



March 06, 2018

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

Re: CHPRC SAF X18-006  
Work Order: 444598  
SDG: GEL444598

Dear Mr. Fitzgerald:

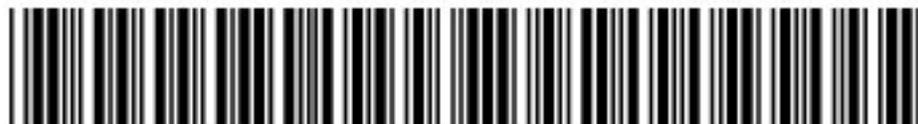
GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 17, 2017. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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,

Heather Shaffer  
Project Manager

Purchase Order: 300071-7H  
Chain of Custody: X18-006-052  
Enclosures



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# **Recheck, Recount, or Reanalysis Order**

## RECHECK, RECOUNT, OR REANALYSIS ORDER

02/15/2018

**Order Number: 180213GEL-R9371**

GEL Laboratories, LLC

2040 Savage Road

Charleston, SC 29407

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**Sample Delivery Group: GEL435286**

Method Name: TC99\_EIE\_LSC

Sample#: B3DH59

Sample Date: 10/16/2017 10:22:00 AM

SAF #: X18-006

Lab Sample ID	RDR Action Start Date	Constituent	Action	TAT (Hardcopy/EDD)
435286001	2/15/2018 3:11:03 PM	Technetium-99	REANALYZE	15 Days / 15 Days
Special Instructions: Result is out of trend and does not agree with split value. SLF 02/15/2018				

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Deliver Report Results to: CHPRC

P.O. Box 1600

Richland, WA 99352

C/O Mr.Scot Fitzgerald

# Case Narrative

**General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF X18-006  
SDG: GEL444598**

**March 06, 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 October 17, 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. Samples under this SDG were a client request for reanalysis. Please refer to the enclosed RDR for further details..

**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>
444598001	B3DH59

**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.

3/7/2018

REV.0

*Heather Shaffer*

Heather Shaffer  
Project Manager

**Radiochemistry  
 Technical Case Narrative  
 CH2M Hill Plateau Remediation Company (CPRC)  
 SDG #: GEL444598  
 Work Order #: 444598**

**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.

**Quality Control (QC) Information**

**Tracer/Carrier Yield**

Sample (See Below) did not meet the client's yield requirement. However, GEL internal limits were met.

Sample	Analyte	Value
1203978881 (MB)	Technetium-99m Tracer	108* (30%-105%)

**Technical Information**

**Recounts**

Sample 1203978883 (LCS) was recounted due to low recovery. The recount is reported.

**Miscellaneous Information**

**Additional Comments**

Sample 444598001 (B3DH59) was re-analyzed to verify results at the client's request. The re-analysis results are -12.4 pCi/L with an MDA of 44.5 pCi/L. Sample 444598001 (B3DH59) was run as the batch duplicate with a result of 3.54 pCi/L and an MDA of 40.5 pCi/L. These results compare with an RER of 0.908.

**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**

CH2M Hill Plateau Remediation Company		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> <i>435280-152/23/18 444598</i>		C.O.C.# <b>X18-006-052</b>
Collector: <b>Juan Aguilar</b> <small>ICMPRC</small>		Contact/Requester: <b>Karen Waters-Husted</b>	Telephone No.: <b>509-376-4650</b>	
SAF No.: <b>X18-006</b>		Sampling Origin: <b>Hanford Site</b>	Purchase Order/Charge Code: <b>303064</b>	
Project Title: <b>AQUIFER TUBES, NOVEMBER 2017</b>		Logbook No.: <b>HNF-N-506-84164</b>	Ice Chest No.: <b>GWS-608</b>	
Shipped To (Lab): <b>GEL Laboratories, LLC</b>		Method of Shipment <b>Commercial Carrier</b>	Bill of Lading/Air Bill No.: <b>7705 10370450</b>	
Protocol <b>CERCLA</b>		Priority: <b>30 Days</b>	Offsite Property No.: <b>8391</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.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3DH59	N	W	10-16-17	1022	1x1-L G/P	AMCMISO_EIE_PRECIP_AEA: COMMON	180 Days	HNO3 to pH <2
B3DH59	N	W	↓	↓	1x1-L G/P	PU241_IE_LSC: COMMON; PUIISO_IE_PRECIP_AEA: COMMON	6 Months	HNO3 to pH <2
B3DH59	N	W			1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B3DH59	N	W			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B3DH59	N	W			1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2
B3DH59	N	W			1x250-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B3DH59	N	W			1x500-mL G/P	6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B3DH59	N	W			10-16-17	1022	1x1-L G/P	UIISO_IE_PRECIP_AEA: COMMON

Relinquished By: <b>Juan Aguilar</b> <small>ICMPRC</small> Print First and Last Name      Signature      Date/Time <i>[Signature]</i> <b>OCT 16 2017 1120</b>	Received By: <b>Lesly Wall</b> <small>ICMPRC</small> Print First and Last Name      Signature      Date/Time <i>[Signature]</i> <b>OCT 16 2017 1120</b>	Matrix * S = Soil      DS = Drum Solids SE = Sediment      DL = Drum Liquid SO = Solid      T = Tissue SL = Sludge      WI = Wipe W = Water      L = Liquid O = Oil      V = Vegetation A = Air      X = Other
Relinquished By: <b>Lesly Wall</b> <small>ICMPRC</small> Print First and Last Name      Signature      Date/Time <i>[Signature]</i> <b>OCT 16 2017 1400</b>	Received By: <b>FEDEX</b> Print First and Last Name      Signature      Date/Time _____      _____      _____	
Relinquished By: <b>FeDEX</b> Print First and Last Name      Signature      Date/Time _____      _____      _____	Received By: <b>STACY BOONE</b> Print First and Last Name      Signature      Date/Time <i>[Signature]</i> <b>10/17/17 0955</b>	
Relinquished By: _____ Print First and Last Name      Signature      Date/Time _____      _____      _____	Received By: _____ Print First and Last Name      Signature      Date/Time _____      _____      _____	
<b>FINAL SAMPLE DISPOSITION</b> Disposal Method (e.g., Return to customer, per lab procedure, used in process): _____		Disposed By: _____      Date/Time: _____

3/7/2018

REV.0

# **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 06 March 2018**

<b>State</b>	<b>Certification</b>
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 Radchem	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 #: GEL444598  
Work Order #: 444598**

**Product:** TC99\_EIE\_LSC: COMMON  
**Analytical Method:** TC99\_EIE\_LSC  
**Analytical Procedure:** GL-RAD-A-059 REV# 5  
**Analytical Batch:** 1742237

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>
444598001	B3DH59
1203978881	Method Blank (MB)
1203978882	444598001(B3DH59) Sample Duplicate (DUP)
1203978883	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.

**Quality Control (QC) Information**

**Tracer/Carrier Yield**

Sample (See Below) did not meet the client's yield requirement. However, GEL internal limits were met.

Sample	Analyte	Value
1203978881 (MB)	Technetium-99m Tracer	108* (30%-105%)

**Technical Information**

**Recounts**

Sample 1203978883 (LCS) was recounted due to low recovery. The recount is reported.

**Miscellaneous Information**

**Additional Comments**

Sample 444598001 (B3DH59) was re-analyzed to verify results at the client's request. The re-analysis results are -12.4 pCi/L with an MDA of 44.5 pCi/L. Sample 444598001 (B3DH59) was run as the batch duplicate with a result of 3.54 pCi/L and an MDA of 40.5 pCi/L. These results compare with an RER of 0.908.

**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: GEL444598 GEL Work Order: 444598

**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:** 05 MAR 2018**Title:** Group Leader

# Sample Data Summary

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

SDG Number: GEL444598	Client: CPRC001	Project: CPRC0X18006
Lab Sample ID: 444598001	Date Collected: 10/16/2017 10:22	Matrix: WATER
Client Sample: -Relog from 435286001	Date Received: 10/17/2017 08:55	
Client ID: B3DH59		Prep Basis: "As Received"
Batch ID: 1742237	Method: TC99_EIE_LSC	SOP Ref: GL-RAD-A-059
Run Date: 03/04/2018 07:03	Analyst: CXS7	Instrument: LSCGREEN
Data File: E1742237R.xls	Aliquot: 100 mL	Count Time: 20 min
Prep Batch: 1742237	Prep Method: DOE EML HASL-300, Tc-02-	
Prep Date: 02/28/2018 10:14		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-12.4	pCi/L	+/-25.2	25.2	44.5	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	35800	44000	CPM	81.3	(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 5, 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:** 444598

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>Rad Liquid Scintillation</b>										
Batch	1742237									
QC1203978881	MB									
Technetium-99			U	-22	pCi/L			CXS7	03/04/1807:24	
				Uncert: +/-18.5						
				TPU: +/-18.5						
**Technetium-99m Tracer	44000			47600	CPM	REC: 108*	(30%-105%)			
QC1203978882	444598001	DUP								
Technetium-99		U	-12.4	U	3.54				03/04/1807:46	
				Uncert: +/-25.2		RPD: 0	N/A			
				TPU: +/-25.2		RER: 0.908	(0-2)			
**Technetium-99m Tracer	44000		35800	40000	CPM	REC: 91	(30%-105%)			
QC1203978883	LCS									
Technetium-99	888			757	pCi/L	REC: 85	(80%-120%)		03/05/1807:46	
				Uncert: +/-50.2						
				TPU: +/-97.8						
**Technetium-99m Tracer	44000			38500	CPM	REC: 88	(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.