

July 14, 2017



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July 14, 2017

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

Re: CHPRC SAF F16-025  
Work Order: 425897  
SDG: GEL425897

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 21, 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: 303979 - 7H  
Chain of Custody: F16-025-231 and F16-025-389  
Enclosures



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# Case Narrative

July 14, 2017

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F16-025  
SDG: GEL425897

July 14, 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 21, 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. 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:

<b>Laboratory Identification</b>	<b>Sample Description</b>
425897001	B3B074
425897002	B3B0X3

**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.

July 14, 2017

*B. Luthman*  
Brielle Luthman for  
Heather Shaffer  
Project Manager

**July 14, 2017**

**Radiochemistry**

**Technical Case Narrative**

**CH2M Hill Plateau Remediation Company (CPRC)**

**SDG #: GEL425897**

**Work Order #: 425897**

**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.

**Miscellaneous Information**

**Additional Comments**

The matrix spike, 1203822935 (Non SDG 425783002MS), aliquot was reduced to conserve sample volume.

**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 14, 2017

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-025-389	PAGE 1 OF 1
COLLECTOR Jeff Tuckeen CHPRC	COMPANY CONTACT LYNCH, SA	TELEPHONE NO. 373-5586	PROJECT COORDINATOR LYNCH, SA	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION C9635, I-009	PROJECT DESIGNATION FY2016 200-UP-1 Remedial Action Wells Sampling and Analysis - Water		SAF NO. F16-025	AIR QUALITY	
ICE CHEST NO. GWS236	FIELD LOGBOOK NO. HNF-N-645-7 pg 63	ACTUAL SAMPLE DEPTH 354.43'	COA 303979	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. 8072		BILL OF LADING/AIR BILL NO. 779450028825		

MATRIX* A=Air DL=Drum 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.	None			
	PRESERVATION	6 Months			
	HOLDING TIME	P			
	TYPE OF CONTAINER	1			
	NO. OF CONTAINER(S)	500mL			
	VOLUME	TRITIUM_DIST LISC. COMMON;			
	SAMPLE ANALYSIS				
SPECIAL HANDLING AND/OR STORAGE NA					
SAMPLE NO. B3BOX3	MATRIX* WATER	SAMPLE DATE 6-20-17	SAMPLE TIME 1054		

425897

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS TRVL-17-127	
RELINQUISHED BY/REMOVED FROM Jeff Tuckeen CHPRC	DATE/TIME JUN 20 2017 1135	RECEIVED BY/STORED IN Christina Aguilar CHPRC	DATE/TIME JUN 20 2017 1135		
RELINQUISHED BY/REMOVED FROM Christina Aguilar CHPRC	DATE/TIME JUN 20 2017 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME JUN 20 2017 1135		
RELINQUISHED BY/REMOVED FROM	DATE/TIME FED EX	RECEIVED BY/STORED IN L S R STACY BOOYER	DATE/TIME 6/21/17	Filter	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME		
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME		



# 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	

July 14, 2017

# Laboratory Certifications

List of current GEL Certifications as of 14 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 14, 2017

Radiochemistry

Technical Case Narrative

CH2MHill Plateau Remediation Company (CPRC)

SDG #: GEL425897

Work Order #: 425897

**Product:** TRITIUM\_DIST\_LSC: COMMON

**Analytical Method:** TRITIUM\_DIST\_LSC

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

**Analytical Batch:** 1678920

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

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
425897001	B3B074
425897002	B3B0X3
1203822933	Method Blank (MB)
1203822934	425783002(NonSDG) Sample Duplicate (DUP)
1203822935	425783002(NonSDG) Matrix Spike (MS)
1203822936	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.

#### **Miscellaneous Information**

##### **Additional Comments**

The matrix spike, 1203822935 (Non SDG 425783002MS), aliquot was reduced to conserve sample volume.

#### **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 14, 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: GEL425897 GEL Work Order: 425897

**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:** 13 JUL 2017

**Title:** Analyst I

# Sample Data Summary

July 14, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425897	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F16025
<b>Lab Sample ID:</b> 425897001	<b>Date Collected:</b> 06/20/2017 09:05	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/21/2017 08:50	
<b>Client ID:</b> B3B074	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1678920	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 07/07/2017 13:44	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCSILVER
<b>Data File:</b> T1678920.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 50 min
<b>Prep Batch:</b> 1678920		
<b>Prep Date:</b> 07/07/2017 08:43		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		3980	pCi/L	+/-326	835	307	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

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

July 14, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL425897	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F16025
<b>Lab Sample ID:</b> 425897002	<b>Date Collected:</b> 06/20/2017 10:54	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/21/2017 08:50	
<b>Client ID:</b> B3B0X3	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1678920	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 07/07/2017 14:36	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCSILVER
<b>Data File:</b> T1678920.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 50 min
<b>Prep Batch:</b> 1678920		
<b>Prep Date:</b> 07/07/2017 08:43		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	289	pCi/L	+/-189	197	306	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

**QC Summary**

Report Date: July 13, 2017  
Page 1 of 1

**Client :** CH2MHill Plateau Remediation Company  
MSIN R3-50 CHPRC  
PO Box 1600  
Richland, Washington 99352

**Contact:** Mr. Scot Fitzgerald

**Workorder:** 425897

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
Batch	1678920								
QC1203822933	MB								
Tritium			U	138	pCi/L			BXM4	07/08/1705:57
				Uncert: +/-180					
				TPU: +/-181					
QC1203822934	425783002	DUP							
Tritium		21200		20800	pCi/L				07/08/1706:49
				Uncert: +/-656		RPD: 2	(0% - 20%)		
				TPU: +/-4160		RER: 0.147	(0-2)		
QC1203822935	425783002	MS							
Tritium	4480	21200		24900	pCi/L	REC: 81	(75%-125%)		07/08/1707:41
				Uncert: +/-656					
				TPU: +/-4160					
QC1203822936	LCS								
Tritium	2230			2270	pCi/L	REC: 102	(80%-120%)		07/08/1708:33
				Uncert: +/-270					
				TPU: +/-516					

**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.