

July 13, 2016



a member of **The GEL Group** INC



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July 13, 2016

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

Re: CHPRC SAF S16-006
Work Order: 399479
SDG: GEL399479

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 16, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,

B Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Purchase Order: 300071 - 7H
Chain of Custody: S16-006-286 and S16-006-292
Enclosures



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Sample Issue Resolution

SAMPLE ISSUE RESOLUTION	SIR NUM	SIR16-456
	REV NUM	0
	DATE INITIATED	7/5/2016

SAMPLE EVENT INFORMATION

SAF NUM(S) S16-006
OPERABLE UNIT(S) NONE
PROJECT(S) SURV16
SAMPLE EVENT TITLE(S) SURV16
LABORATORY GEL Laboratories, LLC

SAMPLING INFORMATION

NUMBER OF SAMPLES 1
SAMPLE NUMBERS B35CH2
SAMPLE MATRIX WATER
COLLECTION DATE 6/15/2016 - 6/15/2016
SDG NUM GEL399479

ISSUE BACKGROUND

CLASS Laboratory Issue
TYPE Quality Control Failure
DESCRIPTION The Se-79 batch for the listed SDGs had an LCS recovery of 121% that does not meet the client recovery range of 80-120%; however, it does meet our standard requirement of 125%. All of the sample results in the batch are less than MDA; therefore, this high bias does not impact the data.

DISPOSITION

DESCRIPTION Proposed Resolution: Initiate SIR, report results and include a detailed comment in the case narrative.
JUSTIFICATION Final Disposition: Accept proposed resolution.
SUBMITTED BY: Heather Shaffer DATE: 07/01/2016
ACCEPTED BY: Sarah Nagel DATE: 07/05/2016

Case Narrative

General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF S16-006
SDG: GEL399479

July 13, 2016

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt

The sample(s) arrived at GEL Laboratories, LLC, Charleston, South Carolina on June 16, 2016, 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. Please see the enclosed SIR regarding a QC issue for Se79 analysis.

Items of Note All efforts were made by the lab to meet any short hold times. Samples that were analyzed outside of the initial hold time but still within 2X hold time will be noted in the lab case narrative and DER.

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
399479001	B35CH2
399479002	B35CM8

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: Metals and Radiochemistry.

We certify that this package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.

July 13, 2016

B. Luthman
Brielle Luthman for
Heather Shaffer
Project Manager

Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL399479
Work Order #: 399479

Metals

Determination of Metals by ICP-MS

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

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of antimony, thallium and strontium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203568971 (MB).

Radiochemistry

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.

Technical Information

Recounts

Sample 399479001 (B35CH2) was recounted due to poor resolution. The recount is reported.

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.

UIISO_IE_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.

GAMMA_GS:COMMON + GW 01

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, 1203570526 (B35C93DUP), did not meet the Cs-137 relative error ratio requirement; however, both results are less than their respective MDCs.

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.

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.

Technical Information

Recounts

Sample 1203574873 (B35B65DUP) was verified by recounting at least five days from the separation date. The recount is reported.

PU241_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.

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.

Quality Control (QC) Information

QC Information

The laboratory control sample 1203570474 (LCS) does not meet the client's LCS requirement of 80-120%; however, it does meet GEL's standard LCS requirement of 75-125%. Reporting results.

Technical Information

Recounts

Sample 1203570474 (LCS) was recounted due to high recovery. The recount is reported.

Miscellaneous Information

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.

TRITIUM_DIST_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

61105

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# **S16-006-292**
Page 1 of 1

Collector: Juan Aguilera CH2M Telephone No. 509-376-4650

SAF No. S16-006 Purchase Order/Charge Code 300071

Project Title: SURV, JUNE 2016 Logbook No. HNF-N-506 SL/29 Ice Chest No. 6005-458

Shipped To (Lab): GEL Laboratories, LLC Method of Shipment: Commercial Carrier Bill of Lading/Air Bill No. 77652689 1840

Protocol: SURV Priority: 30 Days SPECIAL INSTRUCTIONS: **PRIORITY** Offsite Property No. 6130

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
B35CM8	N	W	6-15-16	0824	1x500-mL G/P	6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B35CM8	N	W			1x4-L G/P	GAMMA_GS: COMMON	6 Months	HNO3 to pH <2
B35CM8	N	W			2x4-L G/P	I129LL_SEP_LEPS_GS_LL: COMMON	6 Months	None
B35CM8	N	W			1x1-L G/P	PUISO_PLATE_AEA: COMMON	6 Months	HNO3 to pH <2
B35CM8	N	W			3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B35CM8	N	W			1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2
B35CM8	N	W	6-15-16	0824	1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None

Relinquished By: <u>Juan Aguilera</u>	Print: <u>Juan Aguilera</u>	Sign: <u>[Signature]</u>	Date/Time: JUN 15 2016 0850	Received By: <u>Leah Wall</u>	Print: <u>Leah Wall</u>	Sign: <u>[Signature]</u>	Date/Time: JUN 15 2016 0850	Matrix * S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other
Relinquished By: <u>Leah Wall</u>	Print: <u>Leah Wall</u>	Sign: <u>[Signature]</u>	Date/Time: JUN 15 2016 1400	Received By: <u>FEDEX</u>	Print: <u>FEDEX</u>	Sign: <u>[Signature]</u>	Date/Time: JUN 15 2016 0915	
Relinquished By: <u>[Signature]</u>	Print: <u>[Signature]</u>	Sign: <u>[Signature]</u>	Date/Time: JUN 15 2016 0915	Received By: <u>[Signature]</u>	Print: <u>[Signature]</u>	Sign: <u>[Signature]</u>	Date/Time: JUN 15 2016 0915	

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

Disposed By: _____ Date/Time: _____

PRINTED ON 4/21/2016 FSR ID = FSR31910 A-6004-842 (REV 2)

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **S16-006-286**
Page 1 of 1

Collector: **Juan Aguilar** *UHP/C*

Contact/Requester: **Karen Waters-Husted**

Telephone No. **509-376-4650**

SAF No. **S16-006**

Sampling Origin: **Hanford Site**

Purchase Order/Charge Code: **300071**

Project Title: **SURV, JUNE 2016**

Logbook No. **HNF-N-506 86/29**

Ice Chest No. **6WS-524 91/165**

Shipped To (Lab): **GEL Laboratories, LLC**

Method of Shipment: **Commercial Carrier**

Bill of Lading/Air Bill No. **7765 2909 9024**

Protocol: **SURV**

Priority: **30 Days**

Offsite Property 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

SPECIAL INSTRUCTIONS: **N/A**

Hold Time: _____

Total Activity Exemption: Yes No

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B35CH2	N	W	6-15-16	0937	1x500-mL G/P	6020_METALS_ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B35CH2	N	W			1x1-L G/P	AMCMISO_EIE_PRECIP_AEA: COMMON	180 Days	HNO3 to pH <2
B35CH2	N	W			1x500-mL G/P	C14_LSC: COMMON	6 Months	None
B35CH2	N	W			1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B35CH2	N	W			2x4-L G/P	I129LL_SEP_LEPS_GS_LL: COMMON	6 Months	None
B35CH2	N	W			1x1-L G/P	PU241_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B35CH2	N	W			1x1-L G/P	PUISO_PLATE_AEA: COMMON	6 Months	HNO3 to pH <2
B35CH2	N	W			1x1-L G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B35CH2	N	W			3x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B35CH2	N	W			1x500-mL G/P	TC99_EIE_LSC: COMMON	6 Months	HNO3 to pH <2
B35CH2	N	W			1x500-mL P	TRITIUM_DIST_LSC: COMMON	6 Months	None
B35CH2	N	W	6-15-16	0937	3x1-L G/P	UIISO_IE_PRECIP_AEA: COMMON	6 Months	HNO3 to pH <2

Relinquished By: Juan Aguilar <i>UHP/C</i>	Date/Time: JUN 15 2016 1020	Received By: Judy Wall	Date/Time: JUN 15 2016 1020	Print	Sign
Relinquished By: Judy Wall <i>IC/PRC</i>	Date/Time: JUN 15 2016 1400	Received By: FEDEX	Date/Time: _____	Print	Sign
Relinquished By: _____	Date/Time: _____	Received By: M. Kaskaw <i>M. Kaskaw</i>	Date/Time: 6-16-16 0915	Print	Sign
Relinquished By: _____	Date/Time: _____	Received By: _____	Date/Time: _____	Print	Sign

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

FRS ID = FSR31663

PRINTED ON 4/27/2016

SAMPLE RECEIPT & REVIEW FORM

Client: <u>OPRC</u>		SDG/AR/COC/Work Order: <u>399479</u>
Received By: <u>MJC</u>		Date Received: <u>6-16-16</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts):
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius <u>1c 2c</u>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>150462902</u> Secondary Temperature Device Serial# (if Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Preservation added, Lot#: Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air <u>7765</u> FedEx Ground <u>2909</u> UPS <u>9355</u> Field Services <u>2c</u> Courier <u>2c</u> Other <u>9263</u> <u>0193</u> <u>20c</u> <u>NO ICE</u> <u>9024</u> <u>2c</u> <u>9355</u> <u>21c</u> <u>NO ICE</u> <u>7765</u> <u>2689</u> <u>1840</u> <u>1c</u> <u>1390</u> <u>2c</u>

Comments (Use Continuation Form if needed):

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

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

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

Laboratory Certifications

List of current GEL Certifications as of 13 July 2016

State	Certification
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG #: GEL399479
Work Order #: 399479

Product: Determination of Metals by ICP-MS
Analytical Method: 6020_METALS_ICPMS
Analytical Procedure: GL-MA-E-014 REV# 28
Analytical Batch: 1575102

Preparation Method: SW846 3005A
Preparation Procedure: GL-MA-E-006 REV# 13
Preparation Batch: 1575101

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
399479002	B35CM8
1203568971	Method Blank (MB)ICP-MS
1203568972	Laboratory Control Sample (LCS)
1203568975	399469007(NonSDGL) Serial Dilution (SD)
1203568973	399469007(NonSDGS) Matrix Spike (MS)
1203568974	399469007(NonSDGSD) Matrix Spike Duplicate (MSD)

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

Method Blank (MB) Statement

The method blanks (MB) analyzed with this SDG met the exception criteria with the exception of antimony, thallium and strontium. In instances where there were positive hits in the method blank, the results were evaluated and appropriately flagged on the data. 1203568971 (MB).

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: GEL399479 GEL Work Order: 399479

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- 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).
- 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.

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: Nik-Cole Elmore

Date: 13 JUL 2016

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL399479

CONTRACT: CPRC0S16006

METHOD TYPE: SW846

SAMPLE ID:399479001

BASIS: As Received

DATE COLLECTED 15-JUN-16

CLIENT ID: B35CH2

LEVEL: Low

DATE RECEIVED 16-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	0.694	ug/L		0.067	0.2	15	1	MS	BAJ	07/11/16 13:09	160711-4	1575102

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1575102	1575101	SW846 3005A	50	mL	50	mL	06/17/16	SXW1

***Analytical Methods:**

MS SW846 3005A/6020A

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL399479

CONTRACT: CPRC0S16006

METHOD TYPE: SW846

SAMPLE ID:399479002

BASIS: As Received

DATE COLLECTED 15-JUN-16

CLIENT ID: B35CM8

LEVEL: Low

DATE RECEIVED 16-JUN-16

MATRIX: WATER

%SOLIDS: 0

CAS No.	Analyte	Result	Units	Qual	MDL	PQL	CRDL	DF	M*	Analyst	Run Date	Analytical Run	Analytical Batch
7440-61-1	Uranium	9.46	ug/L		0.067	0.2	15	1	MS	BAJ	07/11/16 13:10	160711-4	1575102

Prep Information:

Analytical Batch	Prep Batch	Prep Method	Initial wt./vol.	Units	Final wt./vol.	Units	Date	Analyst
1575102	1575101	SW846 3005A	50	mL	50	mL	06/17/16	SXW1

***Analytical Methods:**

MS SW846 3005A/6020A

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: July 13, 2016

CH2M Hill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 399479

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1575102										
QC1203568972	LCS										
Uranium	50.0			57.2	ug/L		114	(80%-120%)	BAJ	07/11/16	13:01
QC1203568971	MB										
Uranium		U		0.067	ug/L					07/11/16	12:59
QC1203568973	399469007	MS									
Uranium	50.0	D	324 D	390	ug/L		N/A	(75%-125%)		07/11/16	13:03
QC1203568974	399469007	MSD									
Uranium	50.0	D	324 D	360	ug/L	7.84	N/A	(0%-20%)		07/11/16	13:04
QC1203568975	399469007	SDILT									
Uranium		D	16.2 D	3.21	ug/L	.858		(0%-10%)		07/11/16	13:05

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- 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).
- 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.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- 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

July 13, 2016

GEL LABORATORIES LLC

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

QC Summary

Workorder: 399479

Page 2 of 2

<u>Parmname</u>	<u>NOM</u>	<u>Sample Qual</u>	<u>QC</u>	<u>Units</u>	<u>RPD/D%</u>	<u>REC%</u>	<u>Range</u>	<u>Anlst</u>	<u>Date</u>	<u>Time</u>
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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.

^ 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.

* Indicates that a Quality Control parameter was not within specifications.

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.

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL399479
Work Order #: 399479

Product: PUISO_PRECIP_AEA:COMMON
Analytical Method: PUISO_PRECIP_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1576179

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
399479002	B35CM8
1203571626	Method Blank (MB)
1203571627	399479001(B35CH2) Sample Duplicate (DUP)
1203571628	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 399479001 (B35CH2) was recounted due to poor resolution. The recount is reported.

Product: AMCMISO_EIE_PRECIP_AEA: COMMON
Analytical Method: AMCMISO_EIE_PREC_AEA
Analytical Procedure: GL-RAD-A-011 REV# 26
Analytical Batch: 1576183

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
1203571630	Method Blank (MB)
1203571631	399479001(B35CH2) Sample Duplicate (DUP)
1203571632	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: UISO_IE_PRECIP_AEA:COMMON

Analytical Method: UISO_IE_PRECIP_AEA

Analytical Procedure: GL-RAD-A-011 REV# 26

Analytical Batch: 1576192

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
1203571666	Method Blank (MB)
1203571667	399479001(B35CH2) Sample Duplicate (DUP)
1203571668	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# 25

Analytical Batch: 1575754

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
399479002	B35CM8
1203570525	Method Blank (MB)
1203570526	399283007(B35C93) Sample Duplicate (DUP)
1203570527	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, 1203570526 (B35C93DUP), did not meet the Cs-137 relative error ratio requirement; however, both results are less than their respective MDCs.

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: 1575923

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
399479002	B35CM8
1203571035	Method Blank (MB)
1203571036	399283007(B35C93) Sample Duplicate (DUP)
1203571037	399283007(B35C93) Matrix Spike (MS)
1203571038	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# 17

Analytical Batch: 1577445

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
399479002	B35CM8
1203574872	Method Blank (MB)
1203574873	399283005(B35B65) Sample Duplicate (DUP)
1203574874	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 1203574873 (B35B65DUP) was verified by recounting at least five days from the separation date. The recount is reported.

Product: PU241_IE_LSC: COMMON

Analytical Method: PU241_IE_LSC

Analytical Procedure: GL-RAD-A-035 REV# 17

Analytical Batch: 1576184

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
1203571634	Method Blank (MB)
1203571635	399479001(B35CH2) Sample Duplicate (DUP)
1203571636	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: SE79_SEP_IE_LSC: COMMON

Analytical Method: SE79_SEP_IE_LSC

Analytical Procedure: GL-RAD-A-031 REV# 11

Analytical Batch: 1575739

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
1203570472	Method Blank (MB)

1203570473 398770001(B35D12) Sample Duplicate (DUP)
1203570474 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 laboratory control sample 1203570474 (LCS) does not meet the client's LCS requirement of 80-120%; however, it does meet GEL's standard LCS requirement of 75-125%. Reporting results.

Technical Information

Recounts

Sample 1203570474 (LCS) was recounted due to high recovery. The recount is reported.

Product: TC99_EIE_LSC: COMMON
Analytical Method: TC99_EIE_LSC
Analytical Procedure: GL-RAD-A-059 REV# 4
Analytical Batch: 1575749

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
399479002	B35CM8
1203570510	Method Blank (MB)
1203570511	399283007(B35C93) Sample Duplicate (DUP)
1203570512	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# 21
Analytical Batch: 1576839

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
399479002	B35CM8
1203573300	Method Blank (MB)
1203573301	399283007(B35C93) Sample Duplicate (DUP)
1203573302	399283007(B35C93) Matrix Spike (MS)
1203573303	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: 1576854

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

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
399479001	B35CH2
1203573364	Method Blank (MB)
1203573365	399283007(B35C93) Sample Duplicate (DUP)
1203573367	399283007(B35C93) Matrix Spike (MS)
1203573369	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.

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: GEL399479 GEL Work Order: 399479

The Qualifiers in this report are defined as follows:

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.

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: Kate Gellatly

Date: 12 JUL 2016

Title: Analyst I

Sample Data Summary

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399479001	Date Collected: 06/15/2016 09:37	Matrix: WATER
	Date Received: 06/16/2016 09:15	
Client ID: B35CH2	Method: PUIISO_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1576179	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 07/05/2016 11:02	Aliquot: 0.4 L	Instrument: 1104
Data File: S0399479001_PU.1B.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 239.9998 min
Prep Batch: 1576179		
Prep Date: 07/01/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	-0.00948	pCi/L	+/-0.0419	0.042	0.109	1.00
OER-100-70	Plutonium-239/240	U	0.0261	pCi/L	+/-0.0817	0.0818	0.153	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	3.53	4.93	pCi/L	71.7	(30%-105%)

Comments:

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

Rad
 Certificate of Analysis
 Sample Summary

SDG Number: GEL399479	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399479001	Date Collected: 06/15/2016 09:37	Matrix: WATER
	Date Received: 06/16/2016 09:15	
Client ID: B35CH2	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "As Received"
Batch ID: 1576183	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 07/02/2016 10:51	Aliquot: 0.4 L	Instrument: 1110
Data File: S0399479001_AM.1A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 240 min
Prep Batch: 1576183		
Prep Date: 07/01/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.0131	pCi/L	+/-0.0729	0.073	0.140	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	3.12	5.34	pCi/L	58.3	(30%-105%)

Comments:

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

Rad
 Certificate of Analysis
 Sample Summary

SDG Number: GEL399479
 Lab Sample ID: 399479001

Client: CPRC001
 Date Collected: 06/15/2016 09:37
 Date Received: 06/16/2016 09:15

Project: CPRC0S16006
 Matrix: WATER

Client ID: B35CH2
 Batch ID: 1576184
 Run Date: 07/08/2016 10:12
 Data File: PU1576184.xls
 Prep Batch: 1576184
 Prep Date: 07/01/2016 00:00

Method: PU241_IE_LSC
 Analyst: MXS2
 Aliquot: 0.4 L
 Prep Method: DOE EML HASL-300, Pu-11-

Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-035
 Instrument: LSCRED
 Count Time: 40 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14119-32-5	Plutonium-241	U	2.79	pCi/L	+/-9.89	9.91	16.9	25.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	3.53	4.93	pCi/L	71.7	(30%-105%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

Page 1 of 1

SDG Number: GEL399479
 Lab Sample ID: 399479001

Client: CPRC001
 Date Collected: 06/15/2016 09:37
 Date Received: 06/16/2016 09:15

Project: CPRC0S16006
 Matrix: WATER

Client ID: B35CH2
 Batch ID: 1576192
 Run Date: 07/02/2016 10:50
 Data File: S0399479001_UU.1A.gcnf
 Prep Batch: 1576192
 Prep Date: 07/01/2016 00:00

Method: UIISO_IE_PRECIP_AEA
 Analyst: MXS2
 Aliquot: 0.4 L
 Prep Method: DOE EML HASL-300, U-02-R

Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-011
 Instrument: 1004
 Count Time: 239.9998 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		0.216	pCi/L	+/-0.172	0.175	0.201	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.0167	pCi/L	+/-0.0926	0.0928	0.178	1.00
7440-61-1	Uranium-238		0.195	pCi/L	+/-0.154	0.157	0.144	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	3.66	5.21	pCi/L	70.1	(30%-105%)

Comments:

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.

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

The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479
Lab Sample ID: 399479001

Client: CPRC001
Date Collected: 06/15/2016 09:37
Date Received: 06/16/2016 09:15

Project: CPRC0S16006
Matrix: WATER

Client ID: B35CH2
Batch ID: 1577445
Run Date: 07/05/2016 17:04
Data File: S1577445r.xls
Prep Batch: 1577445
Prep Date: 06/30/2016 00:00

Method: SRISO_SEP_PRECIP_GPC
Analyst: KSD1
Aliquot: 300 mL
Prep Method: EPA 905.0 Modified/DOE RP5

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-004
Instrument: PIC11A
Count Time: 60 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	-0.781	pCi/L	+/-0.537	0.537	1.19	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	5.80	7.37	mg	78.8	(40%-110%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479
Lab Sample ID: 399479001

Client ID: B35CH2
Batch ID: 1575754
Run Date: 06/28/2016 09:31
Data File: G399479001.CNF;1
Prep Batch: 1575754
Prep Date: 06/24/2016 00:00

Client: CPRC001
Date Collected: 06/15/2016 09:37
Date Received: 06/16/2016 09:15

Method: 901.1_GAMMA_GS
Analyst: MXR1
Aliquot: 2 L
Prep Method: EPA 901.1

Project: CPRC0S16006
Matrix: WATER

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-013
Instrument: GAM44
Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14234-35-6	Antimony-125	U	6.15	pCi/L	+/-8.03	8.51	15.8	
13967-70-9	Cesium-134	U	1.25	pCi/L	+/-2.66	2.72	5.54	
10045-97-3	Cesium-137	U	2.52	pCi/L	+/-3.43	3.62	6.93	15.0
10198-40-0	Cobalt-60	U	1.75	pCi/L	+/-3.29	3.39	7.01	
14683-23-9	Europium-152	U	-1.26	pCi/L	+/-8.39	8.41	15.1	
15585-10-1	Europium-154	U	-3.89	pCi/L	+/-8.76	8.94	15.8	
14391-16-3	Europium-155	U	-4.42	pCi/L	+/-11.3	11.5	19.3	
13966-00-2	Potassium-40	U	6.70	pCi/L	+/-40.3	40.4	85.5	

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

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

Rad
 Certificate of Analysis
 Sample Summary

SDG Number: GEL399479	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399479001	Date Collected: 06/15/2016 09:37	Matrix: WATER
	Date Received: 06/16/2016 09:15	
Client ID: B35CH2	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1575923	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 06/30/2016 15:42	Aliquot: 1.5 L	Instrument: XRAY6
Data File: I399479001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 120 min
Prep Batch: 1575923		
Prep Date: 06/29/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.080	pCi/L	+/-0.270	0.273	0.615	1.00

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479
Lab Sample ID: 399479001

Client: CPRC001
Date Collected: 06/15/2016 09:37
Date Received: 06/16/2016 09:15

Project: CPRC0S16006
Matrix: WATER

Client ID: B35CH2
Batch ID: 1575739
Run Date: 06/24/2016 19:24
Data File: SE1575739R2.xls
Prep Batch: 1575739
Prep Date: 06/22/2016 00:00

Method: SE79_SEP_IE_LSC
Analyst: CXS7
Aliquot: 0.1 L
Prep Method: NERC ORD

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-031
Instrument: LSCBLUE
Count Time: 60 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15758-45-9	Selenium-79	NU	-1.55	pCi/L	+/-12.2	12.2	20.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Selenium Carrier	14.8	20.0	mg	74	(40%-110%)

Comments:

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.

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

The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

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SDG Number: GEL399479
 Lab Sample ID: 399479001

Client: CPRC001
 Date Collected: 06/15/2016 09:37
 Date Received: 06/16/2016 09:15

Project: CPRC0S16006
 Matrix: WATER

Client ID: B35CH2
 Batch ID: 1575749
 Run Date: 07/05/2016 19:40
 Data File: E1575749.xls
 Prep Batch: 1575749
 Prep Date: 06/30/2016 12:36

Method: TC99_EIE_LSC
 Analyst: CXS7
 Aliquot: 100 mL
 Prep Method: DOE EML HASL-300, Tc-02-

Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-059
 Instrument: LSCBLUE
 Count Time: 30 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-5.08	pCi/L	+/-15.2	15.2	26.8	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	40200	43800	CPM	91.7	(30%-105%)

Comments:

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.

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

The MDC is a sample specific MDC.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399479001	Date Collected: 06/15/2016 09:37	Matrix: WATER
	Date Received: 06/16/2016 09:15	
Client ID: B35CH2	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1576839	Analyst: TXJ1	SOP Ref: GL-RAD-A-002
Run Date: 06/30/2016 11:31	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1576839.xls	Prep Method: EPA 906.0 Modified	Count Time: 40 min
Prep Batch: 1576839		
Prep Date: 06/29/2016 15:40		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium	U	-22.6	pCi/L	+/-186	186	330	400

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399479001	Date Collected: 06/15/2016 09:37	Matrix: WATER
	Date Received: 06/16/2016 09:15	
Client ID: B35CH2	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1576854	Analyst: TXJ1	SOP Ref: GL-RAD-A-003
Run Date: 07/01/2016 09:09	Aliquot: 60 mL	Instrument: LSCBROWN
Data File: C1576854.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 30 min
Prep Batch: 1576854		
Prep Date: 06/30/2016 16:07		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14	U	-5.36	pCi/L	+/-18.8	18.8	32.8	50.0

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

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399479002	Date Collected: 06/15/2016 08:24	Matrix: WATER
	Date Received: 06/16/2016 09:15	
Client ID: B35CM8	Method: PUIISO_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1576179	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 07/02/2016 10:52	Aliquot: 0.4 L	Instrument: 1217
Data File: S0399479002_PU.1A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 240 min
Prep Batch: 1576179		
Prep Date: 07/01/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.0615	pCi/L	+/-0.121	0.121	0.167	1.00
OER-100-70	Plutonium-239/240	U	0.0279	pCi/L	+/-0.125	0.125	0.245	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	2.53	4.93	pCi/L	51.4	(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.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399479002	Date Collected: 06/15/2016 08:24	Matrix: WATER
	Date Received: 06/16/2016 09:15	
Client ID: B35CM8	Method: SRISO_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1577445	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 07/05/2016 17:05	Aliquot: 300 mL	Instrument: PIC11B
Data File: S1577445r.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1577445		
Prep Date: 06/30/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10098-97-2	Strontium-90	U	-0.169	pCi/L	+/-0.565	0.565	1.11	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	5.50	7.37	mg	74.7	(40%-110%)

Comments:

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

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479
Lab Sample ID: 399479002

Client ID: B35CM8
Batch ID: 1575754
Run Date: 06/28/2016 09:38
Data File: G399479002.CNF;1
Prep Batch: 1575754
Prep Date: 06/24/2016 00:00

Client: CPRC001
Date Collected: 06/15/2016 08:24
Date Received: 06/16/2016 09:15

Method: 901.1_GAMMA_GS
Analyst: MXR1
Aliquot: 2 L
Prep Method: EPA 901.1

Project: CPRC0S16006
Matrix: WATER

Prep Basis: "As Received"
SOP Ref: GL-RAD-A-013
Instrument: GAM02
Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	1.75	pCi/L	+/-3.45	3.54	6.06	15.0
10198-40-0	Cobalt-60	U	-1.63	pCi/L	+/-3.24	3.32	5.66	
14683-23-9	Europium-152	U	-4.75	pCi/L	+/-9.31	9.56	15.8	
15585-10-1	Europium-154	U	-1.11	pCi/L	+/-8.37	8.39	15.9	
14391-16-3	Europium-155	U	-0.57	pCi/L	+/-12.7	12.7	21.7	

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.

Rad
Certificate of Analysis
Sample Summary

SDG Number: GEL399479	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399479002	Date Collected: 06/15/2016 08:24	Matrix: WATER
	Date Received: 06/16/2016 09:15	
Client ID: B35CM8	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1575923	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 07/01/2016 06:41	Aliquot: 1.5 L	Instrument: GAM05
Data File: I399479002.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 120 min
Prep Batch: 1575923		
Prep Date: 06/29/2016 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129		1.24	pCi/L	+/-0.783	0.793	0.962	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.

Rad
 Certificate of Analysis
 Sample Summary

SDG Number: GEL399479
 Lab Sample ID: 399479002

Client: CPRC001
 Date Collected: 06/15/2016 08:24
 Date Received: 06/16/2016 09:15

Project: CPRC0S16006
 Matrix: WATER

Client ID: B35CM8
 Batch ID: 1575749
 Run Date: 07/05/2016 20:12
 Data File: E1575749.xls
 Prep Batch: 1575749
 Prep Date: 06/30/2016 12:36

Method: TC99_EIE_LSC
 Analyst: CXS7
 Aliquot: 100 mL
 Prep Method: DOE EML HASL-300, Tc-02-

Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-059
 Instrument: LSCBLUE
 Count Time: 30 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99	U	-5.26	pCi/L	+/-15.8	15.8	27.7	50.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	38700	43800	CPM	88.4	(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.

Rad
 Certificate of Analysis
 Sample Summary

SDG Number: GEL399479	Client: CPRC001	Project: CPRC0S16006
Lab Sample ID: 399479002	Date Collected: 06/15/2016 08:24	Matrix: WATER
	Date Received: 06/16/2016 09:15	
Client ID: B35CM8	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1576839	Analyst: TXJ1	SOP Ref: GL-RAD-A-002
Run Date: 06/30/2016 12:13	Aliquot: 50 mL	Instrument: LSCRED
Data File: T1576839.xls	Prep Method: EPA 906.0 Modified	Count Time: 40 min
Prep Batch: 1576839		
Prep Date: 06/29/2016 15:40		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		1370	pCi/L	+/-254	367	335	400

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

July 13, 2016

GEL LABORATORIES LLC

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QC Summary

Report Date: July 12, 2016
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Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352
Contact: Mr. Scot Fitzgerald
Workorder: 399479

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1576179								
QC1203571626 MB									
Plutonium-238			U	-0.0426	pCi/L			MXS2	07/02/1610:52
				Uncert: +/-0.060					
				TPU: +/-0.0601					
Plutonium-239/240			U	-0.0233	pCi/L				
				Uncert: +/-0.0788					
				TPU: +/-0.0789					
**Plutonium-242 Tracer	4.93			3.62	pCi/L	REC: 73	(30%-105%)		
				Uncert: +/-0.695					
				TPU: +/-1.02					
QC1203571627 399479001 DUP									
Plutonium-238		U -0.00948	U	-0.00519	pCi/L				07/02/1610:52
				Uncert: +/-0.0419		RPD: 0	N/A		
				TPU: +/-0.042		RER: 0.137	(0-2)		
Plutonium-239/240		U 0.0261	U	0.104	pCi/L				
				Uncert: +/-0.0817		RPD: 0	N/A		
				TPU: +/-0.0818		RER: 1.07	(0-2)		
**Plutonium-242 Tracer	4.93	3.53		4.15	pCi/L	REC: 84	(30%-105%)		
				Uncert: +/-0.616					
				TPU: +/-0.912					
QC1203571628 LCS									
Plutonium-238			U	0.090	pCi/L				07/02/1610:53
				Uncert: +/-0.114					
				TPU: +/-0.115					
Plutonium-239/240	4.94			5.26	pCi/L	REC: 107	(80%-120%)		
				Uncert: +/-0.727					
				TPU: +/-1.08					
**Plutonium-242 Tracer	4.93			3.60	pCi/L	REC: 73	(30%-105%)		
				Uncert: +/-0.699					
				TPU: +/-1.03					
Batch	1576183								
QC1203571630 MB									
Americium-241			U	0.0516	pCi/L			MXS2	07/02/1610:53
				Uncert: +/-0.082					
				TPU: +/-0.0824					
**Americium-243 Tracer	5.34			4.97	pCi/L	REC: 93	(30%-105%)		
				Uncert: +/-0.647					
				TPU: +/-0.981					
QC1203571631 399479001 DUP									
Americium-241		U 0.0131	U	0.0078	pCi/L				07/02/1610:53
				Uncert: +/-0.0729		RPD: 0	N/A		
				TPU: +/-0.073		RER: 0.0906	(0-2)		
**Americium-243 Tracer	5.34	3.12		4.13	pCi/L	REC: 77	(30%-105%)		
				Uncert: +/-0.719					
				TPU: +/-1.08					

July 13, 2016

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QC Summary

Workorder: 399479

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1576183								
QC1203571632	LCS								
Americium-241	4.93			4.46	pCi/L	REC: 91	(80%-120%)		07/02/1610:53
	Uncert:			+/-0.593					
	TPU:			+/-0.853					
**Americium-243 Tracer	5.34			4.80	pCi/L	REC: 90	(30%-105%)		
	Uncert:			+/-0.644					
	TPU:			+/-0.976					
Batch	1576184								
QC1203571634	MB								
Plutonium-241			U	8.39	pCi/L			MXS2	07/08/1611:36
	Uncert:			+/-9.88					
	TPU:			+/-10.1					
**Plutonium-242 Tracer	4.93			3.62	pCi/L	REC: 73	(30%-105%)		
	Uncert:			+/-0.695					
	TPU:			+/-1.02					
QC1203571635	399479001	DUP							
Plutonium-241		U	2.79	U	-4.75				07/08/1612:18
	Uncert:		+/-9.89		+/-8.17	RPD: 0	N/A		
	TPU:		+/-9.91		+/-8.17	RER: 1.15	(0-2)		
**Plutonium-242 Tracer	4.93		3.53		4.15	pCi/L	REC: 84	(30%-105%)	
	Uncert:		+/-0.616		+/-0.643				
	TPU:		+/-0.912		+/-0.949				
QC1203571636	LCS								
Plutonium-241	193			174	pCi/L	REC: 90	(80%-120%)		07/08/1613:00
	Uncert:			+/-12.8					
	TPU:			+/-40.2					
**Plutonium-242 Tracer	4.93			4.13	pCi/L	REC: 84	(30%-105%)		
	Uncert:			+/-0.651					
	TPU:			+/-0.960					
Batch	1576192								
QC1203571666	MB								
Uranium-233/234			U	0.0378	pCi/L			MXS2	07/02/1610:50
	Uncert:			+/-0.0752					
	TPU:			+/-0.0754					
Uranium-235/236			U	-0.011	pCi/L				
	Uncert:			+/-0.0486					
	TPU:			+/-0.0487					
Uranium-238			U	0.0148	pCi/L				
	Uncert:			+/-0.0665					
	TPU:			+/-0.0665					
**Uranium-232 Tracer	5.21			4.06	pCi/L	REC: 78	(30%-105%)		
	Uncert:			+/-0.621					
	TPU:			+/-0.956					
QC1203571667	399479001	DUP							
Uranium-233/234			0.216	0.271	pCi/L				
	Uncert:		+/-0.172	+/-0.150		RPD: 23	(0% - 100%)		
	TPU:		+/-0.175	+/-0.155		RER: 0.465	(0-2)		
Uranium-235/236		U	0.0167	U	0.112	pCi/L			
	Uncert:		+/-0.0926	+/-0.114		RPD: 0	N/A		
	TPU:		+/-0.0928	+/-0.115		RER: 1.26	(0-2)		

July 13, 2016

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QC Summary

Workorder: 399479

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1576192								
Uranium-238		0.195		0.290	pCi/L				
	Uncert:	+/-0.154		+/-0.155		RPD: 39	(0% - 100%)		
	TPU:	+/-0.157		+/-0.160		RER: 0.834	(0-2)		
**Uranium-232 Tracer	5.21	3.66		4.18	pCi/L	REC: 80	(30%-105%)		
	Uncert:	+/-0.732		+/-0.626					
	TPU:	+/-1.10		+/-0.963					
QC1203571668	LCS								
Uranium-233/234				5.71	pCi/L				
	Uncert:			+/-0.624					
	TPU:			+/-1.00					
Uranium-235/236				0.412	pCi/L				
	Uncert:			+/-0.196					
	TPU:			+/-0.204					
Uranium-238	6.73			6.02	pCi/L	REC: 89	(80%-120%)		
	Uncert:			+/-0.639					
	TPU:			+/-1.04					
**Uranium-232 Tracer	5.21			4.48	pCi/L	REC: 86	(30%-105%)		
	Uncert:			+/-0.603					
	TPU:			+/-0.934					
Rad Gamma Spec									
Batch	1575754								
QC1203570525	MB								
Antimony-125			U	-3.53	pCi/L			MXR1	06/29/1612:28
	Uncert:			+/-6.33					
	TPU:			+/-6.53					
Cesium-134			U	2.72	pCi/L				
	Uncert:			+/-2.58					
	TPU:			+/-2.86					
Cesium-137			U	0.0772	pCi/L				
	Uncert:			+/-2.19					
	TPU:			+/-2.19					
Cobalt-60			U	0.786	pCi/L				
	Uncert:			+/-2.51					
	TPU:			+/-2.53					
Europium-152			U	-1.29	pCi/L				
	Uncert:			+/-6.43					
	TPU:			+/-6.46					
Europium-154			U	-1.19	pCi/L				
	Uncert:			+/-6.57					
	TPU:			+/-6.59					
Europium-155			U	-3.92	pCi/L				
	Uncert:			+/-7.68					
	TPU:			+/-7.88					
Potassium-40			U	17.2	pCi/L				
	Uncert:			+/-30.0					
	TPU:			+/-31.0					
QC1203570526	399283007	DUP							
Antimony-125		U	-2.48	U	7.46	pCi/L			06/29/1612:59
	Uncert:		+/-7.56		+/-10.3		RPD: 0	N/A	
	TPU:		+/-7.64		+/-10.9		RER: 1.47	(0-2)	

July 13, 2016

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QC Summary

Workorder: 399479

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gamma Spec										
Batch	1575754									
Cesium-134		U	-1.86	U	2.17	pCi/L				
		Uncert:	+/-2.81		+/-5.31		RPD:	0	N/A	
		TPU:	+/-2.94		+/-5.40		RER:	1.28	(0-2)	
Cesium-137		U	0.109	U	6.40	pCi/L				
		Uncert:	+/-2.76		+/-4.63		RPD:	0	N/A	
		TPU:	+/-2.76		+/-4.64		RER:	2.28	(0-2)	
Cobalt-60		U	-1.37	U	-0.538	pCi/L				
		Uncert:	+/-3.43		+/-4.49		RPD:	0	N/A	
		TPU:	+/-3.49		+/-4.50		RER:	0.287	(0-2)	
Europium-152		U	2.60	U	-4.35	pCi/L				
		Uncert:	+/-10.9		+/-11.1		RPD:	0	N/A	
		TPU:	+/-11.0		+/-11.2		RER:	0.869	(0-2)	
Europium-154		U	-7.55	U	6.91	pCi/L				
		Uncert:	+/-11.0		+/-10.6		RPD:	0	N/A	
		TPU:	+/-11.5		+/-11.1		RER:	1.78	(0-2)	
Europium-155		U	-3.02	U	-1.94	pCi/L				
		Uncert:	+/-12.3		+/-12.8		RPD:	0	N/A	
		TPU:	+/-12.4		+/-12.8		RER:	0.12	(0-2)	
Potassium-40		U	26.9	U	8.19	pCi/L				
		Uncert:	+/-38.7		+/-46.2		RPD:	0	N/A	
		TPU:	+/-38.8		+/-46.2		RER:	0.61	(0-2)	
QC1203570527	LCS									
Americium-241	34400				36200	pCi/L	REC:	105	(80%-120%)	06/29/1614:35
		Uncert:			+/-917					
		TPU:			+/-2850					
Antimony-125				U	45.9	pCi/L				
		Uncert:			+/-200					
		TPU:			+/-201					
Cesium-134				U	41.9	pCi/L				
		Uncert:			+/-71.5					
		TPU:			+/-74.0					
Cesium-137	13400				14500	pCi/L	REC:	108	(80%-120%)	
		Uncert:			+/-310					
		TPU:			+/-695					
Cobalt-60	13500				13700	pCi/L	REC:	101	(80%-120%)	
		Uncert:			+/-326					
		TPU:			+/-600					
Europium-152				U	-52.7	pCi/L				
		Uncert:			+/-186					
		TPU:			+/-188					
Europium-154				U	35.6	pCi/L				
		Uncert:			+/-122					
		TPU:			+/-123					
Europium-155				U	-60.5	pCi/L				
		Uncert:			+/-216					
		TPU:			+/-218					
Potassium-40				U	-41.8	pCi/L				
		Uncert:			+/-237					
		TPU:			+/-237					
Batch	1575923									

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1575923								
QC1203571035	MB								
Iodine-129			U	0.0646	pCi/L			MJH1	07/01/1611:02
				Uncert: +/-0.323					
				TPU: +/-0.324					
QC1203571036	399283007	DUP							
Iodine-129		U	0.166	U	0.134				07/01/1611:02
				Uncert: +/-0.361		RPD: 0	N/A		
				TPU: +/-0.369		RER: 0.145	(0-2)		
QC1203571037	399283007	MS							
Iodine-129		U	0.166		25.2	pCi/L	REC: 90 (75%-125%)		07/01/1611:03
				Uncert: +/-0.361					
				TPU: +/-0.369					
QC1203571038	LCS								
Iodine-129					27.7	pCi/L	REC: 95 (80%-120%)		07/01/1611:08
				Uncert: +/-2.90					
				TPU: +/-3.88					
Rad Gas Flow									
Batch	1577445								
QC1203574872	MB								
Strontium-90			U	-0.204	pCi/L			KSD1	07/05/1617:04
				Uncert: +/-0.365					
				TPU: +/-0.365					
**Strontium Carrier				7.37	5.90	mg	REC: 80 (40%-110%)		
QC1203574873	399283005	DUP							
Strontium-90				3.16	2.69	pCi/L			07/06/1609:02
				Uncert: +/-0.836		RPD: 16	(0% - 100%)		
				TPU: +/-0.987		RER: 0.674	(0-2)		
**Strontium Carrier				7.37	4.80	mg	REC: 69 (40%-110%)		
QC1203574874	LCS								
Strontium-90				73.0	68.2	pCi/L	REC: 94 (80%-120%)		07/05/1617:04
				Uncert: +/-3.51					
				TPU: +/-11.3					
**Strontium Carrier				7.37	5.20	mg	REC: 71 (40%-110%)		
Rad Liquid Scintillation									
Batch	1575739								
QC1203570472	MB								
Selenium-79			U	5.06	pCi/L			CXS7	06/24/1623:35
				Uncert: +/-10.5					
				TPU: +/-10.5					
**Selenium Carrier				20.0	17.3	mg	REC: 87 (40%-110%)		
QC1203570473	398770001	DUP							
Selenium-79		NU	1.64	NU	5.80	pCi/L			06/25/1600:37
				Uncert: +/-11.3		RPD: 0	N/A		
				TPU: +/-11.3		RER: 0.54	(0-2)		
**Selenium Carrier				20.0	16.0	mg	REC: 91 (40%-110%)		
QC1203570474	LCS								
Selenium-79			N		1050	pCi/L	REC: 121* (80%-120%)		06/30/1619:28
				Uncert: +/-30.7					
				TPU: +/-42.8					
**Selenium Carrier				20.0	18.6	mg	REC: 93 (40%-110%)		

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Liquid Scintillation										
Batch	1575749									
QC1203570510	MB									
Technetium-99			U	-10.7	pCi/L			CXS7	07/05/16	22:04
				Uncert: +/-15.4						
				TPU: +/-15.4						
*Technetium-99m Tracer	43800			39300	CPM	REC: 90 (30%-105%)				
QC1203570511	399283007	DUP								
Technetium-99		U	-17.2	U	-2.88				07/05/16	22:36
			Uncert: +/-15.6		+/-15.6	RPD: 0	N/A			
			TPU: +/-15.6		+/-15.6	RER: 1.28	(0-2)			
*Technetium-99m Tracer	43800		38400		39600	CPM	REC: 90 (30%-105%)			
QC1203570512	LCS									
Technetium-99			861		837	pCi/L	REC: 97 (80%-120%)		07/05/16	23:08
			Uncert: +/-34.4		+/-99.0					
			TPU: +/-34.4		+/-99.0					
*Technetium-99m Tracer	43800				39600	CPM	REC: 90 (30%-105%)			
Batch	1576839									
QC1203573300	MB									
Tritium			U	-159	pCi/L			TXJ1	06/30/16	18:31
				Uncert: +/-185						
				TPU: +/-185						
QC1203573301	399283007	DUP								
Tritium		U	0.624	U	70.2	pCi/L			06/30/16	19:13
			Uncert: +/-189		+/-196	RPD: 0	N/A			
			TPU: +/-189		+/-197	RER: 0.499	(0-2)			
QC1203573302	399283007	MS								
Tritium		U	0.624		1890	pCi/L	REC: 81 (75%-125%)		06/30/16	19:55
			Uncert: +/-189		+/-279					
			TPU: +/-189		+/-459					
QC1203573303	LCS									
Tritium			2330		2090	pCi/L	REC: 90 (80%-120%)		06/30/16	20:37
			Uncert: +/-287		+/-495					
			TPU: +/-287		+/-495					
Batch	1576854									
QC1203573364	MB									
Carbon-14			U	-8.98	pCi/L			TXJ1	07/01/16	13:51
				Uncert: +/-18.5						
				TPU: +/-18.5						
QC1203573365	399283007	DUP								
Carbon-14		U	0.650	U	1.82	pCi/L			07/01/16	14:22
			Uncert: +/-18.9		+/-18.9	RPD: 0	N/A			
			TPU: +/-18.9		+/-18.9	RER: 0.0861	(0-2)			
QC1203573367	399283007	MS								
Carbon-14		U	0.650		1210	pCi/L	REC: 96 (75%-125%)		07/01/16	14:53
			Uncert: +/-18.9		+/-43.1					
			TPU: +/-18.9		+/-229					
QC1203573369	LCS									
Carbon-14			1260		1250	pCi/L	REC: 99 (80%-120%)		07/01/16	15:25
			Uncert: +/-43.7		+/-237					
			TPU: +/-43.7		+/-237					

Notes:

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
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TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- 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).
- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- 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.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- 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
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- 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.