

June 28, 2017



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

June 28, 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: 424658
SDG: GEL424658

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 03, 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: S17-006-228, S17-006-229, S17-006-230, S17-006-231, S17-006-232, S17-006-260,
S17-006-261 and S17-006-392
Enclosures



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Case Narrative

June 28, 2017

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S17-006
SDG: GEL424658

June 28, 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 03, 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:

<u>Laboratory Identification</u>	<u>Sample Description</u>
424658001	B39RM1
424658002	B39RN0
424658003	B39RN6
424658004	B39RP2
424658005	B39RP8
424658006	B39TC9
424658007	B39TC8
424658008	B39RL8

Case Narrative

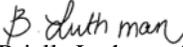
Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

June 28, 2017

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.


Brielle Luthman for
Heather Shaffer
Project Manager

June 28, 2017

Radiochemistry

Technical Case Narrative

CH2M Hill Plateau Remediation Company (CPRC)

SDG #: GEL424658

Work Order #: 424658

PUISO_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.

I129LL_SEP_LEPS_GS: COMMON (low level)

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.

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.

9310_ALPHABETA_GPC: Gross Beta

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

Matrix Spike and Matrix Spike Duplicate, 1203803803 (B39RN6MS) and 1203803804 (B39RN6MSD), do not meet the beta recovery requirement due to the sample activity being greater than five times the spiked nominal concentration.

Technical Information

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Sample 1203803801 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203803803 (B39RN6MS) and 1203803804 (B39RN6MSD), aliquots were reduced to conserve sample volume.

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

RDL Met

The blank, 1203804263 (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.

SE79_SEP_IE_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.

TC99_EIE_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.

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.

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

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #

S17-006-229

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 88/68
 Ice Chest No. 6WS-587
 Shipped To (Lab): GEL Laboratories, LLC
 Method of Shipment: Commercial Carrier
 Bill of Lading/Air Bill No. 1779292153223
 Protocol: SURV
 Priority: 30 Days
 Priority: **PRIORITY**
 Offsite Property No. 7982

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

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39RN0	N	6-2-17	1204	1x1-L P	9310_ALPHABETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B39RN0	N			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B39RN0	N			4x1-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B39RN0	N			1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B39RN0	N	6-2-17	1204	1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2

SPECIAL INSTRUCTIONS: Hold Time
 N/A

Total Activity Exemption: Yes No

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Relinquished By: Juan Aguilar /CHPRC	Print	Sign	Date/Time	Received By: Ed Kauer /CHPRC	Print	Sign	Date/Time	Matrix *
			JUN 02 2017 1200				JUN 02 2017 1220	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
Relinquished By: Juan Aguilar /CHPRC	Print	Sign	Date/Time	Received By: FEDEX	Print	Sign	Date/Time	
			JUN 02 2017 8:11				JUN 02 2017 9:00	
Relinquished By: Juan Aguilar /CHPRC	Print	Sign	Date/Time	Received By: STACY BOONE	Print	Sign	Date/Time	
			JUN 02 2017 8:11				6/2/17 9:00	
Relinquished By: Juan Aguilar /CHPRC	Print	Sign	Date/Time	Received By:	Print	Sign	Date/Time	
			JUN 02 2017 8:11					

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# **S17-006-230**
Page 1 of 1

Collector: Juan Aguilar /CHPRC Telephone No. 509-376-4650
 SAF No. S17-006 Purchase Order/Charge Code 300071
 Project Title: SURV, JUNE 2017 Ice Chest No. 6005-5104
 Shipped To (Lab): GEL Laboratories, LLC Bill of Lading/Air Bill No. 77929158 2007
 Protocol: SURV Priority: 30 Days **PRIORITY** Offsite Property No. 79777

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

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39RN6	N	6-2-17	1020	1x1-L P	9310_ALPHA_BETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B39RN6	N	↓	↓	1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B39RN6	N	↓	↓	4x1-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW.01	6 Months	HNO3 to pH <2
B39RN6	N	↓	↓	1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B39RN6	N	6-2-17	1020	1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2

SPECIAL INSTRUCTIONS Hold Time: N/A
 Total Activity Exemption: Yes No

Relinquished By: Juan Aguilar /CHPRC	Sign: [Signature]	Date: JUN 02 2017	Time: 1130
Relinquished By: Juan Aguilar /CHPRC	Sign: [Signature]	Date: JUN 02 2017	Time: 1400

Received By: [Signature] Sign: JUN 02 2017 Date/Time: 1130
 Received By: FEDEX Date/Time: [Blank]
 Received By: [Signature] Sign: STACY BOONE Date/Time: 6-3-17 9:00
 Received By: [Blank] Date/Time: [Blank]

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 Disposed By: [Blank] Date/Time: [Blank]
 Disposal Method (e.g., Return to customer, per lab procedure, used in process): [Blank]

PRINTED ON 5/15/2017 FSR ID = FSR44226 A-6004-842 (REV 2)

June 28, 2017

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **S17-006-231**
Page 1 of 1

Collector: Juan Aguilar /CHPRC
SAF No.: S17-006
Project Title: SURV, JUNE 2017
Shipped To (Lab): GEL Laboratories, LLC
Protocol: SURV

Contact/Requester: Karen Waters-Husted
Sampling Origin: Hanford Site
Logbook No.: HNF-N-506 88/67
Method of Shipment: Commercial Carrier
Priority: 30 Days **PRIORITY**

Telephone No.: 509-376-4650
Purchase Order/Charge Code: 300071
Ice Chest No.: 605-569
Bill of Lading/Air Bill No.: 7792 9158 2007
Offsite Property No.: 79777

SPECIAL INSTRUCTIONS: N/A
Hold Time: Total Activity Exemption: Yes No

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

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39RP2	N	W	6-2-17	0946	1x1-L P	9310_ALPHA BETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B39RP2	N	W			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B39RP2	N	W			4x1-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B39RP2	N	W			1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B39RP2	N	W	6-2-17	0946	1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2

Relinquished By: Juan Aguilar /CHPRC
Relinquished By: Juan Aguilar /CHPRC
Relinquished By: Juan Aguilar /CHPRC
Relinquished By: Juan Aguilar /CHPRC

Received By: Lesly Wall /CHPRC
Received By: FEDEX
Received By: Lesly Wall /CHPRC

Print Sign
 JUN 02 2017 1130
 JUN 02 2017 1400
 JUN 02 2017 1130
 JUN 02 2017 1400
 JUN 02 2017 1130
 JUN 02 2017 1400

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

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

FINAL SAMPLE DISPOSITION
 Disposed By: _____ Date/Time: _____

PRINTED ON 5/15/2017
 FSR ID = FSR38229
 A-6004-842 (REV 2)

June 28, 2017

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# S17-006-232
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 88/68
 Ice Chest No. 605-587
 Shipped To (Lab): GEL Laboratories, LLC
 Method of Shipment: Commercial Carrier
 Bill of Lading/Air Bill No. 17942 9A15 3223
 Protocol: SURV
 Priority: 30 Days
 Priority: **PRIORITY**
 Offsite Property No. 17982

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
 N/A

Total Activity Exemption: Yes No

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B39RP8	N	W	6-2-17	1244	1x1-L P	9310_ALPHA BETA_GPC: Gross Beta	6 Months	HNO3 to pH <2
B39RP8	N	W	↓	↓	1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B39RP8	N	W	↓	↓	4x1-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B39RP8	N	W	↓	↓	1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B39RP8	N	W	6-2-17	1244	1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2

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Relinquished By Juan Aguilar /CHPRC	Print 	Sign JUN 02 2017	Date/Time 1320	Received By Lesly Wall /CHPRC	Print 	Sign JUN 02 2017	Date/Time 1320
Relinquished By 3 of 6	Print 	Sign JUN 02 2017	Date/Time 1400	Received By FEDEX	Print FEDEX	Sign	Date/Time
Relinquished By 6 of 6	Print 	Sign JUN 02 2017	Date/Time FED EX	Received By Katy B...	Print Katy B...	Sign Katy B...	Date/Time 6/3/17 9:00
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time

Disposal Method (e.g., Return to customer, per lab procedure, used in process)

Disposed By _____ Date/Time _____

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

June 28, 2017

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. # S17-006-261
Collector Dave Wight CHPRC		Contact/Requester Karen Waters-Husted	Telephone No. 509-376-4650	Page 1 of 1		
SAF No. S17-006	Sampling Origin Hanford Site	Logbook No. HNF-N-506 43 / 48	Purchase Order/Charge Code 300071	Ice Chest No. 6005-504	Bill of Lading/Air Bill No. 7792 9158 2007	
Project Title SURV, JUNE 2017	Method of Shipment Commercial Carrier	Priority: 30 Days	PRIORITY	Offsite Property No.	Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Shipped To (Lab) GEL Laboratories, LLC	SPECIAL INSTRUCTIONS N/A	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				
Filter N	Date WJUN 02 2017 0929	No/Type Container 1X1-L P	Sample Analysis 9310_ALPHABETA_GPC: Gross Alpha	Holding Time 6 Months	Preservative HNO3 to pH <2	

Relinquished By Dave Wight CHPRC	Print <i>[Signature]</i>	Sign	Date/Time JUN 02 2017 1135	Received By Lesly Wall CHPRC	Print <i>[Signature]</i>	Sign	Date/Time JUN 02 2017 1135	Matrix *
Relinquished By Lesly Wall CHPRC	Print <i>[Signature]</i>	Sign	Date/Time JUN 02 2017 1400	Received By FEDEX	Print <i>[Signature]</i>	Sign	Date/Time JUN 02 2017	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By FED EX	Print <i>[Signature]</i>	Sign	Date/Time JUN 02 2017 1400	Received By STACY BOONE	Print <i>[Signature]</i>	Sign	Date/Time 6/17/17 9:00	DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	
FINAL SAMPLE DISPOSITION				Disposal Method (e.g., Return to customer, per lab procedure, used in process)				Date/Time
PRINTED ON 5/1/2017				Disposed By				Date/Time
				FSR ID = FSR44374				A-6004-842 (REV 2)

June 28, 2017

CH2M Hill Plateau Remediation Company		C.O.C. # S17-006-260	
424658		Page 1 of 1	
Collector	Dave Wight CHPRC	Contact/Requester	Karen Waters-Husted
SAF No.	S17-006	Telephone No.	509-376-4650
Project Title	SURV, JUNE 2017	Purchase Order/Charge Code	300071
Shipped To (Lab)	GEL Laboratories, LLC	Ice Chest No.	605-564
Protocol	SURV	Bill of Lading/Air Bill No.	7929158 2007
		Offsite Property No.	79777
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		Priority: 30 Days PRIORITY SPECIAL INSTRUCTIONS N/A	Hold Time Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sample No.	Filter *	Date	Time
B39TC8	N	JUN 02 2017	0715
No/Type Container	1x1-L P	9310_ALPHABETA_GPC: Gross Alpha	Sample Analysis
Holding Time	6 Months	Preservative	HNO3 to pH <2

Relinquished By	Print	Sign	Date/Time	1735	Received By	Print	Sign	Date/Time	1735
Dave Wight CHPRC			JUN 02 2017		Lesly Wall CHPRC			JUN 02 2017	
Relinquished By	Print	Sign	Date/Time	1400	Received By	Print	Sign	Date/Time	1400
Lesly Wall CHPRC			JUN 02 2017		FEDEX			JUN 02 2017	
Relinquished By	Print	Sign	Date/Time	FED EX	Received By	Print	Sign	Date/Time	9:00
Lesly Wall CHPRC			JUN 02 2017		STACY BOONE			6-3-17	
Relinquished By	Print	Sign	Date/Time		Received By	Print	Sign	Date/Time	

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Date/Time
PRINTED ON 5/1/2017	Disposed By	Date/Time

FRS ID = FSR44908

A-6004-842 (REV 2)

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Qualifier	Qualifier Definition	Department	Fraction
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.		
J	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated	Organics	
P	Aroclor target analyte with greater than 25% difference between column analyses.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The analyte was detected in both the associated QC blank and in the sample.	Organics	
E	Concentration exceeds the calibration range of the instrument	Organics	
A	The TIC is a suspected aldol-condensation product	Organics	Semi-Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Spike Sample recovery is outside control limits.		
*	Duplicate analysis not within control limits	Inorganics	
>	Result greater than quantifiable range or greater than upper limit of the analysis range	General Chemistry	
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	Inorganics	Metals
D	Results are reported from a diluted aliquot of sample.		
E	Reported value is estimated due to interferences. See comment in narrative.	Inorganics	Metals
M	Duplicate precision not met.	Inorganics	Metals
o	Analyte failed to recover within LCS limits (Organics only)	Organics	
S	Reported value determined by the Method of Standard Additions (MSA)	Inorganics	
T	Spike and/or spike duplicate sample recovery is outside control limits.	Organics	
W	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Inorganics	
B	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample	Radiological	
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
+	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Inorganics	
B	The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).	General Chemistry	
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.	Inorganics	Metals
C	Target analyte was detected in the sample and the associated blank. The associated blank concentration is \geq EQL or is > 5% of the measured concentration and/or decision level for associated samples.	General Chemistry	
<	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	General Chemistry	
UX	Gamma Spectroscopy--Uncertain identification	Radiological	

Laboratory Certifications

List of current GEL Certifications as of 28 June 2017

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA170010
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122017-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-17-12
Utah NELAP	SC000122017-22
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Radiological Analysis

Case Narrative

June 28, 2017

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL424658
Work Order #: 424658

Product: PUISO_PRECIP_AEA:COMMON
Analytical Method: PUISO_PRECIP_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1671142

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424658008	B39RL8
1203804260	Method Blank (MB)
1203804261	424658008(B39RL8) Sample Duplicate (DUP)
1203804262	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: I129LL_SEP_LEPS_GS: COMMON (low level)
Analytical Method: DOE EML HASL-300,I-01 Modified
Analytical Procedure: GL-RAD-A-006 REV# 21
Analytical Batch: 1671427

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424658008	B39RL8
1203804805	Method Blank (MB)
1203804806	424692001(NonSDG) Sample Duplicate (DUP)
1203804807	424692001(NonSDG) Matrix Spike (MS)
1203804808	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: 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>	<u>Client Sample Identification</u>
424658001	B39RM1
424658002	B39RN0
424658003	B39RN6
424658004	B39RP2
424658005	B39RP8
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: 9310_ALPHABETA_GPC: Gross Beta

Analytical Method: 9310_ALPHABETA_GPC

Analytical Procedure: GL-RAD-A-001 REV# 19

Analytical Batch: 1670989

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424658001	B39RM1
424658002	B39RN0
424658003	B39RN6
424658004	B39RP2
424658005	B39RP8
424658006	B39TC9
424658007	B39TC8
1203803801	Method Blank (MB)
1203803802	424658003(B39RN6) Sample Duplicate (DUP)
1203803803	424658003(B39RN6) Matrix Spike (MS)
1203803804	424658003(B39RN6) Matrix Spike Duplicate (MSD)
1203803805	Laboratory Control Sample (LCS)

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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: Matrix Spike and Matrix Spike Duplicate, 1203803803 (B39RN6MS) and 1203803804 (B39RN6MSD), do not meet the beta recovery requirement due to the sample activity being greater than five times the spiked nominal concentration.

Technical Information

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Sample 1203803801 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike and matrix spike duplicate, 1203803803 (B39RN6MS) and 1203803804 (B39RN6MSD), aliquots were reduced to conserve sample volume.

Product: PU241_IE_LSC: COMMON

Analytical Method: PU241_IE_LSC

Analytical Procedure: GL-RAD-A-035 REV# 18

Analytical Batch: 1671143

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424658008	B39RL8
1203804263	Method Blank (MB)
1203804264	424658008(B39RL8) Sample Duplicate (DUP)
1203804265	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

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procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

RDL Met

The blank, 1203804263 (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.

Product: SE79_SEP_IE_LSC: COMMON

Analytical Method: SE79_SEP_IE_LSC

Analytical Procedure: GL-RAD-A-031 REV# 13

Analytical Batch: 1671431

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424658001	B39RM1
424658002	B39RN0
424658003	B39RN6
424658004	B39RP2
424658005	B39RP8
1203804812	Method Blank (MB)
1203804813	424658002(B39RN0) Sample Duplicate (DUP)
1203804814	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: TC99_EIE_LSC: COMMON

Analytical Method: TC99_EIE_LSC

Analytical Procedure: GL-RAD-A-059 REV# 5

Analytical Batch: 1671435

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424658001	B39RM1
424658002	B39RN0
424658003	B39RN6
424658004	B39RP2

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424658005	B39RP8
1203804815	Method Blank (MB)
1203804816	424658001(B39RM1) Sample Duplicate (DUP)
1203804817	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: C14_LSC: COMMON

Analytical Method: C14_LSC

Analytical Procedure: GL-RAD-A-003 REV# 15

Analytical Batch: 1672415

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
424658001	B39RM1
424658002	B39RN0
424658003	B39RN6
424658004	B39RP2
424658005	B39RP8
424658008	B39RL8
1203807372	Method Blank (MB)
1203807373	424658001(B39RM1) Sample Duplicate (DUP)
1203807374	424658001(B39RM1) Matrix Spike (MS)
1203807375	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.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

June 28, 2017

GEL LABORATORIES LLC

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

**Qualifier Definition Report
for**

CPRC001 CH2MHill Plateau Remediation Company

Client SDG: GEL424658 GEL Work Order: 424658

The Qualifiers in this report are defined as follows:

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

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

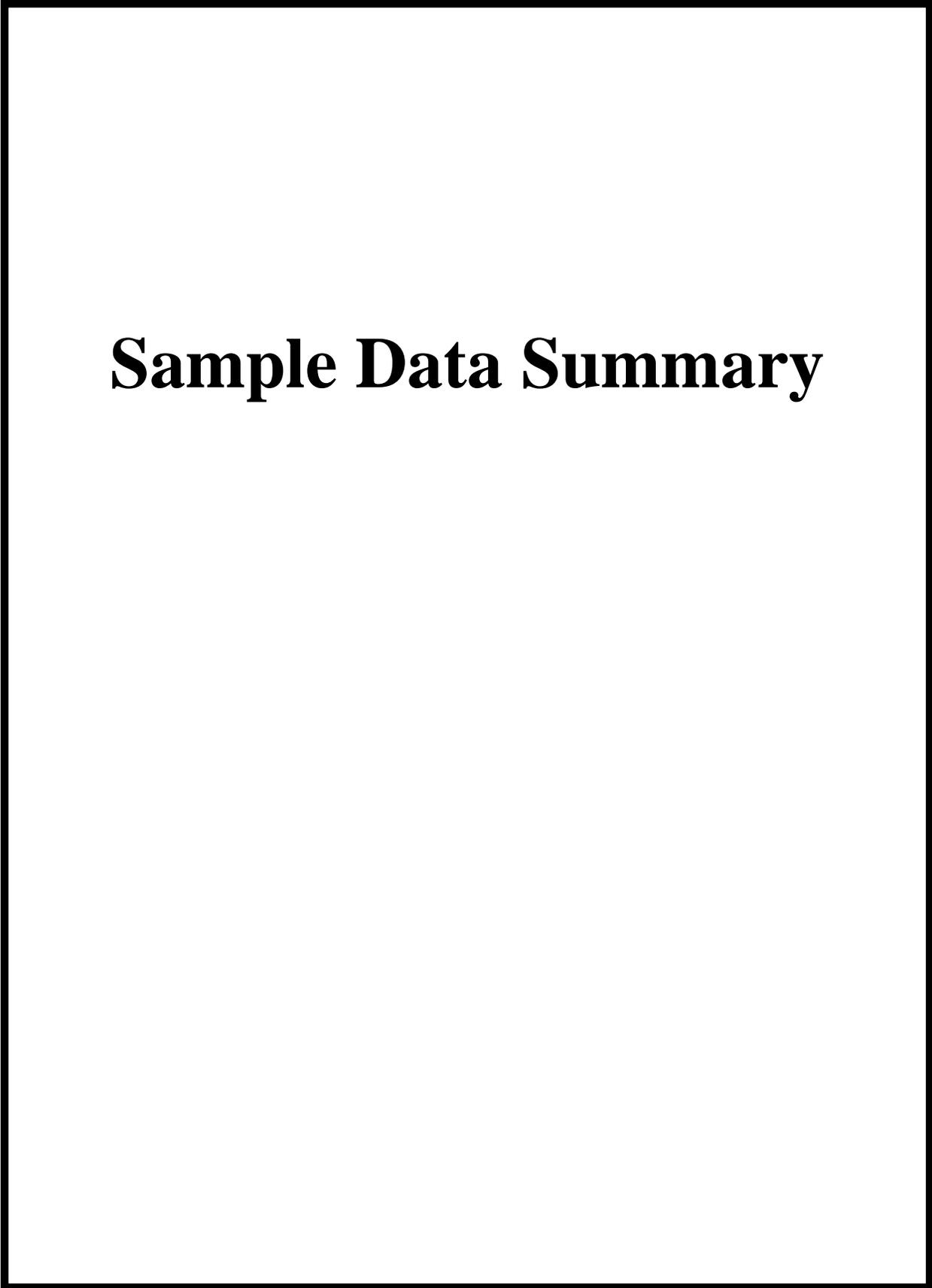
The following data validator verified the information presented in this data report:

Signature: 

Name: Theresa Austin

Date: 28 JUN 2017

Title: Group Leader



Sample Data Summary

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658001	Date Collected: 06/02/2017 08:23	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RM1		Prep Basis: "As Received"
Batch ID: 1670989	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 06/06/2017 18:18	Analyst: LXB3	Instrument: LB4100G1
Data File: AB1670989.xls	Aliquot: 125 mL	Count Time: 500 min
Prep Batch: 1670989	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/06/2017 09:56		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		3530	pCi/L	+/-14.6	578	1.40	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658
 Lab Sample ID: 424658001

 Client ID: B39RM1
 Batch ID: 1675360
 Run Date: 06/21/2017 12:49
 Data File: G424658001.CNF;1
 Prep Batch: 1675360
 Prep Date: 06/21/2017 00:00

Client: CPRC001
 Date Collected: 06/02/2017 08:23
 Date Received: 06/03/2017 09:00

 Method: 901.1_GAMMA_GS
 Analyst: MXR1
 Aliquot: 0.5 L
 Prep Method: EPA 901.1

Project: CPRC0S17006
 Matrix: WATER

 Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM28
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	-8.93	pCi/L	+/-10.2	10.9	16.3	
13967-70-9	Cesium-134	U	-1.03	pCi/L	+/-4.29	4.31	8.09	
10045-97-3	Cesium-137	U	-1.4	pCi/L	+/-4.25	4.30	7.91	15.0
10198-40-0	Cobalt-60	U	0.798	pCi/L	+/-3.95	3.96	8.33	
14683-23-9	Europium-152	U	8.49	pCi/L	+/-11.2	11.9	21.6	
15585-10-1	Europium-154	U	-4.04	pCi/L	+/-11.9	12.0	21.7	
14391-16-3	Europium-155	U	8.00	pCi/L	+/-11.8	12.4	22.0	
13966-00-2	Potassium-40	U	-53.9	pCi/L	+/-52.0	57.6	101	

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658001	Date Collected: 06/02/2017 08:23	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RM1	Method: SE79_SEP_IE_LSC	Prep Basis: "As Received"
Batch ID: 1671431	Analyst: CXS7	SOP Ref: GL-RAD-A-031
Run Date: 06/27/2017 09:31	Aliquot: 0.08 L	Instrument: LSCBROWN
Data File: SE1671431.xls	Prep Method: NERC ORD	Count Time: 30 min
Prep Batch: 1671431		
Prep Date: 06/26/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	U	10.8	pCi/L	+/-21.9	21.9	37.2	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	19.2	20.0	mg	96	(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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658001	Date Collected: 06/02/2017 08:23	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RM1	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1671435	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 06/27/2017 04:53	Aliquot: 100 mL	Instrument: LSCBROWN
Data File: E1671435.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 14.4499998092651 min
Prep Batch: 1671435		
Prep Date: 06/22/2017 13:55		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		7420	pCi/L	+/-150	836	51.7	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	51700	62500	CPM	82.7	(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.

June 28, 2017

Certificate of Analysis
Sample Summary

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658001	Date Collected: 06/02/2017 08:23	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RM1	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1672415	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 06/27/2017 15:49	Aliquot: 100 mL	Instrument: LSCRED
Data File: C1672415.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1672415		
Prep Date: 06/27/2017 14:50		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-7.29	pCi/L	+/-16.0	16.0	28.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658002	Date Collected: 06/02/2017 12:04	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RN0		Prep Basis: "As Received"
Batch ID: 1670989	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 06/06/2017 18:18	Analyst: LXB3	Instrument: LB4100G2
Data File: AB1670989.xls	Aliquot: 125 mL	Count Time: 500 min
Prep Batch: 1670989	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/06/2017 09:56		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		11.3	pCi/L	+/-1.19	2.21	1.52	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658
 Lab Sample ID: 424658002

 Client ID: B39RN0
 Batch ID: 1675360
 Run Date: 06/21/2017 12:50
 Data File: G424658002.CNF;1
 Prep Batch: 1675360
 Prep Date: 06/21/2017 00:00

Client: CPRC001
 Date Collected: 06/02/2017 12:04
 Date Received: 06/03/2017 09:00

 Method: 901.1_GAMMA_GS
 Analyst: MXR1
 Aliquot: 0.5 L
 Prep Method: EPA 901.1

Project: CPRC0S17006
 Matrix: WATER

 Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM29
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	0.602	pCi/L	+/-10.5	10.5	20.2	
13967-70-9	Cesium-134	U	-0.938	pCi/L	+/-4.15	4.17	7.70	
10045-97-3	Cesium-137	U	0.441	pCi/L	+/-3.55	3.56	7.06	15.0
10198-40-0	Cobalt-60	U	1.17	pCi/L	+/-3.45	3.49	7.50	
14683-23-9	Europium-152	U	0.281	pCi/L	+/-9.80	9.80	19.0	
15585-10-1	Europium-154	U	2.90	pCi/L	+/-11.1	11.2	22.9	
14391-16-3	Europium-155	U	1.02	pCi/L	+/-13.0	13.0	22.2	
13966-00-2	Potassium-40	U	39.9	pCi/L	+/-88.1	88.1	80.0	

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658002	Date Collected: 06/02/2017 12:04	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RN0	Method: SE79_SEP_IE_LSC	Prep Basis: "As Received"
Batch ID: 1671431	Analyst: CXS7	SOP Ref: GL-RAD-A-031
Run Date: 06/27/2017 10:02	Aliquot: 0.08 L	Instrument: LSCBROWN
Data File: SE1671431.xls	Prep Method: NERC ORD	Count Time: 30 min
Prep Batch: 1671431		
Prep Date: 06/26/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	U	-28.6	pCi/L	+/-22.7	22.7	40.1	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	17.8	20.0	mg	89	(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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658002	Date Collected: 06/02/2017 12:04	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RN0	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1671435	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 06/27/2017 05:09	Aliquot: 100 mL	Instrument: LSCBROWN
Data File: E1671435.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1671435		
Prep Date: 06/22/2017 13:55		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	3.68	pCi/L	+/-24.5	24.5	42.5	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	54700	62500	CPM	87.4	(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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658002	Date Collected: 06/02/2017 12:04	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RN0	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1672415	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 06/27/2017 16:05	Aliquot: 100 mL	Instrument: LSCRED
Data File: C1672415.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1672415		
Prep Date: 06/27/2017 14:50		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-13.9	pCi/L	+/-15.6	15.6	28.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

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**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658003	Date Collected: 06/02/2017 10:20	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RN6		Prep Basis: "As Received"
Batch ID: 1670989	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 06/06/2017 18:18	Analyst: LXB3	Instrument: LB4100G3
Data File: AB1670989.xls	Aliquot: 125 mL	Count Time: 500 min
Prep Batch: 1670989	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/06/2017 09:56		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		14900	pCi/L	+/-29.0	2410	1.49	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

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Certificate of Analysis
Sample Summary

SDG Number: GEL424658
Lab Sample ID: 424658003

Client ID: B39RN6
Batch ID: 1675360
Run Date: 06/21/2017 12:50
Data File: G424658003.CNF;1
Prep Batch: 1675360
Prep Date: 06/21/2017 00:00

Client: CPRC001
Date Collected: 06/02/2017 10:20
Date Received: 06/03/2017 09:00

Method: 901.1_GAMMA_GS
Analyst: MXR1
Aliquot: 0.5 L
Prep Method: EPA 901.1

Project: CPRC0S17006
Matrix: WATER

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-013
Instrument: GAM33
Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	14.9	pCi/L	+/-10.9	12.9	24.0	
13967-70-9	Cesium-134	U	-0.719	pCi/L	+/-4.75	4.76	8.82	
10045-97-3	Cesium-137	U	-0.914	pCi/L	+/-4.40	4.42	8.11	15.0
10198-40-0	Cobalt-60	U	-0.926	pCi/L	+/-4.03	4.05	8.12	
14683-23-9	Europium-152	U	-0.499	pCi/L	+/-11.4	11.4	19.7	
15585-10-1	Europium-154	U	5.52	pCi/L	+/-9.72	10.1	24.0	
14391-16-3	Europium-155	U	8.93	pCi/L	+/-14.6	15.1	25.6	
13966-00-2	Potassium-40	U	-39.6	pCi/L	+/-70.1	72.5	137	

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658003	Date Collected: 06/02/2017 10:20	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RN6	Method: SE79_SEP_IE_LSC	Prep Basis: "As Received"
Batch ID: 1671431	Analyst: CXS7	SOP Ref: GL-RAD-A-031
Run Date: 06/27/2017 10:34	Aliquot: 0.08 L	Instrument: LSCBROWN
Data File: SE1671431.xls	Prep Method: NERC ORD	Count Time: 30 min
Prep Batch: 1671431		
Prep Date: 06/26/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	U	32.0	pCi/L	+/-22.8	22.8	37.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	18.9	20.0	mg	94.5	(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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658003	Date Collected: 06/02/2017 10:20	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RN6	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1671435	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 06/27/2017 05:30	Aliquot: 100 mL	Instrument: LSCBROWN
Data File: E1671435.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 3.5 min
Prep Batch: 1671435		
Prep Date: 06/22/2017 13:55		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		29200	pCi/L	+/-574	3280	85.6	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	53700	62500	CPM	85.8	(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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658003	Date Collected: 06/02/2017 10:20	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RN6	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1672415	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 06/27/2017 16:22	Aliquot: 100 mL	Instrument: LSCRED
Data File: C1672415.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1672415		
Prep Date: 06/27/2017 14:50		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	5.14	pCi/L	+/-16.6	16.7	28.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658004	Date Collected: 06/02/2017 09:46	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RP2		Prep Basis: "As Received"
Batch ID: 1670989	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 06/06/2017 18:18	Analyst: LXB3	Instrument: LB4100G4
Data File: AB1670989.xls	Aliquot: 125 mL	Count Time: 500 min
Prep Batch: 1670989	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/06/2017 09:56		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		6660	pCi/L	+/-19.5	1080	1.37	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658
 Lab Sample ID: 424658004

 Client ID: B39RP2
 Batch ID: 1675360
 Run Date: 06/21/2017 15:41
 Data File: G424658004.CNF;1
 Prep Batch: 1675360
 Prep Date: 06/21/2017 00:00

Client: CPRC001
 Date Collected: 06/02/2017 09:46
 Date Received: 06/03/2017 09:00

 Method: 901.1_GAMMA_GS
 Analyst: MXR1
 Aliquot: 0.5 L
 Prep Method: EPA 901.1

Project: CPRC0S17006
 Matrix: WATER

 Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM19
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	14.2	pCi/L	+/-17.7	18.9	26.7	
13967-70-9	Cesium-134	U	-5.42	pCi/L	+/-6.06	6.55	10.3	
10045-97-3	Cesium-137	U	2.56	pCi/L	+/-5.01	5.14	10.3	15.0
10198-40-0	Cobalt-60	U	-1.88	pCi/L	+/-4.85	4.93	8.82	
14683-23-9	Europium-152	U	4.64	pCi/L	+/-13.4	13.6	25.4	
15585-10-1	Europium-154	U	3.98	pCi/L	+/-12.8	12.9	27.4	
14391-16-3	Europium-155	U	-10.2	pCi/L	+/-15.9	16.5	25.3	
13966-00-2	Potassium-40	U	31.0	pCi/L	+/-65.8	67.3	127	

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658004	Date Collected: 06/02/2017 09:46	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RP2	Method: SE79_SEP_IE_LSC	Prep Basis: "As Received"
Batch ID: 1671431	Analyst: CXS7	SOP Ref: GL-RAD-A-031
Run Date: 06/27/2017 11:06	Aliquot: 0.08 L	Instrument: LSCBROWN
Data File: SE1671431.xls	Prep Method: NERC ORD	Count Time: 30 min
Prep Batch: 1671431		
Prep Date: 06/26/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	U	30.2	pCi/L	+/-22.9	22.9	38.0	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	18.8	20.0	mg	94	(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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658004	Date Collected: 06/02/2017 09:46	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RP2	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1671435	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 06/27/2017 05:34	Aliquot: 100 mL	Instrument: LSCBROWN
Data File: E1671435.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 8.30000019073486 min
Prep Batch: 1671435		
Prep Date: 06/22/2017 13:55		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		13000	pCi/L	+/-258	1460	62.4	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	51700	62500	CPM	82.7	(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.

June 28, 2017

Certificate of Analysis
Sample Summary

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658004	Date Collected: 06/02/2017 09:46	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RP2	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1672415	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 06/27/2017 16:38	Aliquot: 100 mL	Instrument: LSCRED
Data File: C1672415.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1672415		
Prep Date: 06/27/2017 14:50		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-5.59	pCi/L	+/-16.0	16.0	28.7	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658005	Date Collected: 06/02/2017 12:44	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RP8		Prep Basis: "As Received"
Batch ID: 1670989	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 06/06/2017 18:18	Analyst: LXB3	Instrument: LB4100H1
Data File: AB1670989.xls	Aliquot: 125 mL	Count Time: 500 min
Prep Batch: 1670989	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/06/2017 09:56		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-47-2	Beta BETA		9.80	pCi/L	+/-1.15	1.97	1.49	4.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

Certificate of Analysis
Sample Summary

SDG Number: GEL424658
Lab Sample ID: 424658005

Client ID: B39RP8
Batch ID: 1675360
Run Date: 06/22/2017 07:20
Data File: G424658005.CNF;1
Prep Batch: 1675360
Prep Date: 06/21/2017 00:00

Client: CPRC001
Date Collected: 06/02/2017 12:44
Date Received: 06/03/2017 09:00

Method: 901.1_GAMMA_GS
Analyst: MXR1
Aliquot: 0.5 L
Prep Method: EPA 901.1

Project: CPRC0S17006
Matrix: WATER

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-013
Instrument: GAM41
Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	-6.24	pCi/L	+/-11.9	12.2	20.8	
13967-70-9	Cesium-134	U	-2.82	pCi/L	+/-6.63	6.75	12.3	
10045-97-3	Cesium-137	U	-0.82	pCi/L	+/-5.23	5.24	9.62	15.0
10198-40-0	Cobalt-60	U	-1.39	pCi/L	+/-5.63	5.66	10.8	
14683-23-9	Europium-152	U	2.16	pCi/L	+/-11.9	11.9	23.3	
15585-10-1	Europium-154	U	8.81	pCi/L	+/-14.5	15.1	34.6	
14391-16-3	Europium-155	U	1.32	pCi/L	+/-10.3	10.3	18.8	
13966-00-2	Potassium-40	U	24.4	pCi/L	+/-84.3	85.1	166	

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658005	Date Collected: 06/02/2017 12:44	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RP8	Method: SE79_SEP_IE_LSC	Prep Basis: "As Received"
Batch ID: 1671431	Analyst: CXS7	SOP Ref: GL-RAD-A-031
Run Date: 06/27/2017 11:38	Aliquot: 0.08 L	Instrument: LSCBROWN
Data File: SE1671431.xls	Prep Method: NERC ORD	Count Time: 30 min
Prep Batch: 1671431		
Prep Date: 06/26/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	U	-20.8	pCi/L	+/-19.8	19.8	34.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	20.5	20.0	mg	103	(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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658005	Date Collected: 06/02/2017 12:44	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RP8	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1671435	Analyst: CXS7	SOP Ref: GL-RAD-A-059
Run Date: 06/27/2017 05:44	Aliquot: 100 mL	Instrument: LSCBROWN
Data File: E1671435.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 20 min
Prep Batch: 1671435		
Prep Date: 06/22/2017 13:55		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	27.9	pCi/L	+/-27.5	27.7	46.0	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	52600	62500	CPM	84.1	(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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658005	Date Collected: 06/02/2017 12:44	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RP8	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1672415	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 06/27/2017 16:54	Aliquot: 100 mL	Instrument: LSCRED
Data File: C1672415.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1672415		
Prep Date: 06/27/2017 14:50		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-4.21	pCi/L	+/-16.1	16.1	28.7	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658006	Date Collected: 06/02/2017 09:29	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39TC9		Prep Basis: "As Received"
Batch ID: 1670989	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 06/06/2017 18:18	Analyst: LXB3	Instrument: LB4100H2
Data File: AB1670989.xls	Aliquot: 150 mL	Count Time: 500 min
Prep Batch: 1670989	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/06/2017 09:56		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA		125	pCi/L	+/-4.95	21.4	1.21	3.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
The MDC is a sample specific MDC.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658007	Date Collected: 06/02/2017 07:15	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39TC8		Prep Basis: "As Received"
Batch ID: 1670989	Method: 9310_ALPHABETA_GPC	SOP Ref: GL-RAD-A-001
Run Date: 06/06/2017 18:18	Analyst: LXB3	Instrument: LB4100H3
Data File: AB1670989.xls	Aliquot: 150 mL	Count Time: 500 min
Prep Batch: 1670989	Prep Method: EPA 900.0/SW846 9310	
Prep Date: 06/06/2017 09:56		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
12587-46-1	Alpha ALPHA	U	0.118	pCi/L	+/-0.478	0.478	0.854	3.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

Certificate of Analysis
Sample Summary

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658008	Date Collected: 06/02/2017 10:57	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RL8	Method: PUIISO_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1671142	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 06/22/2017 08:52	Aliquot: 0.4 L	Instrument: 1083
Data File: S0424658008_PU.1A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 239.9998 min
Prep Batch: 1671142		
Prep Date: 06/21/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	-0.00521	pCi/L	+/-0.045	0.0451	0.104	1.00
OER-100-70	Plutonium-239/240	U	-0.0625	pCi/L	+/-0.0563	0.0564	0.200	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	3.06	4.92	pCi/L	62.1	(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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658008	Date Collected: 06/02/2017 10:57	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RL8	Method: PU241_IE_LSC	Prep Basis: "As Received"
Batch ID: 1671143	Analyst: MXS2	SOP Ref: GL-RAD-A-035
Run Date: 06/23/2017 06:08	Aliquot: 0.4 L	Instrument: LSCGREEN
Data File: PU1671143.xls	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 30 min
Prep Batch: 1671143		
Prep Date: 06/21/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14119-32-5	Plutonium-241	U	3.01	pCi/L	+/-14.6	14.7	25.2	25.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	3.06	4.92	pCi/L	62.1	(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.

June 28, 2017

Certificate of Analysis
Sample Summary

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658008	Date Collected: 06/02/2017 10:57	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RL8	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1671427	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 06/08/2017 14:28	Aliquot: 1.6 L	Instrument: XRAY3
Data File: I424658008.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 60 min
Prep Batch: 1671427		
Prep Date: 06/07/2017 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129		3.12	pCi/L	+/-0.989	1.04	0.872	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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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.

June 28, 2017

**Certificate of Analysis
Sample Summary**

SDG Number: GEL424658	Client: CPRC001	Project: CPRC0S17006
Lab Sample ID: 424658008	Date Collected: 06/02/2017 10:57	Matrix: WATER
	Date Received: 06/03/2017 09:00	
Client ID: B39RL8	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1672415	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 06/27/2017 17:10	Aliquot: 100 mL	Instrument: LSCRED
Data File: C1672415.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 15 min
Prep Batch: 1672415		
Prep Date: 06/27/2017 14:50		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-7.25	pCi/L	+/-16.0	16.0	28.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
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Comments:

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).
 The MDC is a sample specific MDC.

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: June 28, 2017
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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 424658

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1671142								
QC1203804260	MB								
Plutonium-238			U	0.00665	pCi/L			MXS2	06/22/1708:52
				Uncert: +/-0.0695					
				TPU: +/-0.0696					
Plutonium-239/240			U	-0.0627	pCi/L				
				Uncert: +/-0.0606					
				TPU: +/-0.0607					
**Plutonium-242 Tracer	4.92			2.82	pCi/L	REC: 57	(30%-105%)		
				Uncert: +/-0.675					
				TPU: +/-0.992					
QC1203804261	424658008	DUP							
Plutonium-238		U	-0.00521	U	-0.016	pCi/L			
			Uncert: +/-0.045		+/-0.0979		RPD: 0	N/A	
			TPU: +/-0.0451		+/-0.0979		RER: 0.197	(0-2)	
Plutonium-239/240		U	-0.0625	U	0.00561	pCi/L			
			Uncert: +/-0.0563		+/-0.0586		RPD: 0	N/A	
			TPU: +/-0.0564		+/-0.0587		RER: 1.64	(0-2)	
**Plutonium-242 Tracer	4.92	3.06			3.24	pCi/L	REC: 66	(30%-105%)	
					Uncert: +/-0.647				
					TPU: +/-0.954				
QC1203804262	LCS								
Plutonium-238			U	-0.0225	pCi/L				
				Uncert: +/-0.0916					
				TPU: +/-0.0916					
Plutonium-239/240	4.94				5.60	pCi/L	REC: 113	(80%-120%)	
					Uncert: +/-0.672				
					TPU: +/-1.03				
**Plutonium-242 Tracer	4.92				3.86	pCi/L	REC: 78	(30%-105%)	
					Uncert: +/-0.631				
					TPU: +/-0.933				
Batch	1671143								
QC1203804263	MB								
Plutonium-241			U	-0.811	pCi/L			MXS2	06/23/1706:40
				Uncert: +/-15.7					
				TPU: +/-15.7					
**Plutonium-242 Tracer	4.92				2.82	pCi/L	REC: 57	(30%-105%)	
					Uncert: +/-0.675				
					TPU: +/-0.992				
QC1203804264	424658008	DUP							
Plutonium-241		U	3.01	U	3.74	pCi/L			06/23/1707:11
			Uncert: +/-14.6		+/-13.8		RPD: 0	N/A	
			TPU: +/-14.7		+/-13.8		RER: 0.0701	(0-2)	
**Plutonium-242 Tracer	4.92	3.06			3.24	pCi/L	REC: 66	(30%-105%)	
					Uncert: +/-0.647				
					TPU: +/-0.954				

QC Summary

Workorder: 424658

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1671143								
QC1203804265	LCS								
Plutonium-241	184			160	pCi/L	REC: 87 (80%-120%)			06/23/1707:43
	Uncert:			+/-16.5					
	TPU:			+/-38.2					
**Plutonium-242 Tracer	4.92			3.67	pCi/L	REC: 75 (30%-105%)			
	Uncert:			+/-0.620					
	TPU:			+/-0.917					
Rad Gamma Spec									
Batch	1671427								
QC1203804805	MB								
Iodine-129			U	-0.00946	pCi/L			MJH1	06/08/1715:40
	Uncert:			+/-0.208					
	TPU:			+/-0.208					
QC1203804806	424692001	DUP							
Iodine-129		0.857		0.939	pCi/L				06/08/1715:40
	Uncert:	+/-0.549		+/-0.442		RPD: 9 (0% - 100%)			
	TPU:	+/-0.555		+/-0.452		RER: 0.225 (0-2)			
QC1203804807	424692001	MS							
Iodine-129	32.0	0.857		36.5	pCi/L	REC: 111 (75%-125%)			06/08/1716:17
	Uncert:	+/-0.549		+/-4.80					
	TPU:	+/-0.555		+/-6.26					
QC1203804808	LCS								
Iodine-129	0.026			27.2	pCi/L	REC: 104 (80%-120%)			06/09/1705:57
	Uncert:			+/-2.81					
	TPU:			+/-3.89					
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					

QC Summary

Workorder: 424658

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1675360								
QC1203814556	424516023	DUP							
Antimony-125		TPU:		+/-78.0					
		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)	
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				

QC Summary

Workorder: 424658

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1675360								
Potassium-40	TPU:			+/-415					
			U	-177	pCi/L				
	Uncert:			+/-519					
	TPU:			+/-525					
Rad Gas Flow									
Batch	1670989								
QC1203803801	MB								
Alpha			U	-0.337	pCi/L			LXB3	06/07/1712:39
	Uncert:			+/-0.783					
	TPU:			+/-0.784					
Beta			U	0.291	pCi/L				
	Uncert:			+/-1.60					
	TPU:			+/-1.60					
QC1203803802	424658003	DUP							
Alpha		U	3.30	4.91	pCi/L				06/06/1718:21
	Uncert:		+/-2.70	+/-2.08		RPD: 39	(0% - 100%)		
	TPU:		+/-2.82	+/-2.27		RER: 0.87	(0-2)		
Beta			14900	13800	pCi/L				
	Uncert:		+/-29.0	+/-29.2		RPD: 8	(0% - 20%)		
	TPU:		+/-2410	+/-2230		RER: 0.652	(0-2)		
QC1203803803	424658003	MS							
Alpha	483	U	3.30	375	pCi/L	REC: 78	(75%-125%)		06/06/1716:27
	Uncert:		+/-2.70	+/-43.0					
	TPU:		+/-2.82	+/-77.9					
Beta	1750		14900	19300	pCi/L	REC: N/A			
	Uncert:		+/-29.0	+/-213					
	TPU:		+/-2410	+/-3180					
QC1203803804	424658003	MSD							
Alpha	483	U	3.30	409	pCi/L	REC: 85	(75%-125%)		06/06/1716:27
	Uncert:		+/-2.70	+/-50.3		RPD: 9	(0%-20%)		
	TPU:		+/-2.82	+/-85.4		RER: 0.577	(0-2)		
Beta	1750		14900	22200	pCi/L	REC: N/A			
	Uncert:		+/-29.0	+/-238		RPD: 14	(0%-20%)		
	TPU:		+/-2410	+/-3610		RER: 1.16	(0-2)		
QC1203803805	LCS								
Alpha	80.6			82.6	pCi/L	REC: 103	(80%-120%)		06/06/1716:27
	Uncert:			+/-8.91					
	TPU:			+/-16.3					
Beta	292			331	pCi/L	REC: 113	(80%-120%)		
	Uncert:			+/-12.0					
	TPU:			+/-57.6					
Rad Liquid Scintillation									
Batch	1671431								
QC1203804812	MB								
Selenium-79			U	-28.7	pCi/L			CXS7	06/27/1713:14
	Uncert:			+/-21.6					
	TPU:			+/-21.6					
**Selenium Carrier	20.0			18.7	mg	REC: 94	(40%-110%)		
QC1203804813	424658002	DUP							

QC Summary

Workorder: 424658

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1671431								
Selenium-79		U	-28.6	U	-9.41	pCi/L			
	Uncert:		+/-22.7		+/-22.9		RPD: 0	N/A	
	TPU:		+/-22.7		+/-22.9		RER: 1.17	(0-2)	
**Selenium Carrier	20.0		17.8		18.0	mg	REC: 90	(40%-110%)	
QC1203804814	LCS								
Selenium-79	33000				33400	pCi/L	REC: 101	(80%-120%)	06/27/1714:17
	Uncert:				+/-657				
	TPU:				+/-952				
**Selenium Carrier	20.0				18.1	mg	REC: 91	(40%-110%)	
Batch	1671435								
QC1203804815	MB								
Technetium-99				U	10.6	pCi/L		CXS7	06/27/1706:48
	Uncert:				+/-25.2				
	TPU:				+/-25.2				
**Technetium-99m Tracer	62500				54800	CPM	REC: 88	(30%-105%)	
QC1203804816	424658001	DUP							
Technetium-99			7420		7530	pCi/L			06/27/1707:10
	Uncert:		+/-150		+/-152		RPD: 1	(0% - 20%)	
	TPU:		+/-836		+/-849		RER: 0.18	(0-2)	
**Technetium-99m Tracer	62500		51700		50500	CPM	REC: 81	(30%-105%)	
QC1203804817	LCS								
Technetium-99	861				780	pCi/L	REC: 91	(80%-120%)	06/27/1707:25
	Uncert:				+/-44.4				
	TPU:				+/-97.2				
**Technetium-99m Tracer	62500				58700	CPM	REC: 94	(30%-105%)	
Batch	1672415								
QC1203807372	MB								
Carbon-14				U	-0.207	pCi/L		TXJ1	06/27/1718:30
	Uncert:				+/-16.3				
	TPU:				+/-16.3				
QC1203807373	424658001	DUP							
Carbon-14		U	-7.29	U	6.81	pCi/L			06/27/1718:47
	Uncert:		+/-16.0		+/-16.7		RPD: 0	N/A	
	TPU:		+/-16.0		+/-16.7		RER: 1.19	(0-2)	
QC1203807374	424658001	MS							
Carbon-14	751	U	-7.29		705	pCi/L	REC: 94	(75%-125%)	06/27/1719:03
	Uncert:		+/-16.0		+/-38.2				
	TPU:		+/-16.0		+/-136				
QC1203807375	LCS								
Carbon-14	751				751	pCi/L	REC: 100	(80%-120%)	06/27/1719:19
	Uncert:				+/-39.3				
	TPU:				+/-145				

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.

QC Summary

Workorder: 424658

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
N	Spike Sample recovery is outside control limits.									
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.									
UX	Gamma Spectroscopy--Uncertain identification									
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									

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

** Indicates analyte is a surrogate compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.