GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
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gel.com

July 10, 2017

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

Re: CHPRC SAF S17-006
Work Order: 425499
SDG: GEL425499

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 15, 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: 300071 - 7H
Chain of Custody: S17-006-206 and S17-006-254
Enclosures

Table of Contents

Case Narrative

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S17-006
SDG: GEL425499

July 10, 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 15, 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:

Laboratory Identification	Sample Description
425499001	B39PP3
425499002	B39T75

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 10, 2017

Brielle Luthman for
Heather Shaffer
Project Manager

PUISO_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
Refer to Miscellaneous Information section.

Miscellaneous Information

AMCMISO_EIE_PRECIP_AEA: COMMON

There are no exceptions, anomalies or deviations from the specified methods. 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.

UISO_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 sample and the duplicate, 1203820136 (B39T75DUP) and 425499002 (B39T75), did not meet the relative percent difference requirement for U-238; however, they do meet the relative error ratio requirement with a value of 1.12.

GAMMA_GS:COMMON + GW 01

There are no exceptions, anomalies or deviations from the specified methods. 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.

SRISO_SEP_PRECIP_GPC: 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 sample and the duplicate, 1203815774 (B39R31DUP), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with a value of 1.19.

Technical Information

Recounts
Samples 1203815774 (B39R31DUP) and 425499001 (B39PP3) were verified by recounting at least five days from the separation date. The recounts are reported.

PU241_IE_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

QC Information
Refer to Miscellaneous Information section.

RDL Met
The blank, 1203820149 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

Miscellaneous Information

C14_LSC: COMMON

There are no exceptions, anomalies or deviations from the specified methods. 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.

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 1203815893 (B39T96MS) was recounted due to low recovery. The recount is reported.

Miscellaneous Information

Additional Comments
The matrix spike, 1203815893 (B39T96MS), aliquot was reduced to conserve sample volume.

SE79_SEP_IE_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

Sample Re-prep/Re-analysis
Samples were reprepped due to low recovery. The re-analysis is being reported.

Recounts
Sample 1203821238 (REF) 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

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

425499

C.O.C. # S17-006-206

Page 1 of 1

Collector	Frank Hall /CHPRC	**Contact/Requester**	Karen Waters-Husted	**Telephone No.**	509-376-4650
SAF No.	S17-006	**Sampling Origin**	Hanford Site	**Purchase Order/Charge Code**	300071
Project Title	SURV, JUNE 2017	**Logbook No.**	HNF-N-506 931 52	**Ice Chest No.**	6WS 610
Shipped To (Lab)	GEL Laboratories, LLC	**Method of Shipment**	Commercial Carrier	**Bill of Lading/Air Bill No.**	7793 9781 8328
Protocol	SURV	**Priority:**	30 Days **PRIORITY**	**Offsite Property No.**	8038

POSSIBLE SAMPLE HAZARDS/REMARKS

** ** 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

SPECIAL INSTRUCTIONS **Hold Time** Total Activity Exemption: Yes ☑ No ☐

N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39PP3	N	W	JUN 13 2017	1325	1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2

July 10, 2017

Relinquished By Print: Frank Hall /CHPRC Sign: Frank Hall	Date/Time 1414 JUN 13 2017	Received By Print: SSU#1 Sign: SSU#1	Date/Time 1414 JUN 13 2017
Relinquished By SSU#1	Date/Time JUN 14 2017 0700	Received By Janelle Zunker CHPRC	Date/Time JUN 14 2017 0700
Relinquished By Janelle Zunker CHPRC	Date/Time JUN 14 2017 1400	Received By FEDEX	Date/Time
Relinquished By	Date/Time FEDEX	Received By STACY BOONE	Date/Time 6-15-17 0900

Matrix *

S	= Soil	DS	=	Drum Solids	
SE	= Sediment	DL	=	Drum Liquids	
SO	= Solid	T	=	Tissue	
SL	= Sludge	WI	=	Wipe	
W	= Water	L	=	Liquid	
O	= Oil	V	=	Vegetation	
A	= Air	X	=	Other	

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FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

PRINTED ON 4/26/2017 FSR ID = FSR36129 A-6004-842 (REV 2)

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

425499

C.O.C. # S17-006-254

Page 1 of 1

Collector	Juan Aguilar /CHPRC	**Contact/Requester**	Karen Waters-Husted	**Telephone No.**	509-376-4650
SAF No.	S17-006	**Sampling Origin**	Hanford Site	**Purchase Order/Charge Code**	300071
Project Title	SURV, JUNE 2017	**Logbook No.**	HNF-N-506 88/79	**Ice Chest No.**	GWS-610
Shipped To (Lab)	GEL Laboratories, LLC	**Method of Shipment**	Commercial Carrier	**Bill of Lading/Air Bill No.**	7793 9781 8328
Protocol	SURV	**Priority:**	30 Days **PRIORITY**	**Offsite Property No.**	8038

POSSIBLE SAMPLE HAZARDS/REMARKS

** ** 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

SPECIAL INSTRUCTIONS **Hold Time** Total Activity Exemption: Yes ☑ No ☐

N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39T75	N	W	6-13-17	1258	1x1-L G/P	AMCMISO_EIE_PRECIP_AEA: COMMON; PU241_IE_LSC: COMMON; PUISO_IE_PRECIP_AEA: COMMON; UISO_IE_PRECIP_AEA: COMMON	180 Days	HNO3 to pH <2
B39T75	N	W	↓	↓	1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B39T75	N	W			4x1-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B39T75	N	W			1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B39T75	N	W			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B39T75	N	W	6-13-17	1258	1x250-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Juan Aguilar /CHPRC			JUN 13 2017 1325	SSU#1			JUN 13 2017 1325
SSU#1			JUN 14 2017 0700	Janelle Zunker CHPRC			JUN 14 2017 0700
Janelle Zunker CHPRC			JUN 14 2017 1400	FEDEX			
			FED EX	STACY BOONE			6/15/17 910

Matrix *

S	= Soil	DS	= Drum Solids		
SE	= Sediment	DL	= Drum Liquids		
SO	= Solid	T	= Tissue		
SL	= Sludge	WI	= Wipe		
W	= Water	L	= Liquid		
O	= Oil	V	= Vegetation		
A	= Air	X	= Other		

FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

PRINTED ON 5/8/2017 FSR ID = FSR45036 A-6004-842 (REV 2)

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: CPRC	SDG/AR/COC/Work Order: 425499
Received By: Stacy Boone	Date Received: 6-15-17
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 7794 0470 3935 - 1 c 7793 9781 8328 1 c 7794 0471 3579 - 1 c

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): Ø 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?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP:_____
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR3-17 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	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?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials NS Date 6/16/17 Page 1 of 1

GL-CHL-SR-001 Rev 5

Data Review Qualifier Definitions

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 (843) 556−8171

Report Date: 10−JUL−17

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 (0rganics 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 >= 2X the MDA and, after corrections, result is >= 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 >= 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 >= 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 10 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

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL425499
Work Order #: 425499

Product: **PUISO_PRECIP_AEA:COMMON**
Analytical Method: PUISO_PRECIP_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1677692

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

GEL Sample ID#	Client Sample Identification
425499002	B39T75
1203820112	Method Blank (MB)
1203820113	Laboratory Control Sample (LCS)
1203820114	425499002(B39T75) Sample Duplicate (DUP)

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: Refer to Miscellaneous Information section.

Miscellaneous Information

1. The Pu-242 tracer for samples 4246411003 and 1203820115 did not meet the resolution requirements of having a full width half maximum of 100 keV or less. 2. The Pu-242 tracer for sample 1203820112 is greater than 50 keV from the expected energy of 4890 keV. 1. The tracer peaks are within the Pu-242 and the client tracer yield recovery requirements were met. Reporting results. 2. The tracer peak is within the Pu-242 and the client tracer yield recovery requirements were met. Reporting results.

Product: **AMCMISO_EIE_PRECIP_AEA: COMMON**
Analytical Method: AMCMISO_EIE_PREC_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1677694

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

GEL Sample ID#	Client Sample Identification
425499002	B39T75

1203820130	Method Blank (MB)
1203820131	Laboratory Control Sample (LCS)
1203820132	425499002(B39T75) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. 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.

Product: **UISO_IE_PRECIP_AEA:COMMON**
Analytical Method: UISO_IE_PRECIP_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1677699

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

GEL Sample ID#	Client Sample Identification
425499002	B39T75
1203820134	Method Blank (MB)
1203820135	Laboratory Control Sample (LCS)
1203820136	425499002(B39T75) Sample Duplicate (DUP)

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 sample and the duplicate, 1203820136 (B39T75DUP) and 425499002 (B39T75), did not meet the relative percent difference requirement for U-238; however, they do meet the relative error ratio requirement with a value of 1.12.

Product: **GAMMA_GS:COMMON + GW 01**
Analytical Method: 901.1_GAMMA_GS
Analytical Procedure: GL-RAD-A-013 REV# 27
Analytical Batch: 1675360

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

GEL Sample ID#	Client Sample Identification
425499002	B39T75
1203814555	Method Blank (MB)
1203814556	424516023(NonSDG) Sample Duplicate (DUP)
1203814557	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. 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.

Product: **SRISO_SEP_PRECIP_GPC: COMMON**
Analytical Method: SRISO_SEP_PRECIP_GPC
Analytical Procedure: GL-RAD-A-004 REV# 18
Analytical Batch: 1675923

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

GEL Sample ID#	Client Sample Identification
425499001	B39PP3
425499002	B39T75
1203815773	Method Blank (MB)
1203815774	425103020(B39R31) Sample Duplicate (DUP)
1203815775	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 sample and the duplicate, 1203815774 (B39R31DUP), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with a value of 1.19.

Technical Information

Recounts
Samples 1203815774 (B39R31DUP) and 425499001 (B39PP3) were verified by recounting at least five days from the separation date. The recounts are reported.

Product: **PU241_IE_LSC: COMMON**
Analytical Method: PU241_IE_LSC
Analytical Procedure: GL-RAD-A-035 REV# 18
Analytical Batch: 1677707

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

GEL Sample ID#	Client Sample Identification
425499002	B39T75
1203820149	Method Blank (MB)
1203820150	425499002(B39T75) Sample Duplicate (DUP)
1203820151	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: Refer to Miscellaneous Information section.

RDL Met
The blank, 1203820149 (MB), did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

Miscellaneous Information

1. The Pu-242 tracer for sample 1203820149 is greater than 50 keV from the expected energy of 4890 keV. 2. The Pu-242 tracer for sample 426411003 did not meet the resolution requirements of having a full width half maximum of 100 keV or less. 1. The tracer peak is within the Pu-242 ROI and the tracer yield recovery does meet the client acceptance criteria. Reporting results. 2. The tracer peak is within the Pu-242 ROI and the tracer yield recovery does meet the client acceptance criteria. Reporting results.

Product: **C14_LSC: COMMON**
Analytical Method: C14_LSC
Analytical Procedure: GL-RAD-A-003 REV# 15
Analytical Batch: 1674668

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

GEL Sample ID#	Client Sample Identification
425499002	B39T75

1203812815	Method Blank (MB)
1203812816	425282001(NonSDG) Sample Duplicate (DUP)
1203812817	425282001(NonSDG) Matrix Spike (MS)
1203812818	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. 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.

Product: **TRITIUM_DIST_LSC: COMMON**
Analytical Method: TRITIUM_DIST_LSC
Analytical Procedure: GL-RAD-A-002 REV# 22
Analytical Batch: 1675960

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

GEL Sample ID#	Client Sample Identification
425499002	B39T75
1203815891	Method Blank (MB)
1203815892	425280008(B39T96) Sample Duplicate (DUP)
1203815893	425280008(B39T96) Matrix Spike (MS)
1203815894	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 1203815893 (B39T96MS) was recounted due to low recovery. The recount is reported.

Miscellaneous Information

Additional Comments
The matrix spike, 1203815893 (B39T96MS), aliquot was reduced to conserve sample volume.

Product: **SE79_SEP_IE_LSC: COMMON**

Analytical Method: SE79_SEP_IE_LSC
Analytical Procedure: GL-RAD-A-031 REV# 13
Analytical Batch: 1678200

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

GEL Sample ID#	Client Sample Identification
425499002	B39T75
1203821232	Method Blank (MB)
1203821233	425233002(NonSDG) Sample Duplicate (DUP)
1203821234	Laboratory Control Sample (LCS)
1203821238	Reference (REF)

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

Sample Re-prep/Re-analysis
Samples were reprepped due to low recovery. The re-analysis is being reported.

Recounts
Sample 1203821238 (REF) 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.

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: GEL425499 GEL Work Order: 425499

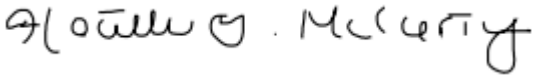
The Qualifiers in this report are defined as follows:

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: **08 JUL 2017** **Title:** **Analyst II**

Sample Data Summary

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499001**	**Date Collected:**	**06/13/2017 13:25**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39PP3**			**Prep Basis:**	**"As Received"**
Batch ID:	**1675923**	**Method:**	**SRISO_SEP_PRECIP_GPC**	**SOP Ref:**	**GL-RAD-A-004**
Run Date:	**07/05/2017 07:59**	**Analyst:**	**JXB7**	**Instrument:**	**PIC4A**
Data File:	**S1675923r1.xls**	**Aliquot:**	**300 mL**	**Count Time:**	**60 min**
Prep Batch:	**1675923**	**Prep Method:**	**EPA 905.0 Modified/DOE RP5**		
Prep Date:	**06/28/2017 10:54**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90		80.9	pCi/L	+/-4.33	13.5	1.54	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	3.90	7.75	mg	50.3	(40%-110%)

Comments:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The MDC is a sample specific MDC.

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499002**	**Date Collected:**	**06/13/2017 12:58**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39T75**			**Prep Basis:**	**"As Received"**
Batch ID:	**1677692**	**Method:**	**PUISO_PRECIP_AEA**	**SOP Ref:**	**GL-RAD-A-011**
Run Date:	**07/01/2017 10:56**	**Analyst:**	**BXA4**	**Instrument:**	**1067**
Data File:	**S0425499002_PU.1A.gcnf**	**Aliquot:**	**0.4 L**	**Count Time:**	**239.9998 min**
Prep Batch:	**1677692**	**Prep Method:**	**DOE EML HASL-300, Pu-11-**		
Prep Date:	**06/30/2017 00:00**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
13981-16-3	Plutonium-238	U	-0.0073	pCi/L	+/-0.0876	0.0877	0.197	1.00
OER-100-70	Plutonium-239/240	U	-0.0705	pCi/L	+/-0.0941	0.0942	0.250	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	4.06	4.92	pCi/L	82.5	(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.

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499002**	**Date Collected:**	**06/13/2017 12:58**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39T75**			**Prep Basis:**	**"As Received"**
Batch ID:	**1677694**	**Method:**	**AMCMISO_EIE_PREC_AEA**	**SOP Ref:**	**GL-RAD-A-011**
Run Date:	**07/01/2017 10:53**	**Analyst:**	**BXA4**	**Instrument:**	**1095**
Data File:	**S0425499002_AM.1A.gcnf**	**Aliquot:**	**0.4 L**	**Count Time:**	**239.9998 min**
Prep Batch:	**1677694**	**Prep Method:**	**DOE EML HASL-300, Am-05**		
Prep Date:	**06/30/2017 00:00**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.00384	pCi/L	+/-0.0331	0.0332	0.0768	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	5.02	5.24	pCi/L	95.8	(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.

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499002**	**Date Collected:**	**06/13/2017 12:58**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39T75**			**Prep Basis:**	**"As Received"**
Batch ID:	**1677699**	**Method:**	**UISO_IE_PRECIP_AEA**	**SOP Ref:**	**GL-RAD-A-011**
Run Date:	**07/01/2017 10:12**	**Analyst:**	**BXA4**	**Instrument:**	**1012**
Data File:	**S0425499002_UU.1A.gcnf**	**Aliquot:**	**0.4 L**	**Count Time:**	**239.9998 min**
Prep Batch:	**1677699**	**Prep Method:**	**DOE EML HASL-300, U-02-R**		
Prep Date:	**06/30/2017 00:00**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 *13968-55-3/13966-29-5*	Uranium-233/234		1.76	pCi/L	+/-0.446	0.531	0.225	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.138	pCi/L	+/-0.152	0.154	0.103	1.00
7440-61-1	Uranium-238		1.56	pCi/L	+/-0.417	0.489	0.195	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	3.03	5.22	pCi/L	58.1	(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.

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499002**	**Date Collected:**	**06/13/2017 12:58**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39T75**			**Prep Basis:**	**"As Received"**
Batch ID:	**1677707**	**Method:**	**PU241_IE_LSC**	**SOP Ref:**	**GL-RAD-A-035**
Run Date:	**07/06/2017 05:45**	**Analyst:**	**BXA4**	**Instrument:**	**LSCBLUE**
Data File:	**PU1677707.xls**	**Aliquot:**	**0.4 L**	**Count Time:**	**45 min**
Prep Batch:	**1677707**	**Prep Method:**	**DOE EML HASL-300, Pu-11-**		
Prep Date:	**06/30/2017 00:00**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14119-32-5	Plutonium-241	U	-6.74	pCi/L	+/-10.4	10.4	18.3	25.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	4.06	4.92	pCi/L	82.5	(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.

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499002**	**Date Collected:**	**06/13/2017 12:58**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39T75**			**Prep Basis:**	**"As Received"**
Batch ID:	**1675923**	**Method:**	**SRISO_SEP_PRECIP_GPC**	**SOP Ref:**	**GL-RAD-A-004**
Run Date:	**07/01/2017 14:19**	**Analyst:**	**JXB7**	**Instrument:**	**PIC9A**
Data File:	**S1675923r1.xls**	**Aliquot:**	**300 mL**	**Count Time:**	**60 min**
Prep Batch:	**1675923**	**Prep Method:**	**EPA 905.0 Modified/DOE RP5**		
Prep Date:	**06/28/2017 10:54**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	0.559	pCi/L	+/-0.650	0.656	1.09	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	6.20	7.75	mg	80	(40%-110%)

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.

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499002**	**Date Collected:**	**06/13/2017 12:58**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39T75**			**Prep Basis:**	**"As Received"**
Batch ID:	**1675360**	**Method:**	**901.1_GAMMA_GS**	**SOP Ref:**	**GL-RAD-A-013**
Run Date:	**06/22/2017 07:30**	**Analyst:**	**MXR1**	**Instrument:**	**GAM36**
Data File:	**G425499002.CNF;1**	**Aliquot:**	**0.5 L**	**Count Time:**	**120 min**
Prep Batch:	**1675360**	**Prep Method:**	**EPA 901.1**		
Prep Date:	**06/21/2017 00:00**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	9.72	pCi/L	+/-15.5	16.2	33.3	
13967-70-9	Cesium-134	U	-0.215	pCi/L	+/-6.90	6.90	13.7	
10045-97-3	Cesium-137	U	0.408	pCi/L	+/-6.81	6.81	13.6	15.0
10198-40-0	Cobalt-60	U	-0.692	pCi/L	+/-7.36	7.37	15.3	
14683-23-9	Europium-152	U	24.7	pCi/L	+/-19.0	22.2	31.6	
15585-10-1	Europium-154	U	-0.0765	pCi/L	+/-19.3	19.3	41.4	
14391-16-3	Europium-155	U	6.84	pCi/L	+/-17.1	17.4	33.1	
13966-00-2	Potassium-40	U	26.8	pCi/L	+/-99.8	101	228	

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

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.

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499002**	**Date Collected:**	**06/13/2017 12:58**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39T75**			**Prep Basis:**	**"As Received"**
Batch ID:	**1674668**	**Method:**	**C14_LSC**	**SOP Ref:**	**GL-RAD-A-003**
Run Date:	**06/23/2017 04:56**	**Analyst:**	**BXM4**	**Instrument:**	**LSCRED**
Data File:	**C1674668.xls**	**Aliquot:**	**60.06 mL**	**Count Time:**	**35 min**
Prep Batch:	**1674668**	**Prep Method:**	**EPA EERF C-01 Modified**		
Prep Date:	**06/22/2017 09:53**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-2.64	pCi/L	+/-17.2	17.2	30.0	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

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.

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499002**	**Date Collected:**	**06/13/2017 12:58**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39T75**			**Prep Basis:**	**"As Received"**
Batch ID:	**1675960**	**Method:**	**TRITIUM_DIST_LSC**	**SOP Ref:**	**GL-RAD-A-002**
Run Date:	**07/06/2017 04:09**	**Analyst:**	**BXM4**	**Instrument:**	**LSCGREEN**
Data File:	**T1675960R.xls**	**Aliquot:**	**50 mL**	**Count Time:**	**45 min**
Prep Batch:	**1675960**	**Prep Method:**	**EPA 906.0 Modified**		
Prep Date:	**07/05/2017 09:31**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		563	pCi/L	+/-234	258	362	400

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits

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.

Rad

Certificate of Analysis
Sample Summary

SDG Number:	**GEL425499**	**Client:**	**CPRC001**	**Project:**	**CPRC0S17006**
Lab Sample ID:	**425499002**	**Date Collected:**	**06/13/2017 12:58**	**Matrix:**	**WATER**
		Date Received:	**06/15/2017 09:00**		
Client ID:	**B39T75**			**Prep Basis:**	**"As Received"**
Batch ID:	**1678200**	**Method:**	**SE79_SEP_IE_LSC**	**SOP Ref:**	**GL-RAD-A-031**
Run Date:	**07/01/2017 08:44**	**Analyst:**	**CXS7**	**Instrument:**	**LSCBLUE**
Data File:	**SE1678200R3.xls**	**Aliquot:**	**0.08 L**	**Count Time:**	**60 min**
Prep Batch:	**1678200**	**Prep Method:**	**NERC ORD**		
Prep Date:	**06/29/2017 09:29**				

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	U	5.94	pCi/L	+/-12.6	12.6	21.3	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	18.6	20.0	mg	93	(40%-110%)

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

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

Workorder: 425499

Report Date: July 7, 2017

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1677692									
QC1203820112 MB									
Plutonium-238			U	-0.0389	pCi/L			BXA4	07/01/1710:56
Uncert:				+/-0.0737					
TPU:				+/-0.0739					
Plutonium-239/240			U	0.0168	pCi/L				
Uncert:				+/-0.0936					
TPU:				+/-0.0938					
**Plutonium-242 Tracer	4.92			2.76	pCi/L	REC: 56	(30%-105%)		
Uncert:				+/-0.788					
TPU:				+/-1.15					
QC1203820113 LCS									
Plutonium-238			U	0.0115	pCi/L				07/01/1710:56
Uncert:				+/-0.0638					
TPU:				+/-0.0639					
Plutonium-239/240	4.94			4.63	pCi/L	REC: 94	(80%-120%)		
Uncert:				+/-0.631					
TPU:				+/-0.914					
**Plutonium-242 Tracer	4.92			3.82	pCi/L	REC: 78	(30%-105%)		
Uncert:				+/-0.649					
TPU:				+/-0.957					
QC1203820114 425499002 DUP									
Plutonium-238		U -0.0073	U	-0.00508	pCi/L				
Uncert:		+/-0.0876		+/-0.0438		RPD: 0	N/A		
TPU:		+/-0.0877		+/-0.0439		RER: 0.0443	(0-2)		
Plutonium-239/240		U -0.0705	U	-0.0102	pCi/L				
Uncert:		+/-0.0941		+/-0.0449		RPD: 0	N/A		
TPU:		+/-0.0942		+/-0.045		RER: 1.13	(0-2)		
**Plutonium-242 Tracer	4.92	4.06		3.93	pCi/L	REC: 80	(30%-105%)		
Uncert:		+/-0.622		+/-0.634					
TPU:		+/-0.920		+/-0.937					
Batch 1677694									
QC1203820130 MB									
Americium-241			U	0.0245	pCi/L			BXA4	07/01/1710:56
Uncert:				+/-0.0563					
TPU:				+/-0.0564					
**Americium-243 Tracer	5.24			4.93	pCi/L	REC: 94	(30%-105%)		
Uncert:				+/-0.568					
TPU:				+/-0.874					
QC1203820131 LCS									
Americium-241	4.92			4.37	pCi/L	REC: 89	(80%-120%)		07/01/1710:53
Uncert:				+/-0.540					
TPU:				+/-0.781					
**Americium-243 Tracer	5.24			5.30	pCi/L	REC: 101	(30%-105%)		
Uncert:				+/-0.583					
TPU:				+/-0.894					

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QC Summary

Workorder: 425499

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1677694									
QC1203820132 425499002 DUP									
Americium-241	U	-0.00384	U	0.000613	pCi/L				
Uncert:		+/-0.0331		+/-0.0454		RPD:	0	N/A	
TPU:		+/-0.0332		+/-0.0455		RER:	0.155	(0-2)	
**Americium-243 Tracer	5.24	5.02		5.48	pCi/L	REC:	104	(30%-105%)	
Uncert:		+/-0.565		+/-0.554					
TPU:		+/-0.871		+/-0.856					
Batch 1677699									
QC1203820134 MB									
Uranium-233/234			U	0.00902	pCi/L			BXA4	07/01/1710:12
Uncert:				+/-0.0669					
TPU:				+/-0.0669					
Uranium-235/236			U	0.00209	pCi/L				
Uncert:				+/-0.0744					
TPU:				+/-0.0744					
Uranium-238			U	-0.027	pCi/L				
Uncert:				+/-0.0826					
TPU:				+/-0.0827					
**Uranium-232 Tracer	5.21			5.03	pCi/L	REC:	97	(30%-105%)	
Uncert:				+/-0.538					
TPU:				+/-0.850					
QC1203820135 LCS									
Uranium-233/234				7.48	pCi/L				07/01/1710:17
Uncert:				+/-0.866					
TPU:				+/-1.46					
Uranium-235/236				0.320	pCi/L				
Uncert:				+/-0.209					
TPU:				+/-0.215					
Uranium-238	6.75			7.81	pCi/L	REC:	116	(80%-120%)	
Uncert:				+/-0.885					
TPU:				+/-1.51					
**Uranium-232 Tracer	5.21			3.70	pCi/L	REC:	71	(30%-105%)	
Uncert:				+/-0.727					
TPU:				+/-1.10					
QC1203820136 425499002 DUP									
Uranium-233/234		1.76		1.61	pCi/L				07/01/1710:17
Uncert:		+/-0.446		+/-0.373		RPD:	8	(0% - 20%)	
TPU:		+/-0.531		+/-0.443		RER:	0.406	(0-2)	
Uranium-235/236	U	0.138	U	0.0478	pCi/L				
Uncert:		+/-0.152		+/-0.0939		RPD:	6	(0% - 100%)	
TPU:		+/-0.154		+/-0.0942		RER:	0.98	(0-2)	
Uranium-238		1.56		1.20	pCi/L				
Uncert:		+/-0.417		+/-0.326		RPD:	26*	(0% - 20%)	
TPU:		+/-0.489		+/-0.371		RER:	1.12	(0-2)	
**Uranium-232 Tracer	5.22	3.03		4.52	pCi/L	REC:	87	(30%-105%)	
Uncert:		+/-0.767		+/-0.668					
TPU:		+/-1.15		+/-1.02					
Batch 1677707									
QC1203820149 MB									
Plutonium-241			U	-11.8	pCi/L			BXA4	07/06/1707:19

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QC Summary

Workorder: 425499

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch 1677707									
	Uncert:			+/-15.4					
	TPU:			+/-15.4					
**Plutonium-242 Tracer	4.92			2.76	pCi/L	REC: 56	(30%-105%)		
	Uncert:			+/-0.788					
	TPU:			+/-1.15					
QC1203820150 425499002 DUP									
Plutonium-241	U	-6.74	U	-1.52	pCi/L				07/06/1708:06
	Uncert:	+/-10.4		+/-11.1		RPD: 0	N/A		
	TPU:	+/-10.4		+/-11.1		RER: 0.671	(0-2)		
**Plutonium-242 Tracer	4.92	4.06		3.93	pCi/L	REC: 80	(30%-105%)		
	Uncert:	+/-0.622		+/-0.634					
	TPU:	+/-0.920		+/-0.937					
QC1203820151 LCS									
Plutonium-241	184			170	pCi/L	REC: 93	(80%-120%)		07/06/1708:53
	Uncert:			+/-14.3					
	TPU:			+/-38.2					
**Plutonium-242 Tracer	4.92			4.23	pCi/L	REC: 86	(30%-105%)		
	Uncert:			+/-0.561					
	TPU:			+/-0.838					
Rad Gamma Spec									
Batch 1675360									
QC1203814555 MB									
Antimony-125			U	2.55	pCi/L			MXR1	06/22/1707:31
	Uncert:			+/-11.5					
	TPU:			+/-11.6					
Cesium-134			U	-2.77	pCi/L				
	Uncert:			+/-3.85					
	TPU:			+/-4.05					
Cesium-137			U	1.64	pCi/L				
	Uncert:			+/-4.69					
	TPU:			+/-4.75					
Cobalt-60			U	1.89	pCi/L				
	Uncert:			+/-5.64					
	TPU:			+/-5.71					
Europium-152			U	-1.48	pCi/L				
	Uncert:			+/-11.3					
	TPU:			+/-11.4					
Europium-154			U	-0.932	pCi/L				
	Uncert:			+/-12.7					
	TPU:			+/-12.7					
Europium-155			U	-0.472	pCi/L				
	Uncert:			+/-14.7					
	TPU:			+/-14.7					
Potassium-40			U	32.7	pCi/L				
	Uncert:			+/-76.5					
	TPU:			+/-78.0					
QC1203814556 424516023 DUP									
Antimony-125	U	-2.94	U	-1.64	pCi/L				06/22/1707:31
	Uncert:	+/-12.2		+/-13.6		RPD: 0	N/A		
	TPU:	+/-12.2		+/-13.6		RER: 0.139	(0-2)		

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QC Summary

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch 1675360									
Cesium-134		U -1.34	U	-0.802	pCi/L				
	Uncert:	+/-5.42		+/-6.19		RPD: 0	N/A		
	TPU:	+/-5.46		+/-6.20		RER: 0.127	(0-2)		
Cesium-137		107		117	pCi/L				
	Uncert:	+/-15.3		+/-18.7		RPD: 9	(0% - 20%)		
	TPU:	+/-16.1		+/-19.5		RER: 0.776	(0-2)		
Cobalt-60		110		117	pCi/L				
	Uncert:	+/-16.2		+/-19.4		RPD: 7	(0% - 20%)		
	TPU:	+/-16.8		+/-20.0		RER: 0.578	(0-2)		
Europium-152		U -5.64	U	-10.4	pCi/L				
	Uncert:	+/-11.6		+/-13.5		RPD: 0	N/A		
	TPU:	+/-11.8		+/-14.3		RER: 0.507	(0-2)		
Europium-154		U 6.37	U	-3.19	pCi/L				
	Uncert:	+/-11.2		+/-12.1		RPD: 0	N/A		
	TPU:	+/-11.5		+/-12.2		RER: 1.12	(0-2)		
Europium-155		U -5.07	U	-1.14	pCi/L				
	Uncert:	+/-13.5		+/-18.8		RPD: 0	N/A		
	TPU:	+/-13.7		+/-18.8		RER: 0.331	(0-2)		
Potassium-40		U -33.4	U	-56.9	pCi/L				
	Uncert:	+/-59.9		+/-70.2		RPD: 0	N/A		
	TPU:	+/-61.8		+/-74.8		RER: 0.475	(0-2)		
QC1203814557 LCS									
Americium-241	1.10E+05			1.16E+05	pCi/L	REC: 105	(80%-120%)		06/22/1707:35
	Uncert:			+/-2150					
	TPU:			+/-9420					
Antimony-125			U	-33.9	pCi/L				
	Uncert:			+/-330					
	TPU:			+/-331					
Cesium-134			U	-57.4	pCi/L				
	Uncert:			+/-143					
	TPU:			+/-145					
Cesium-137	42000			43900	pCi/L	REC: 104	(80%-120%)		
	Uncert:			+/-746					
	TPU:			+/-4200					
Cobalt-60	38000			39300	pCi/L	REC: 103	(80%-120%)		
	Uncert:			+/-822					
	TPU:			+/-3450					
Europium-152			U	-339	pCi/L				
	Uncert:			+/-294					
	TPU:			+/-333					
Europium-154			U	-90.2	pCi/L				
	Uncert:			+/-201					
	TPU:			+/-205					
Europium-155			U	405	pCi/L				
	Uncert:			+/-371					
	TPU:			+/-415					
Potassium-40			U	-177	pCi/L				
	Uncert:			+/-519					
	TPU:			+/-525					
Rad Gas Flow									

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QC Summary

Workorder: 425499

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch 1675923									
QC1203815773 MB									
Strontium-90			U	-0.266	pCi/L			JXB7	07/01/1714:19
Uncert:				+/-0.572					
TPU:				+/-0.572					
**Strontium Carrier	7.75			5.80	mg	REC: 75	(40%-110%)		
QC1203815774 425103020 DUP									
Strontium-90		5.98		4.83	pCi/L				07/05/1708:00
Uncert:		+/-1.06		+/-1.02		RPD: 21*	(0% - 20%)		
TPU:		+/-1.43		+/-1.27		RER: 1.19	(0-2)		
**Strontium Carrier	7.75	5.50		7.20	mg	REC: 93	(40%-110%)		
QC1203815775 LCS									
Strontium-90	72.8			83.3	pCi/L	REC: 114	(80%-120%)		07/01/1714:20
Uncert:				+/-4.35					
TPU:				+/-14.1					
**Strontium Carrier	7.75			5.20	mg	REC: 67	(40%-110%)		
Rad Liquid Scintillation									
Batch 1674668									
QC1203812815 MB									
Carbon-14			U	2.19	pCi/L			BXM4	06/23/1706:45
Uncert:				+/-17.4					
TPU:				+/-17.4					
QC1203812816 425282001 DUP									
Carbon-14		65.6		46.9	pCi/L				06/23/1707:22
Uncert:		+/-19.6		+/-18.9		RPD: 33	(0% - 100%)		
TPU:		+/-23.1		+/-20.8		RER: 1.18	(0-2)		
QC1203812817 425282001 MS									
Carbon-14	1250	65.6		1210	pCi/L	REC: 92	(75%-125%)		06/23/1707:58
Uncert:		+/-19.6		+/-62.7					
TPU:		+/-23.1		+/-234					
QC1203812818 LCS									
Carbon-14	1250			1110	pCi/L	REC: 89	(80%-120%)		06/23/1708:14
Uncert:				+/-60.3					
TPU:				+/-215					
Batch 1675960									
QC1203815891 MB									
Tritium			U	66.7	pCi/L			BXM4	07/06/1708:59
Uncert:				+/-205					
TPU:				+/-206					
QC1203815892 425280008 DUP									
Tritium		9520		8980	pCi/L				07/06/1709:46
Uncert:		+/-495		+/-485		RPD: 6	(0% - 20%)		
TPU:		+/-1910		+/-1800		RER: 0.403	(0-2)		
QC1203815893 425280008 MS									
Tritium	4480	9520		13900	pCi/L	REC: 97	(75%-125%)		07/07/1706:22
Uncert:		+/-495		+/-1500					
TPU:		+/-1910		+/-3070					
QC1203815894 LCS									
Tritium	2230			2110	pCi/L	REC: 94	(80%-120%)		07/06/1710:48
Uncert:				+/-470					
TPU:				+/-622					

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QC Summary

Workorder: 425499

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch 1678200									
QC1203821232 MB									
Selenium-79			U	2.09	pCi/L			CXS7	07/01/1709:46
	Uncert:			+/-12.0					
	TPU:			+/-12.0					
**Selenium Carrier	20.0			19.4	mg	REC: 97	(40%-110%)		
QC1203821233 425233002 DUP									
Selenium-79	U	-13.7	U	11.4	pCi/L				07/01/1710:49
	Uncert:	+/-22.7		+/-11.2		RPD: 0	N/A		
	TPU:	+/-22.7		+/-11.2		RER: 1.95	(0-2)		
**Selenium Carrier	20.0	10.1		21.1	mg	REC: 106	(40%-110%)		
QC1203821234 LCS									
Selenium-79	19600			16300	pCi/L	REC: 83	(80%-120%)		07/01/1711:50
	Uncert:			+/-320					
	TPU:			+/-463					
**Selenium Carrier	20.0			19.9	mg	REC: 100	(40%-110%)		
QC1203821238 REF									
Selenium-79				19600	pCi/L				07/03/1721:02
	Uncert:			+/-388					
	TPU:			+/-560					
**Selenium Carrier	20.0			20.0	mg	REC: 100	(40%-110%)		

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 >= 2X the MDA and, after corrections, result is >= 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 acceptence 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.