

February 02, 2018

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

Re: CHPRC SAF I18-004  
Work Order: 442464  
SDG: GEL442464

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 26, 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: I18-004-128  
Enclosures



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# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF I18-004  
SDG: GEL442464**

**February 02, 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 January 26, 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:

<b>Laboratory Identification</b>	<b>Sample Description</b>
442464001	B3FPP7

**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.

February 21, 2018  
*Heather Shaffer*

Revision 0

Heather Shaffer  
Project Manager

**Radiochemistry**  
**Technical Case Narrative**  
**CH2M Hill Plateau Remediation Company (CPRC)**  
**SDG #: GEL442464**  
**Work Order #: 442464**

**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, 1203963165 (B3FPM6MS), 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**

<b>CH2M Hill Plateau Remediation Company</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>		C.O.C.# <b>I18-004-128</b> Page 1 of 1
Collector: <b>Juan Aguilar / CHPRC</b>	Contact/Requester: <b>Karen Waters-Husted</b>	Telephone No.: <b>509-376-4650</b>		
SAF No.: <b>I18-004</b>	Sampling Origin: <b>Hanford Site</b>	Purchase Order/Charge Code: <b>300071</b>		
Project Title: <b>SURV18, JANUARY 2018</b>	Logbook No.: <b>HNF-N-506 -97/48</b>	Ice Chest No.: <b>GWS-571</b>		
Shipped To (Lab): <b>GEL Laboratories, LLC</b>	Method of Shipment: <b>Commercial Carrier</b>	Bill of Lading/Air Bill No.: <b>7713 295872</b>		
Protocol: <b>SURV</b>	Priority: <b>30 Days</b>	Offsite Property No.: <b>9000</b>		
<b>POSSIBLE SAMPLE HAZARDS/REMARK</b> ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1		<b>SPECIAL INSTRUCTIONS</b> N/A		
Sample No. <b>B3FPP7</b>	Filter <b>N</b>	* <b>W</b>	No/Type Container <b>1x250-mL P</b>	Sample Analysis <b>TRITIUM_DIST_LSC: COMMON</b>
Date <b>12-4-18</b>	Time <b>12:41</b>	Holding Time <b>6 Months</b>		
				Preservative <b>None</b>

Relinquished By: <b>Juan Aguilar / CHPRC</b>	Signature	JAN 24 2018	Date/Time	Received By: <b>SSU-1</b>	Signature	JAN 24 2018	Date/Time	Matrix *
Relinquished By: <b>SSU-1</b>	Signature	JAN 25 2018	Date/Time	Received By: <b>Lesly Wall / CHPRC</b>	Signature	JAN 25 2018	Date/Time	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By: <b>Lesly Wall / CHPRC</b>	Signature	JAN 25 2018	Date/Time	Received By: <b>FEDEX</b>	Signature	JAN 25 2018	Date/Time	DS = Drum Solids DL = Drum Liquid T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By: <b>FedEx</b>	Signature	JAN 25 2018	Date/Time	Received By: <b>Cheris Terpin</b>	Signature	JAN 25 2018	Date/Time	
<b>FINAL SAMPLE DISPOSITION</b>				Disposal Method (e.g., Return to customer, per lab procedure, used in process):				Date/Time:

**SAMPLE RECEIPT & REVIEW FORM**

#5

Client: CPRC

SDG/AR/COC/Work Order: 442464

Received By: C. TARPLIN

Date Received: 01/26/18

Carrier and Tracking Number

Circle Applicable:  
 FedEx Express     FedEx Ground     UPS     Field Services     Courier     Other  
7713 2195 8752  
7713 2651 3173

Suspected Hazard Information

Yes  No  \*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

Shipped as a DOT Hazardous?

Hazard Class Shipped: \_\_\_\_\_ UN#: \_\_\_\_\_

COC/Samples marked or classified as radioactive?

Maximum Net Counts Observed\* (Observed Counts - Area Background Counts): 0  CPM/mR/Hr  
 Classified as:  Rad 1     Rad 2     Rad 3

Is package, COC, and/or Samples marked HAZ?

If yes, select Hazards below, and contact the GEL Safety Group.  
 PCB's     Flammable     Foreign Soil     RCRA     Asbestos     Beryllium     Other:

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <input checked="" type="radio"/> Wet Ice <input type="radio"/> Ice Packs <input type="radio"/> Dry Ice <input type="radio"/> None <input type="radio"/> Other: *all temperatures are recorded in Celsius TEMP: <u>2°C</u>
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR4-17</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: _____
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If Preservation added, Lot#: _____ 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: _____
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials MEH Date 1/29/18 Page 1 of 1

# **Data Review Qualifier Definitions**

## Project Specific Qualifier Definitions for GEL Client Code: CPRC

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The analyte was detected in the associated method blank $\geq$ 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 02 February 2018**

<b>State</b>	<b>Certification</b>
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	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 Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# Radiological Analysis

# Case Narrative

**Radiochemistry**  
**Technical Case Narrative**  
**CH2M Hill Plateau Remediation Company (CPRC)**  
**SDG #: GEL442464**  
**Work Order #: 442464**

**Product:** TRITIUM\_DIST\_LSC: COMMON  
**Analytical Method:** TRITIUM\_DIST\_LSC  
**Analytical Procedure:** GL-RAD-A-002 REV# 22  
**Analytical Batch:** 1735946

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>
442464001	B3FPP7
1203963163	Method Blank (MB)
1203963164	442329001(B3FPM6) Sample Duplicate (DUP)
1203963165	442329001(B3FPM6) Matrix Spike (MS)
1203963166	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, 1203963165 (B3FPM6MS), 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.

**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: GEL442464 GEL Work Order: 442464

**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:** Heather McCarty

**Date:** 21 FEB 2018

**Title:** Analyst II

# Sample Data Summary

February 21, 2018

Revision 0

**Certificate of Analysis**  
**Sample Summary**

SDG Number: GEL442464  
Lab Sample ID: 442464001

Client: CPRC001  
Date Collected: 01/24/2018 12:41  
Date Received: 01/26/2018 09:05

Project: CPRC0118004  
Matrix: WATER

Client ID: B3FPP7  
Batch ID: 1735946  
Run Date: 02/01/2018 23:16  
Data File: T1735946.xls  
Prep Batch: 1735946  
Prep Date: 02/01/2018 08:03

Method: TRITIUM\_DIST\_LSC  
Analyst: BXM4  
Aliquot: 50 mL  
Prep Method: EPA 906.0 Modified

Prep Basis: "As Received"  
SOP Ref: GL-RAD-A-002  
Instrument: LSCYELLOW  
Count Time: 50 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		38500	pCi/L	+/-911	7500	269	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.

# Quality Control Summary

**QC Summary**

Report Date: February 21, 2018  
 Page 1 of 1

**Client :** CH2MHill Plateau Remediation Company  
 MSIN R3-50 CHPRC  
 PO Box 1600  
 Richland, Washington 99352  
**Contact:** Mr. Scot Fitzgerald  
**Workorder:** 442464

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
Batch	1735946								
QC1203963163	MB								
Tritium			U	52.1	pCi/L			BXM4	02/02/1803:53
				Uncert: +/-156					
				TPU: +/-156					
QC1203963164	442329001	DUP							
Tritium		3350		3520	pCi/L				02/02/1804:44
				Uncert: +/-305		RPD: 5	(0%-20%)		
				TPU: +/-716		RER: 0.309	(0-2)		
QC1203963165	442329001	MS							
Tritium	4330	3350		8010	pCi/L	REC: 108	(75%-125%)		02/02/1805:35
				Uncert: +/-305					
				TPU: +/-716					
QC1203963166	LCS								
Tritium	2160			1860	pCi/L	REC: 86	(80%-120%)		02/02/1806:26
				Uncert: +/-244					
				TPU: +/-434					

**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.