		51.0	52.8	ug/L		106	(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

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QC Summary

Workorder: 445711

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

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Surrogate Recovery Report

SDG Number: GEL445711

Matrix Type: LIQUID

Sample ID	Client ID	DCED4 %REC	TOL %REC	BFB %REC
1203992153	LCS for batch 1747916	111	98	96
1203992152	MB for batch 1747916	112	100	101
445711004	B3HFV6	115	100	99
1203991255	B3HLJ2PS	111	105	97
1203991257	B3HLJ2PSD	106	106	95

Surrogate

DCED4 = 1,2-Dichloroethane-d4

TOL = Toluene-d8

BFB = Bromofluorobenzene

Acceptance Limits

(70%-130%)

(70%-130%)

(70%-130%)

* Recovery outside Acceptance Limits

Column to be used to flag recovery values

D Sample Diluted

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL445711
Work Order #: 445711

Product: 9310_ALPHABETA_GPC: Gross Beta
Analytical Method: 9310_ALPHABETA_GPC
Analytical Procedure: GL-RAD-A-001 REV# 19
Analytical Batch: 1746734

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445711001	B3HF79
445711002	B3HF96
445711003	B3HHN9
1203988765	Method Blank (MB)
1203988766	445711003(B3HHN9) Sample Duplicate (DUP)
1203988767	445711003(B3HHN9) Matrix Spike (MS)
1203988768	445711003(B3HHN9) Matrix Spike Duplicate (MSD)
1203988769	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.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203988767 (B3HHN9MS) and 1203988768 (B3HHN9MSD), aliquots were reduced to conserve sample volume.

Product: TC99_EIE_LSC: COMMON
Analytical Method: TC99_EIE_LSC
Analytical Procedure: GL-RAD-A-059 REV# 5

Analytical Batch: 1747308

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
445711001	B3HF79
445711002	B3HF96
445711003	B3HHN9
1203989890	Method Blank (MB)
1203989891	445848001(NonSDG) Sample Duplicate (DUP)
1203989892	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

Samples 1203989891 (Non SDG 445848001DUP), 445711001 (B3HF79) and 445711002 (B3HF96) were recounted to verify sample results. Recounts are reported.

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: GEL445711 GEL Work Order: 445711

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: Theresa Austin

Date: 30 MAR 2018

Title: Group Leader

Sample Data Summary

04/06/2018

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL445711	Client: CPRC001	Project: CPRC0S18003
Lab Sample ID: 445711001	Date Collected: 03/09/2018 11:40	Matrix: WATER
	Date Received: 03/13/2018 09:05	
Client ID: B3HF79		Prep Basis: "As Received"
Batch ID: 1746734	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 03/27/2018 08:59	Analyst: AXH4	Instrument: PIC14A
Data File: B1746734.xls	Aliquot: 125 mL	Count Time: 60 min
Prep Batch: 1746734	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 03/26/2018 12:39		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		3830	pCi/L	+/-42.6	639	2.80	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.

04/06/2018

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL445711	Client: CPRC001	Project: CPRC0S18003
Lab Sample ID: 445711001	Date Collected: 03/09/2018 11:40	Matrix: WATER
	Date Received: 03/13/2018 09:05	
Client ID: B3HF79	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1747308	Analyst: TXJ1	SOP Ref: GL-RAD-A-059
Run Date: 03/26/2018 07:13	Aliquot: 100 mL	Instrument: LSCMOCHA
Data File: E1747308R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 13.5500001907349 min
Prep Batch: 1747308		
Prep Date: 03/20/2018 16:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		6490	pCi/L	+/-131	732	42.1	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	25700	28800	CPM	89.3	(30%-105%)

Comments:

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

The MDC is a sample specific MDC.

04/06/2018

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL445711	Client: CPRC001	Project: CPRC0S18003
Lab Sample ID: 445711002	Date Collected: 03/09/2018 12:18	Matrix: WATER
	Date Received: 03/13/2018 09:05	
Client ID: B3HF96		Prep Basis: "As Received"
Batch ID: 1746734	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 03/27/2018 08:59	Analyst: AXH4	Instrument: PIC13A
Data File: B1746734.xls	Aliquot: 125 mL	Count Time: 60 min
Prep Batch: 1746734	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 03/26/2018 12:39		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		5590	pCi/L	+/-52.0	904	2.62	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.

04/06/2018

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL445711	Client: CPRC001	Project: CPRC0S18003
Lab Sample ID: 445711002	Date Collected: 03/09/2018 12:18	Matrix: WATER
	Date Received: 03/13/2018 09:05	
Client ID: B3HF96	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1747308	Analyst: TXJ1	SOP Ref: GL-RAD-A-059
Run Date: 03/26/2018 07:28	Aliquot: 100 mL	Instrument: LSCMOCHA
Data File: E1747308R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 8.05000019073486 min
Prep Batch: 1747308		
Prep Date: 03/20/2018 16:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		10500	pCi/L	+/-208	1180	48.1	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	26600	28800	CPM	92.4	(30%-105%)

Comments:

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

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL445711	Client: CPRC001	Project: CPRC0S18003
Lab Sample ID: 445711003	Date Collected: 03/09/2018 10:24	Matrix: WATER
	Date Received: 03/13/2018 09:05	
Client ID: B3HHN9		Prep Basis: "As Received"
Batch ID: 1746734	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 03/27/2018 08:57	Analyst: AXH4	Instrument: PIC10B
Data File: B1746734.xls	Aliquot: 125 mL	Count Time: 60 min
Prep Batch: 1746734	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 03/26/2018 12:39		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		14.7	pCi/L	+/-3.18	3.99	3.11	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.

04/06/2018

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL445711	Client: CPRC001	Project: CPRC0S18003
Lab Sample ID: 445711003	Date Collected: 03/09/2018 10:24	Matrix: WATER
	Date Received: 03/13/2018 09:05	
Client ID: B3HHN9	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1747308	Analyst: TXJ1	SOP Ref: GL-RAD-A-059
Run Date: 03/25/2018 08:03	Aliquot: 100 mL	Instrument: LSCMOCHA
Data File: E1747308R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 25 min
Prep Batch: 1747308		
Prep Date: 03/20/2018 16:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-5.01	pCi/L	+/-21.5	21.5	37.4	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	25300	28800	CPM	87.9	(30%-105%)

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.

Quality Control Summary

QC Summary

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 445711

Report Date: March 30, 2018
Page 1 of 2

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1746734								
QC1203988765	MB								
Beta			U	0.909	pCi/L			AXH4	03/27/1808:57
				Uncert: +/-1.64					
				TPU: +/-1.65					
QC1203988766	445711003	DUP							
Beta		14.7		12.9	pCi/L				03/27/1808:57
				Uncert: +/-3.18		RPD: 13 (0% - 100%)			
				TPU: +/-3.99		RER: 0.675 (0-2)			
QC1203988767	445711003	MS							
Beta	1880	14.7		1850	pCi/L	REC: 98 (75%-125%)			03/27/1808:57
				Uncert: +/-3.18					
				TPU: +/-3.99					
QC1203988768	445711003	MSD							
Beta	1880	14.7		1910	pCi/L	REC: 101 (75%-125%)			03/27/1808:58
				Uncert: +/-3.18		RPD: 3 (0%-20%)			
				TPU: +/-3.99		RER: 0.265 (0-2)			
QC1203988769	LCS								
Beta	376			392	pCi/L	REC: 104 (80%-120%)			03/27/1808:58
				Uncert: +/-13.7					
				TPU: +/-64.8					
Rad Liquid Scintillation									
Batch	1747308								
QC1203989890	MB								
Technetium-99			U	-14.7	pCi/L			TXJ1	03/25/1813:22
				Uncert: +/-19.7					
				TPU: +/-19.7					
**Technetium-99m Tracer	28800			26300	CPM	REC: 91 (30%-105%)			
QC1203989891	445848001	DUP							
Technetium-99		62.4		65.9	pCi/L				03/26/1811:09
				Uncert: +/-26.4		RPD: 6 (0% - 100%)			
				TPU: +/-27.3		RER: 0.186 (0-2)			
**Technetium-99m Tracer	28800	20900		22800	CPM	REC: 79 (30%-105%)			
QC1203989892	LCS								
Technetium-99	888			857	pCi/L	REC: 97 (80%-120%)			03/25/1814:15
				Uncert: +/-39.1					
				TPU: +/-103					
**Technetium-99m Tracer	28800			26900	CPM	REC: 93 (30%-105%)			

Notes:

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

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.

QC Summary

Workorder: 445711

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
B										
C										
D										
E										
J										
N										
P										
T										
U										
UX										
X										
Y										
Z										
o										

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.