



June 22, 2017

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

Re: CHPRC SAF F17-014
Work Order: 424522
SDG: GEL424522

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 02, 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: 302938 - 7H
Chain of Custody: F17-014-094
Enclosures

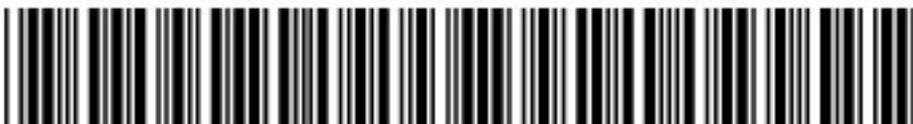


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Case Narrative

June 26, 2017

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F17-014
SDG: GEL424522

June 22, 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 02, 2017, for analysis. The sample was 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 sample:

Laboratory Identification	Sample Description
424522001	B398Y3

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.

June 26, 2017

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

June 26, 2017

Radiochemistry

Technical Case Narrative

CH2M Hill Plateau Remediation Company (CPRC)

SDG #: GEL424522

Work Order #: 424522

I129_SEP_LEPS_GS: 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.

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 1203803133 (LCS) was recounted due to low recovery. The recount is reported.

906.0_TRITIUM_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 1203811842 (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

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	

June 26, 2017

Laboratory Certifications

List of current GEL Certifications as of 22 June 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

June 26, 2017

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL424522
Work Order #: 424522

Product: I129_SEP_LEPS_GS: COMMON
Analytical Method: DOE EML HASL-300,I-01 Modified
Analytical Procedure: GL-RAD-A-006 REV# 21
Analytical Batch: 1671427

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424522001	B398Y3
1203804805	Method Blank (MB)
1203804806	424692001(NonSDG) Sample Duplicate (DUP)
1203804807	424692001(NonSDG) Matrix Spike (MS)
1203804808	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: TC99_EIE_LSC: COMMON
Analytical Method: TC99_EIE_LSC
Analytical Procedure: GL-RAD-A-059 REV# 5
Analytical Batch: 1670715

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424522001	B398Y3
1203803131	Method Blank (MB)
1203803132	424396002(NonSDG) Sample Duplicate (DUP)
1203803133	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 1203803133 (LCS) was recounted due to low recovery. The recount is reported.

Product: 906.0 TRITIUM_LSC:COMMON

Analytical Method: TRITIUM_DIST_LSC

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

Analytical Batch: 1674224

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424522001	B398Y3
1203811839	Method Blank (MB)
1203811840	425104003(NonSDG) Sample Duplicate (DUP)
1203811841	425104003(NonSDG) Matrix Spike (MS)
1203811842	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 1203811842 (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.

June 26, 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: GEL424522 GEL Work Order: 424522

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: 22 JUN 2017

Title: Group Leader

Sample Data Summary

June 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424522	Client: CPRC001	Project: CPRC0F17014
Lab Sample ID: 424522001	Date Collected: 05/31/2017 12:55	Matrix: WATER
	Date Received: 06/02/2017 09:00	
Client ID: B398Y3	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1671427	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 06/08/2017 14:28	Aliquot: 0.4 L	Instrument: XRAY1
Data File: I424522001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 60 min
Prep Batch: 1671427		
Prep Date: 06/07/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	-0.247	pCi/L	+/-1.66	1.66	3.23	5.00

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.

June 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424522	Client: CPRC001	Project: CPRC0F17014
Lab Sample ID: 424522001	Date Collected: 05/31/2017 12:55	Matrix: WATER
	Date Received: 06/02/2017 09:00	
Client ID: B398Y3	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1670715	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 06/11/2017 07:31	Aliquot: 100 mL	Instrument: LSCSILVER
Data File: E1670715R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1670715		
Prep Date: 06/06/2017 12:11		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	25.1	pCi/L	+/-20.8	21.0	34.5	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	43000	46400	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.

June 26, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424522	Client: CPRC001	Project: CPRC0F17014
Lab Sample ID: 424522001	Date Collected: 05/31/2017 12:55	Matrix: WATER
	Date Received: 06/02/2017 09:00	
Client ID: B398Y3	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1674224	Analyst: BXM4	SOP Ref: GL-RAD-A-002
Run Date: 06/20/2017 20:17	Aliquot: 50 mL	Instrument: LSCGREEN
Data File: T1674224R2.xls	Prep Method: EPA 906.0 Modified	Count Time: 30 min
Prep Batch: 1674224		
Prep Date: 06/20/2017 12:47		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-6.74	pCi/L	+/-213	213	381	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.

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 22, 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: 424522

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1671427								
QC1203804805	MB								
Iodine-129			U	-0.00946	pCi/L			MJH1	06/08/1715:40
				Uncert: +/-0.208					
				TPU: +/-0.208					
QC1203804806	424692001	DUP							
Iodine-129		0.857		0.939	pCi/L				06/08/1715:40
				Uncert: +/-0.549		RPD: 9 (0% - 100%)			
				TPU: +/-0.555		RER: 0.225 (0-2)			
QC1203804807	424692001	MS							
Iodine-129		32.0	0.857	36.5	pCi/L	REC: 111 (75%-125%)			06/08/1716:17
				Uncert: +/-0.549					
				TPU: +/-0.555					
QC1203804808	LCS								
Iodine-129		0.026		27.2	pCi/L	REC: 104 (80%-120%)			06/09/1705:57
				Uncert: +/-2.81					
				TPU: +/-3.89					
Rad Liquid Scintillation									
Batch	1670715								
QC1203803131	MB								
Technetium-99			U	16.3	pCi/L			CXS7	06/11/1707:53
				Uncert: +/-21.0					
				TPU: +/-21.1					
**Technetium-99m Tracer		46400		42900	CPM	REC: 93 (30%-105%)			
QC1203803132	424396002	DUP							
Technetium-99		U	2.58	U	14.6	pCi/L			06/11/1708:14
				Uncert: +/-21.2		RPD: 0 N/A			
				TPU: +/-21.2		RER: 0.784 (0-2)			
**Technetium-99m Tracer		46400		42000	CPM	REC: 90 (30%-105%)			
QC1203803133	LCS								
Technetium-99		861		817	pCi/L	REC: 95 (80%-120%)			06/12/1707:30
				Uncert: +/-47.9					
				TPU: +/-103					
**Technetium-99m Tracer		46400		44700	CPM	REC: 96 (30%-105%)			
Batch	1674224								
QC1203811839	MB								
Tritium			U	-60.9	pCi/L			BXM4	06/20/1723:58
				Uncert: +/-211					
				TPU: +/-211					
QC1203811840	425104003	DUP							
Tritium		2210		2010	pCi/L				06/21/1700:30
				Uncert: +/-335		RPD: 9 (0% - 20%)			
				TPU: +/-543		RER: 0.525 (0-2)			
QC1203811841	425104003	MS							
Tritium		2240	2210	4470	pCi/L	REC: 101 (75%-125%)			06/21/1701:01

QC Summary

Workorder: 424522

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1674224								
		Uncert:	+/-335	+/-420					
		TPU:	+/-543	+/-961					
QC1203811842	LCS								
Tritium	2240			1820	pCi/L	REC: 82 (80%-120%)			06/22/1709:00
		Uncert:		+/-521					
		TPU:		+/-629					

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.