

September 03, 2015

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

Re: CHPRC SAF F15-028
Work Order: 375052
SDG: GEL375052

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 13, 2015. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. Per client P&D, this revision is to remove Cm-243/244 as it was not requested.

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,



Heather Shaffer
Project Manager

Purchase Order: 303581 - 7H
Chain of Custody: F15-028-011 and F15-028-012
Enclosures



Table of Contents

Problem and Discrepancy Report.....1

Sample Issue Resolution.....3

Case Narrative.....5

Chain of Custody and Supporting Documentation.....8

Data Review Qualifier Definitions.....12

Laboratory Certifications.....15

Metals Analysis.....17

 Case Narrative.....18

 Sample Data Summary.....23

 Quality Control Summary.....26

Radiological Analysis.....29

 Sample Data Summary.....47

 Quality Control Data.....66

Problem and Discrepancy Report

Problem and Discrepancy Report

GEL

SDG GEL375052

08/18/15

The data package has the following issues:

The SDG reports curium-243/244. We only requested Am-241 to be reported. Please remove the curium result.

Resolution: *Provide correction.*

Lab Response:

Please correct the issue and resubmit the Hard copy and electronic data packages.

Provide a resolution to each issue noted on the report

Page 1 of 1

Sample Issue Resolution

SAMPLE ISSUE RESOLUTION

SIR NUM	SIR15-336
REV NUM	0
DATE INITIATED	6/15/2015

SAMPLE EVENT INFORMATION

SAF NUM(S)	F15-028
OPERABLE UNIT(S)	100-KR-2
PROJECT(S)	100-KE FSB
SAMPLE EVENT TITLE(S)	Characterization Boreholes in UPR-100-K-1 and 1116-KE-3 Waste Sites
LABORATORY	GEL Laboratories, LLC

SAMPLING INFORMATION

NUMBER OF SAMPLES	1
SAMPLE NUMBERS	B30RR2
SAMPLE MATRIX	WATER
COLLECTION DATE	-
SDG NUM	GEL375052

ISSUE BACKGROUND

CLASS	Field Sampling Issue
TYPE	Incorrect Sample Preservation
DESCRIPTION	For Tc99 container for B30RR2 was received at a pH of 9.

DISPOSITION

DESCRIPTION	Proposed Disposition: Preserve to the correct pH and proceed.
JUSTIFICATION	Final Disposition: Accept proposed resolution

SUBMITTED BY: Heather Shaffer DATE: 06/15/2015
 ACCEPTED BY: Scot Fitzgerald DATE: 06/15/2015

Case Narrative

Per client P&D, this revision is to remove Cm-243/244 as it was not requested.

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F15-028
SDG: GEL375052**

September 03, 2015

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 13, 2015, 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 and DER

Sample Identification

The laboratory received the following samples:

Laboratory Identification	Sample Description
375052001	B30RR0
375052002	B30RR2

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.

This package, to the best of my knowledge, 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 Manger (or designee) and the laboratory's client services representative as verified by their signatures on this report.

September 4, 2015
Heather Shaffer

Rev 1

Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>375052</u>	
Received By: <u>MIC</u>		Date Received: <u>6-13-15</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	<input type="checkbox"/>

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input 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 type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) <i>1°C 2°C</i> *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>E 5032015830</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input 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 type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#: <u>* see below</u>
6 Do Low Level Perchlorate samples (EPA 6850) have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
8 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
9 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
10 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
11 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7738 2290 6894 6908 7206</u> 1 ^c 1 ^c 2 ^c

Comments (Use Continuation Form if needed):
* B30RR2 - TC99 BOTTLE PH = 9

Data Review Qualifier Definitions

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
U	Programmed	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.	Y			Includes MDA, TPU, count uncert.
J	Programmed	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	Y	Organics		Organics only
P	Programmed	Aroclor target analyte with greater than 25% difference between column analyses.	Y	Organics		PCB only
C	Manual	Analyte has been confirmed by GC/MS analysis	Y	Organics	Pesticide	IF GC/MS confirmation was attempted but unsuccessful do not qualify with C
B	Programmed	The analyte was detected in both the associated QC blank and in the sample.	Y	Organics		
E	Manual	Concentration exceeds the calibration range of the instrument	Y	Organics		Qualifier Uploaded
A	Manual	The TIC is a suspected aldol-condensation product	Y	Organics	Semi-Volatile	Uploaded with TIC
X	Programmed	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			Replaces H Hold Date In RAD replaces UI. Same usage as standard X as well.
N	Programmed	Spike Sample recovery is outside control limits.	Y			
*	Programmed	Duplicate analysis not within control limits	Y	Inorganics		
>	Programmed	Result greater than quantifiable range or greater than upper limit of the analysis range	Y	General Chemistry		
Z	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
B	Programmed	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).	Y	Inorganics	Metals	Replaces J Estimated Value
D	Programmed	Results are reported from a diluted aliquot of sample.	Y			Dilution
E	Programmed	Reported value is estimated due to interferences. See comment in narrative.	Y	Inorganics	Metals	GEL E
M	Manual	Duplicate precision not met.	Y	Inorganics	Metals	Replaces *
o	Programmed	Analyte failed to recover within LCS limits (Organics only)	Y	Organics		
S	Manual	Reported value determined by the Method of Standard Additions (MSA)	Y	Inorganics		Not coded B/C Rarely performed
T	Programmed	Spike and/or spike duplicate sample recovery is outside control limits.	Y	Organics		GC/MS only
W	Manual	Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.	Y	Inorganics		No GFAA in house.
B	Programmed	The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample	Y	Radiological		
Y	Manual	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier	Y			
+	Manual	Correlation coefficient for Method of Standard Additions (MSA) is < 0.995	Y	Inorganics		
B	Programmed	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).	Y	General Chemistry		Replaces J Estimated Value
C	Programmed	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.	Y	Inorganics	Metals	Replaces B Blank Detection
C	Programmed	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.	Y	General Chemistry		Replaces B Blank Detection
<	Programmed	Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide	Y	General Chemistry		for Reactive CN/S

Project Specific Qualifier Definitions for GEL Client Code: CPRC

Code	Status	Qualifier Definition	CofA	Department	Fraction	Additional Comments
UX	Manual	Gamma Spectroscopy--Uncertain identification	Y	Radiological		

Laboratory Certifications

List of current GEL Certifications as of 03 September 2015

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California	2940 Interim
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
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	LA150001
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122015-18
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

Metals Analysis

Case Narrative

Metals**Technical Case Narrative****CH2MHill Plateau Remediation Company (CPRC)****SDG #: GEL375052****Work Order #: 375052**

Sample ID	Client ID
375052001	B30RR0
375052002	B30RR2
1203337323	Method Blank (MB)ICP
1203337324	Laboratory Control Sample (LCS)
1203337327	375049001(B31686L) Serial Dilution (SD)
1203337330	375052001(B30RR0L) Serial Dilution (SD)
1203337325	375049001(B31686S) Matrix Spike (MS)
1203337328	375052001(B30RR0S) Matrix Spike (MS)
1203337326	375049001(B31686SD) Matrix Spike Duplicate (MSD)
1203337329	375052001(B30RR0SD) Matrix Spike Duplicate (MSD)

Sample Analysis

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

Method/Analysis Information

Analytical Batch:	1485759
Prep Batch :	1485758
Standard Operating Procedures:	GL-MA-E-013 REV# 24 and GL-MA-E-006 REV# 12
Analytical Method:	6010_METALS_ICP
Prep Method :	SW846 3005A

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

Calibration Information**Instrument Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

CRDL/PQL Requirements

The CRDL/PQL standard recoveries met the referenced advisory control limits.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blanks (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 375049001 (B31686) and 375052001 (B30RR0).

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

MS/MSD Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated matrix spike duplicate (MSD) is evaluated based on acceptance criteria of 20%. The RPD values between qualifying analyte results in the MS and MSD were within the acceptance limits.

Serial Dilution % Difference Statement

All applicable analytes in the serial dilution (SDILT) demonstrated acceptable correlation to its associated sample and met the established acceptance percent difference criteria.

Technical Information**Holding Time Specifications**

GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Preparation Information

The samples in this SDG were not diluted and prepared according to the cited SOP.

Miscellaneous Information**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

A Data exception report (DER) was generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) 1424608 was generated for sample 1203337327 (Non SDG 375049001SDILT) in this SDG/batch.

Additional Comments

Additional comments were not required for this SDG.

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: GEL375052 GEL Work Order: 375052

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.
- M Duplicate precision not met.
- 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: 10 JUL 2015

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL375052

METHOD TYPE: SW846

SAMPLE ID: 375052001

CLIENT ID: B3ORR0

CONTRACT: CPRC0F15028

MATRIX: WATER

DATE RECEIVED 13-JUN-15

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-47-3	Chromium	1	ug/L	U		P	1	1	OPTIMA3	061815-1

*Analytical Methods:

P SW846 3005A/6010C

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: GEL375052

METHOD TYPE: SW846

SAMPLE ID: 375052002

CLIENT ID: B30RR2

CONTRACT: CPRC0F15028

MATRIX: WATER

DATE RECEIVED 13-JUN-15

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-47-3	Chromium	1	ug/L	U		P	1	1	OPTIMA3	061815-1

*Analytical Methods:

P SW846 3005A/6010C

Quality Control Summary

QC Summary

Report Date: July 10, 2015

Page 1 of 2

CH2M Hill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington
Contact: Mr. Scot Fitzgerald

Workorder: 375052

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1485759										
QC1203337324	LCS										
Chromium	500			508	ug/L		102	(80%-120%)	HSC	06/18/15	13:37
QC1203337323	MB										
Chromium			U	ND	ug/L					06/18/15	13:34
QC1203337325	375049001	MS									
Chromium	500	B	1.92	509	ug/L		102	(75%-125%)		06/18/15	13:44
QC1203337328	375052001	MS									
Chromium	500	U	ND	503	ug/L		101	(75%-125%)		06/18/15	14:21
QC1203337326	375049001	MSD									
Chromium	500	B	1.92	494	ug/L	3.12	98.4	(0%-20%)		06/18/15	13:47
QC1203337329	375052001	MSD									
Chromium	500	U	ND	502	ug/L	0.123	100	(0%-20%)		06/18/15	14:24
QC1203337327	375049001	SDILT									
Chromium		B	1.92 DU	ND	ug/L	N/A		(0%-10%)		06/18/15	13:50
QC1203337330	375052001	SDILT									
Chromium		U	ND DU	ND	ug/L	N/A		(0%-10%)		06/18/15	14:27

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.

QC Summary

Workorder: 375052

Page 2 of 2

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

^ 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

Radiochemistry
Technical Case Narrative
CH2MHill Plateau Remediation Company (CPRC)
SDG #: GEL375052
Work Order #: 375052

Method/Analysis Information

Product: AMCMISO_EIE_PRECIP_AEA: COMMON
Analytical Method: AMCMISO_EIE_PREC_AEA
Analytical Batch Number: 1489314

Sample ID	Client ID
375052001	B30RR0
375052002	B30RR2
1203346289	Method Blank (MB)
1203346292	Laboratory Control Sample (LCS)
1203346291	375889001(B30RT1) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 375889001 (B30RT1).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

The batch was repped due to elevated MDC's. The reanalysis is being reported.

Recounts

Sample 1203346289 (MB) was recounted due to high MDC. The recount is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: PUIISO_PLATE_AEA:COMMON
Analytical Method: PUIISO_PLATE_AEA
Analytical Batch Number: 1489315

Sample ID	Client ID
375052001	B30RR0
375052002	B30RR2
1203346295	Method Blank (MB)
1203346298	Laboratory Control Sample (LCS)
1203346297	375889001(B30RT1) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:**Blank Information**

The blank volume is representative of the sample volumes in this batch.

Designated QC

The following sample was used for QC: 375889001 (B30RT1).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

Batch was reprepared due to elevated MDC's. The reanalysis is being reported.

Recounts

Samples 1203346295 (MB) and 375052001 (B30RR0) were recounted due to high MDCs. The recounts are reported.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: UISO_PLATE_AEA:COMMON
Analytical Method: UISO_IE_PRECIP_AEA
Analytical Batch Number: 1489317

Sample ID	Client ID
375052001	B30RR0
375052002	B30RR2
1203346299	Method Blank (MB)
1203346302	Laboratory Control Sample (LCS)
1203346301	375889001(B30RT1) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:**Blank Information**

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 375889001 (B30RT1).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

Samples 375052001 (B30RR0) and 375052002 (B30RR2) were reprep'd due to high MDC's. The reanalysis is being reported.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GAMMA_GS:COMMON (Cs137,Co60,Eu152,Eu154,Eu155)
Analytical Method: 901.1_GAMMA_GS
Analytical Batch Number: 1483990

Sample ID	Client ID
375052001	B30RR0
375052002	B30RR2
1203332765	Method Blank (MB)
1203332768	Laboratory Control Sample (LCS)
1203332766	374557001(B30RP7) Sample Duplicate (DUP)
1203332767	374560001(B318R3) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:**Blank Information**

The blank volume is representative of the sample volume in this batch.

Designated QC

The following samples were used for QC: 374557001 (B30RP7) and 374560001 (B318R3).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: I129_SEP_LEPS_GS: COMMON
Analytical Method: DOE EML HASL-300,I-01 Modified
Analytical Batch Number: 1484008

Sample ID	Client ID
375052001	B30RR0
375052002	B30RR2
1203332811	Method Blank (MB)
1203332814	Laboratory Control Sample (LCS)
1203332812	375236031(B30R89) Sample Duplicate (DUP)
1203332813	375236031(B30R89) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-006 REV# 21.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:**Blank Information**

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 375236031 (B30R89).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: SRTOT_SEP_PRECIP_GPC: COMMON
Analytical Method: SRTOT_SEP_PRECIP_GPC
Analytical Batch Number: 1486923

Sample ID	Client ID
375052001	B30RR0
375052002	B30RR2
1203339998	Method Blank (MB)
1203340001	Laboratory Control Sample (LCS)
1203340000	375052001(B30RR0) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 17.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:**Blank Information**

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 375052001 (B30RR0).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Chemical Recoveries

All chemical recoveries meet the required acceptance limits for this sample set.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TC99_EIE_LSC: COMMON

Analytical Method: TC99_EIE_LSC

Analytical Batch Number: 1487386

Sample ID	Client ID
375052001	B30RR0
1203341077	Method Blank (MB)
1203341080	Laboratory Control Sample (LCS)
1203341078	375052001(B30RR0) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-059 REV# 3.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 375052001 (B30RR0).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

Samples 1203341077 (MB), 1203341078 (B30RR0DUP), 1203341080 (LCS) and 375052001 (B30RR0) were recounted due to low recovery. The recounts are reported.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TC99_EIE_LSC: COMMON
Analytical Method: TC99_EIE_LSC
Analytical Batch Number: 1487388

Sample ID	Client ID
375052002	B30RR2
1203341081	Method Blank (MB)
1203341084	Laboratory Control Sample (LCS)
1203341082	375432001(B30RR5) Sample Duplicate (DUP)
1203341083	374779001(B318C7) Sample Duplicate (DUP)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-059 REV# 3.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following samples were used for QC: 374779001 (B318C7) and 375432001 (B30RR5).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required prep or reanalysis.

Recounts

Sample 375052002 (B30RR2) was recounted to verify sample results. Recount is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: C14_LSC: COMMON
Analytical Method: C14_LSC
Analytical Batch Number: 1487528

Sample ID	Client ID
375052001	B30RR0
375052002	B30RR2
1203341502	Method Blank (MB)

1203341507 Laboratory Control Sample (LCS)
1203341503 375432001(B30RR5) Sample Duplicate (DUP)
1203341505 375432001(B30RR5) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-003 REV# 15.

Calibration Information:**Calibration Information**

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:**Blank Information**

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 375432001 (B30RR5).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203341502 (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.

Technical Information:**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

The matrix spike, 1203341505 (B30RR5MS), aliquot was reduced to conserve sample volume.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TRITIUM_DIST_LSC: COMMON

Analytical Method: TRITIUM_DIST_LSC

Analytical Batch Number: 1488605

Sample ID	Client ID
375052001	B30RR0
375052002	B30RR2
1203344361	Method Blank (MB)
1203344366	Laboratory Control Sample (LCS)
1203344362	375706001(B30RR8) Sample Duplicate (DUP)
1203344364	375706001(B30RR8) Matrix Spike (MS)

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

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-002 REV# 21.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 375706001 (B30RR8).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: Refer to Data Exception Report (DER).

Technical Information:**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: DER 1427598 was generated due to RDL less than MDA. 1. Samples 375107001, 375228001, and 1203344361 do not meet the required detection limit. The samples were counted the maximum count time of 120 minutes to achieve the best possible results. 1. Reporting results.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

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: GEL375052 GEL Work Order: 375052

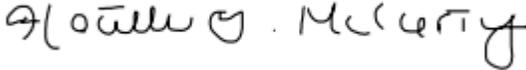
The Qualifiers in this report are defined as follows:

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

Review/Validation

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

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

Signature: 

Name: Heather McCarty

Date: 04 SEP 2015

Title: Analyst II

DATA EXCEPTION REPORT			
Mo.Day Yr. 07-JUL-15	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: LSC	Test / Method: EPA 906.0 Modified	Matrix Type: Liquid	Client Code: CPRC
Batch ID: 1488605	Sample Numbers: See below		
Potentially affected work order(s)(SDG): 374830(GEL374830),374834(GEL374834),375052(GEL375052),375100(GEL375100),375107(GEL375107),375228(GEL375228)			
Application Issues: RDL less than MDA			
Specification and Requirements Exception Description:		DER Disposition:	
1. Samples 375107001, 375228001, and 1203344361 do not meet the required detection limit. The samples were counted the maximum count time of 120 minutes to achieve the best possible results.		1. Reporting results.	

Originator's Name:
Lyndsey Pace 07-JUL-15

Data Validator/Group Leader:
Lesley Anderson 07-JUL-15

Sample Data Summary

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052001	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR0	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "As Received"
Batch ID: 1489314	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 07/01/2015 10:04	Aliquot: 0.05 L	Instrument: 1084
Data File: S0375052001_AM.2A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 239.9998 min
Prep Batch: 1489314		
Prep Date: 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	-0.0956	pCi/L	+/-0.289	0.289	0.811	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	34.7	42.8	pCi/L	81.1	(15%-125%)

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052001	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR0	Method: PUIISO_PLATE_AEA	Prep Basis: "As Received"
Batch ID: 1489315	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 07/02/2015 15:54	Aliquot: 0.05 L	Instrument: 1068
Data File: S0375052001_PU.3A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 1000 min
Prep Batch: 1489315		
Prep Date: 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	-5.16E-08	pCi/L	+/-0.378	0.378	0.743	1.00
OER-100-70	Plutonium-239/240	U	-0.0516	pCi/L	+/-0.303	0.303	0.635	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	24.8	39.4	pCi/L	63.1	(15%-125%)

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052001	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR0	Method: UIISO_IE_PRECIP_AEA	Prep Basis: "As Received"
Batch ID: 1489317	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 07/01/2015 10:04	Aliquot: 0.05 L	Instrument: 1010
Data File: S0375052001_UU.2A.gcnf	Prep Method: DOE EML HASL-300, U-02-R	Count Time: 239.9998 min
Prep Batch: 1489317		
Prep Date: 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		4.35	pCi/L	+/-1.57	1.72	0.850	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.220	pCi/L	+/-0.606	0.607	1.05	1.00
7440-61-1	Uranium-238		4.38	pCi/L	+/-1.57	1.72	0.770	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	37.0	42.5	pCi/L	87.3	(15%-125%)

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052001	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR0	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1486923	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 06/30/2015 14:29	Aliquot: 0.3 L	Instrument: LB4100J1
Data File: S1486923.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1486923		
Prep Date: 06/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		26.2	pCi/L	+/-1.84	6.38	0.985	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.40	8.10	mg	91.4	(25%-125%)

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052
 Lab Sample ID: 375052001

 Client ID: B30RR0
 Batch ID: 1483990
 Run Date: 06/23/2015 08:08
 Data File: G375052001.CNF;1
 Prep Batch: 1483990
 Prep Date: 06/20/2015 00:00

Client: CPRC001
 Date Collected: 06/11/2015 13:38
 Date Received: 06/13/2015 08:30

 Method: 901.1_GAMMA_GS
 Analyst: MJH1
 Aliquot: 2 L
 Prep Method: EPA 901.1

Project: CPRC0F15028
 Matrix: WATER

 Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM14
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	0.808	pCi/L	+/-2.90	2.92	5.35	10.0
10198-40-0	Cobalt-60	U	-0.668	pCi/L	+/-2.86	2.88	5.47	
14683-23-9	Europium-152	U	-1.95	pCi/L	+/-7.36	7.42	13.2	
15585-10-1	Europium-154	U	4.94	pCi/L	+/-7.90	8.22	17.3	
14391-16-3	Europium-155	U	-1.9	pCi/L	+/-9.66	9.70	16.8	

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052001	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR0	Method: DOE EML HASL-300,I-01 Mo	Prep Basis: "As Received"
Batch ID: 1484008	Analyst: MJH1	SOP Ref: GL-RAD-A-006
Run Date: 06/26/2015 12:21	Aliquot: 1.6 L	Instrument: XRAY1
Data File: I375052001.CNF;1	Prep Method: DOE EML HASL-300,I-01 M	Count Time: 120 min
Prep Batch: 1484008		
Prep Date: 06/24/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.527	pCi/L	+/-0.492	0.495	0.556	5.00

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052001	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR0	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1487386	Analyst: MYM1	SOP Ref: GL-RAD-A-059
Run Date: 07/01/2015 13:32	Aliquot: 0.2 L	Instrument: LSCBROWN
Data File: E1487386R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 40 min
Prep Batch: 1487386		
Prep Date: 06/25/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		121	pCi/L	+/-10.8	17.3	13.4	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	53800	54700	CPM	98.3	(15%-125%)

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052001	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR0	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1487528	Analyst: EXK2	SOP Ref: GL-RAD-A-003
Run Date: 07/01/2015 05:16	Aliquot: 0.25 L	Instrument: LSCRED
Data File: C1487528.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 120 min
Prep Batch: 1487528		
Prep Date: 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		3320	pCi/L	+/-17.2	616	4.11	5.00

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052001	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR0	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1488605	Analyst: GXR1	SOP Ref: GL-RAD-A-002
Run Date: 07/05/2015 01:08	Aliquot: 50 mL	Instrument: LSCPINK
Data File: T1488605.xls	Prep Method: EPA 906.0 Modified	Count Time: 48.59633 min
Prep Batch: 1488605		
Prep Date: 07/01/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		63400	pCi/L	+/-1240	12300	148	100

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052002	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR2	Method: AMCMISO_EIE_PREC_AEA	Prep Basis: "As Received"
Batch ID: 1489314	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 07/01/2015 10:04	Aliquot: 0.05 L	Instrument: 1085
Data File: S0375052002_AM.2A.gcnf	Prep Method: DOE EML HASL-300, Am-05	Count Time: 239.9998 min
Prep Batch: 1489314		
Prep Date: 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14596-10-2	Americium-241	U	0.00	pCi/L	+/-0.367	0.368	0.547	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Americium-243 Tracer	27.3	42.8	pCi/L	63.9	(15%-125%)

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052002	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR2	Method: PUIISO_PLATE_AEA	Prep Basis: "As Received"
Batch ID: 1489315	Analyst: MXS2	SOP Ref: GL-RAD-A-011
Run Date: 07/01/2015 10:04	Aliquot: 0.05 L	Instrument: 1069
Data File: S0375052002_PU.2A.gcnf	Prep Method: DOE EML HASL-300, Pu-11-	Count Time: 239.9998 min
Prep Batch: 1489315		
Prep Date: 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
I3981-16-3	Plutonium-238	U	0.00635	pCi/L	+/-0.470	0.471	1.05	1.00
OER-100-70	Plutonium-239/240	U	0.203	pCi/L	+/-0.559	0.559	0.969	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Plutonium-242 Tracer	28.6	39.4	pCi/L	72.6	(15%-125%)

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052002	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR2	Prep Basis: "As Received"	
Batch ID: 1489317	Method: UIISO_IE_PRECIP_AEA	SOP Ref: GL-RAD-A-011
Run Date: 07/01/2015 10:04	Analyst: MXS2	Instrument: 1011
Data File: S0375052002_UU.2A.gcnf	Aliquot: 0.05 L	Count Time: 239.9998 min
Prep Batch: 1489317	Prep Method: DOE EML HASL-300, U-02-R	
Prep Date: 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
U-233/234 <small>13968-55-3/13966-29-5</small>	Uranium-233/234		4.63	pCi/L	+/-1.66	1.81	1.13	1.00
15117-96-1/13982-7	Uranium-235/236	U	0.823	pCi/L	+/-0.838	0.848	0.829	1.00
7440-61-1	Uranium-238		3.15	pCi/L	+/-1.35	1.44	0.775	1.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Uranium-232 Tracer	35.1	42.5	pCi/L	82.7	(15%-125%)

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).

September 4, 2015

Page **Rev 1**

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052002	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR2	Method: SRTOT_SEP_PRECIP_GPC	Prep Basis: "As Received"
Batch ID: 1486923	Analyst: KSD1	SOP Ref: GL-RAD-A-004
Run Date: 06/30/2015 14:29	Aliquot: 0.3 L	Instrument: LB4100J2
Data File: S1486923.xls	Prep Method: EPA 905.0 Modified/DOE RP5	Count Time: 60 min
Prep Batch: 1486923		
Prep Date: 06/22/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
SR-RAD	Total Strontium		23.9	pCi/L	+/-1.71	5.78	0.834	2.00

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Strontium Carrier	7.70	8.10	mg	95.1	(25%-125%)

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052
 Lab Sample ID: 375052002

 Client ID: B30RR2
 Batch ID: 1483990
 Run Date: 06/23/2015 08:14
 Data File: G375052002.CNF;1
 Prep Batch: 1483990
 Prep Date: 06/20/2015 00:00

Client: CPRC001
 Date Collected: 06/11/2015 13:38
 Date Received: 06/13/2015 08:30

 Method: 901.1_GAMMA_GS
 Analyst: MJH1
 Aliquot: 2 L
 Prep Method: EPA 901.1

Project: CPRC0F15028
 Matrix: WATER

 Prep Basis: "As Received"
 SOP Ref: GL-RAD-A-013
 Instrument: GAM12
 Count Time: 120 min

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10045-97-3	Cesium-137	U	-2.34	pCi/L	+/-3.36	3.53	5.60	10.0
10198-40-0	Cobalt-60	U	1.23	pCi/L	+/-2.98	3.03	6.27	
14683-23-9	Europium-152	U	-5.5	pCi/L	+/-8.57	8.93	14.2	
15585-10-1	Europium-154	U	3.36	pCi/L	+/-8.17	8.32	17.2	
14391-16-3	Europium-155	U	14.8	pCi/L	+/-13.6	15.2	25.9	

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052002	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR2	Prep Basis: "As Received"	
Batch ID: 1484008	Method: DOE EML HASL-300,I-01 Mo	SOP Ref: GL-RAD-A-006
Run Date: 06/26/2015 12:22	Analyst: MJH1	Instrument: XRAY3
Data File: I375052002.CNF;1	Aliquot: 1.6 L	Count Time: 120 min
Prep Batch: 1484008	Prep Method: DOE EML HASL-300,I-01 M	
Prep Date: 06/24/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
15046-84-1	Iodine-129	U	0.222	pCi/L	+/-0.277	0.278	0.408	5.00

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052002	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR2	Method: TC99_EIE_LSC	Prep Basis: "As Received"
Batch ID: 1487388	Analyst: MYM1	SOP Ref: GL-RAD-A-059
Run Date: 07/02/2015 09:01	Aliquot: 0.3 L	Instrument: LSCBLUE
Data File: E1487388R.xls	Prep Method: DOE EML HASL-300, Tc-02-	Count Time: 15 min
Prep Batch: 1487388		
Prep Date: 06/25/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14133-76-7	Technetium-99		66.5	pCi/L	+/-9.93	12.4	12.5	15.0

Surrogate/Tracer recovery	Result	Nominal	Units	Recovery%	Acceptable Limits
Technetium-99m Tracer	68500	75500	CPM	90.7	(15%-125%)

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052002	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR2	Method: C14_LSC	Prep Basis: "As Received"
Batch ID: 1487528	Analyst: EXK2	SOP Ref: GL-RAD-A-003
Run Date: 07/01/2015 07:18	Aliquot: 0.25 L	Instrument: LSCRED
Data File: C1487528.xls	Prep Method: EPA EERF C-01 Modified	Count Time: 44.2999992370605 min
Prep Batch: 1487528		
Prep Date: 06/30/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
14762-75-5	Carbon-14		3150	pCi/L	+/-27.6	585	5.69	5.00

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).

September 4, 2015

Page 1 of 1 Rev 1

**Certificate of Analysis
Sample Summary**

SDG Number: GEL375052	Client: CPRC001	Project: CPRC0F15028
Lab Sample ID: 375052002	Date Collected: 06/11/2015 13:38	Matrix: WATER
	Date Received: 06/13/2015 08:30	
Client ID: B30RR2	Method: TRITIUM_DIST_LSC	Prep Basis: "As Received"
Batch ID: 1488605	Analyst: GXR1	SOP Ref: GL-RAD-A-002
Run Date: 07/05/2015 01:59	Aliquot: 50 mL	Instrument: LSCPINK
Data File: T1488605.xls	Prep Method: EPA 906.0 Modified	Count Time: 47.69633 min
Prep Batch: 1488605		
Prep Date: 07/01/2015 00:00		

CAS No.	Parmname	Qual	Result	Units	Uncert	TPU	MDC	RDL
10028-17-8	Tritium		62200	pCi/L	+/-1210	12100	145	100

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).

Quality Control Data

QC Summary

Report Date: September 4, 2015

Page 1 of 7

Client : CH2MHill Plateau Remediation Company
 MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 375052

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1489314								
QC1203346289	MB								
Americium-241			U	0.257	pCi/L			MXS2	07/02/1515:48
				Uncert: +/-0.302					
				TPU: +/-0.303					
**Americium-243 Tracer	42.8			29.0	pCi/L	REC: 68	(15%-125%)		
				Uncert: +/-2.91					
				TPU: +/-4.75					
QC1203346291	375889001	DUP							
Americium-241		U	-0.12	U	0.0952	pCi/L			07/01/1510:04
				Uncert: +/-0.363	+/-0.615	RPD: 0	N/A		
				TPU: +/-0.364	+/-0.615	RER: 0.591	(0-2)		
**Americium-243 Tracer	42.8		31.3		28.1	pCi/L	REC: 66	(15%-125%)	
				Uncert: +/-5.22	+/-5.29				
				TPU: +/-7.75	+/-7.85				
QC1203346292	LCS								
Americium-241					39.5	pCi/L	REC: 91	(80%-120%)	
				Uncert: +/-4.62					
				TPU: +/-6.56					
**Americium-243 Tracer	42.8				35.7	pCi/L	REC: 84	(15%-125%)	
				Uncert: +/-5.00					
				TPU: +/-7.46					
Batch	1489315								
QC1203346295	MB								
Plutonium-238			U	-0.365	pCi/L			MXS2	07/02/1515:54
				Uncert: +/-0.334					
				TPU: +/-0.334					
Plutonium-239/240			U	-0.182	pCi/L				
				Uncert: +/-0.419					
				TPU: +/-0.419					
**Plutonium-242 Tracer	39.4				25.3	pCi/L	REC: 64	(15%-125%)	
				Uncert: +/-2.67					
				TPU: +/-4.35					
QC1203346297	375889001	DUP							
Plutonium-238		U	0.138	U	0.0465	pCi/L			07/01/1510:04
				Uncert: +/-0.471	+/-0.486	RPD: 0	N/A		
				TPU: +/-0.472	+/-0.487	RER: 0.264	(0-2)		
Plutonium-239/240		U	-0.053	U	0.0863	pCi/L			
				Uncert: +/-0.495	+/-0.480	RPD: 0	N/A		
				TPU: +/-0.496	+/-0.480	RER: 0.396	(0-2)		
**Plutonium-242 Tracer	39.4		32.8		29.0	pCi/L	REC: 74	(15%-125%)	
				Uncert: +/-4.50	+/-5.04				
				TPU: +/-6.72	+/-7.45				
QC1203346298	LCS								
Plutonium-238					0.889	pCi/L			07/01/1510:31
				Uncert: +/-0.734					

QC Summary

Workorder: 375052

Page 2 of 7

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1489315								
Plutonium-239/240	39.4	TPU:		+/-0.743					
		Uncert:		33.4	pCi/L	REC: 85	(80%-120%)		
		TPU:		+/-4.14					
**Plutonium-242 Tracer	39.4	TPU:		+/-5.92					
		Uncert:		33.7	pCi/L	REC: 86	(15%-125%)		
		TPU:		+/-4.49					
		TPU:		+/-6.70					
Batch	1489317								
QC1203346299	MB								
Uranium-233/234			U	0.211	pCi/L			MXS2	07/01/1510:04
		Uncert:		+/-0.479					
		TPU:		+/-0.480					
Uranium-235/236			U	0.400	pCi/L				
		Uncert:		+/-0.576					
		TPU:		+/-0.579					
Uranium-238			U	0.206	pCi/L				
		Uncert:		+/-0.406					
		TPU:		+/-0.407					
**Uranium-232 Tracer	42.4			41.9	pCi/L	REC: 99	(15%-125%)		
		Uncert:		+/-4.39					
		TPU:		+/-7.78					
QC1203346301	375889001	DUP							
Uranium-233/234		U	0.335	U	0.790	pCi/L			
		Uncert:	+/-0.542		+/-0.807		RPD: 0	N/A	
		TPU:	+/-0.545		+/-0.817		RER: 0.908	(0-2)	
Uranium-235/236		U	0.0769	U	0.309	pCi/L			
		Uncert:	+/-0.427		+/-0.607		RPD: 0	N/A	
		TPU:	+/-0.428		+/-0.609		RER: 0.611	(0-2)	
Uranium-238		U	0.512		0.960	pCi/L			
		Uncert:	+/-0.585		+/-0.793		RPD: 27	(0% - 100%)	
		TPU:	+/-0.591		+/-0.808		RER: 0.878	(0-2)	
**Uranium-232 Tracer	42.4		40.4		37.9	pCi/L	REC: 89	(15%-125%)	
		Uncert:	+/-4.47		+/-4.86				
		TPU:	+/-7.87		+/-8.32				
QC1203346302	LCS								
Uranium-233/234				60.2	pCi/L				
		Uncert:		+/-5.75					
		TPU:		+/-11.2					
Uranium-235/236				2.73	pCi/L				
		Uncert:		+/-1.43					
		TPU:		+/-1.49					
Uranium-238	54.3			60.9	pCi/L	REC: 112	(80%-120%)		
		Uncert:		+/-5.78					
		TPU:		+/-11.3					
**Uranium-232 Tracer	42.4			35.4	pCi/L	REC: 83	(15%-125%)		
		Uncert:		+/-4.88					
		TPU:		+/-8.34					
Rad Gamma Spec									
Batch	1483990								

QC Summary

Workorder: 375052

Page 3 of 7

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1483990								
QC1203332765	MB								
Cesium-137			U	-1.24	pCi/L			MJH1	06/23/1511:35
				Uncert: +/-2.94					
				TPU: +/-2.99					
Cobalt-60			U	-0.424	pCi/L				
				Uncert: +/-3.42					
				TPU: +/-3.43					
Europium-152			U	-5.07	pCi/L				
				Uncert: +/-7.46					
				TPU: +/-7.83					
Europium-154			U	8.91	pCi/L				
				Uncert: +/-9.43					
				TPU: +/-10.3					
Europium-155			U	1.58	pCi/L				
				Uncert: +/-8.37					
				TPU: +/-8.40					
QC1203332766	374557001	DUP							
Cesium-137		U	3.61	U	-2.7	pCi/L			06/23/1511:36
				Uncert: +/-2.63	+/-2.96		RPD: 0	N/A	
				TPU: +/-2.65	+/-3.21		RER: 2.97	(0-2)	
Cobalt-60		U	0.670	U	0.221	pCi/L			
				Uncert: +/-2.51	+/-2.40		RPD: 0	N/A	
				TPU: +/-2.53	+/-2.40		RER: 0.252	(0-2)	
Europium-152		U	4.55	U	0.999	pCi/L			
				Uncert: +/-7.44	+/-8.74		RPD: 0	N/A	
				TPU: +/-7.73	+/-8.75		RER: 0.596	(0-2)	
Europium-154		U	6.43	U	1.75	pCi/L			
				Uncert: +/-7.21	+/-8.57		RPD: 0	N/A	
				TPU: +/-7.79	+/-8.61		RER: 0.791	(0-2)	
Europium-155		U	-2.03	U	-0.105	pCi/L			
				Uncert: +/-9.21	+/-11.2		RPD: 0	N/A	
				TPU: +/-9.26	+/-11.2		RER: 0.26	(0-2)	
QC1203332767	374560001	DUP							
Cesium-137		U	2.35	U	-2.31	pCi/L			06/23/1511:50
				Uncert: +/-3.14	+/-3.63		RPD: 0	N/A	
				TPU: +/-3.15	+/-3.78		RER: 1.86	(0-2)	
Cobalt-60		U	1.37	U	1.59	pCi/L			
				Uncert: +/-2.90	+/-3.00		RPD: 0	N/A	
				TPU: +/-2.97	+/-3.08		RER: 0.1	(0-2)	
Europium-152		U	2.62	U	4.95	pCi/L			
				Uncert: +/-7.81	+/-11.6		RPD: 0	N/A	
				TPU: +/-7.91	+/-11.9		RER: 0.319	(0-2)	
Europium-154		U	-4.3	U	7.28	pCi/L			
				Uncert: +/-7.42	+/-7.67		RPD: 0	N/A	
				TPU: +/-7.68	+/-8.37		RER: 2	(0-2)	
Europium-155		U	2.32	U	-1.11	pCi/L			
				Uncert: +/-13.0	+/-13.0		RPD: 0	N/A	
				TPU: +/-13.0	+/-13.0		RER: 0.365	(0-2)	
QC1203332768	LCS								
Americium-241	34400			35000	pCi/L	REC: 102	(80%-120%)		06/23/1507:30

QC Summary

Workorder: 375052

Page 4 of 7

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1483990								
				Uncert:					
				TPU:					
Cesium-137	13700			14200	pCi/L	REC: 103	(80%-120%)		
				Uncert:					
				TPU:					
Cobalt-60	15400			15600	pCi/L	REC: 101	(80%-120%)		
				Uncert:					
				TPU:					
Europium-152			U	108	pCi/L				
				Uncert:					
				TPU:					
Europium-154			U	-3.35	pCi/L				
				Uncert:					
				TPU:					
Europium-155			U	227	pCi/L				
				Uncert:					
				TPU:					
Batch	1484008								
QC1203332811	MB								
Iodine-129			U	0.165	pCi/L			MJH1	06/26/1514:38
				Uncert:					
				TPU:					
QC1203332812	375236031	DUP							
Iodine-129				1.76	pCi/L				06/26/1514:38
				Uncert:					
				TPU:					
QC1203332813	375236031	MS							
Iodine-129				26.0	pCi/L	REC: 76	(75%-125%)		06/26/1514:39
				Uncert:					
				TPU:					
QC1203332814	LCS								
Iodine-129				26.0	pCi/L	REC: 92	(80%-120%)		06/26/1514:39
				Uncert:					
				TPU:					
Rad Gas Flow									
Batch	1486923								
QC1203339998	MB								
Total Strontium			U	0.232	pCi/L			KSD1	06/30/1514:29
				Uncert:					
				TPU:					
**Strontium Carrier				8.10	mg	REC: 93	(25%-125%)		
QC1203340000	375052001	DUP							
Total Strontium				26.2	pCi/L				06/30/1514:27
				Uncert:					
				TPU:					
**Strontium Carrier				8.10	mg	REC: 95	(25%-125%)		
QC1203340001	LCS								
Total Strontium				72.9	pCi/L	REC: 84	(80%-120%)		06/30/1514:29
				Uncert:					
				TPU:					

QC Summary

Workorder: 375052

Page 5 of 7

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch		1486923							
**Strontium Carrier	8.10			7.50	mg	REC:	93 (25%-125%)		
Rad Liquid Scintillation									
Batch		1487386							
QC1203341077 MB Technetium-99			U	3.12	pCi/L			MYM1	07/01/1518:00
				Uncert: +/-5.10					
				TPU: +/-5.11					
**Technetium-99m Tracer	54700			55800	CPM	REC:	102 (15%-125%)		
QC1203341078 375052001 DUP Technetium-99			121	109	pCi/L				07/01/1518:43
				Uncert: +/-10.8		RPD:	10 (0% - 20%)		
				TPU: +/-17.3		RER:	1 (0-2)		
**Technetium-99m Tracer	54700	53800		54500	CPM	REC:	100 (15%-125%)		
QC1203341080 LCS Technetium-99				287	pCi/L	REC:	88 (80%-120%)		07/01/1520:08
				Uncert: +/-10.0					
				TPU: +/-29.6					
**Technetium-99m Tracer	54700			57100	CPM	REC:	104 (15%-125%)		
Batch		1487388							
QC1203341081 MB Technetium-99			U	-2.84	pCi/L			MYM1	07/01/1523:05
				Uncert: +/-4.87					
				TPU: +/-4.87					
**Technetium-99m Tracer	75500			74600	CPM	REC:	99 (15%-125%)		
QC1203341082 375432001 DUP Technetium-99			U	4.13	pCi/L				07/01/1523:48
				Uncert: +/-7.60		RPD:	0 N/A		
				TPU: +/-7.61		RER:	0.0956 (0-2)		
**Technetium-99m Tracer	75500	74100		72400	CPM	REC:	96 (15%-125%)		
QC1203341083 374779001 DUP Technetium-99			U	1.09	pCi/L				07/02/1500:31
				Uncert: +/-7.23		RPD:	0 N/A		
				TPU: +/-7.23		RER:	0.612 (0-2)		
**Technetium-99m Tracer	75500	76400		71200	CPM	REC:	94 (15%-125%)		
QC1203341084 LCS Technetium-99				287	pCi/L	REC:	85 (80%-120%)		07/02/1501:14
				Uncert: +/-9.18					
				TPU: +/-28.6					
**Technetium-99m Tracer	75500			76700	CPM	REC:	102 (15%-125%)		
Batch		1487528							
QC1203341502 MB Carbon-14			U	0.899	pCi/L			EXK2	07/01/1509:08
				Uncert: +/-5.21					
				TPU: +/-5.22					
QC1203341503 375432001 DUP Carbon-14				261	pCi/L				07/01/1509:25
				Uncert: +/-19.5		RPD:	2 (0% - 20%)		
				TPU: +/-52.2		RER:	0.13 (0-2)		
QC1203341505 375432001 MS									

QC Summary

Workorder: 375052

Page 6 of 7

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1487528								
Carbon-14	1520	261		1840	pCi/L	REC: 104	(75%-125%)		
	Uncert:	+/-19.5		+/-84.5					
	TPU:	+/-52.2		+/-351					
QC1203341507	LCS								
Carbon-14	303			311	pCi/L	REC: 102	(80%-120%)		07/01/1509:57
	Uncert:			+/-15.6					
	TPU:			+/-59.7					
Batch	1488605								
QC1203344361	MB								
Tritium			U	2.34	pCi/L			GXR1	07/06/1502:40
	Uncert:			+/-57.3					
	TPU:			+/-57.3					
QC1203344362	375706001	DUP							
Tritium		231		268	pCi/L				07/06/1505:57
	Uncert:	+/-74.9		+/-76.6		RPD: 15	(0% - 100%)		
	TPU:	+/-87.1		+/-92.5		RER: 0.582	(0-2)		
QC1203344364	375706001	MS							
Tritium	1830	231		1910	pCi/L	REC: 92	(75%-125%)		07/06/1508:00
	Uncert:	+/-74.9		+/-397					
	TPU:	+/-87.1		+/-542					
QC1203344366	LCS								
Tritium	1830			1740	pCi/L	REC: 95	(80%-120%)		07/06/1508:17
	Uncert:			+/-389					
	TPU:			+/-513					

Notes:

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 >= 2X the MDA and, after corrections, result is >= MDA for this sample
- 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.
- 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

QC Summary

Workorder: 375052

Page 7 of 7

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

** 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.