

July 24, 2016



a member of **The GEL Group** INC



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July 22, 2016

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

Re: CHPRC SAF F13-002  
Work Order: 400387  
SDG: GEL400387

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 30, 2016. 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: 300071ES20  
Chain of Custody: F13-002-2137  
Enclosures



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# Case Narrative

General Narrative  
for  
CH2MHill Plateau Remediation Company  
CHPRC SAF F13-002  
SDG: GEL400387

July 22, 2016

**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 30, 2016, 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 and DER.

**Sample Identification**

The laboratory received the following sample:

<b>Laboratory Identification</b>	<b>Sample Description</b>
400387001	B35K24

**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 24, 2016**

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

**July 24, 2016**

**Radiochemistry  
Technical Case Narrative  
CH2M Hill Plateau Remediation Company (CPRC)  
SDG #: GEL400387  
Work Order #: 400387**

**UIISO\_IE\_PRECIP\_AEA: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**

**QC Information**

The blank did not meet the U-233/334, U-235/236, and U-238 detection limits due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

**Technical Information**

**Sample Re-prep/Re-analysis**

Samples were re-prepped due to high carrier/tracer yield. The re-analysis is being reported.

**Recounts**

Sample 400387001 (B35K24) was recounted due to high MDC. The recount is reported. Sample 1203580636 (MB) was recounted once due to high carrier/tracer yield and a second time due to a suspected blank false positive. The second recount is reported.

**Miscellaneous Information**

**Additional Comments**

The U-235/236 result for sample 400387001 (B35K24) is greater than the MDC; however, it is less than 3 Sigma TPU and less than the MDC plus the Uncertainty.

**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**



SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>400387</u>	
Received By: <u>MIC</u>		Date Received: <u>6-30-16</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Package COC and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	<input type="checkbox"/>

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 checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>152462912</u> Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added Lot#:
6	Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7	VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9	Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10	Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
15	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
16	Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7766 3981 0790</u>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials DS Date 6/30/16 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	

# Laboratory Certifications

List of current GEL Certifications as of 22 July 2016

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	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
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	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# Radiological Analysis

# Case Narrative

Radiochemistry  
Technical Case Narrative  
CH2MHill Plateau Remediation Company (CPRC)  
SDG #: GEL400387  
Work Order #: 400387

**Product:** UISO\_IE\_PRECIP\_AEA:COMMON  
**Analytical Method:** UISO\_IE\_PRECIP\_AEA  
**Analytical Procedure:** GL-RAD-A-011 REV# 26  
**Analytical Batch:** 1580015

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
400387001	B35K24
1203580636	Method Blank (MB)
1203580637	400387001(B35K24) Sample Duplicate (DUP)
1203580638	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**

**QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The blank did not meet the U-233/334, U-235/236, and U-238 detection limits due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

**Technical Information**

**Sample Re-prep/Re-analysis**

Samples were re-prepped due to high carrier/tracer yield. The re-analysis is being reported.

**Recounts**

Sample 400387001 (B35K24) was recounted due to high MDC. The recount is reported. Sample 1203580636 (MB) was recounted once due to high carrier/tracer yield and a second time due to a suspected blank false positive. The second recount is reported.

**Miscellaneous Information**

**Additional Comments**

The U-235/236 result for sample 400387001 (B35K24) is greater than the MDC; however, it less than 3 Sigma TPU and less than the MDC plus the Uncertainty.

**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: GEL400387 GEL Work Order: 400387

**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:** 21 JUL 2016

**Title:** Group Leader

# Sample Data Summary

Rad  
Certificate of Analysis  
Sample Summary

SDG Number: GEL400387	Client: CPRC001	Project: CPRC0F13002
Lab Sample ID: 400387001	Date Collected: 06/28/2016 09:45	Matrix: WATER
	Date Received: 06/30/2016 09:15	
Client ID: B35K24	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1580015	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 07/11/2016 10:21	Aliquot: 0.04 L	Instrument: 1160
Data File: S0400387001_UU.3A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 505 min
Prep Batch: 1580015		
Prep Date: 07/07/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234	U	0.609	pCi/L	+/-0.678	0.682	0.795	1.00
15117-96-1/13982-7	Uranium-235/236		0.837	pCi/L	+/-0.821	0.828	0.502	1.00
7440-61-1	Uranium-238	U	0.271	pCi/L	+/-0.479	0.480	0.407	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	33.4	52.1	pCi/L	64.1	(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

July 24, 2016

**GEL LABORATORIES LLC**

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**QC Summary**

Report Date: July 21, 2016  
Page 1 of 2

**Client :** CH2MHill Plateau Remediation Company  
MSIN R3-50 CHPRC  
PO Box 1600  
Richland, Washington 99352  
**Contact:** Mr. Scot Fitzgerald  
**Workorder:** 400387

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
<b>Rad Alpha Spec</b>										
Batch	1580015									
QC1203580636	MB									
Uranium-233/234			U	0.00889	pCi/L			MXS2	07/12/1609:01	
				Uncert:						
				TPU:						
Uranium-235/236			U	0.418	pCi/L					
				Uncert:						
				TPU:						
Uranium-238			U	-0.0978	pCi/L					
				Uncert:						
				TPU:						
**Uranium-232 Tracer	52.1			42.4	pCi/L	REC: 81	(30%-105%)			
				Uncert:						
				TPU:						
QC1203580637	400387001	DUP								
Uranium-233/234		U	0.609	U	0.542	pCi/L			07/08/1609:46	
				Uncert:	+/-0.678			RPD: 0		N/A
				TPU:	+/-0.682			RER: 0.118		(0-2)
Uranium-235/236			0.837	U	0.435	pCi/L				
				Uncert:	+/-0.821			RPD: 25		(0% - 100%)
				TPU:	+/-0.828			RER: 0.708		(0-2)
Uranium-238		U	0.271	U	0.485	pCi/L				
				Uncert:	+/-0.479			RPD: 0		N/A
				TPU:	+/-0.480			RER: 0.494		(0-2)
**Uranium-232 Tracer	52.1		33.4		39.4	pCi/L	REC: 76			(30%-105%)
				Uncert:	+/-5.24					
				TPU:	+/-8.33					
QC1203580638	LCS									
Uranium-233/234					64.8	pCi/L				
				Uncert:	+/-6.64					
				TPU:	+/-11.1					
Uranium-235/236					2.67	pCi/L				
				Uncert:	+/-1.60					
				TPU:	+/-1.65					
Uranium-238	67.3				75.1	pCi/L	REC: 111			(80%-120%)
				Uncert:	+/-7.13					
				TPU:	+/-12.5					
**Uranium-232 Tracer	52.1				42.4	pCi/L	REC: 81			(30%-105%)
				Uncert:	+/-6.00					
				TPU:	+/-9.30					

**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

July 24, 2016

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 400387

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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.