TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-9107-1
TestAmerica Sample Delivery Group: RL9107-1
Client Project/Site: I19-006

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: CPP Sample Management

Ashley L Worthy

Authorized for release by:
3/18/2019 2:56:29 PM

Ashley Worthy, Project Manager I
(509)375-3131
ashley.worthy@testamericainc.com

LINKS
Review your project results through TotalAccess
Have a Question? Ask The Expert
Visit us at: www.testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a desingee as verified by the attached signature.

The laboratory is accredited to EPA 7196A in Solid and Chemical Materials, per Washington State Department of Ecology this is approved for non-discharge water samples.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Client Sample Results 6
Tracer Carrier Summary 8
QC Sample Results 10
QC Association Summary 16
Lab Chronicle 17
Method Summary 18
Sample Summary 19
Chain of Custody 20
Receipt Checklists 21

Definitions/Glossary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.
X	Tracer is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Job ID: 300-9107-1

Laboratory: TestAmerica Richland

Narrative

Job Narrative
300-9107-1

Comments
No additional comments.

Receipt
The sample was received on 12/20/2018 10:45 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 7.6º C.

RAD
The PUISO tracer was outside acceptance criteria. For more information seet he attached SIR.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR19-0530
Rev. Number: 0
Date Initiated: 03/18/2019

SAMPLE EVENT INFORMATION

SAF NUM(S): I19-006

LABORATORY: TARL

SAMPLING INFORMATION

NUMBER OF SAMPLES: 1

SAMPLE NUMBERS: B3M8C3

SAMPLE MATRIX: WATER

SDG NUM(S): RL9107-1

ISSUE BACKGROUND

CLASS: Laboratory Issue

TYPE: Quality Control Failure

DESCRIPTION: The PUISO tracer yield for the LCS is outside acceptance criteria at 107%. The sample results are a nondetect.

RESOLUTION

PROPOSED RESOLUTION: Report results and narrate.

FINAL RESOLUTION: Report results and narrate.

SUBMITTED BY:

WORTHY, A 03/18/2019

ACCEPTED BY:

HEY, BE 03/18/2019

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Client Sample ID: B3M8C3

Date Collected: 12/20/18 09:30
Date Received: 12/20/18 10:45

Lab Sample ID: 300-9107-1

Matrix: Water

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
K-40	-3.2	U		21.3		40.6	pCi/L	01/07/19 12:37	01/11/19 10:56	1
Co-60	-0.21	U		4.68	25.0	3.77	pCi/L	01/07/19 12:37	01/11/19 10:56	1
Sb-125	-7.3	U		8.01	50.0	7.90	pCi/L	01/07/19 12:37	01/11/19 10:56	1
Cs-134	1.87	U		2.96	80.0	3.49	pCi/L	01/07/19 12:37	01/11/19 10:56	1
Cs-137	2.27	U		2.40	15.0	3.34	pCi/L	01/07/19 12:37	01/11/19 10:56	1
Eu-152	**5.51**			4.99	50.0	3.69	pCi/L	01/07/19 12:37	01/11/19 10:56	1
Eu-154	-2.1	U		12.2	50.0	2.36	pCi/L	01/07/19 12:37	01/11/19 10:56	1
Eu-155	0.504	U		2.36	50.0	3.45	pCi/L	01/07/19 12:37	01/11/19 10:56	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/L*	*01/07/19 12:37*	*01/11/19 10:56*	*1*

Method: A-01-R - Isotopic Curium and/or Americium 241 (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Americium 241	0.0640	U	0.169	0.170	1.00	0.391	pCi/L	01/07/19 10:15	03/14/19 11:35	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Am-243(T)	*82.6*		*30 - 105*	*01/07/19 10:15*	*03/14/19 11:35*	*1*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.031	U	0.154	0.154	1.00	0.391	pCi/L	01/14/19 15:20	02/21/19 13:11	1
Pu-239/240	0.000	U	0.153	0.153	1.00	0.280	pCi/L	01/14/19 15:20	02/21/19 13:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*91.8*		*30 - 105*	*01/14/19 15:20*	*02/21/19 13:11*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	**1.80**		0.735	0.784	1.00	0.398	pCi/L	01/24/19 08:40	02/14/19 06:33	1
U-233/234	**2.84**		0.917	1.01	1.00	0.368	pCi/L	01/24/19 08:40	02/14/19 06:33	1
U-235/236	0.0617	U	0.147	0.148	1.00	0.319	pCi/L	01/24/19 08:40	02/14/19 06:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*76.5*		*30 - 105*	*01/24/19 08:40*	*02/14/19 06:33*	*1*

Method: ST-RC-0058 - Total Beta Strontium by GFPC (Extraction Chromatography)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Beta Strontium	0.202	U	0.597	0.599	10.0	1.05	pCi/L	01/07/19 08:20	01/17/19 15:34	1

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Client Sample ID: B3M8C3
Date Collected: 12/20/18 09:30
Date Received: 12/20/18 10:45

Lab Sample ID: 300-9107-1
Matrix: Water

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Sr(C)	*99.2*		*30 - 105*	*01/07/19 08:20*	*01/17/19 15:34*	*1*

Method: ST-RC-0245 - Plutonium-241 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	6.81	U	0.627	6.95	25.0	11.2	pCi/L	01/22/19 11:30	03/02/19 06:48	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*91.8*			*01/22/19 11:30*	*03/02/19 06:48*	*1*

Method: TC-02-RC - Technetium-99 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tc-99	4.13	U	0.370	5.56	50.0	12.3	pCi/L	01/15/19 15:22	02/14/19 14:56	1

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Method: A-01-R - Isotopic Curium and/or Americium 241 (Alpha Spectrometry)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Am-243(T) (30-105)
300-9107-1	B3M8C3	82.6
300-9139-A-1-C DU	Duplicate	91.7
LCS 300-17161/2-A	Lab Control Sample	102
MB 300-17161/1-A	Method Blank	100

Tracer/Carrier Legend

Am-243(T) = Am-243(T)

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Pu-242(T) (30-105)
300-9037-D-2-B DU	Duplicate	95.3
300-9107-1	B3M8C3	91.8
LCS 300-17335/2-A	Lab Control Sample	107 X
MB 300-17335/1-A	Method Blank	96.0

Tracer/Carrier Legend

Pu-242(T) = Pu-242(T)

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	U-232(T) (30-105)
300-9107-1	B3M8C3	76.5
300-9114-A-1-C DU	Duplicate	67.6
LCS 300-17528/2-A	Lab Control Sample	55.5
MB 300-17528/1-A	Method Blank	51.2

Tracer/Carrier Legend

U-232(T) = U-232(T)

Method: ST-RC-0058 - Total Beta Strontium by GFPC (Extraction Chromatography)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Sr(C) (30-105)
300-9107-1	B3M8C3	99.2
300-9164-D-2-B DU	Duplicate	96.7
LCS 300-17156/2-A	Lab Control Sample	95.0
MB 300-17156/1-A	Method Blank	92.6

Tracer/Carrier Legend

Sr(C) = Sr(C)

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Pu-242 (T)
Lab Sample ID	**Client Sample ID**	
300-9037-D-2-D DU	Duplicate	95.3
300-9107-1	B3M8C3	91.8
LCS 300-17479/2-A	Lab Control Sample	107
MB 300-17479/1-A	Method Blank	96.0

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Method: 901.1 - Cesium 137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 300-17167/1-A
Matrix: Water
Analysis Batch: 17356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 17167

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
K-40	12.71	U		42.6		42.2	pCi/L	01/07/19 12:37	01/11/19 10:54	1
Co-60	-1.49	U		5.28	25.0	4.09	pCi/L	01/07/19 12:37	01/11/19 10:54	1
Sb-125	2.457	U		5.44	50.0	6.98	pCi/L	01/07/19 12:37	01/11/19 10:54	1
Cs-134	0.978	U		2.95	80.0	3.47	pCi/L	01/07/19 12:37	01/11/19 10:54	1
Cs-137	2.356	U		2.55	15.0	3.38	pCi/L	01/07/19 12:37	01/11/19 10:54	1
Eu-152	-5.48	U		6.65	50.0	3.75	pCi/L	01/07/19 12:37	01/11/19 10:54	1
Eu-154	-6.04	U		12.5	50.0	2.20	pCi/L	01/07/19 12:37	01/11/19 10:54	1
Eu-155	0.949	U		2.26	50.0	2.97	pCi/L	01/07/19 12:37	01/11/19 10:54	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/L*	*01/07/19 12:37*	*01/11/19 10:54*	*1*

Lab Sample ID: LCS 300-17167/2-A
Matrix: Water
Analysis Batch: 17356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 17167

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Co-60			37.2	35.53		3.45	25.0	3.96	pCi/L	96	80 - 120		
Cs-137			49.5	48.23		4.78	15.0	4.00	pCi/L	97	80 - 120		
Eu-152			76.0	67.25		4.68	50.0	6.65	pCi/L	88	80 - 120		

Lab Sample ID: 300-9141-C-1-B DU
Matrix: Water
Analysis Batch: 17356

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 17167

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
K-40	2.76	U		-30.6	U y	75.9		134	pCi/L			240	20
Co-60	1.45	U		2.994	U y	5.58	25.0	6.08	pCi/L			70	20
Sb-125	5.05	U		0.770	U y	12.8	50.0	14.6	pCi/L			147	20
Cs-134	-0.49	U		2.999	U y	6.15	80.0	5.93	pCi/L			279	20
Cs-137	0.384	U		-0.606	U y	5.92	15.0	6.21	pCi/L			893	20
Eu-152	-5.5	U		-0.146	U y	14.3	50.0	12.8	pCi/L			190	20
Eu-154	-7.9	U		6.002	U y	17.5	50.0	9.13	pCi/L			1495	20
Eu-155	-3.3	U		-1.97	U y	11.3	50.0	15.4	pCi/L			49	20

Other Detected Radionuclides	*Sample Result*	*Sample Qual*		*DU Result*	*DU Qual*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*			*RPD*	*RPD Limit*
Other Detected Radionuclide	*None*			*None*					*pCi/L*				

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 300-17528/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 17876 — **Prep Batch: 17528**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.0371	U	0.233	0.233	1.00	0.568	pCi/L	01/24/19 08:40	02/14/19 06:32	1
U-233/234	-0.0232	U	0.233	0.233	1.00	0.522	pCi/L	01/24/19 08:40	02/14/19 06:32	1
U-235/236	-0.00464	U	0.232	0.232	1.00	0.425	pCi/L	01/24/19 08:40	02/14/19 06:32	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
U-232(T)	*51.2*		*30 - 105*	*01/24/19 08:40*	*02/14/19 06:32*	*1*

Lab Sample ID: LCS 300-17528/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 17876 — **Prep Batch: 17528**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-238	16.5	16.67		4.07	1.00	0.861	pCi/L	101	80 - 120
U-233/234	15.8	16.46		4.03	1.00	0.631	pCi/L	104	80 - 120

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
U-232(T)	*55.5*		*30 - 105*

Lab Sample ID: 300-9114-A-1-C DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 17876 — **Prep Batch: 17528**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
U-238	20.0		23.25		4.75	1.00	0.404	pCi/L	15	20
U-233/234	20.5		22.09		4.56	1.00	0.355	pCi/L	7	20
U-235/236	1.47		1.164		0.675	1.00	0.330	pCi/L	23	

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
U-232(T)	*67.6*		*30 - 105*

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry)

Lab Sample ID: MB 300-17335/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 18011 — **Prep Batch: 17335**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.0261	U	0.146	0.146	1.00	0.364	pCi/L	01/14/19 15:20	02/21/19 13:10	1
Pu-239/240	0.0145	U	0.147	0.147	1.00	0.435	pCi/L	01/14/19 15:20	02/21/19 13:10	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242(T)	*96.0*		*30 - 105*	*01/14/19 15:20*	*02/21/19 13:10*	*1*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Method: A-01-R - Isotopic Plutonium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 300-17335/2-A
Matrix: Water
Analysis Batch: 18011

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 17335

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-239/240			23.6	21.71		3.98	1.00	0.369	pCi/L	92	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242(T)	*107*	*X*	*30 - 105*

Lab Sample ID: 300-9037-D-2-B DU
Matrix: Water
Analysis Batch: 18011

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 17335

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-238	-0.079	U		-0.0845	U	0.150	1.00	0.482	pCi/L			6	20
Pu-239/240	-0.0095	U		-0.0291	U y	0.147	1.00	0.373	pCi/L			102	20

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242(T)	*95.3*		*30 - 105*

Method: A-01-R - Isotopic Curium and/or Americium 241 (Alpha Spectrometry)

Lab Sample ID: MB 300-17161/1-A
Matrix: Water
Analysis Batch: 18250

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 17161

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Americium 241	0.131	U	0.197	0.198	1.00	0.290	pCi/L	01/07/19 10:15	03/14/19 11:35	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Am-243(T)	*100*		*30 - 105*	*01/07/19 10:15*	*03/14/19 11:35*	*1*

Lab Sample ID: LCS 300-17161/2-A
Matrix: Water
Analysis Batch: 18250

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 17161

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium 241			22.6	20.12		3.83	1.00	0.394	pCi/L	89	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Am-243(T)	*102*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Method: A-01-R - Isotopic Curium and/or Americium 241 (Alpha Spectrometry) (Continued)

Lab Sample ID: 300-9139-A-1-C DU
Matrix: Water
Analysis Batch: 18250

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 17161

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Americium 241	-0.038	U		-0.0246	U y	0.154	1.00	0.376	pCi/L			43	20

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Am-243(T)	*91.7*		*30 - 105*

Method: ST-RC-0058 - Total Beta Strontium by GFPC (Extraction Chromatography)

Lab Sample ID: MB 300-17156/1-A
Matrix: Water
Analysis Batch: 17430

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 17156

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Beta Strontium	-0.0325	U	0.572	0.572	10.0	1.05	pCi/L	01/07/19 08:20	01/17/19 15:34	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Sr(C)	*92.6*		*30 - 105*	*01/07/19 08:20*	*01/17/19 15:34*	*1*

Lab Sample ID: LCS 300-17156/2-A
Matrix: Water
Analysis Batch: 17430

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 17156

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Total Beta Strontium			13.5	14.61		3.66	10.0	1.04	pCi/L	108	80 - 120		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Sr(C)	*95.0*		*30 - 105*

Lab Sample ID: 300-9164-D-2-B DU
Matrix: Water
Analysis Batch: 17430

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 17156

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Total Beta Strontium	-0.29	U		0.371	U y	0.560	10.0	0.932	pCi/L			1572	20

Carrier	*DU %Yield*	*DU Qualifier*	*Limits*
Sr(C)	*96.7*		*30 - 105*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Method: ST-RC-0245 - Plutonium-241 (LSC)

Lab Sample ID: MB 300-17479/1-A
Matrix: Water
Analysis Batch: 18141

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 17479

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	0.0556	U	0.311	6.46	25.0	11.0	pCi/L	01/22/19 11:30	03/01/19 16:12	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Pu-242 (T)	*96.0*			*01/22/19 11:30*	*03/01/19 16:12*	*1*

Lab Sample ID: LCS 300-17479/2-A
Matrix: Water
Analysis Batch: 18141

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 17479

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Pu-241			1100	1126		72.1	25.0	11.1	pCi/L	102	80 - 120		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Pu-242 (T)	*107*		

Lab Sample ID: 300-9037-D-2-D DU
Matrix: Water
Analysis Batch: 18141

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 17479

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Pu-241	-0.59	U		-1.55	U y	6.45	25.0	11.2	pCi/L			89	20

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Pu-242 (T)	*95.3*		

Method: TC-02-RC - Technetium-99 (LSC)

Lab Sample ID: MB 300-17363/1-A
Matrix: Water
Analysis Batch: 17929

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 17363

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tc-99	1.622	U	0.212	5.45	50.0	12.3	pCi/L	01/15/19 15:22	02/14/19 13:32	1

Lab Sample ID: LCS 300-17363/2-A
Matrix: Water
Analysis Batch: 17929

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 17363

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Tc-99			110	97.48		8.95	50.0	12.3	pCi/L	89	80 - 120		

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Method: TC-02-RC - Technetium-99 (LSC) (Continued)

Lab Sample ID: 300-9164-E-2-B MS
Matrix: Water
Analysis Batch: 17929

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 17363

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Tc-99	47.4		542	486.6		22.4	50.0	12.3	pCi/L	90	75 - 125		

Lab Sample ID: 300-9164-F-1-B DU
Matrix: Water
Analysis Batch: 17929

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 17363

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RPD	RPD Limit
Tc-99	63.3			54.76		7.51	50.0	12.3	pCi/L			14	20

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Rad

Prep Batch: 17156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-9107-1	B3M8C3	Total/NA	Water	ExtChrom	
MB 300-17156/1-A	Method Blank	Total/NA	Water	ExtChrom	
LCS 300-17156/2-A	Lab Control Sample	Total/NA	Water	ExtChrom	
300-9164-D-2-B DU	Duplicate	Total/NA	Water	ExtChrom	

Prep Batch: 17161

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-9107-1	B3M8C3	Total/NA	Water	ExtChrAct	
MB 300-17161/1-A	Method Blank	Total/NA	Water	ExtChrAct	
LCS 300-17161/2-A	Lab Control Sample	Total/NA	Water	ExtChrAct	
300-9139-A-1-C DU	Duplicate	Total/NA	Water	ExtChrAct	

Prep Batch: 17167

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-9107-1	B3M8C3	Total/NA	Water	Evaporation	
MB 300-17167/1-A	Method Blank	Total/NA	Water	Evaporation	
LCS 300-17167/2-A	Lab Control Sample	Total/NA	Water	Evaporation	
300-9141-C-1-B DU	Duplicate	Total/NA	Water	Evaporation	

Prep Batch: 17335

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-9107-1	B3M8C3	Total/NA	Water	ExtChrAct	
MB 300-17335/1-A	Method Blank	Total/NA	Water	ExtChrAct	
LCS 300-17335/2-A	Lab Control Sample	Total/NA	Water	ExtChrAct	
300-9037-D-2-B DU	Duplicate	Total/NA	Water	ExtChrAct	

Prep Batch: 17363

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-9107-1	B3M8C3	Total/NA	Water	ExtChr_LSC	
MB 300-17363/1-A	Method Blank	Total/NA	Water	ExtChr_LSC	
LCS 300-17363/2-A	Lab Control Sample	Total/NA	Water	ExtChr_LSC	
300-9164-E-2-B MS	Matrix Spike	Total/NA	Water	ExtChr_LSC	
300-9164-F-1-B DU	Duplicate	Total/NA	Water	ExtChr_LSC	

Prep Batch: 17479

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-9107-1	B3M8C3	Total/NA	Water	ExtChr_LSC	
MB 300-17479/1-A	Method Blank	Total/NA	Water	ExtChr_LSC	
LCS 300-17479/2-A	Lab Control Sample	Total/NA	Water	ExtChr_LSC	
300-9037-D-2-D DU	Duplicate	Total/NA	Water	ExtChr_LSC	

Prep Batch: 17528

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-9107-1	B3M8C3	Total/NA	Water	ExtChrAct	
MB 300-17528/1-A	Method Blank	Total/NA	Water	ExtChrAct	
LCS 300-17528/2-A	Lab Control Sample	Total/NA	Water	ExtChrAct	
300-9114-A-1-C DU	Duplicate	Total/NA	Water	ExtChrAct	

Lab Chronicle

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Client Sample ID: B3M8C3

Date Collected: 12/20/18 09:30
Date Received: 12/20/18 10:45

Lab Sample ID: 300-9107-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Evaporation					17167	01/07/19 12:37	RH	TAL RCH
Total/NA	Analysis	901.1		1	2.00007 L	2.00007 L	17356	01/11/19 10:56	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					17528	01/24/19 08:40	RH	TAL RCH
Total/NA	Analysis	A-01-R		1	200.01 g	200.01 g	17876	02/14/19 06:33	DJJ	TAL RCH
Total/NA	Prep	ExtChrAct					17335	01/14/19 15:20	RH	TAL RCH
Total/NA	Analysis	A-01-R		1	200.07 g	200.07 g	18011	02/21/19 13:11	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					17161	01/07/19 10:15	SHA	TAL RCH
Total/NA	Analysis	A-01-R		1	201.31 g	201.31 g	18250	03/14/19 11:35	DJ	TAL RCH
Total/NA	Prep	ExtChrom					17156	01/07/19 08:20	SHA	TAL RCH
Total/NA	Analysis	ST-RC-0058		1	505.84 g	505.84 g	17430	01/17/19 15:34	DJJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					17479	01/22/19 11:30	RH	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	200.07 g	200.07 g	18141	03/02/19 06:48	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					17363	01/15/19 15:22	RH	TAL RCH
Total/NA	Analysis	TC-02-RC		1	125.01 g	125.01 g	17929	02/14/19 14:56	DJ	TAL RCH

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Method	Method Description	Protocol	Laboratory
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
A-01-R	Isotopic Curium and/or Americium 241 (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Plutonium (Alpha Spectrometry)	DOE	TAL RCH
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL RCH
ST-RC-0058	Total Beta Strontium by GFPC (Extraction Chromatography)	TAL-STL	TAL RCH
ST-RC-0245	Plutonium-241 (LSC)	TAL-STL	TAL RCH
TC-02-RC	Technetium-99 (LSC)	DOE	TAL RCH
Evaporation	Preparation, Evaporation	None	TAL RCH
ExtChr_LSC	Preparation, Extraction Chromatography	None	TAL RCH
ExtChrAct	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL RCH
ExtChrom	Preparation, Extraction Chromatography Resin, Strontium	None	TAL RCH

Protocol References:

DOE = U.S. Department of Energy
EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-006

TestAmerica Job ID: 300-9107-1
SDG: RL9107-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-9107-1	B3M8C3	Water	12/20/18 09:30	12/20/18 10:45

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # I19-006-158
		Page 1 of 1

Collector: Jeff Tucksen CHPRC	**Contact/Requester:** Karen Waters-Husted	**Telephone No.:** 509-376-4650
SAF No.: I19-006	**Sampling Origin:** Hanford Site	**Purchase Order/Charge Code:** 300071
Project Title: AEA, DECEMBER 2018	**Logbook No.:** HNF-N-506 106	**Ice Chest No.:** N/A
Shipped To (Lab): TestAmerica Incorporated, Rich	**Method of Shipment:** GOVERNMENT VEHICLE	**Bill of Lading/Air Bill No.:** N/A
Protocol: SURV	**Priority:** 15 Days PRIORITY	**Offsite Property No.:** N/A

POSSIBLE SAMPLE HAZARDS/REMARK
** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

SPECIAL INSTRUCTIONS
N/A

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B3M8C3	N	W	DEC 2 0 2018	0930	1x1-L G/P	AMCMISO_EIE_PLATE_AEA: COMMON; PU241_IE_LSC: COMMON; PUISO_PLATE_AEA: COMMON; UISO_PLATE_AEA: COMMON	6 Months	HNO3 to pH <2
B3M8C3	N	W	↓	↓	1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B3M8C3	N	W			1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B3M8C3	N	W			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B3M8C3	N	W			1x500-mL P	TC99_ETVDSK_LSC: COMMON	6 Months	HNO3 to pH <2

9107

300-9107 COC

Relinquished By: Jeff Tucksen CHPRC	Signature	DEC 2 0 2018 1045 Date/Time	Received By: Charlotte Burgner CBTAKL	Signature	DEC 2 0 2018 1045 Date/Time
Relinquished By:	Signature	Date/Time	Received By:	Signature	Date/Time
Relinquished By:	Signature	Date/Time	Received By:	Signature	Date/Time
Relinquished By:	Signature	Date/Time	Received By:	Signature	Date/Time

Matrix *
S = Soil, DS = Drum Solids, SE = Sediment, DL = Drum Liquids, SO = Solid, T = Tissue, SL = Sludge, WI = Wipe, W = Water, L = Liquid, O = Oil, V = Vegetation, A = Air, X = Other

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

Printed On 10/29/2018 FSR ID = FSR71395 A-6004-842 (REV 3)

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-9107-1
SDG Number: RL9107-1

Login Number: 9107
List Number: 1
Creator: Burghard, Charlette JA

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	