



June 22, 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: 424524  
SDG: GEL424524

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: 303979 - 7H  
Chain of Custody: F16-025-365  
Enclosures



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June 26, 2017

# Case Narrative

June 26, 2017

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F16-025  
SDG: GEL424524

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:

<b>Laboratory Identification</b>	<b>Sample Description</b>
424524001	B3B0T8

**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**

**CH2MHill Plateau Remediation Company (CPRC)**

**SDG #: GEL424524**

**Work Order #: 424524**

**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 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**

June 26, 2017

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F16-025-365	PAGE 1 OF 1
COLLECTOR	Jeff Tuckesen CHPRC	COMPANY CONTACT	LYNCH, SA	TELEPHONE NO.	373-5586
SAMPLING LOCATION	C9635, I-005	PROJECT DESIGNATION	FY2016 200-UP-1 Remedial Action Wells Sampling and Analysis - Water	PROJECT COORDINATOR	TODAK, D
ICE CHEST NO.	CWS-645	FIELD LOGBOOK NO.	HNF-N-645 4-83	SAF NO.	F16-025
SHIPPED TO	GEL Laboratories, LLC	OFFSITE PROPERTY NO.	79109	COA	303979
MATRIX*	A=Air DL=Drum L=Liquid DS=Drum S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	PRESERVATION	None	BILL OF LADING/AIR BILL NO.	7792 0750 5454
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.	HOLDING TIME	6 Months	METHOD OF SHIPMENT	FEDERAL EXPRESS
SPECIAL HANDLING AND/OR STORAGE	NA	TYPE OF CONTAINER	P	AIR QUALITY	<input type="checkbox"/>
		NO. OF CONTAINER(S)	1	PRICE CODE	7H
		VOLUME	500ml	DATA TURNAROUND	30 Days / 30 Days
		SAMPLE ANALYSIS	TRITIUM_DIST LSC. COMMON;	ORIGINAL	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	4245224	
B3B0T8	WATER	MAY 31 2017	0915		

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM JEFF TUCKESAN CHPRC		RECEIVED BY/STORED IN SSU-1	MAY 31 2017 1455
RELINQUISHED BY/REMOVED FROM Janelle Zunker CHPRC		RECEIVED BY/STORED IN Janelle Zunker CHPRC	JUN 01 2017 0730
RELINQUISHED BY/REMOVED FROM Janelle Zunker CHPRC		RECEIVED BY/STORED IN FED EX	JUN 01 2017 1400
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN STACY BOONE	6-2-17 9:00
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS		DATE/TIME
TRVL-17-127		
FILTER		
LABORATORY SECTION	RECEIVED BY	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DATE/TIME
PRINTED ON 4/27/2017	FRS ID = FSR44870	TRVL NUM = TRVL-17-127
		A-6003-618 (REV 2)

June 26, 2017

SAMPLE RECEIPT & REVIEW FORM

Client: <b>CPRC</b>		SDG/AR/COC/Work Order: <b>424524</b>			
Received By: <b>Stacy Boone</b>		Date Received: <b>2 - JUN -17</b>			
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 <b>7792 8185 0281-1c</b> <b>7792 7756 5456-1c</b> <b>7792 8184 9336-2c</b> <b>7792 8185 0176-20c</b> <b>7792 8185 0204-21c</b>			
Suspected Hazard Information		*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.			
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/> Hazard Class Shipped:                      UN#:			
COC/Samples marked or classified as radioactive?		Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>0</b> CPM / mR/Hr Classified as: Rad 1 <b>6/21/17</b> Rad 2 <b>6/21/17</b> Rad 3 <b>6/21/17</b> <b>037RW2 gms</b> <b>6/21/17</b> *See below			
Is package, COC, and/or Samples marked HAZ?		<input checked="" type="checkbox"/> If yes, select Hazards below, and contact the GEL Safety Group. <input type="checkbox"/> PCB's <input type="checkbox"/> Flammable <input type="checkbox"/> Foreign Soil <input type="checkbox"/> RCRA <input type="checkbox"/> Asbestos <input type="checkbox"/> Beryllium <input type="checkbox"/> 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: <u>Wet Ice</u> Ice Packs    Dry ice <u>None</u> 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 #: <b>1R3-17</b> 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 <input checked="" type="checkbox"/> (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes <input checked="" type="checkbox"/> No ___ N/A (If unknown, select No) VOA vials free of headspace? Yes <input checked="" type="checkbox"/> 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): <b>*Radioactive Sample on unique SRP.</b>					

PM (or PMA) review: Initials **BL**    Date **6.5.17**    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 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 #: GEL424524

Work Order #: 424524

**Product:** TRITIUM\_DIST\_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).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
424524001	B3B0T8
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: GEL424524 GEL Work Order: 424524

**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.

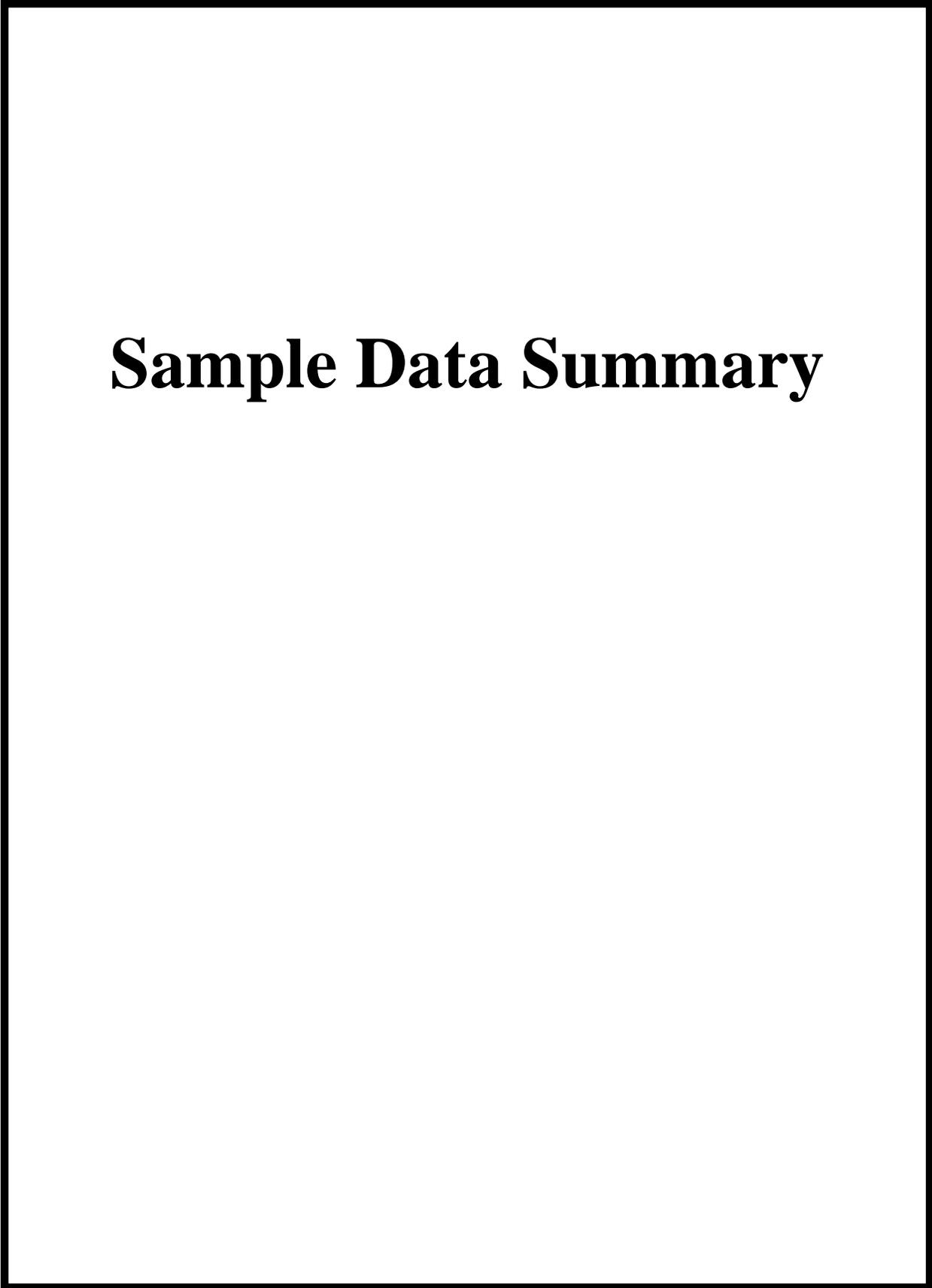
The following data validator verified the information presented in this data report:

**Signature:** 

**Name:** Theresa Austin

**Date:** 22 JUN 2017

**Title:** Group Leader



# Sample Data Summary

June 26, 2017

**Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> GEL424524	<b>Client:</b> CPRC001	<b>Project:</b> CPRC0F16025
<b>Lab Sample ID:</b> 424524001	<b>Date Collected:</b> 05/31/2017 09:15	<b>Matrix:</b> WATER
	<b>Date Received:</b> 06/02/2017 09:00	
<b>Client ID:</b> B3B0T8	<b>Method:</b> TRITIUM_DIST_LSC	<b>Prep Basis:</b> "As Received"
<b>Batch ID:</b> 1674224	<b>Analyst:</b> BXM4	<b>SOP Ref:</b> GL-RAD-A-002
<b>Run Date:</b> 06/20/2017 20:48	<b>Aliquot:</b> 50 mL	<b>Instrument:</b> LSCGREEN
<b>Data File:</b> T1674224R2.xls	<b>Prep Method:</b> EPA 906.0 Modified	<b>Count Time:</b> 30 min
<b>Prep Batch:</b> 1674224		
<b>Prep Date:</b> 06/20/2017 12:47		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		5430	pCi/L	+/-448	1140	373	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: June 22, 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:** 424524

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
<b>Rad Liquid Scintillation</b>									
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
				Uncert: +/-335					
				TPU: +/-543					
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.