



a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417 2040 Savage Road Charleston, SC 29407 P 843.556.8171 F 843.766.1178

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 duth man Brielle Luthman for Heather Shaffer Project Manager

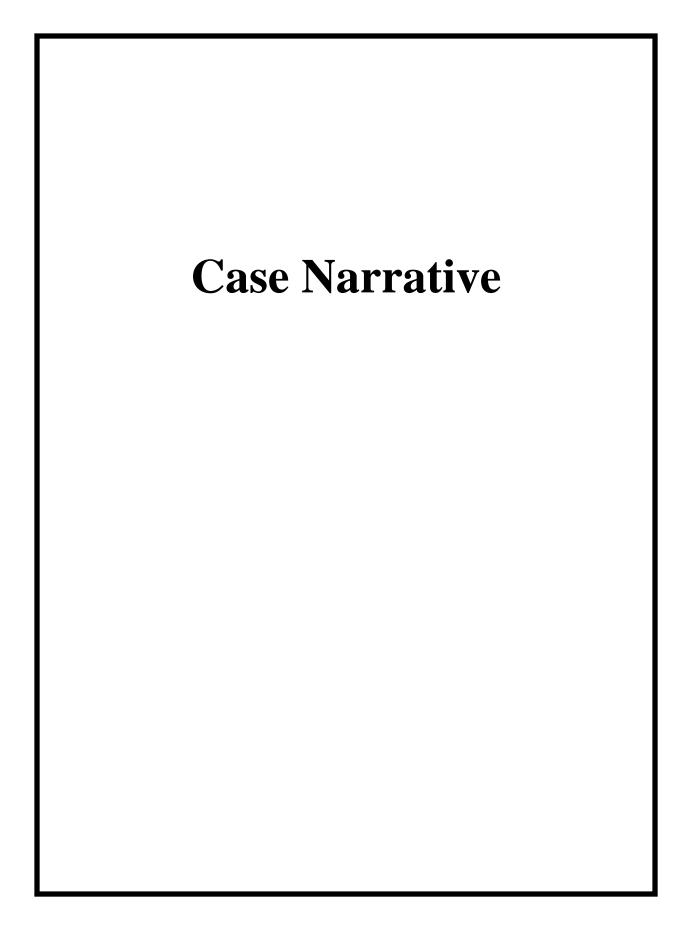
Purchase Order: 300071 - 7H Chain of Custody: S17-006-206 and S17-006-254 Enclosures



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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	Sample
Identification	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.

GEL Laboratories LLC

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

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.

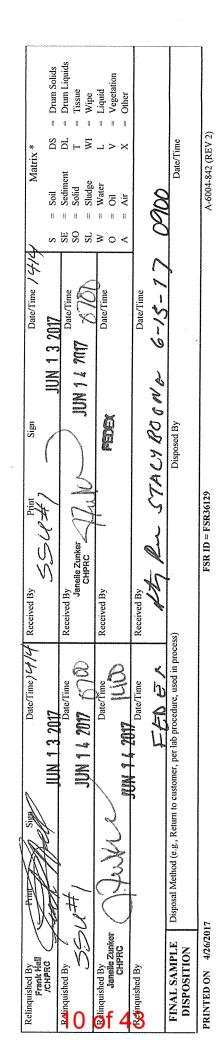
Certification Statement

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

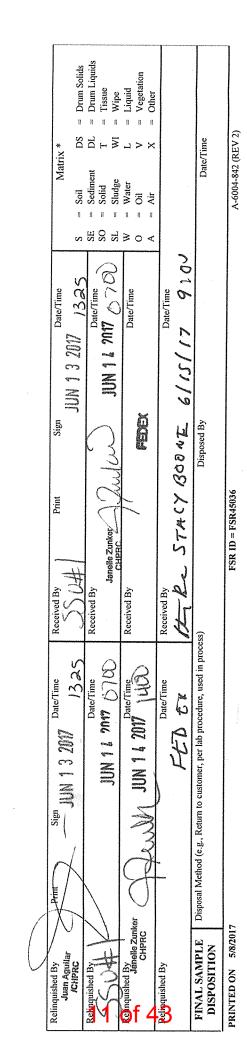
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CH2MHill Plateau Remediation Company	au Remediation	U	CHAIN OF CUSTC	OF CUSTODY/SAMPLE ANALYSIS REQUEST	LYSIS REQUEST	c.o.c.# S17-006-206
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Collector Prank Neal	_	•	Contact/Requester Karen	Karen Waters-Husted	Telephone No. 509-376-4650	
SAF No. S	S17-006	ÿ	Sampling Origin Hanfo	Hanford Site	Purchase Order/Charge Code	300071
Project Title S	SURV, JUNE 2017		Logbook No. HNF-N-506	HNF-N-506 931 52	Ice Chest No. CWS- WO	C
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Protocol S	SURV		Priority: 30 Days P	PRIORITY	Offsite Property No. 8038	
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Holding Time	6 Months	
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Date	JUN 1 3 2017	
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Sample No. Filter * Date Line	B39PP3	



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Collector Jue	Juan Agullar ICHPRC	4			Contact/	Contact/Requester Karen Waters-Husted	Husted	Telephone No. 509-376-4650	50	
SAF No.	S17.	S17-006		- The second	Sampling Origin	Origin Hanford Site		Purchase Order/Charge Code	300071	
Project Title	SUF	SURV, JUNE 2017	IE 2017		Logbook No.	い。 HNF-N-506 88/ 79	50	Ice Chest No. $\int_{a}^{b} \dot{u} S^{-1}$	010	
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Protocol	SURV	۲V			Priority:	: 30 Days PRIORITY	IIIV	Offsite Property No.	NJS NW	
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Sample No.	Filter	*	Date	Time	No/Type Container	Sample /	Sample Analysis	Holding Time	Preservative	
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B39T75	z	N			1x500-mL G/P	C14_LSC: COMMON		6 Months	None	
B39T75	N	N			4x1-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01		6 Months	HNO3 to pH <2	· -
B39T75	z	M			1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	N	6 Months	HNO3 to pH <2	- 1
B39T75	z	X			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	COMMON	6 Months	HNO3 to pH <2	



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July 10, 2017

None

6 Months

TRITIUM_DIST_LSC: COMMON

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5 Sample containers intact and sealed? Sample iD's and Containers Affected: 6 Samples requiring chemical preservation at proper pH? Sample iD's and Containers Affected: 7 Do any samples require Volatile Analysis? If Preservation added. Lot#: 8 Samples received within hc.difng time? Do' VOA vials containers 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? Sample ID's affected: 12 Are sample containers identifiable as GEL provided? Sample ID's affected:	5 Sample containers intact and sealed? Sample ID's and Containers Affected: If Preservation added. Lot#: 6 Samples requiring chemical preservation at proper pH? If Yes, Are Encores or Soil Kits present? YesNo(If yes, take to VOA Freezer) Do VOA vials contain acid preservation? YesNoN/A(If unknown, select No) VOA vials free of headspace? YesNoN/ASample ID's and containers affected: 7 Do any samples require Volatile Analysis? ID's and containers affected: 8 Sample ID's on COC match ID's on bottles? ID's and containers affected: 9 Sample ID's 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? Sample ID's affected: 13 COC form is properly signed in relinquished/received sections? Sample ID's affected:	A Daily check	k performed and passed on IR			
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7 Do any samples require Volatile If Yes, Are Encores or Soil Kits present? Yes	7 Do any samples require Volatile Analysis? If Yes, Are Encores or Soil Kits present? YesNo (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? YesNoN/A 8 Samples received within hc.difing time? ID's and containers 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? Sample ID's affected: 13 COC form is properly signed in relinquished/received sections? Sample ID's affected:					
8 Samples received within hc.ding 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? Sample ID's affected: 13 COC form is properly signed in COC	8 Samples received within hc.ding 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? Sample ID's affected: 13 COC form is properly signed in relinquished/received sections? Image: Container in the image: Container	71 7	nples require Volatile			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:
9 Sample ID's on COC match table solid 10 Date & time on COC match date & time on bottles? 11 Number of containers received match number indicated on COC? 12 Are sample containers identifiable as GEL provided? 13 COC form is properly signed in	9 Sample ID's on COC match date & time on COC match date & time on bottles? Sample ID's 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? Sample ID's affected: 13 COC form is properly signed in relinquished/received sections? Image: Content of the section of the s			V	- or	a the ID's and tests affected;"
10 Date & time of COC match date & time 11 Number of containers received match number indicated on COC? 12 Are sample containers identifiable as GEL provided? 13 COC form is properly signed in	10 Date & time of COC match date & time 11 Number of containers received match number indicated on COC? 12 Are sample containers identifiable as GEL provided? 13 COC form is properly signed in relinquished/received sections?	91 .	's on COC match ID's on	1		Sample ID's and containers 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	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?	Date & tim				Sample ID's affected:
GEL provided? Image: COC form is properly signed in	Image: Constraint of the section o					Sample ID's affected:
COC form is properly signed in	3 COC form is properly signed in relinquished/received sections?					
		COC form	is properly signed in	-		
			PM (or PMA) revie	w: In	itial	
GL-CHL-SR-001 Rev 5	GL-CHL-SR-001 Rev 5					12 of 43

Data Review Qualifier Definitions

Report Date: 10-JUL-17

GEL UNBORATORIES LLC 2040 Savage Road Charleston, SC 29407 (843) 556–8171

Project Specific Qualifier Definitions for GEL Client Code: CPRC

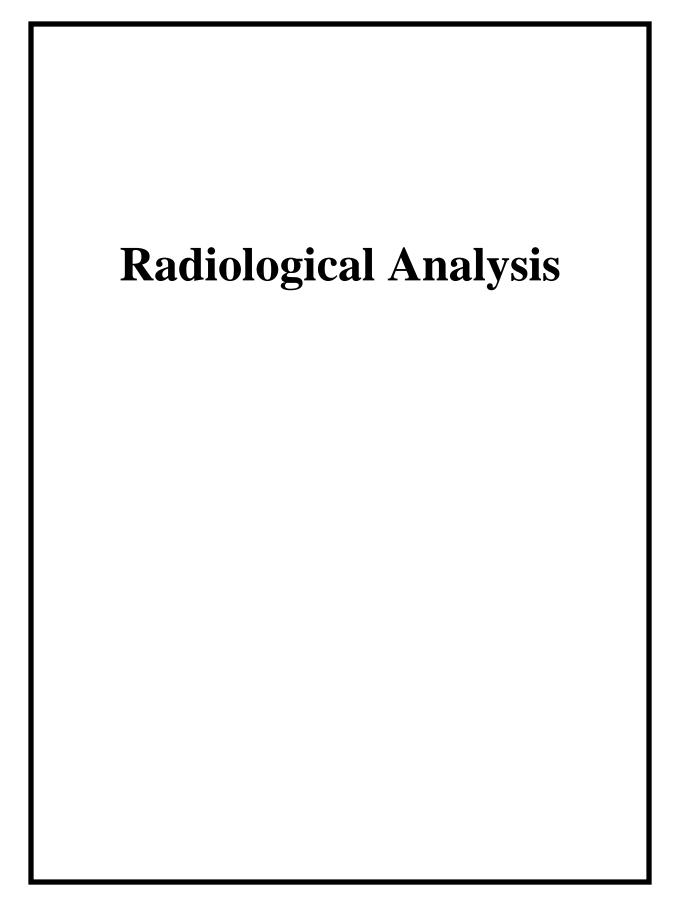
Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
Р	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
С	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
3	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	
4	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	
<u>Z</u>	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
В	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.		
=	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
N	Duplicate precision not met.	Inorganics	Metals
)	Analyte failed to recover within LCS limits (Organics only)	Organics	
6	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
N	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
3	The associated QC sample blank has a result >= 2X the MDA and, after corrections, result is >= MDA for this sample	Radiological	
(Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
÷	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
3	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
0	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 SpectroscopyUncertain identification	Radiological	

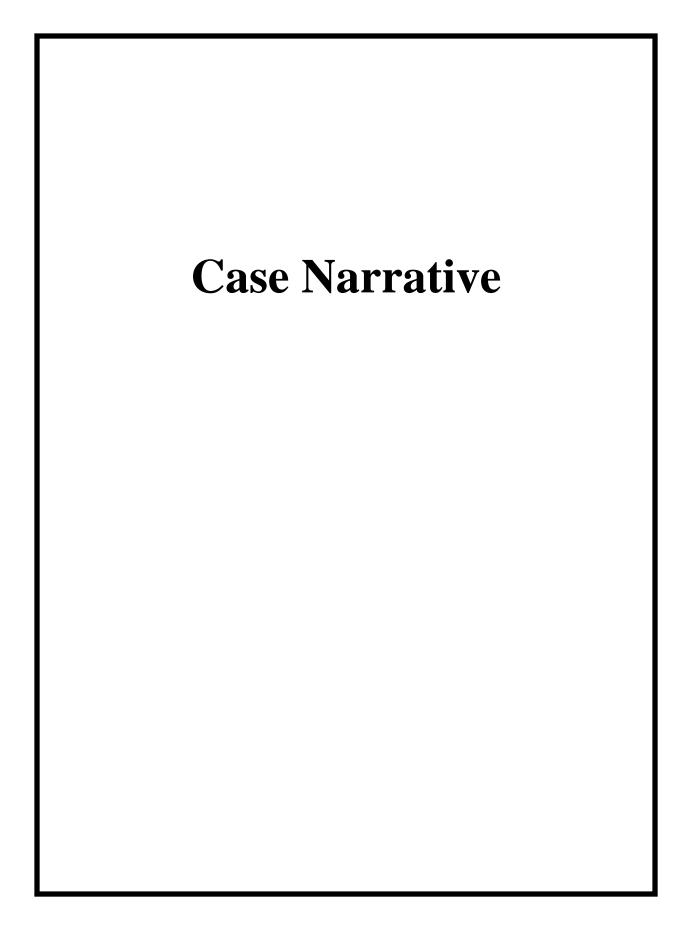
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Laboratory Certifications

State Certification Alaska UST-0110 88-0651 Arkansas CLIA 42D0904046 California 2940 Colorado SC00012 Connecticut PH-0169 SC00012 Delaware DoD ELAP/ ISO17025 A2LA 2567.01 Florida NELAP E87156 Foreign Soils Permit P330-15-00283, P330-15-00253 Georgia SC00012 967 Georgia SDWA SC00012 Hawaii Idaho Chemistry SC00012 Idaho Radiochemistry SC00012 Illinois NELAP 200029 Indiana C-SC-01 Kansas NELAP E-10332 Kentucky SDWA 90129 Kentucky Wastewater 90129 03046 (AI33904) Louisiana NELAP LA170010 Louisiana SDWA Maryland 270 Massachusetts M-SC012 Michigan 9976 SC00012 Mississippi NE-OS-26-13 Nebraska 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 9904 Oklahoma Pennsylvania NELAP 68-00485 10120002 S.Carolina Radchem South Carolina Chemistry 10120001 Tennessee TN 02934 T104704235-17-12 Texas NELAP SC000122017-22 Utah NELAP VT87156 Vermont Virginia NELAP 460202 C780 Washington West Virginia 997404

List of current GEL Certifications as of 10 July 2017





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).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
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 Identification425499002B39T75

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).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
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).

<u>GEL Sample ID#</u>	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).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
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).

<u>GEL Sample ID#</u>	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).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
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).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
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

<u>Analytical Method:</u> SE79_SEP_IE_LSC <u>Analytical Procedure:</u> GL-RAD-A-031 REV# 13 <u>Analytical Batch:</u> 1678200

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

<u>GEL Sample ID#</u>	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: Alout G. Mulary

Name: Heather McCarty

Date: 08 JUL 2017

Title: Analyst II



Report Date: July 7, 2017

				ertificat	d ZU e of Anal Summar	lysis			Page 1 of	1
SDG Number: Lab Sample ID:	GEL425499 425499001	Client: CPRC001				Project: Matrix:	•			
Client ID: Batch ID: Run Date: Data File: Prep Batch: Prep Date:	B39PP3 1675923 07/05/2017 07:59 S1675923r1.xls 1675923 06/28/2017 10:54		Method: Analyst: Aliquot:		XB7 00 mL	P_PRECIP_GPC	Instrument: Count Time:		''As Received'' GL-RAD-A-004 PIC4A 60 min	
CAS No.	Parmname	Qual	Re	esult	Units	Uncert	TPU	MDC	RDL	
10098-97-2	Strontium-90		8	0.9	pCi/L	+/-4.33	13.5	1.54	2.00	
Surrogate/Tracer	r 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).

40 0047 .

Report Date: July 7, 2017

			Samp	ate of Anal le Summar					
SDG Number: Lab Sample ID:	GEL425499 425499002		Client: Date Collected: Date Received:	CPRC001 06/13/2017 1 06/15/2017 0		Project: Matrix:		CPRC0S17006 WATER	
Client ID: Batch ID: Run Date: Data File: Prep Batch:	B39T75 1677692 07/01/2017 10:56 S0425499002_PU.1A.gcnf 1677692 06/30/2017 00:00		Method:PUISO_PRECIP_AEAAnalyst:BXA4Aliquot:0.4 LPrep Method:DOE EML HASL-300, Pu-		SOP Ref: Instrument: Count Time:		As Received'' GL-RAD-A-011 067 39.9998 min		
Prep Date:	00/30/2017 00:00								
Prep Date: CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL	
•		Qual U	Result	Units pCi/L	Uncert +/-0.0876	TPU 0.0877	MDC 0.197		
CAS No.	Parmname	-						1.00	
CAS No.	Parmname Plutonium-238 Plutonium-239/240	U U U	-0.0073	pCi/L pCi/L	+/-0.0876	0.0877	0.197	1.00	

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).

GEL Labord	atories LLC	Rep	Report Date: July 7, 2017						
			Certific	1 <mark>RQd 20</mark> ate of Anal le Summa	lysis			Page 1 of	1
SDG Number: Lab Sample ID:	GEL425499 425499002						Project: CPRC0S17006 Matrix: WATER		
Client ID: Batch ID: Run Date: Data File: Prep Batch: Prep Date:	B39T75 1677694 07/01/2017 10:53 S0425499002_AM.1A.gcnf 1677694 06/30/2017 00:00		Method: Analyst: Aliquot: Prep Method:	AMCMISO_EIE_PREC_AEA BXA4 0.4 L DOE EML HASL-300, Am-05		Instrument: Count Time:	GL- 1095	As Received'' SL-RAD-A-011 095 39.9998 min	
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	0.0768	1.00	
Surrogate/Tracei	recovery		Result Nomir	nal Units	Recovery%	Acceptable Lim	its		
Americium-243 T	racer		5.02 5.24	pCi/L	95.8	(30%-105%)			

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).

July 1<u>.Q. 2017</u>

Report Date: July 7, 2017

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

Uranium-232 Trace		3.03	5.22	pCi/L	58.1	(30%-10	5%)						
Surrogate/Tracer recovery			Result	Nominal	Units	Recovery%	Acceptable	Limits					
7440-61-1	Uranium-238		1.56		pCi/L	+/-0.417	0.489	0.195	1.00				
15117-96-1/13982-7	Uranium-235/236	U	0.	0.138		0.138		0.138		+/-0.152	0.154	0.103	1.00
U-233/234 13968-55-3/13966-29-5	Uranium-233/234		1.76		pCi/L	+/-0.446	0.531	0.225	1.00				

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).

GEL Labord	atories LLC		Report Date: July 7, 2017							2017
				ertifica	Rad 20 Ite of Ana e Summa	lysis			Page 1	of 1
SDG Number: Lab Sample ID:	GEL425499 425499002			Client: CPRC001 Date Collected: 06/13/2017 12:58 Date Received: 06/15/2017 09:00					CPRC0S17006 WATER	
Client ID: Batch ID: Run Date: Data File: Prep Batch: Prep Date:	B39T75 1677707 07/06/2017 05:45 PU1677707.xls 1677707 06/30/2017 00:00	Metho Analys Aliquo		Method: Analyst: Aliquot: Prep Method:		LSC , HASL-300, Pu	Prep Bas SOP Ref Instrum Count T -11-	i: o ent: 1	"As Received" GL-RAD-A-035 LSCBLUE 45 min	
CAS No.	Parmname	Qual	Re	esult	Units	Uncert	TPU	MDC	C RDL	
14119-32-5	Plutonium-241	U	-6	5.74	pCi/L	+/-10.4	10.4	18.3	25.0	
Surrogate/Trace	recovery		Result	Nomina	al Units	Recovery%	Acceptable	Limits		
Plutonium-242 Tr	acer		4.06	4.92	pCi/L	82.5	(30%-10	5%)		

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).

GEL Labord	atories LLC							Report	Date: July 7, 20	017	
				ertificat	Rad 20 te of Ana Summa	lysis			Page 1	of 1	
SDG Number: Lab Sample ID:	GEL425499 425499002		Client: Date Coll Date Rec	ected:	CPRC001 06/13/2017 06/15/2017		Project: Matrix:		CPRC0S17006 WATER		
Client ID: Batch ID: Run Date: Data File: Prep Batch: Prep Date:	B39T75 1675923 07/01/2017 14:19 S1675923r1.xls 1675923 06/28/2017 10:54		Method: Analyst: Aliquot: Prep Met	J	JXB7 300 mL	P_PRECIP_GP Modified/DOE	Instrument: Count Time:		"As Received" GL-RAD-A-004 PIC9A 60 min	ı	
CAS No.	Parmname	Qual	Re	esult	Units	Uncert	TPU	MD	C RDL		
10098-97-2	Strontium-90	U	0.	.559	pCi/L	+/-0.650	0.656	1.09	2.00		
Surrogate/Trace	Surrogate/Tracer recovery		Result	Nominal	l Units	Recovery%	Acceptable	Limits			
Strontium Carrier			6.20	7.75	mg	80	(40%-110)%)			

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).

Report Date: July 7, 2017

OLL Lucci	aiories LLC			Report Date: July 7, 2017								
			Certific	Tread 20 ate of Analy le Summary	sis		f 1					
SDG Number: Lab Sample ID:	GEL425499 425499002	Client: Date Collected: Date Received:	CPRC001 06/13/2017 12 06/15/2017 09		Project: Matrix:		RC0S17006 ATER					
Client ID: Batch ID: Run Date: Data File: Prep Batch: Prep Date:	atch ID: 1675360 un Date: 06/22/2017 07:30 ata File: G425499002.CNF;1 rep Batch: 1675360		Method:901.1_GAMMA_GSAnalyst:MXR1Aliquot:0.5 LPrep Method:EPA 901.1			Prep Ba SOP Re Instrum Count T	f: GL ent: GA	As Received'' L-RAD-A-013 AM36 20 min				
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	7				
13967-70-9	Cesium-134	U	-0.215	pCi/L	+/-6.90	6.90	13.7	1				
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		1			
14683-23-9	Europium-152	U	24.7	pCi/L	+/-19.0	22.2	31.6	1				
15585-10-1	Europium-154	U	-0.0765	pCi/L	+/-19.3	19.3	41.4	1				
13967-70-9 10045-97-3 10198-40-0 14683-23-9 15585-10-1	Cesium-137 Cobalt-60 Europium-152	U U U U	0.408 -0.692 24.7	pCi/L pCi/L pCi/L	+/-6.81 +/-7.36 +/-19.0	6.81 7.37 22.2	13.6 15.3 31.6	-	15.0			

pCi/L

pCi/L

Units

+/-17.1

+/-99.8

Recovery%

17.4

101

Acceptable Limits

33.1

228

Surrogate/Tracer recovery

Comments:

14391-16-3

13966-00-2

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

6.84

26.8

Nominal

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

U

U

Result

The MDC is a sample specific MDC.

Europium-155

Potassium-40

GEL Labord	atories LLC				Report Date: July 7, 2017				
				1 <mark>Rad 2017</mark> ate of Analysis le Summary		Page 1 of 1			
SDG Number: Lab Sample ID:	GEL425499 425499002		Client: Date Collected: Date Received:	CPRC001 06/13/2017 12:58 06/15/2017 09:00	Project: Matrix:	CPRC0S17006 WATER			
Client ID: Batch ID: Run Date: Data File: Prep Batch: Prep Date:	B39T75 1674668 06/23/2017 04:56 C1674668.xls 1674668 06/22/2017 09:53		Method: Analyst: Aliquot: Prep Method:	C14_LSC BXM4 60.06 mL EPA EERF C-01 Modified	Prep Basis: SOP Ref: Instrument: Count Time:	"As Received" GL-RAD-A-003 LSCRED 35 min			
CAS No.	Parmname	Qual	Result	Units Uncert	TPU M	IDC RDL			
14762-75-5	Carbon-14	U	-2.64	pCi/L +/-17.2	17.2 3	0.0 50.0			
Surrogate/Trace	recovery	·	Result Nomir	nal Units Recovery%	Acceptable Limit	ts			

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).

GEL Labor	atories LLC				Report Date: July 7, 2017					
			July	1 _{RQd} 20	17			Page 1 of 1		
			Certific	ate of Analy			-			
				le Summar						
SDG Number:	GEL425499		Client:	CPRC001		Project:	СР	RC0S17006		
Lab Sample ID:	425499002		Date Collected:	06/13/2017 12	2:58	Matrix:	W	ATER		
			Date Received:	06/15/2017 0	9:00					
Client ID:	B39T75					Prep Bas	sis: "A	"As Received"		
Batch ID:	1675960	60		TRITIUM_I	DIST_LSC	SOP Ref: G		2-RAD-A-002		
Run Date:	07/06/2017 04:09		Analyst:	BXM4		Instrum	CGREEN			
Data File:	T1675960R.xls		Aliquot:	50 mL		Count T	ime: 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	-8 Tritium		563	pCi/L	+/-234	258	362	400		
Surrogate/Trace	r recovery	·	Result Nomin	nal Units	Recovery%	Acceptable	Limits			

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).

GEL Labord	atories LLC							Report I	Date: July 7, 201	7	
		ysis 'y		Page 1	of 1						
SDG Number: Lab Sample ID:	GEL425499 425499002		Client: Date Colle Date Recei	cted:	CPRC001 06/13/2017 1 06/15/2017 (Project: Matrix:		CPRC0S17006 WATER		
Client ID: Batch ID: Run Date: Data File: Prep Batch: Prep Date:	B39T75 1678200 07/01/2017 08:44 SE1678200R3.xls 1678200 06/29/2017 09:29		Method: Analyst: Aliquot: Prep Meth	(SE79_SEP_ CXS7 0.08 L NERC ORI		Prep Bas SOP Ref Instrumo Count Ti	ent:	"As Received" GL-RAD-A-031 LSCBLUE 60 min		
CAS No.	Parmname	Qual	Res	ult	Units	Uncert	TPU	MDC	C RDL		
15758-45-9	Selenium-79	U	5.	94	pCi/L	+/-12.6	12.6	21.3	50.0		
Surrogate/Tracer	urrogate/Tracer recovery		Result	Nominal	l Units	Recovery%	Acceptable	Limits			
Selenium Carrier			18.6 20.0		mg	93	(40%-110%)				

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).

Quality Control Summary

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

QC Summary

Report Date: July 7, 2017 **Client : CH2MHill Plateau Remediation Company** Page 1 of 6 MSIN R3-50 CHPRC PO Box 1600 Richland, Washington 99352 **Contact:** Mr. Scot Fitzgerald Workorder: 425499 NOM QC Criteria Date Time Parmname Sample Qual QC Units Range Analyst Rad Alpha Spec Batch 1677692 OC1203820112 MB Plutonium-238 U -0.0389 pCi/L BXA4 07/01/1710:56 +/-0.0737Uncert: TPU: +/-0.0739 U Plutonium-239/240 0.0168 pCi/L Uncert: +/-0.0936 TPU: +/-0.0938 **Plutonium-242 Tracer 4.92 2.76 pCi/L REC: (30%-105%) 56 +/-0.788 Uncert: TPU: +/-1.15QC1203820113 LCS U Plutonium-238 0.0115 pCi/L 07/01/1710:56 Uncert: +/-0.0638 TPU: +/-0.0639 4.94 Plutonium-239/240 pCi/L REC: (80%-120%) 4.63 94 Uncert: +/-0.631 TPU: +/-0.914 **Plutonium-242 Tracer 4.92 3.82 pCi/L REC: 78 (30% - 105%)Uncert: +/-0.649 +/-0.957 TPU: QC1203820114 425499002 DUP -0.00508 Plutonium-238 U -0.0073 U pCi/L Uncert: +/-0.0876 +/-0.0438 RPD: 0 N/A 0.0443 TPU: +/-0.0877 +/-0.0439 RER: (0-2)Plutonium-239/240 U -0.0705 U -0.0102 pCi/L +/-0.0941+/-0.0449 RPD: 0 N/A Uncert: +/-0.045 1.13 (0-2)TPU: +/-0.0942RER: **Plutonium-242 Tracer 4.92 4.06 3.93 pCi/L REC: 80 (30% - 105%)+/-0.622 Uncert: +/-0.634 TPU: +/-0.920 +/-0.937 Batch 1677694 QC1203820130 MB U 07/01/1710:56 Americium-241 0.0245 pCi/L BXA4 Uncert: +/-0.0563 TPU: +/-0.0564**Americium-243 Tracer 5.24 4.93 pCi/L REC: (30%-105%) 94 Uncert: +/-0.568 TPU: +/-0.874 QC1203820131 LCS Americium-241 4.92 4.37 pCi/L REC: 89 (80%-120%) 07/01/1710:53 +/-0.540Uncert: TPU: +/-0.781 **Americium-243 Tracer 5.24 5.30 pCi/L REC: 101 (30% - 105%)Uncert: +/-0.583

+/-0.894

TPU:

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QC Summary

Workorder: 425499			•	Page 2 of 6						
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	<i>C</i> : <i>T</i>	RER:	0.155	(0-2)		
**Americium-243 Tracer	5.24	5.02		5.48	pC1/L	REC:	104	(30%-105%)		
	Uncert: TPU:	+/-0.565 +/-0.871		+/-0.554 +/-0.856						
Batch 1677699 —	110.	+/-0.0/1		+/-0.850						
QC1203820134 MB Uranium-233/234			U	0.00902	pCi/L				BXA4	07/01/1710:12
	Uncert:		U	+/-0.0669	PCI/L				Dinii	07/01/1/10.12
	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						
**Uranium-232 Tracer	TPU: 5.21			+/-0.0827 5.03	nCi/I	REC:	97	(30%-105%)		
oranium-252 Tracer	Uncert:			+/-0.538	pei/L	KLC.)1	(30/0-103/0)		
	TPU:			+/-0.850						
QC1203820135 LCS										
Uranium-233/234				7.48	pCi/L					07/01/1710:17
	Uncert:			+/-0.866						
ц. : <u>225/22</u> с	TPU:			+/-1.46	0.1					
Uranium-235/236	TT (0.320	pCi/L					
	Uncert: TPU:			+/-0.209 +/-0.215						
Uranium-238	6.75			7.81	pCi/L	REC:	116	(80%-120%)		
	Uncert:			+/-0.885	Perz	ille.	110	(00/0120/0)		
	TPU:			+/-1.51						
**Uranium-232 Tracer	5.21			3.70	pCi/L	REC:	71	(30%-105%)	1	
	Uncert:			+/-0.727						
	TPU:			+/-1.10						
QC1203820136 425499002 DUP Uranium-233/234		1.74	<pre></pre>	1 61	лC:Л					07/01/1710.17
Ofailfulli-235/234	Uncert:	1.76 +/-0.446		1.61 +/-0.373	pCi/L	RPD:	8	(0% - 20%)		07/01/1710:17
	TPU:	+/-0.440		+/-0.373		RER:	0.406	(0.2)		
Uranium-235/236	U U	0.138		0.0478	pCi/L	TUDIU.	01100	(0 -)		
	Uncert:	+/-0.152		+/-0.0939	1	RPD:	6	(0% - 100%))	
	TPU:	+/-0.154	ŀ	+/-0.0942		RER:	0.98	(0-2)		
Uranium-238		1.56		1.20	pCi/L					
	Uncert:	+/-0.417		+/-0.326		RPD:	26*	· · · · · ·		
**! Ironium 222 T	TPU:	+/-0.489		+/-0.371		RER:	1.12	(0-2)		
**Uranium-232 Tracer	5.22	3.03		4.52	pC1/L	REC:	87	(30%-105%)		
	Uncert: TPU:	+/-0.767 +/-1.15		+/-0.668 +/-1.02						
Batch 1677707 —	110.	F/ -1.1 J	,	1/-1.02						
QC1203820149 MB										
Plutonium-241			U	-11.8	pCi/L				BXA4	07/06/1707:19

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QC Summary

		<u> </u>		Jan							
Workorder: 425499					Page 3 of 6						
Parmname	NOM	Sample	Qual	QC	Units	QC	Criteria	Range	Analyst	Date Time	
Rad Alpha Spec Batch 1677707											
**Plutonium-242 Tracer	Uncert: TPU: 4.92 Uncert: TPU:			+/-15.4 +/-15.4 2.76 +/-0.788 +/-1.15	pCi/L	REC:	56	(30%-105%)		
QC1203820150 425499002 DUP				+/-1.13							
Plutonium-241	U Uncert:	-6.74 +/-10.4	4	-1.52 +/-11.1	pCi/L	RPD:	0	N/A		07/06/1708:06	
**Plutonium-242 Tracer	TPU: 4.92 Uncert:	+/-10.4 4.00 +/-0.622	6 2	+/-11.1 3.93 +/-0.634	pCi/L	RER: REC:	0.671 80	(0-2) (30%-105%)		
QC1203820151 LCS	TPU:	+/-0.920)	+/-0.937							
Plutonium-241	184 Uncert:			170 +/-14.3	pCi/L	REC:	93	(80%-120%)	07/06/1708:53	
**Plutonium-242 Tracer	TPU: 4.92 Uncert:			+/-38.2 4.23 +/-0.561	pCi/L	REC:	86	(30%-105%)		
	TPU:			+/-0.838							
Rad Gamma Spec Batch 1675360											
QC1203814555 MB Antimony-125			U	2.55	pCi/L				MXR1	06/22/1707:31	
Cesium-134	Uncert: TPU:		U	+/-11.5 +/-11.6 -2.77	pCi/L						
Cesium-154	Uncert: TPU:		U	+/-3.85 +/-4.05	pent						
Cesium-137	Uncert:		U	1.64 +/-4.69	pCi/L						
Cobalt-60	TPU: Uncert:		U	+/-4.75 1.89 +/-5.64	pCi/L						
Europium-152	TPU:		U	+/-5.71 -1.48	pCi/L						
Europium-154	Uncert: TPU:		U	+/-11.3 +/-11.4 -0.932	pCi/L						
	Uncert: TPU:		U	+/-12.7 +/-12.7	pent						
Europium-155	Uncert:		U	-0.472 +/-14.7	pCi/L						
Potassium-40	TPU: Uncert:		U	+/-14.7 32.7 +/-76.5	pCi/L						
	TPU:			+/-78.0							
QC1203814556 424516023 DUP Antimony-125	U Uncert:	-2.94 +/-12.2		-1.64 +/-13.6	pCi/L	RPD:	0	N/A		06/22/1707:31	
	TPU:	+/-12.2		+/-13.6		RER:	0.139	(0-2)			

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QC Summary

Parmame NOM Sample Qual QC Units QC Criteria Range Analyst Date Time Rad Gamm Spec bach 1075500	Workorder: 425499		-	*	•/	•	Page 4 of 6					
Baid167330Cisim-134UVVVKUncert+5-540+6-20KKVTUU+5-540+6-20KKVCisim-137TUU+5-540+6-20KKVTUU+5-540+6-20KKVVCobalt-60TUU+4-153+7-180KVVCobalt-60TUU+4-18+7-193KVVCobalt-60U-5-16VKKVVCobalt-61U+4-18+7-193KVVVCobalt-61U-5-16V-7-16(0× - 20%)VCobalt-61U-5-16V-7-16VVVCobalt-61U-5-16V-7-16(0× - 20%)VVCobalt-61Uncert+4-18-7-16KKVVCobalt-61Uncert-7-12KKKVVCobalt-61Uncert-7-12KKKVVCobalt-61Uncert-7-16KKKVVCobalt-61Uncert-7-16KKKKVCoret-7-16KKKKKKKCoret-7-16KKKKKKKCoret-7-13Uncert-7-13KKKK </th <th>Parmname</th> <th>NOM</th> <th>Sample</th> <th>Qual</th> <th>QC</th> <th>Units</th> <th>QC</th> <th>C Criteria</th> <th>Range</th> <th>Analyst</th> <th>Date Time</th>	Parmname	NOM	Sample	Qual	QC	Units	QC	C Criteria	Range	Analyst	Date Time	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Rad Gamma Spec											
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Batch 1675360											
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Cesium-134	U	-1.3	4 U	-0.802	nCi/L						
$\begin{array}{cccc} \mbox{TPU:} & +1.5.46 & +1.6.20 & RER: 0.27 & (0.2) $						penz	RPD:	0	N/A			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$												
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Cesium-137		10	07	117	pCi/L						
$ \begin{array}{cccc} Coherence (Coherence ($												
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		TPU:					RER:	0.776	(0-2)			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Cobalt-60					pCi/L		_				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Europium 152					mC:/I	RER:	0.578	(0-2)			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Europium-152					pC1/L	, רוח ח	0	NI/A			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$												
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Europium-154					nCi/L	KLK.	0.507	(0-2)			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Luiopium io i					pent	RPD.	0	N/A			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$												
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Europium-155					pCi/L						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	-	Uncert:					RPD:	0	N/A			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$								0.331	(0-2)			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Potassium-40	U	-33.	4 U	-56.9	pCi/L						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$												
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		TPU:	+/-61	.8	+/-74.8		RER:	0.475	(0-2)			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		1 105 . 05			1.1(E).05	C:/I	DEC.	105	(800/ 1000/	``	06/00/1707.25	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Americium-241					pC1/L	KEC:	105	(80%-120%))	06/22/1707:35	
Antimony-125 U -33.9 pCi/L Uncert: +/-330 - TPU: +/-331 - Cesium-134 Uncert: +/-143 TPU: +/-143 - Cesium-137 42000 457.4 Uncert: +/-145 - TPU: +/-145 - Cobalt-60 38000 93900 PCi/L REC: 104 (80%-120%) Cobalt-60 38000 39300 PCi/L REC: 103 (80%-120%) Cobalt-60 38000 39300 PCi/L REC: 103 (80%-120%) Cobalt-60 38000 39300 PCi/L REC: 103 (80%-120%) Europium-152 Uncert: +/-420 -												
$\begin{array}{cccc} & & & & & & & & & & & & & & & & & $	Antimony-125	IFU.		IJ		nCi/L						
$\begin{array}{cccc} & TPU: & +/-33 & & & & & & & & & & & & & & & & & & $	Anthiony 125	Uncert		U		pent						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$												
$\begin{array}{cccc} & & & & & & & & & & & & & & & & & $	Cesium-134			U		pCi/L						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		Uncert:			+/-143							
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					+/-145							
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cesium-137	42000			43900	pCi/L	REC:	104	(80%-120%))		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$												
$\begin{array}{cccccccccccccccccccccccccccccccccccc$							~					
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cobalt-60					pCi/L	REC:	103	(80%-120%))		
Europium-152 U -339 pCi/L Uncert: $+/-294$ $+/-333$ Europium-154 U -90.2 pCi/L Uncert: $+/-201$ $+/-205$ Europium-155 U 405 pCi/L Europium-155 U 405 pCi/L Potassium-40 -177 pCi/L Uncert: $+/-519$ $+/-519$ TPU: $+/-525$ $+/-525$												
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Europium 152	TPU:		TT		nC:/I						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Europium-152	Uncert		U		pCI/L						
Europium-154 U -90.2 pCi/L Uncert: +/-201 TPU: +/-205 Europium-155 U 405 Ducert: +/-371 TPU: +/-415 Potassium-40 U -177 Uncert: +/-519 TPU: +/-519 TPU: +/-525												
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Europium-154	110.		U		nCi/L						
$\begin{array}{cccc} TPU: & +/-205 \\ Europium-155 & U & 405 & pCi/L \\ & Uncert: & +/-371 \\ TPU: & +/-415 \\ Potassium-40 & U & -177 & pCi/L \\ & Uncert: & +/-519 \\ TPU: & +/-525 \end{array}$	Luropium ic i	Uncert:		C		pend						
Europium-155 U 405 pCi/L Uncert: $+/-371$ TPU: $+/-415$ Potassium-40 U -177 pCi/L Uncert: $+/-519$ TPU: $+/-525$												
TPU: +/-415 Potassium-40 U -177 pCi/L Uncert: +/-519 TPU: +/-525	Europium-155			U		pCi/L						
Potassium-40 U -177 pCi/L Uncert: +/-519 TPU: +/-525		Uncert:			+/-371							
Uncert: +/-519 TPU: +/-525		TPU:										
TPU: +/-525	Potassium-40			U		pCi/L						
Rad Gas Flow		TPU:			+/-525							
	Rad Gas Flow											

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QC Summary

Workorder: 4	25499		<u> </u>		Page 5 of 6						
Parmname		NOM	Sample Qu	al	QC	Units	QC	Criteria		Analyst	Date Time
Rad Gas Flow											
Batch 167	5923										
QC1203815773	MB			TT	0.200					IVD7	07/01/1714.10
Strontium-90		T T		U	-0.266	pCi/L				JXB7	07/01/1714:19
		Uncert: TPU:			+/-0.572 +/-0.572						
**Strontium Carrier		7.75			5.80	mg	REC:	75	(40%-110%)	
QC1203815774	425103020	DUP				C C			[*]	, ,	
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 QC1203815775	LCS	7.75	5.50		7.20	mg	REC:	93	(40%-110%)	
Strontium-90	LCS	72.8			83.3	pCi/L	REC:	114	(80%-120%)	07/01/1714:20
		Uncert:			+/-4.35	rond			(,	
		TPU:			+/-14.1						
**Strontium Carrier		7.75			5.20	mg	REC:	67	(40%-110%)	
Rad Liquid Scintilla											
Batch 167	4668										
QC1203812815	MB										
Carbon-14			-	U	2.19	pCi/L				BXM4	06/23/1706:45
		Uncert:			+/-17.4						
QC1203812816	125282001	TPU:			+/-17.4						
Carbon-14	423282001	DUF	65.6		46.9	pCi/L					06/23/1707:22
		Uncert:	+/-19.6		+/-18.9	pend	RPD:	33	(0% - 100%)	00,20,100,122
		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						
QC1203812818	LCS	TPU:	+/-23.1		+/-234						
Carbon-14	LCS	1250			1110	pCi/L	REC:	89	(80%-120%)	06/23/1708:14
		Uncert:			+/-60.3	rond		07	(,	
		TPU:			+/-215						
Batch 167	5960										
QC1203815891	MB										
Tritium				U	66.7	pCi/L				BXM4	07/06/1708:59
		Uncert:			+/-205						
001202015002	125200000	TPU:			+/-206						
QC1203815892 Tritium	425280008	DUP	9520		8980	pCi/L					07/06/1709:46
11110111		Uncert:	+/-495		+/-485	PCI/L	RPD:	6	(0% - 20%))	01/00/1107.40
		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						
001202015004	LCS	TPU:	+/-1910		+/-3070						
QC1203815894 Tritium	LCS	2230			2110	pCi/L	REC:	94	(80%-120%)	07/06/1710:48
		Uncert:			+/-470	rond		2.	(,	
		TPU:			+/-622						

QC Summary

Workorder: 425499								Page 6	of 6	
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	07/01/1709:40
	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	2.7	+/-11.2		RPD:	0	N/A		
	TPU:	+/-22	2.7	+/-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 $\geq 2X$ the MDA and, after corrections, result is $\geq MDA$ for this sample
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- UX Gamma Spectroscopy--Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable. ** Indicates analyte is a surrogate compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the 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.