

July 13, 2018

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

Re: CHPRC SAF F12-024
Work Order: 452839
SDG: GEL452839

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 20, 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: 302841 - 7H
Chain of Custody: F12-024-371, F12-024-376 and F12-024-381
Enclosures

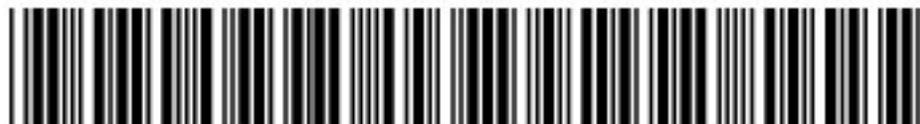


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Case Narrative

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F12-024
SDG: GEL452839

July 13, 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 20, 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:

Laboratory Identification	Sample Description
452839001	B3K399
452839002	B3K3B4
452839003	B3K3B9

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: 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

**Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL452839
Work Order #: 452839**

SRTOT_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**

Samples 1204054069 (Non SDG 452854003DUP) and 452839002 (B3K3B4) were recounted due to results more negative than the three sigma TPU. The second counts are 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.

Technical Information**Recounts**

Sample 1204054894 (LCS) was recounted due to low recovery. The recount is reported.

Miscellaneous Information**Additional Comments**

The matrix spike, 1204054893 (Non SDG 452851001MS), aliquot was 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**

Sample 1204054948 (LCS) was recounted due to low recovery. The recount is 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		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			452839	F12-024-371	PAGE 1 OF 1
COLLECTOR Jeff Tucksen CHPRC		COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC		REQUIRED TAT 30 Days	
SAMPLING LOCATION 100-HX, Process Bldg. 689, Inf Tank, Valve T-H3 (V-H3AA4)		PROJECT DESIGNATION 100-HX Pump and Treat - INFLUENT/EFFLUENT/TRANSFER TANKS - WAT		SAF NO. F12-024		ORIGINAL	
ICE CHEST NO. GWS-1086		FIELD LOGBOOK NO. INF-491-17/6	ACTUAL SAMPLE DEPTH N/A	PURCHASE ORDER/CHARGE CODE 302845		METHOD OF SHIPMENT FEDERAL EXPRESS	
SHIPPED TO GEL Laboratories, LLC		OFFSITE PROPERTY NO. 9577		BILL OF LADING/AIR BILL NO. 172513370897			
MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	PRESERVATION	HNO3 to pH <2	HNO3 to pH <2	None		
A=Air		HOLDING TIME	6 Months	6 Months	6 Months		
DL=Drum		TYPE OF CONTAINER	G/P	G/P	P		
Liquids		NO. OF CONTAINER(S)	1	1	1		
DS=Drum		VOLUME	1L	500mL	250mL		
Solids		SAMPLE ANALYSIS	SRTOT_SEP_PR ECIP_GPC: COMMON;	TC99_EIE_LSC: COMMON;	TRITIUM_DIST_LSC: COMMON;		
L=Liquid	SPECIAL HANDLING AND/OR STORAGE N/A						
O=Oil							
S=Soil							
SE=Sediment							
T=Tissue							
V=Vegetation							
W=Water							
WI=Wipe							
X=Other							
SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B3K399	N/A	WATER	JUN 19 2018	0923	✓	✓	✓

07/13/2018

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	TRVL-18-143; ** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.** The extraction wells associated with this SAF are all located at the Transfer Building.	
Jeff Tucksen CHPRC	JUN 19 2018 1035	Janelle Zunker CHPRC	JUN 19 2018 1035		
Janelle Zunker CHPRC	JUN 19 2018 1400	FEDEX			
		Chakeris Tarplin GEL Laboratories	6/20/18 850		
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME		

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CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 452839			F12-024-376	PAGE 1 OF 1
COLLECTOR Jeff Tucksen CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC		REQUIRED TAT 30 Days	
SAMPLING LOCATION 100-HX, Process Bldg. 689, Eff Tank, Valve T-H5 (V-H5A6AA)		PROJECT DESIGNATION 100-HX Pump and Treat - INFLUENT/EFFLUENT/TRANSFER TANKS - WAT		SAF NO. F12-024	ORIGINAL	
ICE CHEST NO. GWS-686		FIELD LOGBOOK NO. HNF-N-491-17/6	ACTUAL SAMPLE DEPTH N/A		PURCHASE ORDER/CHARGE CODE 302845	METHOD OF SHIPMENT FEDERAL EXPRESS
SHIPPED TO GEL Laboratories, LLC		OFFSITE PROPERTY NO. 9577		BILL OF LADING/AIR BILL NO. 172513370897		
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	PRESERVATION		HNO3 to pH <2	HNO3 to pH <2	None
		HOLDING TIME		6 Months	6 Months	6 Months
		TYPE OF CONTAINER		G/P	G/P	P
		NO. OF CONTAINER(S)		1	1	1
		VOLUME		1L	500mL	250mL
		SPECIAL HANDLING AND/OR STORAGE N/A		SAMPLE ANALYSIS		SRTOT_SEP_PR ECIP_GPC: COMMON;
SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME		
B3K3B4	N/A	WATER	JUN 19 2018	0927	✓	✓

07/13/2018

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN		DATE/TIME	
Jeff Tucksen CHPRC		Janelle Zunker CHPRC		JUN 19 2018 1035	
Janelle Zunker CHPRC		Chakeris Tarplin GEL Laboratories		JUN 19 2018 1035 6/20/18 850	
Fed Ex		FEDEX			
FINAL SAMPLE DISPOSITION		DISPOSAL METHOD		DISPOSED BY	

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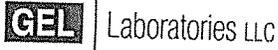
CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST 452839				F12-024-381	PAGE 1 OF 1
COLLECTOR Jeff Tucksen CHPRC		COMPANY CONTACT SUMNER, LC		TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC		REQUIRED TAT 30 Days
SAMPLING LOCATION 100-HX, Process Bldg 689, Eff Tank, Valve T-H5 (V-H5A6AA) FT		PROJECT DESIGNATION 100-HX Pump and Treat - INFLUENT/EFFLUENT/TRANSFER TANKS - WAT			SAF NO. F12-024		
ICE CHEST NO. GWS-6896		FIELD LOGBOOK NO. HNF-N-491-17/6		ACTUAL SAMPLE DEPTH N/A	PURCHASE ORDER/CHARGE CODE 302845		ORIGINAL METHOD OF SHIPMENT FEDERAL EXPRESS
SHIPPED TO GEL Laboratories, LLC		OFFSITE PROPERTY NO. 9577			BILL OF LADING/AIR BILL NO. 772513370897		
MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.			PRESERVATION	HNO3 to pH <2	HNO3 to pH <2	None
				HOLDING TIME	6 Months	6 Months	6 Months
				TYPE OF CONTAINER	G/P	G/P	P
				NO. OF CONTAINER(S)	1	1	1
				VOLUME	1L	500mL	250mL
				SAMPLE ANALYSIS	SRTOT_SEP_PR ECIP_GPC: COMMON;	TC99_EIE_LSC: COMMON;	TRITIUM_DIST_ LSC: COMMON;
SPECIAL HANDLING AND/OR STORAGE N/A							
SAMPLE NO.	FILTERED	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B3K3B9	N/A	WATER	JUN 19 2018	0816	✓	✓	✓

07/13/2018

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
Jeff Tucksen CHPRC	JUN 19 2018 1035	Janelle Zunker CHPRC	JUN 19 2018 1035	TRVL-18-143; ** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.** The extraction wells associated with this SAF are all located at the Transfer Building.
Janelle Zunker CHPRC	JUN 19 2018 1400	FEDEX		
Fed Ex		Chakeris Tarplin GEL Laboratories	6/20/18 850	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME

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SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPCC</u>		SDG/AR/COC/Work Order: <u>452839</u>			
Received By: <u>C. TARPLIN</u>		Date Received: <u>06-20-18</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>7725 1474 4065</u> <u>7725 1474 3595</u> <u>7725 1337 0897</u> <u>7725 10132115</u>			
Suspected Hazard Information		*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.			
Shipped as a DOT Hazardous?		Hazard Class Shipped: _____ UN#: _____			
COC/Samples marked or classified as radioactive?		Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <input checked="" type="checkbox"/> CPM/mR/Hr Classified as: <u>Rad 1</u> Rad 2 Rad 3			
Is package, COC, and/or Samples marked HAZ?		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"/>	<input 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"/>	<input type="checkbox"/>	
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input 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"/>	<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"/>	<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"/>	<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"/>	<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 ___ No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A ___ Sample ID's and containers affected: _____
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Comments (Use Continuation Form if needed):					

PM (or PMA) review: Initials ast Date 6/21/18 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 13 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

Radiological Analysis

Case Narrative

**Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL452839
Work Order #: 452839**

Product: SRTOT_SEP_PRECIP_GPC: COMMON
Analytical Method: SRTOT_SEP_PRECIP_GPC
Analytical Procedure: GL-RAD-A-004 REV# 20
Analytical Batch: 1775471

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
452839001	B3K399
452839002	B3K3B4
452839003	B3K3B9
1204054068	Method Blank (MB)
1204054069	452854003(NonSDG) Sample Duplicate (DUP)
1204054070	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 1204054069 (Non SDG 452854003DUP) and 452839002 (B3K3B4) were recounted due to results more negative than the three sigma TPU. The second counts are reported.

Product: TRITIUM_DIST_LSC: COMMON
Analytical Method: TRITIUM_DIST_LSC
Analytical Procedure: GL-RAD-A-002 REV# 22
Analytical Batch: 1775848

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
452839001	B3K399
452839002	B3K3B4
452839003	B3K3B9
1204054891	Method Blank (MB)
1204054892	452851001(NonSDG) Sample Duplicate (DUP)
1204054893	452851001(NonSDG) Matrix Spike (MS)

1204054894 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 1204054894 (LCS) was recounted due to low recovery. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1204054893 (Non SDG 452851001MS), aliquot was 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: 1775871

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
452839001	B3K399
452839002	B3K3B4
452839003	B3K3B9
1204054946	Method Blank (MB)
1204054947	452851001(NonSDG) Sample Duplicate (DUP)
1204054948	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 1204054948 (LCS) was recounted due to low recovery. The recount is 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.

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: GEL452839 GEL Work Order: 452839

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: 13 JUL 2018

Title: Group Leader

Sample Data Summary

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL452839	Client: CPRC001	Project: CPRC0F12024
Lab Sample ID: 452839001	Date Collected: 06/19/2018 09:23	Matrix: WATER
	Date Received: 06/20/2018 08:50	
Client ID: B3K399	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1775471	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 06/25/2018 10:45	Aliquot: 300 mL	Instrument: PIC6A
Data File: S1775471r3.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1775471		
Prep Date: 06/21/2018 12:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.344	pCi/L	+/-0.571	0.577	0.995	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	4.30	4.19	mg	103	(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.

07/13/2018

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL452839	Client: CPRC001	Project: CPRC0F12024
Lab Sample ID: 452839001	Date Collected: 06/19/2018 09:23	Matrix: WATER
	Date Received: 06/20/2018 08:50	
Client ID: B3K399	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1775848	Analyst: MXH8	SOP Ref: GL-RAD-A-002
Run Date: 06/27/2018 21:48	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1775848.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1775848		
Prep Date: 06/27/2018 07:43		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		382	pCi/L	+/-185	199	291	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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL452839	Client: CPRC001	Project: CPRC0F12024
Lab Sample ID: 452839001	Date Collected: 06/19/2018 09:23	Matrix: WATER
	Date Received: 06/20/2018 08:50	
Client ID: B3K399	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1775871	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/01/2018 06:46	Aliquot: 100 mL	Instrument: LSCSILVER
Data File: E1775871R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1775871		
Prep Date: 06/26/2018 14:07		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-4.96	pCi/L	+/-19.6	19.6	34.4	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	42200	42900	CPM	98.3	(30%-105%)

Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
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 The MDC is a sample specific MDC.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL452839	Client: CPRC001	Project: CPRC0F12024
Lab Sample ID: 452839002	Date Collected: 06/19/2018 09:27	Matrix: WATER
	Date Received: 06/20/2018 08:50	
Client ID: B3K3B4	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1775471	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 06/26/2018 08:14	Aliquot: 300 mL	Instrument: PIC7B
Data File: S1775471r3.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1775471		
Prep Date: 06/21/2018 12:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.546	pCi/L	+/-0.555	0.569	0.918	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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL452839	Client: CPRC001	Project: CPRC0F12024
Lab Sample ID: 452839002	Date Collected: 06/19/2018 09:27	Matrix: WATER
	Date Received: 06/20/2018 08:50	
Client ID: B3K3B4	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1775848	Analyst: MXH8	SOP Ref: GL-RAD-A-002
Run Date: 06/27/2018 22:40	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1775848.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1775848		
Prep Date: 06/27/2018 07:43		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		478	pCi/L	+/-193	214	297	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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL452839	Client: CPRC001	Project: CPRC0F12024
Lab Sample ID: 452839002	Date Collected: 06/19/2018 09:27	Matrix: WATER
	Date Received: 06/20/2018 08:50	
Client ID: B3K3B4	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1775871	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/01/2018 07:08	Aliquot: 100 mL	Instrument: LSCSILVER
Data File: E1775871R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1775871		
Prep Date: 06/26/2018 14:07		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	10.1	pCi/L	+/-21.6	21.7	37.0	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	39500	42900	CPM	92	(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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL452839	Client: CPRC001	Project: CPRC0F12024
Lab Sample ID: 452839003	Date Collected: 06/19/2018 08:10	Matrix: WATER
	Date Received: 06/20/2018 08:50	
Client ID: B3K3B9	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1775471	Analyst: LXB3	SOP Ref: GL-RAD-A-004
Run Date: 06/25/2018 10:46	Aliquot: 300 mL	Instrument: PIC6C
Data File: S1775471r3.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1775471		
Prep Date: 06/21/2018 12:16		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.284	pCi/L	+/-0.691	0.694	1.23	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	3.80	4.19	mg	90.7	(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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL452839	Client: CPRC001	Project: CPRC0F12024
Lab Sample ID: 452839003	Date Collected: 06/19/2018 08:10	Matrix: WATER
	Date Received: 06/20/2018 08:50	
Client ID: B3K3B9	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1775848	Analyst: MXH8	SOP Ref: GL-RAD-A-002
Run Date: 06/27/2018 23:32	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1775848.xls	Prep Method: EPA 906.0 Modified	Count Time: 50 min
Prep Batch: 1775848		
Prep Date: 06/27/2018 07:43		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	34.3	pCi/L	+/-169	169	295	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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL452839	Client: CPRC001	Project: CPRC0F12024
Lab Sample ID: 452839003	Date Collected: 06/19/2018 08:10	Matrix: WATER
	Date Received: 06/20/2018 08:50	
Client ID: B3K3B9	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1775871	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/01/2018 07:30	Aliquot: 100 mL	Instrument: LSCSILVER
Data File: E1775871R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1775871		
Prep Date: 06/26/2018 14:07		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-14	pCi/L	+/-20.5	20.5	36.7	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	39700	42900	CPM	92.6	(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

Report Date: July 13, 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: 452839

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1775471								
QC1204054068	MB								
Total Strontium			U	0.120	pCi/L			LXB3	06/25/1810:45
				Uncert: +/-0.810					
				TPU: +/-0.810					
**Strontium Carrier		4.19		3.00	mg	REC: 72	(40%-110%)		
QC1204054069	452854003	DUP							
Total Strontium		U	-0.0677	U	0.0108	pCi/L			06/25/1812:16
				Uncert: +/-0.438	+/-0.402	RPD: 0	N/A		
				TPU: +/-0.438	+/-0.402	RER: 0.258	(0-2)		
**Strontium Carrier		4.19	3.80	4.20	mg	REC: 100	(40%-110%)		
QC1204054070	LCS								
Total Strontium		77.9		73.4	pCi/L	REC: 94.3	(80%-120%)		06/25/1810:45
				Uncert: +/-3.65					
				TPU: +/-17.4					
**Strontium Carrier		4.19		3.30	mg	REC: 79	(40%-110%)		
Rad Liquid Scintillation									
Batch	1775848								
QC1204054891	MB								
Tritium			U	-11.4	pCi/L			MXH8	06/28/1811:55
				Uncert: +/-167					
				TPU: +/-167					
QC1204054892	452851001	DUP							
Tritium		2210		2320	pCi/L				06/28/1812:47
				Uncert: +/-260	+/-272	RPD: 5	(0%-20%)		
				TPU: +/-499	+/-525	RER: 0.309	(0-2)		
QC1204054893	452851001	MS							
Tritium		5060	2210	7630	pCi/L	REC: 107	(75%-125%)		06/28/1813:39
				Uncert: +/-260	+/-1090				
				TPU: +/-499	+/-1830				
QC1204054894	LCS								
Tritium		2530		2430	pCi/L	REC: 95.9	(80%-120%)		06/29/1807:14
				Uncert: +/-538					
				TPU: +/-714					
Batch	1775871								
QC1204054946	MB								
Technetium-99			U	0.724	pCi/L			CXS7	07/01/1814:05
				Uncert: +/-22.4					
				TPU: +/-22.4					
**Technetium-99m Tracer		42900		37400	CPM	REC: 87	(30%-105%)		
QC1204054947	452851001	DUP							
Technetium-99		U	-3.37	U	-7.37	pCi/L			07/01/1814:27
				Uncert: +/-20.0	+/-20.3	RPD: 0	N/A		
				TPU: +/-20.0	+/-20.3	RER: 0.275	(0-2)		
**Technetium-99m Tracer		42900	41700	40700	CPM	REC: 95	(30%-105%)		

QC Summary

Workorder: 452839

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1775871									
QC1204054948	LCS									
Technetium-99	888			744	pCi/L	REC: 83.8	(80%-120%)		07/02/1807:40	
				Uncert:						+/-42.5
				TPU:						+/-92.5
*Technetium-99m Tracer	42900			37600	CPM	REC: 88	(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:

- B The analyte was detected in the associated method blank >= MDC or >5% sample activity.
- 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.
- UX Gamma Spectroscopy--Uncertain identification
- 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

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.