



March 26, 2018

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

Re: CHPRC SAF S18-001
Work Order: 444860
SDG: GEL444860

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 01, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,

Heather Shaffer
Project Manager

Purchase Order: 300071 - 7H
Chain of Custody: S18-001-092
Enclosures

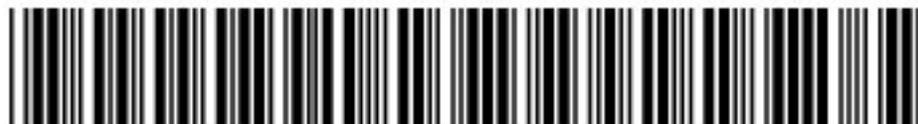


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Case Narrative

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S18-001
SDG: GEL444860**

March 26, 2018

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on March 01, 2018, 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
444860001	B3FW46

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.

MARCH 27, 2018

REV. 0

Heather Shaffer

Heather Shaffer
Project Manager

Radiochemistry
Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL444860
Work Order #: 444860

I129LL_SEP_LEPS_GS: COMMON (low level)

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.

SRISO_SEP_PRECIP_GPC: COMMON

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Recounts

Sample 1203981512 (LCS) was recounted due to low recovery. The recount is reported.

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 1203982372 (LCS) was recounted due to low recovery. The recount is reported. Sample 444860001 (B3FW46) was recounted to verify sample results. 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 analyte was detected in the associated method blank \geq MDC or $>$ 5% sample activity.	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	General Chemistry	
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $>$ 5% of the measured concentration and/or decision level for associated samples.	Inorganics	Metals
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is $>$ 5% of the measured concentration and/or decision level for associated samples.	General Chemistry	
<	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	General Chemistry	
UX	Gamma Spectroscopy--Uncertain identification	Radiological	

Laboratory Certifications

List of current GEL Certifications as of 26 March 2018

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL444860
Work Order #: 444860

Product: I129LL_SEP_LEPS_GS: COMMON (low level)

Analytical Method: DOE EML HASL-300,I-01 Modified

Analytical Procedure: GL-RAD-A-006 REV# 21

Analytical Batch: 1743179

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
444860001	B3FW46
1203981151	Method Blank (MB)
1203981152	444860001(B3FW46) Sample Duplicate (DUP)
1203981153	444860001(B3FW46) Matrix Spike (MS)
1203981154	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: SRISO_SEP_PRECIP_GPC: COMMON

Analytical Method: SRISO_SEP_PRECIP_GPC

Analytical Procedure: GL-RAD-A-004 REV# 19

Analytical Batch: 1743372

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
444860001	B3FW46
1203981510	Method Blank (MB)
1203981511	444749004(NonSDG) Sample Duplicate (DUP)
1203981512	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 1203981512 (LCS) was recounted due to low recovery. The recount is reported.

Product: TC99_EIE_LSC: COMMON

Analytical Method: TC99_EIE_LSC

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

Analytical Batch: 1743792

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
444860001	B3FW46
1203982370	Method Blank (MB)
1203982371	444659004(NonSDG) Sample Duplicate (DUP)
1203982372	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 1203982372 (LCS) was recounted due to low recovery. The recount is reported. Sample 444860001 (B3FW46) was recounted to verify sample results. 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: GEL444860 GEL Work Order: 444860

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: 27 MAR 2018

Title: Analyst I

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL444860	Client: CPRC001	Project: CPRC0S18001
Lab Sample ID: 444860001	Date Collected: 02/28/2018 10:27	Matrix: WATER
	Date Received: 03/01/2018 09:15	
Client ID: B3FW46	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1743372	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 03/08/2018 14:11	Aliquot: 300 mL	Instrument: PIC4D
Data File: S1743372r2.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1743372		
Prep Date: 03/07/2018 11:05		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	0.721	pCi/L	+/-0.759	0.768	1.26	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	4.40	4.30	mg	102	(40%-110%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL444860	Client: CPRC001	Project: CPRC0S18001
Lab Sample ID: 444860001	Date Collected: 02/28/2018 10:27	Matrix: WATER
	Date Received: 03/01/2018 09:15	
Client ID: B3FW46	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1743179	Analyst: BSW1	SOP Ref: GL-RAD-A-006
Run Date: 03/02/2018 10:08	Aliquot: 1.2 L	Instrument: XRAY4
Data File: I444860001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 120 min
Prep Batch: 1743179		
Prep Date: 03/02/2018 10:08		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129		6.76	pCi/L	+/-1.29	1.45	0.686	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL444860	Client: CPRC001	Project: CPRC0S18001
Lab Sample ID: 444860001	Date Collected: 02/28/2018 10:27	Matrix: WATER
	Date Received: 03/01/2018 09:15	
Client ID: B3FW46	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1743792	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 03/21/2018 09:21	Aliquot: 100 mL	Instrument: LSCMOCHA
Data File: E1743792R3.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1743792		
Prep Date: 03/15/2018 13:27		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		48.3	pCi/L	+/-21.8	22.4	34.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	4.76E+05	4.82E+05	CPM	98.8	(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: March 27, 2018
Page 1 of 2

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 444860

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1743179								
QC1203981151	MB								
Iodine-129			U	-0.112	pCi/L			BSW1	03/02/1812:17
				Uncert: +/-0.435					
				TPU: +/-0.438					
QC1203981152	444860001	DUP							
Iodine-129		6.76		5.64	pCi/L				03/02/1812:17
				Uncert: +/-1.29		RPD: 18 (0%-20%)			
				TPU: +/-1.45		RER: 1.15 (0-2)			
QC1203981153	444860001	MS							
Iodine-129		34.7	6.76	39.8	pCi/L	REC: 95 (75%-125%)			03/02/1812:33
				Uncert: +/-1.29					
				TPU: +/-1.45					
QC1203981154	LCS								
Iodine-129		34.7		38.1	pCi/L	REC: 110 (80%-120%)			03/02/1812:33
				Uncert: +/-4.97					
				TPU: +/-6.26					
Rad Gas Flow									
Batch	1743372								
QC1203981510	MB								
Strontium-90			U	-0.14	pCi/L			KSD1	03/08/1814:11
				Uncert: +/-0.545					
				TPU: +/-0.545					
**Strontium Carrier		4.30		4.20	mg	REC: 98 (40%-110%)			
QC1203981511	444749004	DUP							
Strontium-90		U	0.150	U	-0.446	pCi/L			03/08/1814:11
				Uncert: +/-0.533		RPD: 0 N/A			
				TPU: +/-0.534		RER: 1.36 (0-2)			
**Strontium Carrier		4.30	4.30	4.20	mg	REC: 98 (40%-110%)			
QC1203981512	LCS								
Strontium-90		78.4		65.3	pCi/L	REC: 83 (80%-120%)			03/09/1807:34
				Uncert: +/-3.74					
				TPU: +/-10.9					
**Strontium Carrier		4.30		3.70	mg	REC: 86 (40%-110%)			
Rad Liquid Scintillation									
Batch	1743792								
QC1203982370	MB								
Technetium-99			U	25.1	pCi/L			CXS7	03/20/1819:20
				Uncert: +/-22.0					
				TPU: +/-22.2					
**Technetium-99m Tracer		4.82E+05		4.54E+05	CPM	REC: 94 (30%-105%)			
QC1203982371	444659004	DUP							
Technetium-99		U	28.8	U	11.4	pCi/L			03/20/1819:42
				Uncert: +/-22.4		RPD: 0 N/A			
				TPU: +/-22.6		RER: 1.1 (0-2)			

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QC Summary

Workorder: 444860

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1743792									
**Technetium-99m Tracer	4.82E+05	4.59E+05		4.68E+05	CPM	REC: 97	(30%-105%)			
QC1203982372 LCS										
Technetium-99	1780			1430	pCi/L	REC: 80	(80%-120%)		03/23/1822:29	
	Uncert:			+/-63.9						
	TPU:			+/-170						
**Technetium-99m Tracer	4.82E+05			4.59E+05	CPM	REC: 95	(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

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.