

July 10, 2017



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July 07, 2017

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

Re: CHPRC SAF F10-284
Work Order: 425451
SDG: GEL425451

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 14, 2017. 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,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 302878 - 7H
Chain of Custody: F10-284-184, F10-284-189 and F10-284-194
Enclosures

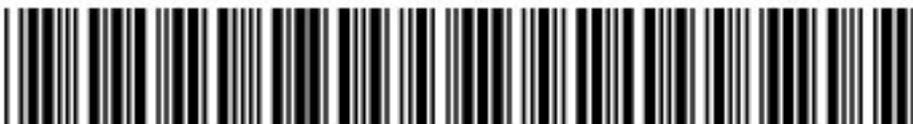


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Sample Issue Resolution

July 10, 2017

SAMPLE ISSUE RESOLUTION	SIR NUM	SIR17-757
	REV NUM	0
	DATE INITIATED	6/20/2017

SAMPLE EVENT INFORMATION

SAF NUM(S) F10-284
OPERABLE UNIT(S) 100-KR-4
PROJECT(S) 100-KW P&T
SAMPLE EVENT TITLE(S) 100-KW Pump & Treat
LABORATORY GEL Laboratories, LLC

SAMPLING INFORMATION

NUMBER OF SAMPLES 1
SAMPLE NUMBERS B3B364
SAMPLE MATRIX WATER
COLLECTION DATE 6/13/2017 - 6/13/2017
SDG NUM GEL425451

ISSUE BACKGROUND

CLASS Chain of Custody Issue (Field)
TYPE Sample Date/time is missing/incorrect/illegible
DESCRIPTION The chain of custody is missing the collection date for sample B3B364. The date on the container is 6/13 and this is the date the lab used.

DISPOSITION

DESCRIPTION Please confirm the collection date.
JUSTIFICATION Final Disposition: Field sampling documents indicated the sample was taken on 06/13/2017 at 08:50.
SUBMITTED BY: Heather Shaffer DATE: 06/20/2017
ACCEPTED BY: Sarah Nagel DATE: 06/12/2017

Case Narrative

July 10, 2017

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F10-284
SDG: GEL425451

July 07, 2017

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 14, 2017, for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. Please see the enclosed SIR for further details..

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>
425451001	B3B364
425451002	B3B369
425451003	B3B374

Case Narrative

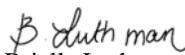
Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

July 10, 2017

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.


Brielle Luthman for
Heather Shaffer
Project Manager

July 10, 2017

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL425451

Work Order #: 425451

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

Sample 425451002 (B3B369) was recounted due to a suspected false positive. The recount is reported. Additional cleanup steps were performed on samples 1203814972 (Non SDG 425529001DUP) in order to confirm sample results. The recounts are reported.

C14_LSC: COMMON

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

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 1203815893 (Non SDG 425280008MS) was recounted due to low recovery. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1203815893 (Non SDG 425280008MS), 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.

July 10, 2017

Technical Information

Recounts

Sample 1203815897 (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

July 10, 2017

425451

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F10-284-194	PAGE 1 OF 1
COLLECTOR CHRISTOPHER CHPRC	COMPANY CONTACT SUMNER, LC	TELEPHONE NO. 376-3922	PROJECT COORDINATOR SUMNER, LC	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION Effluent Valve, V-WJ13 DUP	PROJECT DESIGNATION 100-KW Pump and Treat Influent & Effluent Tanks - Water	ACTUAL SAMPLE DEPTH N/A	SAF NO. F10-284	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. 605-311	FIELD LOGBOOK NO. HNF-N-491-16	OFFSITE PROPERTY NO. 803	COA 302878	ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	BILL OF LADING/AIR BILL NO. 779393729728				

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HNO3 to pH <2	HNO3 to pH <2	None
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	*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.	None	6 Months	6 Months	None
		G/P	G/P	G/P	P
		1	1	1	1
		500mL	1L	500mL	250mL
		C14_LSC: COMMON;	SRTOT_SEP_PR ECIIP_GFC: COMMON;	TC99_EIE_LSC: COMMON;	TRITIUM_DIST LSC: COMMON;
SAMPLE NO. B3B374	MATRIX* WATER	SAMPLE DATE JUN 13 2017	SAMPLE TIME 0900		

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM CHPRC Lesly Webb	RECEIVED BY/STORED IN Lesly Webb CHPRC	TRVL-17-135
DATE/TIME JUN 13 2017 1031	DATE/TIME JUN 13 2017 1031	
RELINQUISHED BY/REMOVED FROM CHPRC Lesly Webb	RECEIVED BY/STORED IN FEDEX Lesly Webb	
DATE/TIME JUN 13 2017 1400	DATE/TIME 6/14/17 9:20	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN	
DATE/TIME	DATE/TIME	

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

July 10, 2017



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: CPRC		SDG/AR/COC/Work Order: 425451			
Received By: STACY BOONE		Date Received: 6-14-17			
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 7793 9372 9728 - 1c 7793 9372 8802 - 1c			
Suspected Hazard Information	Yes <input type="checkbox"/> No <input 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 checked="" type="checkbox"/> No <input 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): <input checked="" type="checkbox"/> CPM / mR/Hr Classified as: Rad 1 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: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None Other: *all temperatures are recorded in Celsius TEMP: _____
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: 1R3-17 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 ___ (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"/>			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 CS Date 6/15/17 Page 1 of 1

GL-CHL-SR-001 Rev 5

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 07 July 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122017-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-22
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Radiological Analysis

Case Narrative

July 10, 2017

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL425451

Work Order #: 425451

Product: SRTOT_SEP_PRECIP_GPC: COMMON

Analytical Method: SRTOT_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 18

Analytical Batch: 1675562

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425451001	B3B364
425451002	B3B369
425451003	B3B374
1203814971	Method Blank (MB)
1203814972	425529001(NonSDG) Sample Duplicate (DUP)
1203814973	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 425451002 (B3B369) was recounted due to a suspected false positive. The recount is reported. Additional cleanup steps were performed on samples 1203814972 (Non SDG 425529001DUP) in order to confirm sample results. The recounts are reported.

Product: C14_LSC: COMMON

Analytical Method: C14_LSC

Analytical Procedure: GL-RAD-A-003 REV# 15

Analytical Batch: 1674668

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425451001	B3B364
425451002	B3B369
425451003	B3B374
1203812815	Method Blank (MB)

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1203812816	425282001(NonSDG) Sample Duplicate (DUP)
1203812817	425282001(NonSDG) Matrix Spike (MS)
1203812818	Laboratory Control Sample (LCS)

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

Data Summary:

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

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1675960

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425451001	B3B364
425451002	B3B369
425451003	B3B374
1203815891	Method Blank (MB)
1203815892	425280008(NonSDG) Sample Duplicate (DUP)
1203815893	425280008(NonSDG) Matrix Spike (MS)
1203815894	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 1203815893 (Non SDG 425280008MS) was recounted due to low recovery. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1203815893 (Non SDG 425280008MS), aliquot was reduced to conserve sample volume.

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Product: TC99_EIE_LSC: COMMON

Analytical Method: TC99_EIE_LSC

Analytical Procedure: GL-RAD-A-059 REV# 5

Analytical Batch: 1675961

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
425451001	B3B364
425451002	B3B369
425451003	B3B374
1203815895	Method Blank (MB)
1203815896	425384006(NonSDG) Sample Duplicate (DUP)
1203815897	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 1203815897 (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.

July 10, 2017

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: GEL425451 GEL Work Order: 425451

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: Kate Gellatly

Date: 07 JUL 2017

Title: Analyst I

Sample Data Summary

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451001	Date Collected: 06/13/2017 08:50	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B364	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1675562	Analyst: BXF1	SOP Ref: GL-RAD-A-004
Run Date: 06/23/2017 11:07	Aliquot: 300 mL	Instrument: PIC2B
Data File: S1675562r.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1675562		
Prep Date: 06/21/2017 13:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.496	pCi/L	+/-0.708	0.718	1.22	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.00	7.75	mg	90.3	(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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451001	Date Collected: 06/13/2017 08:50	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B364	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1674668	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 06/23/2017 00:04	Aliquot: 60.03 mL	Instrument: LSCRED
Data File: C1674668.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 35 min
Prep Batch: 1674668		
Prep Date: 06/22/2017 09:53		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		318	pCi/L	+/-26.4	64.6	30.3	50.0

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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451001	Date Collected: 06/13/2017 08:50	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B364	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1675960	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 07/05/2017 22:17	Aliquot: 50 mL	Instrument: LSCGREEN
Data File: T1675960R.xls	Prep Method: EPA 906.0 Modified	Count Time: 45 min
Prep Batch: 1675960		
Prep Date: 07/05/2017 09:31		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1400	pCi/L	+/-264	378	353	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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451001	Date Collected: 06/13/2017 08:50	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B364	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1675961	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/04/2017 12:00	Aliquot: 100 mL	Instrument: LSCGREEN
Data File: E1675961R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1675961		
Prep Date: 06/29/2017 13:52		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		61.4	pCi/L	+/-24.7	25.6	39.1	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	30300	33500	CPM	90.5	(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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451002	Date Collected: 06/13/2017 09:00	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B369	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1675562	Analyst: BXF1	SOP Ref: GL-RAD-A-004
Run Date: 06/24/2017 12:32	Aliquot: 300 mL	Instrument: PIC1D
Data File: S1675562r.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1675562		
Prep Date: 06/21/2017 13:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	0.471	pCi/L	+/-0.886	0.893	1.55	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.00	7.75	mg	77.4	(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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451002	Date Collected: 06/13/2017 09:00	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B369	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1674668	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 06/23/2017 01:55	Aliquot: 60.04 mL	Instrument: LSCRED
Data File: C1674668.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 35 min
Prep Batch: 1674668		
Prep Date: 06/22/2017 09:53		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		356	pCi/L	+/-27.0	71.4	30.1	50.0

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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451002	Date Collected: 06/13/2017 09:00	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B369	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1675960	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 07/05/2017 23:04	Aliquot: 50 mL	Instrument: LSCGREEN
Data File: T1675960R.xls	Prep Method: EPA 906.0 Modified	Count Time: 45 min
Prep Batch: 1675960		
Prep Date: 07/05/2017 09:31		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1500	pCi/L	+/-270	396	357	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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451002	Date Collected: 06/13/2017 09:00	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B369	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1675961	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/04/2017 12:21	Aliquot: 100 mL	Instrument: LSCGREEN
Data File: E1675961R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1675961		
Prep Date: 06/29/2017 13:52		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		59.8	pCi/L	+/-23.8	24.7	37.6	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	31600	33500	CPM	94.3	(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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451003	Date Collected: 06/13/2017 09:00	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B374	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1675562	Analyst: BXF1	SOP Ref: GL-RAD-A-004
Run Date: 06/23/2017 11:07	Aliquot: 300 mL	Instrument: PIC3B
Data File: S1675562r.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1675562		
Prep Date: 06/21/2017 13:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium	U	1.48	pCi/L	+/-1.16	1.21	1.86	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.60	7.75	mg	85.2	(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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451003	Date Collected: 06/13/2017 09:00	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B374	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1674668	Analyst: BXM4	SOP Ref: GL-RAD-A-003
Run Date: 06/23/2017 02:31	Aliquot: 60.01 mL	Instrument: LSCRED
Data File: C1674668.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 35 min
Prep Batch: 1674668		
Prep Date: 06/22/2017 09:53		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		344	pCi/L	+/-26.8	69.3	30.0	50.0

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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451003	Date Collected: 06/13/2017 09:00	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B374	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1675960	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 07/05/2017 23:51	Aliquot: 50 mL	Instrument: LSCGREEN
Data File: T1675960R.xls	Prep Method: EPA 906.0 Modified	Count Time: 45 min
Prep Batch: 1675960		
Prep Date: 07/05/2017 09:31		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1350	pCi/L	+/-265	371	357	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.

July 10, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL425451	Client: CPRC001	Project: CPRC0F10284
Lab Sample ID: 425451003	Date Collected: 06/13/2017 09:00	Matrix: WATER
	Date Received: 06/14/2017 09:20	
Client ID: B3B374	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1675961	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 07/04/2017 12:42	Aliquot: 100 mL	Instrument: LSCGREEN
Data File: E1675961R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1675961		
Prep Date: 06/29/2017 13:52		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		51.3	pCi/L	+/-23.2	23.9	37.1	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	32100	33500	CPM	96	(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

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 7, 2017
Page 1 of 2

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 425451

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1675562								
QC1203814971	MB								
Total Strontium			U	-0.503	pCi/L			BXF1	06/27/1714:03
				Uncert: +/-0.599					
				TPU: +/-0.599					
**Strontium Carrier		7.75		8.10	mg	REC: 105	(40%-110%)		
QC1203814972	425529001	DUP							
Total Strontium		4.60		3.40	pCi/L				06/27/1716:08
				Uncert: +/-1.51		RPD: 30	(0% - 100%)		
				TPU: +/-1.85		RER: 1.03	(0-2)		
**Strontium Carrier		7.75	4.10	5.60	mg	REC: 72	(40%-110%)		
QC1203814973	LCS								
Total Strontium		72.9		71.7	pCi/L	REC: 98	(80%-120%)		06/23/1711:13
				Uncert: +/-3.81					
				TPU: +/-16.9					
**Strontium Carrier		7.75		7.00	mg	REC: 90	(40%-110%)		
Rad Liquid Scintillation									
Batch	1674668								
QC1203812815	MB								
Carbon-14			U	2.19	pCi/L			BXM4	06/23/1706:45
				Uncert: +/-17.4					
				TPU: +/-17.4					
QC1203812816	425282001	DUP							
Carbon-14		65.6		46.9	pCi/L				06/23/1707:22
				Uncert: +/-19.6		RPD: 33	(0% - 100%)		
				TPU: +/-23.1		RER: 1.18	(0-2)		
QC1203812817	425282001	MS							
Carbon-14		1250	65.6	1210	pCi/L	REC: 92	(75%-125%)		06/23/1707:58
				Uncert: +/-19.6					
				TPU: +/-23.1					
QC1203812818	LCS								
Carbon-14		1250		1110	pCi/L	REC: 89	(80%-120%)		06/23/1708:14
				Uncert: +/-60.3					
				TPU: +/-215					
Batch	1675960								
QC1203815891	MB								
Tritium			U	66.7	pCi/L			BXM4	07/06/1708:59
				Uncert: +/-205					
				TPU: +/-206					
QC1203815892	425280008	DUP							
Tritium		9520		8980	pCi/L				07/06/1709:46
				Uncert: +/-495		RPD: 6	(0% - 20%)		
				TPU: +/-1910		RER: 0.403	(0-2)		
QC1203815893	425280008	MS							
Tritium		4480	9520	13900	pCi/L	REC: 97	(75%-125%)		07/07/1706:22

QC Summary

Workorder: 425451

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1675960								
		Uncert:	+/-495	+/-1500					
		TPU:	+/-1910	+/-3070					
QC1203815894	LCS								
Tritium	2230			2110	pCi/L	REC: 94 (80%-120%)			07/06/1710:48
		Uncert:		+/-470					
		TPU:		+/-622					
Batch	1675961								
QC1203815895	MB								
Technetium-99			U	-1.46	pCi/L			CXS7	07/04/1715:54
		Uncert:		+/-23.2					
		TPU:		+/-23.2					
**Technetium-99m Tracer	33500			29300	CPM	REC: 88 (30%-105%)			
QC1203815896	425384006	DUP							
Technetium-99		U	17.5	U	35.4				07/04/1716:16
		Uncert:	+/-20.8	+/-25.1		RPD: 0	N/A		
		TPU:	+/-20.9	+/-25.4		RER: 1.07	(0-2)		
**Technetium-99m Tracer	33500		33400	28900	CPM	REC: 86 (30%-105%)			
QC1203815897	LCS								
Technetium-99	861			713	pCi/L	REC: 83 (80%-120%)			07/05/1707:49
		Uncert:		+/-52.0					
		TPU:		+/-94.7					
**Technetium-99m Tracer	33500			26600	CPM	REC: 80 (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 associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- 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

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.