



February 24, 2015

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

Re: CHPRC SAF F14-021
Work Order: 362295
SDG: GEL362295

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 03, 2014. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. This data package was revised due to a self-identified error in the lab regarding the TPU result for Alphaspec Am/Cm.

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: 300416 - 7H
Chain of Custody: F14-021-029, F14-021-030, F14-021-031 and F14-021-033
Enclosures





To: Distribution List

From: Robert L. Pullano, Director Quality Systems

Subject: CARR150212-928: Tracer Uncertainty Error for Americium and Curium by Alpha Spec

Date: February 20, 2015

During a recent data audit, GEL uncovered a transcription error that affects the Combined Standard Uncertainty (CSU), also referred to as the Total Propagated Uncertainty (TPU), for samples analyzed for Americium/Curium by alpha spectrometry using Americium-243 tracer 1666-A.

Issue:

Tracer Uncertainty for Americium tracer 1666-A was entered incorrectly (entered in percentage format instead of decimal format). Specifically the uncertainty was entered as 0.45 instead of 0.0045.

The error occurred on November 18, 2014. The first batch using this tracer was prepared on November 25, 2014.

How does this affect the reported data:

This transcription error caused the Tracer Yield Uncertainty term to be biased high, resulting in a high bias for the CSU (TPU). Typically Tracer Yield Uncertainty is in the range of 3% to 8%. In this case, the Tracer Yield Uncertainty would be approximately 45%.

The extent of the high bias of the CSU (TPU) is relative to the Count Rate of the sample itself. For samples that have a Counting Uncertainty greater than 100% of sample Activity (which is indicative of samples with Activity below the MDC), the bias in the CSU (TPU) could be considered insignificant due to the overwhelming contribution from the Counting Uncertainty. For samples with Counting Uncertainty Less than 100% of sample Activity, the CSU (TPU) reported may have a significant high bias. Again, the actual bias is dependent on the Counting Uncertainty.

If the reported CSU (TPU) is utilized to make decisions on the presence (or absence) of activity in the sample, the bias in the TPU may result in an improper decision. This occurrence was infrequent in most of the associated data.

Additionally, if a Duplicate Relative Error Ratio (RER) is calculated for the analytical batch and the sample and/or duplicate results have a counting Uncertainty less than 100%, the RER would be significantly biased low.

**What data is NOT affected:**

- No other reportable parameters for Americium/Curium (i.e. Activity, Uncertainty, Minimum Detectable Activity, Critical Level or Decision Level) are affected by this transcription error.
- Samples analyzed prior to November 18, 2014 are not affected
- Americium/Curium analysis analyzed after November 18, 2014 that **did not** utilize Am-243 tracer 1666-A.
- Uranium, Plutonium, Thorium, Neptunium, Radium, Polonium analysis are not affected.
- This transcription error was identified and corrected on February 10, 2015. All data analyzed and reported after this date is not affected.

What samples are affected:

This transcription error is limited to Americium/Curium data analyzed by Alpha Spectrometry which utilized tracer 1666-A. This tracer was validated on 11/18/2014 and subsequently used for analysis. **This affects only the CSU (TPU) and RER reported for Americium/Curium analysis.**

Actions taken:

A query was run on all data analyzed since 11/18/2014 to identify the samples that utilized Am-243 tracer 1666-A and all affected clients were notified of the issue.

All uncertainty data associated with tracers used in the laboratory were validated and found to be correctly transcribed in the database.

All affected data were recalculated and will be re-reported to our clients by February 26, 2015.

Additionally, a second verification step of all new uncertainty data manually transcribed into LIMS was implemented.

We have conducted a thorough investigation of this issue and have determined that the problem was isolated to this one specific instance. We believe the actions that have been implemented will prevent recurrence of this problem.

GEL prides itself on superior performance in all aspects of its testing and this unusual error, while minor in significance, has been brought to the attention of the laboratory management. We regret any inconvenience this error has caused you in the use of the data provided.

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Case Narrative

This data package was revised due to a self-identified error in the lab regarding the TPU result for Alphaspec Am/Cm.

**General Narrative
for
CH2MHill Plateau Remediation Company
CHPRC SAF F14-021
SDG: GEL362295**

February 24, 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 December 03, 2014, 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
362295001	B2YVT2
362295002	B2YVT3
362295003	B2YVT4
362295004	B2YVT5

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: General Chemistry 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 Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.



Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F14-021-029	PAGE 1 OF 1
COLLECTOR <i>P.S. HAWKEY</i>	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION 105KW Monthly, Pt 10	PROJECT DESIGNATION 105KW Monthly Sampling - Water		SAF NO. F14-021	AIR QUALITY	
ICE CHEST NO. <i>6WS-293</i>	FIELD LOGBOOK NO. <i>HN F-N-251-4</i>	ACTUAL SAMPLE DEPTH <i>N/A</i>	COA 300416	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. <i>N/A</i>		BILL OF LADING/AIR BILL NO. <i>N/A</i>		

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/JATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	COOL <=6C	28 Days/48 Hours	G/P	1	250ml	SEE ITEM (1) IN SPECIAL INSTRUCTIONS
	PRESERVATION						
	HOLDING TIME						
	TYPE OF CONTAINER						
	NO. OF CONTAINER(S)						
	VOLUME						
	SAMPLE ANALYSIS						
SAMPLE NO. B2YVT2	MATRIX* WATER	SAMPLE DATE <i>12-02-14</i>	SAMPLE TIME <i>0830</i>				

362295

CHAIN OF POSSESSION		SIGN/PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM <i>P.S. Hawkey</i>	DATE/TIME <i>12-02-14 1030</i>	RECEIVED BY/STORED IN <i>CHPRC</i>	DATE/TIME <i>DEC 02 2014 1030</i>	TRVL-14-200 (1) 9056_ANIONS_IC: COMMON; 9056_ANIONS_IC: COMMON (Add-on) {Bromide, Phosphorus in phosphate}; 120.1_CONDUCTIVITY: COMMON; TRITIUM_DIST_LSC: COMMON;	
RELINQUISHED BY/REMOVED FROM <i>L.D. Wall</i>	DATE/TIME <i>DEC 02 2014 1400</i>	RECEIVED BY/STORED IN FEDEX	DATE/TIME		
RELINQUISHED BY/REMOVED FROM <i>FED EX</i>	DATE/TIME	RECEIVED BY/STORED IN <i>P. Kent Patereka</i>	DATE/TIME <i>Dec 12-3-14 0940</i>		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY	TITLE		DATE/TIME	
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY		DATE/TIME	

TRVL-14-200

February 27, 2015

Rev. 1

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F14-021-030	PAGE 1 OF 1
COLLECTOR P.S. HAWKEY	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION 105KW Monthly, Pt 10	PROJECT DESIGNATION 105KW Monthly Sampling - Water	FIELD LOGBOOK NO. HNF-N-251-4	SAF NO. F14-021	AIR QUALITY	METHOD OF SHIPMENT FEDERAL EXPRESS
ICE CHEST NO. 605-293	ACTUAL SAMPLE DEPTH N/A	OFFSITE PROPERTY NO. N/A	COA 300416	ORIGINAL	
SHIPPED TO GEL Laboratories, LLC	BILL OF LADING/AIR BILL NO. N/A				

MATRIX* A=Air DL=Drum L=Liquid S=Sediment T=Tissue V=Vegetation W=Water X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/JATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	PRESERVATION HNO3 to pH <2	HOLDING TIME 6 Months	TYPE OF CONTAINER G/P	NO. OF CONTAINER(S) 1	VOLUME 1L	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS
SAMPLE NO. B2VT3	MATRIX* WATER	SAMPLE DATE 12-02-14	SAMPLE TIME 0830	✓			

362295

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM P.S. HAWKEY	DATE/TIME 12-02-14 1000	RECEIVED BY/STORED IN L.D. Wall	DATE/TIME DEC 02 2014 1000	TRVL-14-200 (1) GAMMA_GS: COMMON {Cesium-137}; AMCMISO_EIE_PLATE_AEA: COMMON {Americium-241}; PUISO_PLATE_AEA: COMMON; UIISO_PLATE_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON;	
RELINQUISHED BY/REMOVED FROM L.D. Wall	DATE/TIME DEC 02 2014 1400	RECEIVED BY/STORED IN FED EX	DATE/TIME DEC 02 2014 1400	TRVL-14-200	
RELINQUISHED BY/REMOVED FROM FED EX	DATE/TIME DEC 02 2014 1400	RECEIVED BY/STORED IN P. Dent Patelek	DATE/TIME DEC 12 3 14 0940		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
LABORATORY SECTION	RECEIVED BY		TITLE		
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD		DISPOSED BY		

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F14-021-031	PAGE 1 OF 1
COLLECTOR <i>P.S. HAWKEY</i>	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D	PRICE CODE 7H	DATA TURNAROUND 30 Days / 30 Days
SAMPLING LOCATION 105KW Monthly Set 3, Pt 12	PROJECT DESIGNATION 105KW Monthly Sampling - Water		SAF NO. F14-021	AIR QUALITY	
ICE CHEST NO. <i>GWS-293</i>	FIELD LOGBOOK NO. <i>HNF-N-251-4</i>	ACTUAL SAMPLE DEPTH <i>N/A</i>	COA 300416	METHOD OF SHIPMENT FEDERAL EXPRESS	ORIGINAL
SHIPPED TO GEL Laboratories, LLC	OFFSITE PROPERTY NO. <i>N/A</i>		BILL OF LADING/AIR BILL NO. <i>N/A</i>		

MATRIX* A=Air DL=Drum L=Liquid S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	POSSIBLE SAMPLE HAZARDS/ REMARKS *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	PRESERVATION Cool <=6C
	HOLDING TIME 28 Days	
	TYPE OF CONTAINER G/P	
	NO. OF CONTAINER(S) 1	
	VOLUME 1L	
	SAMPLE ANALYSIS SEE ITEM (1) IN SPECIAL INSTRUCTIONS	
SAMPLE NO. B2YVT4	MATRIX* WATER	SAMPLE DATE <i>12-02-14</i>
		SAMPLE TIME <i>0830</i>
		<input checked="" type="checkbox"/>

362295

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM <i>P.S. HAWKEY</i>	DATE/TIME <i>12-02-14 1020</i>	RECEIVED BY/STORED IN <i>L.D. Wall</i>	DATE/TIME <i>DEC 02 2014 1020</i>
RELINQUISHED BY/REMOVED FROM <i>L.D. Wall</i>	DATE/TIME <i>DEC 02 2014 1400</i>	RECEIVED BY/STORED IN <i>CH2M Hill</i>	DATE/TIME <i>DEC 02 2014 1020</i>
RELINQUISHED BY/REMOVED FROM <i>F.D. EX</i>	DATE/TIME <i>12-03-14 0940</i>	RECEIVED BY/STORED IN <i>P. Kent</i>	DATE/TIME <i>DEC 12 2014 0940</i>
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

SPECIAL INSTRUCTIONS
Lab advised to remove tritium and conductivity aliquots prior to preservation. TRVL-14-200
(1) 120.1_CONDUCTIVITY: COMMON; AMCMISO_EIE_PLATE_AEA: COMMON {Americium-241}; GAMMA_GS: COMMON {Cesium-137}; PUIISO_PLATE_AEA: COMMON; SRTOT_SEP_PRECIP_GPC: COMMON; TRITIUM_DIST_LSC: COMMON; UIISO_PLATE_AEA: COMMON;

TRVL-14-200



SAMPLE RECEIPT & REVIEW FORM

Client: <u>CPRC</u>		SDG/AR/COC/Work Order: <u>362296</u>
Received By: <u>P. W. Dent</u>		Date Received: <u>12-3-14</u>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input 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): <u>500 cpm</u>
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#: <u>0910</u>
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"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>		<u>00</u>	Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): <u>130462966</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.				Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7720 5706 0849</u>

Comments (Use Continuation Form if needed):

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 24 February 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	SC000122014-1
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
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-15-10
Utah NELAP	SC000122014-16
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12

General Chem Analysis

Case Narrative

**General Chemistry Narrative
CH2M Hill Plateau Remediation Company (CPRC)
SDG GEL362295**

Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1440584 **Method:** 9056_ANIONS_IC: COMMON + (add-on)

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9056A:

Sample ID	Client ID
362295001	B2YVT2
1203221432	Method Blank (MB)
1203221433	Laboratory Control Sample (LCS)
1203221434	362295001(B2YVT2) Sample Duplicate (DUP)
1203221435	362295001(B2YVT2) Post Spike (PS)

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-GC-E-086 REV# 23.

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.

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within

acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

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

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 362295001 (B2YVT2).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

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

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

Manual Integrations

The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1203221434 (B2YVT2DUP), 1203221435 (B2YVT2PS) and 362295001 (B2YVT2).

Additional Comments

Additional comments were not required for this SDG.

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. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Specific Conductivity
Analytical Batch: 1442608 **Method:** 120.1_CONDUCTIVITY: COMMON

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 120.1:

Sample ID	Client ID
362295001	B2YVT2
362295003	B2YVT4
362295004	B2YVT5
1203226441	Laboratory Control Sample (LCS)
1203226443	362295003(B2YVT4) 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-GC-E-009 REV# 11.

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.

Calibration Information

The Titration and Ion analysis was performed on a ManSci PC-Titrate Titrator System.

Initial Standardization

The titrant was properly standardized

Calibration Verification Information

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

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

This batch does not require a method blank.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 362295003 (B2YVT4).

Duplicate Relative Percent Difference (RPD) Statement

The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1203226443 (B2YVT4DUP) and 362295003 (B2YVT4).

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

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

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

Additional Comments

Additional comments were not required for this SDG.

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. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

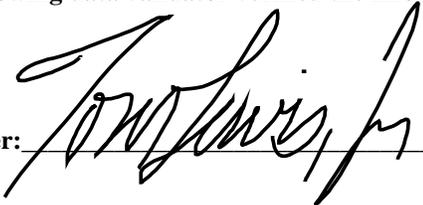
Certification Statement

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.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer:  Date: 26Dec14

Sample Data Summary

GEL LABORATORIES LLC

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

**Certificate of Analysis Report
for**

CPRC001 CH2MHill Plateau Remediation Company
Client SDG: GEL362295 GEL Work Order: 362295

The Qualifiers in this report are defined as follows:

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).

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

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Heather Shaffer.

Reviewed by



Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF F14-021**

Report Date: December 24, 2014

Client Sample ID:	B2YVT2	Project:	CPRC0F14021
Sample ID:	362295001	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	02-DEC-14 08:30		
Receive Date:	03-DEC-14		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography										
<i>9056_ANIONS_IC: COMMON + (add-on) "As Received"</i>										
Bromide	U	0.00	+/-22.3	67.0	250	ug/L	1	MAR112/04/14	0839	1440584 1
24959-67-9										
Chloride	B	106	+/-22.6	67.0	200	ug/L	1			
16887-00-6										
Fluoride	B	37.7	+/-11.1	33.0	500	ug/L	1			
16984-48-8										
Nitrate-N	B	66.4	+/-11.2	33.0	250	ug/L	1			
14797-55-8										
Nitrite-N	U	0.00	+/-12.7	38.0	250	ug/L	1			
14797-65-0										
Phosphorus in phosphate	U	0.00	+/-22.3	67.0	500	ug/L	1			
PO4-P										
Sulfate	B	229	+/-45.0	133	500	ug/L	1			
14808-79-8										
Titration and Ion Analysis										
<i>120.1_CONDUCTIVITY: COMMON "As Received"</i>										
Conductivity	U	0.931		3.63	14.5	umhos/cm	1	PXO1 12/11/14	1523	1442608 2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 9056A	
2	EPA 120.1	

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF F14-021**

Report Date: December 24, 2014

Client Sample ID:	B2YVT4	Project:	CPRC0F14021
Sample ID:	362295003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	02-DEC-14 08:30		
Receive Date:	03-DEC-14		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Titration and Ion Analysis										
<i>120.1_CONDUCTIVITY: COMMON "As Received"</i>										
Conductivity	U	1.86	3.63	14.5	umhos/cm	1	PXO1 12/11/14	1525	1442608	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 120.1	

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: **CHPRC SAF F14-021**

Report Date: December 24, 2014

Client Sample ID:	B2YVT5	Project:	CPRC0F14021
Sample ID:	362295004	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	02-DEC-14 08:30		
Receive Date:	03-DEC-14		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Titration and Ion Analysis										
<i>120.1_CONDUCTIVITY: COMMON "As Received"</i>										
Conductivity	U	0.226	3.63	14.5	umhos/cm	1	PX01 12/11/14	1528	1442608	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 120.1	

Quality Control Summary

February 27, 2015
GEL LABORATORIES LLC

Rev. 1

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

QC Summary

Report Date: December 24, 2014

Page 1 of 3

CH2MHill Plateau Remediation Company

MSIN R3-50 CHPRC

PO Box 1600

Richland, Washington

Contact: Mr. Scot Fitzgerald

Workorder: 362295

<u>Parmname</u>	<u>NOM</u>	<u>Sample</u>	<u>Qual</u>	<u>QC</u>	<u>Units</u>	<u>RPD%</u>	<u>REC%</u>	<u>Range</u>	<u>Anlst</u>	<u>Date</u>	<u>Time</u>
Ion Chromatography											
Batch	1440584										
QC1203221434 362295001 DUP											
Bromide		U	67.0	U	67.0	ug/L	N/A		MAR1	12/04/14	09:09
Chloride		B	106	B	106	ug/L	0.566 ^	(+/-200)			
Fluoride		B	37.7	B	37.8	ug/L	0.265 ^	(+/-500)			
Nitrate-N		B	66.4	B	63.3	ug/L	4.78 ^	(+/-250)			
Nitrite-N		U	38.0	U	38.0	ug/L	N/A				
Phosphorus in phosphate		U	67.0	U	67.0	ug/L	N/A				
Sulfate		B	229	U	133	ug/L	200 ^	(+/-500)			
QC1203221433 LCS											
Bromide	1250				1320	ug/L		105 (90%-110%)		12/04/14	10:39
Chloride	5000				4900	ug/L		98.1 (90%-110%)			
Fluoride	2500				2540	ug/L		102 (90%-110%)			
Nitrate-N	2500				2500	ug/L		100 (90%-110%)			
Nitrite-N	2500				2470	ug/L		99 (90%-110%)			
Phosphorus in phosphate	1250				1320	ug/L		106 (90%-110%)			
Sulfate	10000				10100	ug/L		101 (90%-110%)			
QC1203221432 MB											
Bromide				U	67.0	ug/L				12/04/14	10:09
Chloride				U	67.0	ug/L					
Fluoride				U	33.0	ug/L					
Nitrate-N				U	33.0	ug/L					
Nitrite-N				U	38.0	ug/L					

QC Summary

Workorder: 362295

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1440584										
Phosphorus in phosphate			U	67.0	ug/L				MAR1	12/04/14	10:09
Sulfate			U	133	ug/L						
QC1203221435	362295001	PS									
Bromide	1.25	U	0.00	1.28	mg/L		103	(90%-110%)		12/04/14	09:39
Chloride	5.00	B	0.106	4.79	mg/L		93.6	(90%-110%)			
Fluoride	2.50	B	0.0377	2.49	mg/L		98	(90%-110%)			
Nitrate-N	2.50	B	0.0664	2.46	mg/L		95.6	(90%-110%)			
Nitrite-N	2.50	U	0.00	2.42	mg/L		97	(90%-110%)			
Phosphorus in phosphate	1.25	U	0.00	1.27	mg/L		102	(90%-110%)			
Sulfate	10.0	B	0.229	9.99	mg/L		97.6	(90%-110%)			

Titration and Ion Analysis

Batch	1442608										
QC1203226443	362295003	DUP									
Conductivity		U	3.63	U	3.63	umhos/cm	N/A		PX01	12/11/14	15:27
QC1203226441	LCS										
Conductivity	1410				1420	umhos/cm		101	(95%-105%)	12/11/14	15:18

Notes:

The Qualifiers in this report are defined as follows:

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
- > Result greater than quantifiable range or greater than upper limit of the analysis range
- 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.
- 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.
- 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

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QC Summary

Workorder: 362295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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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 #: GEL362295
Work Order #: 362295

Method/Analysis Information

Product: UISO_IE_PLATE_AEA:COMMON
Analytical Method: DOE EML HASL-300, U-02-RC Modified
Analytical Batch Number: 1441415

Sample ID	Client ID
362295002	B2YVT3
362295003	B2YVT4
362295004	B2YVT5
1203223467	MB for batch 1441415
1203223469	Laboratory Control Sample (LCS)
1203223468	362295002(B2YVT3) 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: 362295002 (B2YVT3).

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 1203223468 (B2YVT3DUP), 362295002 (B2YVT3) and 362295003 (B2YVT4) were given additional clean-up steps and recounted in order to remove suspected interferences. The recounts are being reported for 362295002 and 362295003. The original count is being reported for 1203223468 with the interference integrated out of the U-232 tracer yield ROI.

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

Manual integration of alpha spectroscopy spectra 1203223468 (B2YVT3DUP) was performed to fully separate counts in Regions of Interest which would have been biased.

Sample-Specific MDA/MDC

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

Additional Comments

Samples 362295003 (B2YVT4) and 362295004 (B2YVT5) only had one container. Per product requirements, the remainder of the samples were preserved once the unpreserved tests analyzed their aliquots.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: PUIISO_PLATE_AEA:COMMON
Analytical Method: DOE EML HASL-300, Pu-11-RC Modified
Analytical Batch Number: 1445744

Sample ID	Client ID
362295002	B2YVT3
362295003	B2YVT4
362295004	B2YVT5

1203234008 MB for batch 1445744
1203234010 Laboratory Control Sample (LCS)
1203234009 362295004(B2YVT5) 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: 362295004 (B2YVT5).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203234008 (MB), did not meet the Pu-238 and Pu-239/240 detection limits due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits. The sample and the duplicate, 1203234009 (B2YVT5DUP) and 362295004 (B2YVT5), did not meet the Pu-239/240 relative percent difference requirement; however, they do meet the relative error ratio requirement with a value of 1.62.

Technical Information:**Holding Time**

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

Sample Re-prep/Re-analysis

Samples were re-prepped due to high carrier/tracer yield. The re-analysis 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

Samples 362295003 (B2YVT4) and 362295004 (B2YVT5) only had one container. Per product requirements, the remainder of the samples were preserved once the unpreserved tests analyzed their aliquots.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: AMCMISO_EIE_PLATE_AEA:
Analytical Method: DOE EML HASL-300, Am-05-RC Modified
Analytical Batch Number: 1445973

Sample ID	Client ID
362295003	B2YVT4
362295004	B2YVT5
1203234520	MB for batch 1445973
1203234522	Laboratory Control Sample (LCS)
1203234521	362295004(B2YVT5) 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: 362295004 (B2YVT5).

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

Samples 362295003 (B2YVT4) and 362295004 (B2YVT5) were repped twice due to high tracer yield recoveries and high activity. The third analysis is being reported.

Recounts

Sample 362295003 (B2YVT4) was given additional clean-up steps and recounted in order to remove suspected interferences. The recount is reported.

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

The following DER was generated for this SDG: 1368768. 1203234520 (MB), 1203234521 (B2YVT5DUP) and 362295003 (B2YVT4). DER 1368768 was generated due to RDL less than MDA and Failed RPD for DUP. 1. Samples 362295003 and Method blank 1203234520 did not meet the detection limits for Cm-243/244 due to small aliquots used. 2. The QC sample 362295004 and Duplicate sample 1203234521 do not meet the relative percent difference requirement or the relative error ratio requirement for Am-241. 1. Sample aliquot was reduced due to high levels of Am-241 activity in the sample and the method blank was reduced in order to keep consistent with the sample aliquots. Reporting results. 2. The relative error ratio did meet the GEL duplication criteria with a value of less than 3. Reporting results.

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

Samples 362295003 (B2YVT4) and 362295004 (B2YVT5) only had one container. Per product requirements, the remainder of the samples were preserved once the unpreserved tests analyzed their aliquots. This data package revision contains revised TPU values for Americium-241 and Curium-243/244. The relative error ratio (RER) has also been revised for Americium-241 and Curium-243/244.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: AMCMISO_EIE_PLATE_AEA:
Analytical Method: DOE EML HASL-300, Am-05-RC Modified
Analytical Batch Number: 1446216

Sample ID	Client ID
362295002	B2YVT3
1203235169	MB for batch 1446216
1203235171	Laboratory Control Sample (LCS)
1203235170	362295002(B2YVT3) 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: 362295002 (B2YVT3).

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

Sample 362295002 (B2YVT3) was re-prepped twice due to high Am-241 activity and high tracer yield recoveries. The third analysis 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. The following DER was generated for this SDG: DER 1369087 was generated due to RDL less than MDA and Failed RPD for DUP. 1. The QC sample 362295002 and Duplicate sample 1203235170 do not meet the detection limits for Cm-243/244 and the Method blank 1203235169 does not meet the detection limits for Am-241 and Cm-243/244 due to small aliquots used. 2. The QC sample 362295002 and Duplicate sample 1203235170 do not meet the relative percent difference requirement or the relative error ratio requirement for Am-241. 1. Sample aliquots were reduced due to high levels of Am-241 activity in the samples. The method blank aliquot was reduced in order to keep consistent with the sample aliquots. Reporting results. 2. The poor resolution on the QC sample 362295002 may be contributing to the difference in the Am-241 results, as well as the small aliquot size not being truly representative of the sample activity. The relative error ratio did meet the GEL duplication criteria with a value of less than 3. Reporting results.

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

The resolution for QC sample 362295002 (B2YVT3) does meet the resolution requirements, however all of the tracer yield peak is not within the Am-243 tracer ROI. The QC sample tracer yield recovery does meet the client acceptance criteria. In addition, the Duplicate sample 1203235170 does have better resolution on the Am-243 tracer peak and the results are similar. Sample has been prepped three times, reporting the best overall results. This data package revision contains revised TPU values for Americium-241 and Curium-243/244. The relative error ratio (RER) has also been revised for Americium-241 and Curium-243/244.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GAMMA_GS:COMMON (Cs137)
Analytical Method: EPA 901.1
Analytical Batch Number: 1441629

Sample ID	Client ID
362295002	B2YVT3
362295003	B2YVT4
362295004	B2YVT5
1203224043	MB for batch 1441629

1203224045 Laboratory Control Sample (LCS)
1203224044 362295002(B2YVT3) 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 sample was used for QC: 362295002 (B2YVT3).

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

Samples 362295003 (B2YVT4) and 362295004 (B2YVT5) only had one container. Per product requirements, the remainder of the samples were preserved once the unpreserved tests analyzed their aliquots. Eu-154 was added in samples 1203224044 (B2YVT3DUP), 362295002 (B2YVT3) and 362295003 (B2YVT4) and was added to the batch.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: SRTOT_SEP_PRECIP_GPC: COMMON
Analytical Method: EPA 905.0 Modified
Analytical Batch Number: 1445214

Sample ID	Client ID
362295002	B2YVT3
362295003	B2YVT4
362295004	B2YVT5
1203232739	MB for batch 1445214
1203232741	Laboratory Control Sample (LCS)
1203232740	362295004(B2YVT5) 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: 362295004 (B2YVT5).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The blank, 1203232739 (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

Samples were re-prepped due to high blank activity. The re-analysis is being reported.

Chemical Recoveries

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

Recounts

Sample 1203232739 (MB) was recounted due to a suspected blank false positive. 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.

Sample-Specific MDA/MDC

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

Additional Comments

Samples 362295003 (B2YVT4) and 362295004 (B2YVT5) only had one container. Per product requirements, the remainder of the samples were preserved once the unpreserved tests analyzed their aliquots.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: TRITIUM_DIST_LSC: COMMON
Analytical Method: EPA 906.0 Modified
Analytical Batch Number: 1443049

Sample ID	Client ID
362295001	B2YVT2
362295003	B2YVT4
362295004	B2YVT5

1203227574	MB for batch 1443049
1203227577	Laboratory Control Sample (LCS)
1203227575	362295004(B2YVT5) Sample Duplicate (DUP)
1203227576	362295004(B2YVT5) 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: 362295004 (B2YVT5).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: The Matrix Spike 1203227576 (B2YVT5MS) did not meet recovery requirements due to the sample activity being greater than five times the spiked nominal concentration. The blank 1203227574 (MB) activity is greater than the MDC but is less than five percent of the lowest activity in the batch.

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 362295001 (B2YVT2) and 362295003 (B2YVT4) were recounted to verify sample results. The recount results are similar to the original results. Original results 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.

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: GEL362295 GEL Work Order: 362295

The Qualifiers in this report are defined as follows:

B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample

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

Review/Validation

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

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

Signature: 

Name: Theresa Austin

Date: 19 FEB 2015

Title: Group Leader

DATA EXCEPTION REPORT

Mo.Day Yr. 29-DEC-14	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: ALPHA SPECTROMETER	Test / Method: DOE EML HASL-300, Am-05-RC Modified	Matrix Type: Liquid	Client Code: CPRC
Batch ID: 1445973	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 362295(GEL362295)			
Application Issues: RDL less than MDA Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Samples 362295003 and Method blank 1203234520 did not meet the detection limits for Cm-243/244 due to small aliquots used.</p> <p>2. The QC sample 362295004 and Duplicate sample 1203234521 do not meet the relative percent difference requirement or the relative error ratio requirement for Am-241.</p>		<p>1. Sample aliquot was reduced due to high levels of Am-241 activity in the sample and the method blank was reduced in order to keep consistent with the sample aliquots. Reporting results.</p> <p>2. The relative error ratio did meet the GEL duplication criteria with a value of less than 3. Reporting results.</p>	

Originator's Name:
Jessica Downey 19-FEB-15

Data Validator/Group Leader:
Scott Moreland 19-FEB-15

DATA EXCEPTION REPORT

Mo.Day Yr. 30-DEC-14	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: ALPHA SPECTROMETER	Test / Method: DOE EML HASL-300, Am-05-RC Modified	Matrix Type: Liquid	Client Code: CPRC
Batch ID: 1446216	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 362295(GEL362295)

Application Issues:

RDL less than MDA
Failed RPD for DUP

**Specification and Requirements
Exception Description:**

DER Disposition:

1. The QC sample 362295002 and Duplicate sample 1203235170 do not meet the detection limits for Cm-243/244 and the Method blank 1203235169 does not meet the detection limits for Am-241 and Cm-243/244 due to small aliquots used.
2. The QC sample 362295002 and Duplicate sample 1203235170 do not meet the relative percent difference requirement or the relative error ratio requirement for Am-241.

1. Sample aliquots were reduced due to high levels of Am-241 activity in the samples. The method blank aliquot was reduced in order to keep consistent with the sample aliquots. Reporting results.
2. The poor resolution on the QC sample 362295002 may be contributing to the difference in the Am-241 results, as well as the small aliquot size not being truly representative of the sample activity. The relative error ratio did meet the GEL duplication criteria with a value of less than 3. Reporting results.

Originator's Name:

Jessica Downey 19-FEB-15

Data Validator/Group Leader:

Scott Moreland 19-FEB-15

Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F14-021

Report Date: February 19, 2015

Client Sample ID:	B2YVT2	Project:	CPRC0F14021
Sample ID:	362295001	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	02-DEC-14		
Receive Date:	03-DEC-14		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Liquid Scintillation Analysis													
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>													
Tritium 10028-17-8	B	1.18E+06	+/-22700	819	+/- 2.30E+05	100	pCi/L		BYS1	12/19/14	2051	1443049	1

The following Analytical Methods were performed

Method	Description
1	EPA 906.0 Modified

Notes:
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96 sigma).
 The Qualifiers in this report are defined as follows :

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
 - > Result greater than quantifiable range or greater than upper limit of the analysis range
 - 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.
 - N Spike Sample recovery is outside control limits.
 - U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 - UX Gamma Spectroscopy--Uncertain identification
 - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
 - Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
 - Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- The above sample is reported on an "as received" basis.

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F14-021

Report Date: February 19, 2015

Client Sample ID:	B2YVT3	Project:	CPRC0F14021
Sample ID:	362295002	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	02-DEC-14		
Receive Date:	03-DEC-14		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
<i>AMCMISO_EIE_PLATE_AEA: "As Received"</i>													
Americium-241 14596-10-2		11900	+/-2330	853	+/-2980	1.00	pCi/L		JXR1	12/29/14	1358	1446216	1
Curium-243/244	U	-109	+/-254	751	+/-254	1.00	pCi/L						
<i>PUISO_PLATE_AEA:COMMON "As Received"</i>													
Plutonium-238 13981-16-3		2520	+/-412	127	+/-640	1.00	pCi/L		MXS2	12/24/14	0904	1445744	2
Plutonium-239/240 OER-100-70		14500	+/-980	134	+/-2970	1.00	pCi/L						
<i>UIISO_IE_PLATE_AEA:COMMON "As Received"</i>													
Uranium-233/234 U-233/234		71.0	+/-4.57	0.536	+/-12.3	1.00	pCi/L		JXD2	12/26/14	1321	1441415	3
Uranium-235/236 15117-96-1/13982-70-2		11.7	+/-1.86	0.468	+/-2.65	1.00	pCi/L						
Uranium-238 7440-61-1		53.8	+/-3.98	0.423	+/-9.55	1.00	pCi/L						
Rad Gamma Spec Analysis													
<i>GAMMA_GS:COMMON (Cs137) "As Received"</i>													
Cesium-137 10045-97-3		8.63E+05	+/-1100	169	+/-74000	15.0	pCi/L		MJH1	12/19/14	0622	1441629	4
Europium-154 15585-10-1		790	+/-80.8	41.0	+/-105		pCi/L						
Rad Gas Flow Proportional Counting													
<i>SRTOT_SEP_PRECIP_GPC: COMMON "As Received"</i>													
Total Strontium SR-RAD		4.97E+05	+/-2410	103	+/- 1.17E+05	2.00	pCi/L		KSD1	12/24/14	0847	1445214	5

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	EPA 901.1
5	EPA 905.0 Modified

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F14-021

Report Date: February 19, 2015

Client Sample ID: B2YVT3 Project: CPRC0F14021
 Sample ID: 362295002 Client ID: CPRC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time Batch	Mtd.
Surrogate/Tracer recovery	Test				Recovery%		Acceptable Limits					
Americium-243 Tracer	AMCMISO_EIE_PLATE_AEA: "				68.3		(15%-125%)					
Plutonium-236 Tracer	PUISO_PLATE_AEA:COMMON				60.6		(15%-125%)					
Uranium-232 Tracer	UIISO_IE_PLATE_AEA:COMMO				74.8		(15%-125%)					
Strontium Carrier	SRTOT_SEP_PRECIP_GPC: COM				96.3		(25%-125%)					

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96 sigma).
 The Qualifiers in this report are defined as follows :

- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- UX Gamma Spectroscopy--Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

The above sample is reported on an "as received" basis.

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F14-021

Report Date: February 19, 2015

Client Sample ID:	B2YVT4	Project:	CPRC0F14021
Sample ID:	362295003	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	02-DEC-14		
Receive Date:	03-DEC-14		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time Batch	Mtd.
Rad Alpha Spec Analysis												
<i>AMCMISO_EIE_PLATE_AEA: "As Received"</i>												
Americium-241 14596-10-2		10400	+/-567	24.2	+/-1190	1.00	pCi/L		HAKB	12/28/14	1053 1445973	1
Curium-243/244	U	35.7	+/-44.2	63.5	+/-44.4	1.00	pCi/L					
<i>PUISO_PLATE_AEA:COMMON "As Received"</i>												
Plutonium-238 13981-16-3		819	+/-221	88.6	+/-268	1.00	pCi/L		MXS2	12/24/14	0905 1445744	2
Plutonium-239/240 OER-100-70		3940	+/-479	90.8	+/-863	1.00	pCi/L					
<i>UIISO_IE_PLATE_AEA:COMMON "As Received"</i>												
Uranium-233/234 U-233/234		38.2	+/-3.27	0.746	+/-6.88	1.00	pCi/L		JXD2	12/26/14	1321 1441415	3
Uranium-235/236 15117-96-1/13982-70-2		9.33	+/-1.62	0.532	+/-2.19	1.00	pCi/L					
Uranium-238 7440-61-1		32.0	+/-2.97	0.438	+/-5.87	1.00	pCi/L					
Rad Gamma Spec Analysis												
<i>GAMMA_GS:COMMON (Cs137) "As Received"</i>												
Cesium-137 10045-97-3		5.20E+05	+/-916	131	+/-42300	15.0	pCi/L		MJH1	12/19/14	0622 1441629	4
Europium-154 15585-10-1		566	+/-89.2	156	+/-102		pCi/L					
Rad Gas Flow Proportional Counting												
<i>SRTOT_SEP_PRECIP_GPC: COMMON "As Received"</i>												
Total Strontium SR-RAD		2.92E+05	+/-1870	105	+/-69300	2.00	pCi/L		KSD1	12/24/14	0847 1445214	5
Rad Liquid Scintillation Analysis												
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>												
Tritium 10028-17-8	B	1.28E+06	+/-24600	869	+/- 2.49E+05	100	pCi/L		BYS1	12/19/14	2056 1443049	6

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F14-021

Report Date: February 19, 2015

Client Sample ID: B2YVT4 Project: CPRC0F14021
 Sample ID: 362295003 Client ID: CPRC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time Batch	Mtd.
3		DOE EML HASL-300, U-02-RC Modified										
4		EPA 901.1										
5		EPA 905.0 Modified										
6		EPA 906.0 Modified										

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Americium-243 Tracer	AMCMISO_EIE_PLATE_AEA: "	87.0	(15%-125%)
Plutonium-236 Tracer	PUISO_PLATE_AEA:COMMON	65.2	(15%-125%)
Uranium-232 Tracer	UIISO_IE_PLATE_AEA:COMMO	75.8	(15%-125%)
Strontium Carrier	SRTOT_SEP_PRECIP_GPC: COM	95.1	(25%-125%)

Notes:
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96 sigma).
 The Qualifiers in this report are defined as follows :

- < Sample is below the EPA guidance level for Reactive Releasable Cyanide and/or Reactive Releasable Sulfide
 - > Result greater than quantifiable range or greater than upper limit of the analysis range
 - 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.
 - N Spike Sample recovery is outside control limits.
 - U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
 - UX Gamma Spectroscopy--Uncertain identification
 - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
 - Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
 - Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- The above sample is reported on an "as received" basis.

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F14-021

Report Date: February 19, 2015

Client Sample ID:	B2YVT5	Project:	CPRC0F14021
Sample ID:	362295004	Client ID:	CPRC001
Matrix:	WATER		
Collect Date:	02-DEC-14		
Receive Date:	03-DEC-14		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time Batch	Mtd.
Rad Alpha Spec Analysis												
<i>AMCMISO_EIE_PLATE_AEA: "As Received"</i>												
Americium-241 14596-10-2		78.4	+/-6.55	0.785	+/-11.1	1.00	pCi/L		HAKB	12/26/14 0910	1445973	1
Curium-243/244	U	0.319	+/-0.564	0.855	+/-0.565	1.00	pCi/L					
<i>PUISO_PLATE_AEA:COMMON "As Received"</i>												
Plutonium-238 13981-16-3		4.75	+/-3.31	2.89	+/-3.46	1.00	pCi/L		MXS2	12/24/14 0905	1445744	2
Plutonium-239/240 OER-100-70		54.5	+/-10.4	2.60	+/-15.3	1.00	pCi/L					
<i>UIISO_IE_PLATE_AEA:COMMON "As Received"</i>												
Uranium-233/234 U-233/234	U	0.0676	+/-0.124	0.208	+/-0.124	1.00	pCi/L		JXD2	12/23/14 1451	1441415	3
Uranium-235/236 15117-96-1/13982-70-2	U	0.0339	+/-0.094	0.162	+/-0.0941	1.00	pCi/L					
Uranium-238 7440-61-1	U	0.118	+/-0.110	0.129	+/-0.111	1.00	pCi/L					
Rad Gamma Spec Analysis												
<i>GAMMA_GS:COMMON (Cs137) "As Received"</i>												
Cesium-137 10045-97-3		21100	+/-188	30.0	+/-1830	15.0	pCi/L		MJH1	12/19/14 0622	1441629	4
Rad Gas Flow Proportional Counting												
<i>SRTOT_SEP_PRECIP_GPC: COMMON "As Received"</i>												
Total Strontium SR-RAD		1480	+/-147	107	+/-377	2.00	pCi/L		KSD1	12/24/14 0847	1445214	5
Rad Liquid Scintillation Analysis												
<i>TRITIUM_DIST_LSC: COMMON "As Received"</i>												
Tritium 10028-17-8	B	1.22E+06	+/-23400	840	+/- 2.36E+05	100	pCi/L		BYS1	12/19/14 2100	1443049	6

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	EPA 901.1

Certificate of Analysis

Company : CH2MHill Plateau Remediation Company
 Address : MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F14-021

Report Date: February 19, 2015

Client Sample ID: B2YVT5 Project: CPRC0F14021
 Sample ID: 362295004 Client ID: CPRC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time Batch	Mtd.
5	EPA 905.0	Modified										
6	EPA 906.0	Modified										

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Americium-243 Tracer	AMCMISO_EIE_PLATE_AEA: "	99.3	(15%-125%)
Plutonium-236 Tracer	PUISO_PLATE_AEA:COMMON	48.7	(15%-125%)
Uranium-232 Tracer	UIISO_IE_PLATE_AEA:COMMO	85.4	(15%-125%)
Strontium Carrier	SRTOT_SEP_PRECIP_GPC: COM	91.4	(25%-125%)

Notes:
 TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96 sigma).
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- > Result greater than quantifiable range or greater than upper limit of the analysis range
- 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.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- UX Gamma Spectroscopy--Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

The above sample is reported on an "as received" basis.

Quality Control Data

QC Summary

Report Date: February 19, 2015
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Client : CH2MHill Plateau Remediation Company
 MSIN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 362295

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1441415								
QC1203223467	MB								
Uranium-233/234			U	0.0948	pCi/L			JXD2	12/23/1414:51
				Uncert: +/-0.144					
				TPU: +/-0.144					
Uranium-235/236			U	0.019	pCi/L				
				Uncert: +/-0.0986					
				TPU: +/-0.0987					
Uranium-238			U	0.019	pCi/L				
				Uncert: +/-0.162					
				TPU: +/-0.162					
QC1203223468	362295002	DUP							
Uranium-233/234		71.0		73.6	pCi/L				
				Uncert: +/-4.57		RPD: 4	(0% - 20%)		
				TPU: +/-12.3		RER: 0.331	(0-2)		
Uranium-235/236		11.7		11.5	pCi/L				
				Uncert: +/-1.86		RPD: 1	(0% - 20%)		
				TPU: +/-2.65		RER: 0.106	(0-2)		
Uranium-238		53.8		59.9	pCi/L				
				Uncert: +/-3.98		RPD: 11	(0% - 20%)		
				TPU: +/-9.55		RER: 0.966	(0-2)		
QC1203223469	LCS								
Uranium-233/234				25.3	pCi/L				
				Uncert: +/-1.23					
				TPU: +/-3.33					
Uranium-235/236				1.87	pCi/L				
				Uncert: +/-0.348					
				TPU: +/-0.416					
Uranium-238		27.2		26.5	pCi/L	REC: 97	(80%-120%)		
				Uncert: +/-1.24					
				TPU: +/-3.46					
Batch	1445744								
QC1203234008	MB								
Plutonium-238			U	0.952	pCi/L			MXS2	12/24/1409:05
				Uncert: +/-1.42					
				TPU: +/-1.43					
Plutonium-239/240			U	0.592	pCi/L				
				Uncert: +/-1.24					
				TPU: +/-1.25					
QC1203234009	362295004	DUP							
Plutonium-238		4.75		6.27	pCi/L				12/24/1409:05
				Uncert: +/-3.31		RPD: 27	(0% - 100%)		
				TPU: +/-3.46		RER: 0.597	(0-2)		
Plutonium-239/240		54.5		39.0	pCi/L				
				Uncert: +/-10.4		RPD: 33*	(0% - 20%)		
				TPU: +/-15.3		RER: 1.62	(0-2)		

QC Summary

Workorder: 362295

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch		1445744							
QC1203234010	LCS								
Plutonium-238				5.34	pCi/L				12/24/1409:05
				Uncert: +/-3.32					
				TPU: +/-3.48					
Plutonium-239/240		49.2		56.1	pCi/L	REC: 114 (80%-120%)			
				Uncert: +/-9.40					
				TPU: +/-14.2					
Batch		1445973							
QC1203234520	MB								
Americium-241			U	0.502	pCi/L			HAKB	12/26/1409:10
				Uncert: +/-0.797					
				TPU: +/-0.800					
Curium-243/244			U	0.958	pCi/L				
				Uncert: +/-1.20					
				TPU: +/-1.21					
QC1203234521	362295004	DUP							
Americium-241		78.4		102	pCi/L				
				Uncert: +/-6.55		RPD: 27* (0% - 20%)			
				TPU: +/-11.1		RER: 2.57* (0-2)			
Curium-243/244		U 0.319	U	0.242	pCi/L				
				Uncert: +/-0.564		RPD: 0 N/A			
				TPU: +/-0.565		RER: 0.176 (0-2)			
QC1203234522	LCS								
Americium-241		35.2		34.1	pCi/L	REC: 97 (80%-120%)			
				Uncert: +/-4.53					
				TPU: +/-6.07					
Curium-243/244		69.6		58.2	pCi/L	REC: 84 (80%-120%)			
				Uncert: +/-5.87					
				TPU: +/-9.06					
Batch		1446216							
QC1203235169	MB								
Americium-241			U	0.00	pCi/L			JXR1	12/29/1413:58
				Uncert: +/-172					
				TPU: +/-173					
Curium-243/244			U	84.2	pCi/L				
				Uncert: +/-237					
				TPU: +/-237					
QC1203235170	362295002	DUP							
Americium-241		11900		18800	pCi/L				12/29/1413:58
				Uncert: +/-2330		RPD: 45* (0% - 20%)			
				TPU: +/-2980		RER: 2.88* (0-2)			
Curium-243/244		U -109	U	-101	pCi/L				
				Uncert: +/-254		RPD: 0 N/A			
				TPU: +/-254		RER: 0.0489 (0-2)			
QC1203235171	LCS								
Americium-241		14100		14700	pCi/L	REC: 105 (80%-120%)			12/29/1413:58
				Uncert: +/-2170					
				TPU: +/-2940					
Curium-243/244		27800		25900	pCi/L	REC: 93 (80%-120%)			
				Uncert: +/-2850					

QC Summary

Workorder: 362295

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1446216								
		TPU:		+/-4500					
Rad Gamma Spec									
Batch	1441629								
QC1203224043	MB								
Cesium-137			U	2.41	pCi/L			MJH1	12/19/1406:49
		Uncert:		+/-6.35					
		TPU:		+/-6.44					
Europium-154			U	-1.51	pCi/L				
		Uncert:		+/-13.4					
		TPU:		+/-13.4					
QC1203224044	362295002	DUP							
Cesium-137		8.63E+05		8.52E+05	pCi/L				12/19/1408:40
		Uncert:	+/-1100	+/-1170		RPD: 1	(0% - 20%)		
		TPU:	+/-74000	+/-69400		RER: 0.213	(0-2)		
Europium-154		790		910	pCi/L				
		Uncert:	+/-80.8	+/-117		RPD: 14	(0% - 20%)		
		TPU:	+/-105	+/-142		RER: 1.33	(0-2)		
QC1203224045	LCS								
Americium-241		1.10E+05		1.21E+05	pCi/L	REC: 110	(80%-120%)		12/19/1406:23
		Uncert:		+/-4470					
		TPU:		+/-14200					
Cobalt-60		52900		54300	pCi/L	REC: 103	(80%-120%)		
		Uncert:		+/-1150					
		TPU:		+/-4460					
Cesium-137		44500		45400	pCi/L	REC: 102	(80%-120%)		
		Uncert:		+/-894					
		TPU:		+/-3880					
Europium-154			U	201	pCi/L				
		Uncert:		+/-388					
		TPU:		+/-398					
Rad Gas Flow									
Batch	1445214								
QC1203232739	MB								
Total Strontium			U	32.8	pCi/L			KSD1	12/24/1411:53
		Uncert:		+/-69.4					
		TPU:		+/-69.8					
QC1203232740	362295004	DUP							
Total Strontium		1480		1230	pCi/L				12/24/1408:48
		Uncert:	+/-147	+/-132		RPD: 18	(0% - 20%)		
		TPU:	+/-377	+/-312		RER: 0.992	(0-2)		
QC1203232741	LCS								
Total Strontium		4760		4950	pCi/L	REC: 104	(80%-120%)		12/24/1408:50
		Uncert:		+/-246					
		TPU:		+/-1190					
Rad Liquid Scintillation									
Batch	1443049								
QC1203227574	MB								
Tritium			B	320	pCi/L			BYS1	12/19/1421:04
		Uncert:		+/-72.0					

QC Summary

Workorder: 362295

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time	
Rad Liquid Scintillation										
Batch	1443049									
				TPU:	+/-94.9					
QC1203227575	362295004	DUP								
Tritium		B	1.22E+06	B	1.29E+06	pCi/L			12/19/1422:37	
				Uncert:	+/-23400	+/-24900	RPD:	6	(0% - 20%)	
				TPU:	+/-2.36E+05	+/-2.51E+05	RER:	0.433	(0-2)	
QC1203227576	362295004	MS								
Tritium	1890	B	1.22E+06	B	1.24E+06	pCi/L	REC:	N/A	12/19/1422:41	
				Uncert:	+/-23400	+/-23800				
				TPU:	+/-2.36E+05	+/-2.40E+05				
QC1203227577	LCS									
Tritium	1880			B	2190	pCi/L	REC:	117	(80%-120%)	
				Uncert:	+/-337					
				TPU:	+/-542					

Notes:

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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.