

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: 300-8346-1

TestAmerica Sample Delivery Group: W08292

Client Project/Site: I19-002

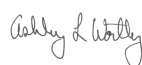
For:

CH2M Hill Plateau Remediation Company

825 Jadwin Avenue

Richland, Washington 99352

Attn: CPP Sample Management



Authorized for release by:

11/19/2018 3:36:53 PM

Ashley Worthy, Project Manager I

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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 desinee 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.

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Definitions/Glossary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
y	Duplicate analysis not within control limits.
o	LCS, LCSD: Recovery exceeds upper or lower control limits.
N	Result may be biased: associated matrix spike result was outside acceptance limits
X	Tracer is outside acceptance limits.
B	Possible laboratory contamination: analyte was detected in the associated method blank above the MDC.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	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: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Job ID: 300-8346-1

Laboratory: TestAmerica Richland

Narrative**Job Narrative
300-8346-1****Comments**

No additional comments.

Receipt

The samples were received on 10/5/2018 2:35 PM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD

Method(s) 906.0: The matrix spike recovery for preparation batch 300-15004 and analytical batch 300-15093 were outside control limits (69%). The associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) A-01-R: The following sample have Pu-242 tracer recoveries above the QC limit of 105% (108%): (MB 300-14935/1-A). For more information see the attached SIR.

Method(s) TC-02-RC: The laboratory control sample (LCS) associated with preparation batch 300-14924 and analytical batch 300-15608 was outside SOW acceptance criteria but within DOE QSAS criteria. For more information see the attached SIR.

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

SAMPLE ISSUE RESOLUTION (SIR) REPORT		SIR Number: SIR19-0129 Rev. Number: 0 Date Initiated: 10/22/2018
<u>SAMPLE EVENT INFORMATION</u>		
SAF NUM(S):	I19-002	
LABORATORY:	TARL	
<u>SAMPLING INFORMATION</u>		
NUMBER OF SAMPLES:	2	
SAMPLE NUMBERS:	B3L9K7, B3L9W0	
SAMPLE MATRIX:	WATER	
SDG NUM(S):	W08292	
<u>ISSUE BACKGROUND</u>		
CLASS:	Laboratory Issue	
TYPE:	Quality Control Failure	
DESCRIPTION:	The PUIISO tracer yield on the method blank is 108%. The sample result is a non-detect.	
<u>RESOLUTION</u>		
PROPOSED RESOLUTION:	Report results and include comment in the case narrative.	
FINAL RESOLUTION:	Proposed Resolution accepted.	
SUBMITTED BY:		
WORTHY, A	10/23/2018	
ACCEPTED BY:		
CUTSFORTH, EC	10/23/2018	

SAMPLE ISSUE RESOLUTION (SIR) REPORT		SIR Number: SIR19-0176 Rev. Number: 0 Date Initiated: 11/08/2018
<u>SAMPLE EVENT INFORMATION</u>		
SAF NUM(S):	I19-002	
LABORATORY:	TARL	
<u>SAMPLING INFORMATION</u>		
NUMBER OF SAMPLES:	2	
SAMPLE NUMBERS:	B3L9K7, B3L9W0	
SAMPLE MATRIX:	WATER	
SDG NUM(S):	W08292	
<u>ISSUE BACKGROUND</u>		
CLASS:	Laboratory Issue	
TYPE:	Quality Control Failure	
DESCRIPTION:	The LCS recovery for TC99 is outside acceptance criteria at 79%. Sample results are a non-detect.	
<u>RESOLUTION</u>		
PROPOSED RESOLUTION:	Report results and include comment in the case narrative.	
FINAL RESOLUTION:	Proposed resolution accepted.	
SUBMITTED BY:		
WORTHY, A	11/08/2018	
ACCEPTED BY:		
HEY, BE	11/08/2018	

SAMPLE ISSUE RESOLUTION (SIR) REPORT		SIR Number: SIR19-0177 Rev. Number: 0 Date Initiated: 11/08/2018
<u>SAMPLE EVENT INFORMATION</u>		
SAF NUM(S):	I19-002	
LABORATORY:	TARL	
<u>SAMPLING INFORMATION</u>		
NUMBER OF SAMPLES:	2	
SAMPLE NUMBERS:	B3L9K7, B3L9W0	
SAMPLE MATRIX:	WATER	
SDG NUM(S):	W08292	
<u>ISSUE BACKGROUND</u>		
CLASS:	General Laboratory Direction	
TYPE:	Other General Laboratory Direction (Specify)	
DESCRIPTION:	COC I19-002-121 and I19-002-104 for Se-79 at TA Richland are split chains of custody for transfer of samples to TASL. As a result, the COC numbers and the sample numbers (ID B3L9K7 and B3L9W0) need to be appended with an "A."	
<u>RESOLUTION</u>		
PROPOSED RESOLUTION:	Append COC I19-002-121 and I19-002-104 and samples B3L9K7 and B3L9W0 with an "A."	
FINAL RESOLUTION:	Accept proposed resolution	
SUBMITTED BY:		
WORTHY, A	11/08/2018	
ACCEPTED BY:		
HEY, BE	11/08/2018	

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Client Sample ID: B3L9W0

Date Collected: 10/05/18 07:50

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-1

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	-18	U		22.5		45.1	pCi/L	10/22/18 15:47	11/01/18 07:19	1
Co-60	1.47	U		2.81	25.0	3.55	pCi/L	10/22/18 15:47	11/01/18 07:19	1
Sb-125	5.36	U		6.56	50.0	8.90	pCi/L	10/22/18 15:47	11/01/18 07:19	1
Cs-134	-1.8	U		4.27	80.0	3.13	pCi/L	10/22/18 15:47	11/01/18 07:19	1
Cs-137	1.13	U		2.53	15.0	3.18	pCi/L	10/22/18 15:47	11/01/18 07:19	1
Eu-152	4.77			6.56	50.0	4.26	pCi/L	10/22/18 15:47	11/01/18 07:19	1
Eu-154	-1.3	U		11.5	50.0	2.75	pCi/L	10/22/18 15:47	11/01/18 07:19	1
Eu-155	1.17	U		2.47	50.0	2.57	pCi/L	10/22/18 15:47	11/01/18 07:19	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	10/22/18 15:47	11/01/18 07:19	1

Method: 906.0 - Tritium, Total (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tritium	-37	U N	15.0	277	700	619	pCi/L	10/17/18 16:28	10/20/18 02:50	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	0.0264	U	0.0398	0.205	1.00	0.300	pCi/L	10/15/18 12:21	10/26/18 09:20	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Am-243(T)	95.4		30 - 105					10/15/18 12:21	10/26/18 09:20	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	-0.034	U	0.156	0.156	1000	0.403	pCi/L	10/16/18 08:31	10/22/18 08:35	1
Pu-239/240	-0.0062	U	0.155	0.155	1000	0.305	pCi/L	10/16/18 08:31	10/22/18 08:35	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Pu-242(T)	95.1		30 - 105					10/16/18 08:31	10/22/18 08:35	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	0.160	U	0.587	0.588	10.0	1.04	pCi/L	10/29/18 09:21	11/07/18 10:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr(C)	95.9		30 - 105					10/29/18 09:21	11/07/18 10:38	1

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Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Client Sample ID: B3L9W0

Date Collected: 10/05/18 07:50

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-1

Matrix: Water

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	0.357	U	0.149	6.16	25.0	8.88	pCi/L	10/16/18 09:31	10/27/18 19:30	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Pu-242 (T)	95.1							10/16/18 09:31	10/27/18 19:30	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	4.60	U o	0.519	5.38	50.0	11.9	pCi/L	10/15/18 13:32	11/02/18 00:09	1

Client Sample ID: B3L9W2

Date Collected: 10/05/18 07:50

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-2

Matrix: Water

Method: EPA 520 - Carbon-14 (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
C-14	12.5	U	1.08	10.8	50.0	22.6	pCi/L	10/21/18 12:36	10/23/18 10:48	1

Client Sample ID: B3L9X3

Date Collected: 10/05/18 08:17

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-3

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	-4.0	U		31.7		57.7	pCi/L	10/22/18 15:47	11/01/18 10:48	1
Co-60	2.10	U		3.68	25.0	3.95	pCi/L	10/22/18 15:47	11/01/18 10:48	1
Sb-125	-4.7	U		8.05	50.0	8.50	pCi/L	10/22/18 15:47	11/01/18 10:48	1
Cs-134	-2.1	U		3.94	80.0	3.44	pCi/L	10/22/18 15:47	11/01/18 10:48	1
Cs-137	-2.2	U		3.56	15.0	3.44	pCi/L	10/22/18 15:47	11/01/18 10:48	1
Eu-152	7.88			6.72	50.0	5.35	pCi/L	10/22/18 15:47	11/01/18 10:48	1
Eu-154	2.87	U		9.87	50.0	3.92	pCi/L	10/22/18 15:47	11/01/18 10:48	1
Eu-155	-1.6	U		6.00	50.0	7.60	pCi/L	10/22/18 15:47	11/01/18 10:48	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	10/22/18 15:47	11/01/18 10:48	1

Method: 906.0 - Tritium, Total (LSC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tritium	5550	N	306	531	700	617	pCi/L	10/17/18 16:28	10/20/18 03:35	1

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Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Client Sample ID: B3L9X3

Date Collected: 10/05/18 08:17

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-3

Matrix: Water

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	-0.25	U	0.556	0.559	10.0	1.08	pCi/L	10/29/18 09:21	11/07/18 10:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr(C)	92.6		30 - 105					10/29/18 09:21	11/07/18 10:38	1

Client Sample ID: B3L9K7

Date Collected: 10/05/18 08:53

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-4

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	-55	U		29.7		61.1	pCi/L	10/22/18 15:47	11/01/18 14:09	1
Co-60	1.23	U		4.09	25.0	4.39	pCi/L	10/22/18 15:47	11/01/18 14:09	1
Sb-125	-8.1	U		8.17	50.0	8.13	pCi/L	10/22/18 15:47	11/01/18 14:09	1
Cs-134	-0.34	U		3.70	80.0	3.60	pCi/L	10/22/18 15:47	11/01/18 14:09	1
Cs-137	0.955	U		3.04	15.0	3.57	pCi/L	10/22/18 15:47	11/01/18 14:09	1
Eu-152	2.16	U		6.98	50.0	5.75	pCi/L	10/22/18 15:47	11/01/18 14:09	1
Eu-154	-0.91	U		12.7	50.0	3.99	pCi/L	10/22/18 15:47	11/01/18 14:09	1
Eu-155	3.01	U		5.62	50.0	7.71	pCi/L	10/22/18 15:47	11/01/18 14:09	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	10/22/18 15:47	11/01/18 14:09	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	-0.041	U	0.0897	0.148	1.00	0.291	pCi/L	10/15/18 12:21	10/26/18 09:20	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Am-243(T)	91.6		30 - 105					10/15/18 12:21	10/26/18 09:20	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	-0.027	U	0.152	0.152	1000	0.378	pCi/L	10/16/18 08:31	10/22/18 08:35	1
Pu-239/240	-0.0060	U	0.151	0.151	1000	0.297	pCi/L	10/16/18 08:31	10/22/18 08:35	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Pu-242(T)	94.2		30 - 105					10/16/18 08:31	10/22/18 08:35	1

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Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Client Sample ID: B3L9K7

Date Collected: 10/05/18 08:53

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-4

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2 σ +/-)	Total Uncert. (2 σ +/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Beta Strontium	0.177	U	0.612	0.614	10.0	1.08	pCi/L	10/29/18 09:21	11/07/18 10:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr(C)	95.0		30 - 105					10/29/18 09:21	11/07/18 10:38	1

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

Analyte	Result	Qualifier	Count Uncert. (2 σ +/-)	Total Uncert. (2 σ +/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	2.62	U	0.274	6.22	25.0	8.78	pCi/L	10/16/18 09:31	10/27/18 22:57	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Pu-242 (T)	94.2							10/16/18 09:31	10/27/18 22:57	1

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

Analyte	Result	Qualifier	Count Uncert. (2 σ +/-)	Total Uncert. (2 σ +/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tc-99	4.42	U o	0.469	5.37	50.0	11.9	pCi/L	10/15/18 13:32	11/02/18 00:52	1

Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

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)	
300-8125-B-1-C DU	Duplicate	89.1	
300-8346-1	B3L9W0	95.4	
300-8346-4	B3L9K7	91.6	
LCS 300-14919/2-A	Lab Control Sample	101	
MB 300-14919/1-A	Method Blank	98.0	
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)	
300-8125-B-1-E DU	Duplicate	88.7	
300-8346-1	B3L9W0	95.1	
300-8346-4	B3L9K7	94.2	
LCS 300-14935/2-A	Lab Control Sample	97.1	
MB 300-14935/1-A	Method Blank	108 X	
Tracer/Carrier Legend			
Pu-242(T) = Pu-242(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)	
300-8346-1	B3L9W0	95.9	
300-8346-3	B3L9X3	92.6	
300-8346-4	B3L9K7	95.0	
300-8399-A-1-C DU	Duplicate	99.2	
LCS 300-15329/2-A	Lab Control Sample	95.9	
MB 300-15329/1-A	Method Blank	93.4	
Tracer/Carrier Legend			
Sr(C) = Sr(C)			

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

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Pu-241 (T)	
300-8125-B-1-G DU	Duplicate	88.7	
300-8346-1	B3L9W0	95.1	
300-8346-4	B3L9K7	94.2	
LCS 300-14941/2-A	Lab Control Sample	97.1	

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Tracer/Carrier Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

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

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Pu-242 (T)	
MB 300-14941/1-A	Method Blank	108	
Tracer/Carrier Legend			
Pu-242 (T) = Pu-242 (T)			

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

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

Lab Sample ID: MB 300-15126/1-A

Matrix: Water

Analysis Batch: 15619

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 15126

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
K-40	43.51	U		31.3		45.7	pCi/L	10/22/18 15:47	10/31/18 15:07	1
Co-60	1.465	U		3.69	25.0	3.66	pCi/L	10/22/18 15:47	10/31/18 15:07	1
Sb-125	-6.11	U		6.65	50.0	6.25	pCi/L	10/22/18 15:47	10/31/18 15:07	1
Cs-134	1.489	U		3.47	80.0	3.72	pCi/L	10/22/18 15:47	10/31/18 15:07	1
Cs-137	1.699	U		2.48	15.0	3.17	pCi/L	10/22/18 15:47	10/31/18 15:07	1
Eu-152	2.577	U		6.12	50.0	3.84	pCi/L	10/22/18 15:47	10/31/18 15:07	1
Eu-154	5.127	B		8.55	50.0	2.37	pCi/L	10/22/18 15:47	10/31/18 15:07	1
Eu-155	1.608	U		2.14	50.0	2.84	pCi/L	10/22/18 15:47	10/31/18 15:07	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	10/22/18 15:47	10/31/18 15:07	1

Lab Sample ID: LCS 300-15126/2-A

Matrix: Water

Analysis Batch: 15619

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 15126

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Co-60	38.8	36.37		3.49	25.0	4.20	pCi/L	94	80 - 120
Cs-137	49.9	47.95		4.78	15.0	4.03	pCi/L	96	80 - 120
Eu-152	77.3	64.35		6.17	50.0	9.93	pCi/L	83	80 - 120

Lab Sample ID: 300-8329-C-1-B DU

Matrix: Water

Analysis Batch: 15619

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 15126

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
K-40	-29	U	40.95	U y	27.6		43.2	pCi/L	1151	20
Co-60	-1.4	U	-3.51	U y	4.84	25.0	3.08	pCi/L	85	20
Sb-125	-11	U	-3.54	U y	7.04	50.0	7.68	pCi/L	103	20
Cs-134	2.11	U	-0.153	U y	3.54	80.0	3.51	pCi/L	231	20
Cs-137	-0.38	U	0.0304	U y	2.71	15.0	3.00	pCi/L	234	20
Eu-152	-11	U	4.087	y	5.13	50.0	3.70	pCi/L	455	20
Eu-154	-12	U	-3.10	U y	11.5	50.0	2.19	pCi/L	121	20
Eu-155	7.47	U	0.477	U y	1.96	50.0	2.74	pCi/L	176	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: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Method: 906.0 - Tritium, Total (LSC)

Lab Sample ID: MB 300-15004/2-A

Matrix: Water

Analysis Batch: 15093

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 15004

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tritium	-79.8	U	23.6	273	700	612	pCi/L	10/17/18 16:28	10/19/18 12:25	1

Lab Sample ID: LCS 300-15004/3-A

Matrix: Water

Analysis Batch: 15093

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 15004

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Tritium	2630	2749		415	700	630	pCi/L	105	80 - 120

Lab Sample ID: 300-8297-A-3-C MS

Matrix: Water

Analysis Batch: 15093

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 15004

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Tritium	87.2	U	1560	1081		479	700	722	pCi/L	69	75 - 125

Lab Sample ID: 300-8314-A-1-C DU

Matrix: Water

Analysis Batch: 15093

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 15004

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Tritium	243	U N	276.8	U N	291	700	609	pCi/L	13	20

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

Lab Sample ID: MB 300-14935/1-A

Matrix: Water

Analysis Batch: 15104

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 14935

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-238	-0.00891	U	0.149	0.149	1000	0.334	pCi/L	10/16/18 08:31	10/22/18 08:33	1
Pu-239/240	-0.0238	U	0.149	0.149	1000	0.393	pCi/L	10/16/18 08:31	10/22/18 08:33	1
Tracer	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Pu-242(T)	108	X	30 - 105					10/16/18 08:31	10/22/18 08:33	1

Lab Sample ID: LCS 300-14935/2-A

Matrix: Water

Analysis Batch: 15104

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 14935

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Pu-239/240	4.51	4.904		1.51	1000	0.417	pCi/L	109	80 - 120

TestAmerica Richland

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

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

Lab Sample ID: LCS 300-14935/2-A

Matrix: Water

Analysis Batch: 15104

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 14935

	LCS	LCS	
Tracer	%Yield	Qualifier	Limits
Pu-242(T)	97.1		30 - 105

Lab Sample ID: 300-8125-B-1-E DU

Matrix: Water

Analysis Batch: 15104

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 14935

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	Limit
Pu-238	-0.031	U	-0.0351	U	0.161	1000	0.416	pCi/L	11	20
Pu-239/240	-0.054	U	-0.0191	U y	0.160	1000	0.370	pCi/L	96	20

	DU	DU	
Tracer	%Yield	Qualifier	Limits
Pu-242(T)	88.7		30 - 105

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

Lab Sample ID: MB 300-14919/1-A

Matrix: Water

Analysis Batch: 15302

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 14919

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Americium 241	-0.0631	U	0.187	0.143	1.00	0.348	pCi/L	10/15/18 12:20	10/26/18 09:18	1

Tracer	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Am-243(T)	98.0		30 - 105	10/15/18 12:20	10/26/18 09:18	1

Lab Sample ID: LCS 300-14919/2-A

Matrix: Water

Analysis Batch: 15302

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 14919

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	22.5	21.95		4.16	1.00	0.346	pCi/L	97	80 - 120

	LCS	LCS	
Tracer	%Yield	Qualifier	Limits
Am-243(T)	101		30 - 105

Lab Sample ID: 300-8125-B-1-C DU

Matrix: Water

Analysis Batch: 15302

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 14919

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	Limit
Americium 241	-0.076	U	-0.0616	U y	0.165	1.00	0.417	pCi/L	22	20

TestAmerica Richland

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

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

Lab Sample ID: 300-8125-B-1-C DU

Matrix: Water

Analysis Batch: 15302

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 14919

Tracer	DU %Yield	DU Qualifier	Limits
Am-243(T)	89.1		30 - 105

Method: EPA 520 - Carbon-14 (LSC)

Lab Sample ID: MB 300-15073/2-A

Matrix: Water

Analysis Batch: 15182

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 15073

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
C-14	-1.73	U	0.677	10.2	50.0	22.7	pCi/L	10/21/18 12:36	10/22/18 18:43	1

Lab Sample ID: LCS 300-15073/3-A

Matrix: Water

Analysis Batch: 15182

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 15073

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
C-14	481	469.8		26.3	50.0	22.7	pCi/L	98	80 - 120

Lab Sample ID: 300-8265-A-1-C MS

Matrix: Water

Analysis Batch: 15182

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 15073

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
C-14	15.5	U	480	493.9		29.7	50.0	22.7	pCi/L	103	75 - 125

Lab Sample ID: 300-8265-A-3-C DU

Matrix: Water

Analysis Batch: 15182

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 15073

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
C-14	1.39	U	1.355	U	10.3	50.0	22.7	pCi/L	2	20

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

Lab Sample ID: MB 300-15329/1-A

Matrix: Water

Analysis Batch: 15686

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 15329

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Total Beta Strontium	-0.149	U	0.612	0.613	10.0	1.14	pCi/L	10/29/18 09:21	11/07/18 10:38	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Sr(C)	93.4		30 - 105	10/29/18 09:21	11/07/18 10:38	1

TestAmerica Richland

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Lab Sample ID: LCS 300-15329/2-A

Matrix: Water

Analysis Batch: 15686

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 15329

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Total Beta Strontium	13.5	14.99		3.75	10.0	1.03	pCi/L	111	80 - 120
Carrier	LCS %Yield	LCS Qualifier	Limits						
Sr(C)	95.9		30 - 105						

Lab Sample ID: 300-8399-A-1-C DU

Matrix: Water

Analysis Batch: 15686

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 15329

Analysis Date: 10/09/20						Prep Date: 10/09/20					
Analyte	Sample	Sample	DU		Total	RL	MDC	Unit		RPD	RPD
	Result	Qual	Result	Qual	Uncert. (2σ+/-)						
Total Beta Strontium	0.585	U	0.205	U y	0.647	10.0	1.13	pCi/L		96	20
Carrier	DU %Yield	DU Qualifier	Limits								
Sr(C)	99.2		30 - 105								

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

Lab Sample ID: MB 300-14941/1-A

Matrix: Water

Analysis Batch: 15336

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 14941

Analysis Date: 10/26/18					Prep Date: 10/16/18					
	Count	Total								
	Uncert.	Uncert.								
Analyte	MB Result	MB Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pu-241	2.553	U	0.147	5.86	25.0	8.26	pCi/L	10/16/18 09:31	10/26/18 19:32	1
Tracer	MB %Yield	MB Qualifier	Limits							
Pu-242 (T)	108									

Lab Sample ID: LCS 300-14941/2-A

Matrix: Water

Analysis Batch: 15336

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 14941

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Pu-241	1120	1138		71.9	25.0	8.77	pCi/L	102	80 - 120
Tracer	LCS %Yield	LCS Qualifier	Limits						
Pu-242 (T)	97.1								

TestAmerica Richland

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

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

Lab Sample ID: 300-8125-B-1-G DU

Matrix: Water

Analysis Batch: 15336

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 14941

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Pu-241	2.23	U	1.661	U y	6.77	25.0	9.74	pCi/L	29	20
Tracer										
	DU	DU								
	%Yield	Qualifier								
Pu-242 (T)	88.7									

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

Lab Sample ID: MB 300-14924/1-A

Matrix: Water

Analysis Batch: 15608

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 14924

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tc-99	7.855	U	0.801	5.54	50.0	11.9	pCi/L	10/15/18 13:32	11/01/18 10:46	1

Lab Sample ID: LCS 300-14924/2-A

Matrix: Water

Analysis Batch: 15608

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 14924

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Tc-99	108	84.46	o	8.39	50.0	12.0	pCi/L	79	80 - 120

Lab Sample ID: 300-8215-A-2-C MS

Matrix: Water

Analysis Batch: 15608

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 14924

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Tc-99	-2.2	U o	530	422.3		18.1	50.0	11.8	pCi/L	80	75 - 125

Lab Sample ID: 300-8165-D-3-D DU

Matrix: Water

Analysis Batch: 15608

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 14924

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RPD	RPD Limit
Tc-99	3.72	U o	2.203	U o y	5.22	50.0	11.7	pCi/L	51	20

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Rad

Prep Batch: 14919

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8346-1	B3L9W0	Total/NA	Water	ExtChrAct	
300-8346-4	B3L9K7	Total/NA	Water	ExtChrAct	
MB 300-14919/1-A	Method Blank	Total/NA	Water	ExtChrAct	
LCS 300-14919/2-A	Lab Control Sample	Total/NA	Water	ExtChrAct	
300-8125-B-1-C DU	Duplicate	Total/NA	Water	ExtChrAct	

Prep Batch: 14924

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8346-1	B3L9W0	Total/NA	Water	ExtChr_LSC	
300-8346-4	B3L9K7	Total/NA	Water	ExtChr_LSC	
MB 300-14924/1-A	Method Blank	Total/NA	Water	ExtChr_LSC	
LCS 300-14924/2-A	Lab Control Sample	Total/NA	Water	ExtChr_LSC	
300-8215-A-2-C MS	Matrix Spike	Total/NA	Water	ExtChr_LSC	
300-8165-D-3-D DU	Duplicate	Total/NA	Water	ExtChr_LSC	

Prep Batch: 14935

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8346-1	B3L9W0	Total/NA	Water	ExtChrAct	
300-8346-4	B3L9K7	Total/NA	Water	ExtChrAct	
MB 300-14935/1-A	Method Blank	Total/NA	Water	ExtChrAct	
LCS 300-14935/2-A	Lab Control Sample	Total/NA	Water	ExtChrAct	
300-8125-B-1-E DU	Duplicate	Total/NA	Water	ExtChrAct	

Prep Batch: 14941

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8346-1	B3L9W0	Total/NA	Water	ExtChr_LSC	
300-8346-4	B3L9K7	Total/NA	Water	ExtChr_LSC	
MB 300-14941/1-A	Method Blank	Total/NA	Water	ExtChr_LSC	
LCS 300-14941/2-A	Lab Control Sample	Total/NA	Water	ExtChr_LSC	
300-8125-B-1-G DU	Duplicate	Total/NA	Water	ExtChr_LSC	

Prep Batch: 15004

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8346-1	B3L9W0	Total/NA	Water	LSC_Dist_Susp	
300-8346-3	B3L9X3	Total/NA	Water	LSC_Dist_Susp	
MB 300-15004/2-A	Method Blank	Total/NA	Water	LSC_Dist_Susp	
LCS 300-15004/3-A	Lab Control Sample	Total/NA	Water	LSC_Dist_Susp	
300-8297-A-3-C MS	Matrix Spike	Total/NA	Water	LSC_Dist_Susp	
300-8314-A-1-C DU	Duplicate	Total/NA	Water	LSC_Dist_Susp	

Prep Batch: 15073

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8346-2	B3L9W2	Total/NA	Water	LSC_Dist_Susp	
MB 300-15073/2-A	Method Blank	Total/NA	Water	LSC_Dist_Susp	
LCS 300-15073/3-A	Lab Control Sample	Total/NA	Water	LSC_Dist_Susp	
300-8265-A-1-C MS	Matrix Spike	Total/NA	Water	LSC_Dist_Susp	
300-8265-A-3-C DU	Duplicate	Total/NA	Water	LSC_Dist_Susp	

Prep Batch: 15126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8346-1	B3L9W0	Total/NA	Water	Evaporation	

TestAmerica Richland

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Rad (Continued)

Prep Batch: 15126 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8346-3	B3L9X3	Total/NA	Water	Evaporation	
300-8346-4	B3L9K7	Total/NA	Water	Evaporation	
MB 300-15126/1-A	Method Blank	Total/NA	Water	Evaporation	
LCS 300-15126/2-A	Lab Control Sample	Total/NA	Water	Evaporation	
300-8329-C-1-B DU	Duplicate	Total/NA	Water	Evaporation	

Prep Batch: 15329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
300-8346-1	B3L9W0	Total/NA	Water	ExtChrom	
300-8346-3	B3L9X3	Total/NA	Water	ExtChrom	
300-8346-4	B3L9K7	Total/NA	Water	ExtChrom	
MB 300-15329/1-A	Method Blank	Total/NA	Water	ExtChrom	
LCS 300-15329/2-A	Lab Control Sample	Total/NA	Water	ExtChrom	
300-8399-A-1-C DU	Duplicate	Total/NA	Water	ExtChrom	

Lab Chronicle

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Client Sample ID: B3L9W0

Date Collected: 10/05/18 07:50

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-1

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					15126	10/22/18 15:47	SHA	TAL RCH
Total/NA	Analysis	901.1		1	2.00718 L	2.00718 L	15619	11/01/18 07:19	DJ	TAL RCH
Total/NA	Prep	LSC_Dist_Susp					15004	10/17/18 16:28	DNH	TAL RCH
Total/NA	Analysis	906.0		1	5.001 g	5.001 g	15093	10/20/18 02:50	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					14935	10/16/18 08:31	SHA	TAL RCH
Total/NA	Analysis	A-01-R		1	201.31 g	201.31 g	15104	10/22/18 08:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					14919	10/15/18 12:21	SHA	TAL RCH
Total/NA	Analysis	A-01-R		1	203.6 g	203.6 g	15302	10/26/18 09:20	DJ	TAL RCH
Total/NA	Prep	ExtChrom					15329	10/29/18 09:21	SHA	TAL RCH
Total/NA	Analysis	ST-RC-0058		1	506.67 g	506.67 g	15686	11/07/18 10:38	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					14941	10/16/18 09:31	SHA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	201.31 g	201.31 g	15336	10/27/18 19:30	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					14924	10/15/18 13:32	SHA	TAL RCH
Total/NA	Analysis	TC-02-RC		1	125.6 g	125.6 g	15608	11/02/18 00:09	DJ	TAL RCH

Client Sample ID: B3L9W2

Date Collected: 10/05/18 07:50

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-2

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	LSC_Dist_Susp					15073	10/21/18 12:36	DNH	TAL RCH
Total/NA	Analysis	EPA 520		1	75 g	75 g	15182	10/23/18 10:48	DJ	TAL RCH

Client Sample ID: B3L9X3

Date Collected: 10/05/18 08:17

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-3

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					15126	10/22/18 15:47	SHA	TAL RCH
Total/NA	Analysis	901.1		1	2.0114 L	2.0114 L	15619	11/01/18 10:48	DJ	TAL RCH
Total/NA	Prep	LSC_Dist_Susp					15004	10/17/18 16:28	DNH	TAL RCH
Total/NA	Analysis	906.0		1	5.0275 g	5.0275 g	15093	10/20/18 03:35	DJ	TAL RCH
Total/NA	Prep	ExtChrom					15329	10/29/18 09:21	SHA	TAL RCH
Total/NA	Analysis	ST-RC-0058		1	505.17 g	505.17 g	15686	11/07/18 10:38	DJ	TAL RCH

Client Sample ID: B3L9K7

Date Collected: 10/05/18 08:53

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-4

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					15126	10/22/18 15:47	SHA	TAL RCH
Total/NA	Analysis	901.1		1	2.01386 L	2.01386 L	15619	11/01/18 14:09	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					14935	10/16/18 08:31	SHA	TAL RCH

TestAmerica Richland

Lab Chronicle

Client: CH2M Hill Plateau Remediation Company
Project/Site: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Client Sample ID: B3L9K7

Date Collected: 10/05/18 08:53

Date Received: 10/05/18 14:35

Lab Sample ID: 300-8346-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	A-01-R		1	205.83 g	205.83 g	15104	10/22/18 08:35	DJ	TAL RCH
Total/NA	Prep	ExtChrAct					14919	10/15/18 12:21	SHA	TAL RCH
Total/NA	Analysis	A-01-R		1	204.12 g	204.12 g	15302	10/26/18 09:20	DJ	TAL RCH
Total/NA	Prep	ExtChrom					15329	10/29/18 09:21	SHA	TAL RCH
Total/NA	Analysis	ST-RC-0058		1	503.7 g	503.7 g	15686	11/07/18 10:38	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					14941	10/16/18 09:31	SHA	TAL RCH
Total/NA	Analysis	ST-RC-0245		1	205.83 g	205.83 g	15336	10/27/18 22:57	DJ	TAL RCH
Total/NA	Prep	ExtChr_LSC					14924	10/15/18 13:32	SHA	TAL RCH
Total/NA	Analysis	TC-02-RC		1	125.82 g	125.82 g	15608	11/02/18 00:52	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: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Method	Method Description	Protocol	Laboratory
901.1	Cesium 137 & Other Gamma Emitters (GS)	EPA	TAL RCH
906.0	Tritium, Total (LSC)	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
EPA 520	Carbon-14 (LSC)	EPA	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
LSC_Dist_Susp	Distillation and Suspension (LSC)	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: I19-002

TestAmerica Job ID: 300-8346-1
SDG: W08292

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
300-8346-1	B3L9W0	Water	10/05/18 07:50	10/05/18 14:35
300-8346-2	B3L9W2	Water	10/05/18 07:50	10/05/18 14:35
300-8346-3	B3L9X3	Water	10/05/18 08:17	10/05/18 14:35
300-8346-4	B3L9K7	Water	10/05/18 08:53	10/05/18 14:35

CH2Mhill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C.# I19-002-104		
						Page 1 of 1		
Collector: Kevin Patterson /CHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650				
SAF No.: I19-002		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071				
Project Title: AEA, OCTOBER 2018		Logbook No.: HNF-N-506 -106/16		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: 30 Days		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
B3L9W0	N		OCT 05 2018	0750	1x250-mL P	906.0_TRITIUM_LSC: COMMON	6 Months	None
B3L9W0	N	W			1x1-L G/P	AMCMISO_EIE_PLATE_AEA: COMMON; PU241_IE_LSC: COMMON; PUISO_PLATE_AEA: COMMON	6 Months	HNO3 to pH <2
B3L9W0	N	W			1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B3L9W0	N	W			1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B3L9W0	N	W			1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B3L9W0	N	W	OCT 05 2018	0750	1x500-mL P	TC99_ETVDSK_LSC: COMMON	6 Months	HCl to pH <2

Relinquished By: Kevin Patterson /CHPRC			Received By: Malcom Chunn /CHPRC			Matrix *		
Print First and Last Name Signature Date/Time			Print First and Last Name Signature Date/Time			S = Soil DS = Drum Solids		
Relinquished By: Malcom Chunn			Received By: T. Holm			SE = Sediment DL = Drum Liquids		
Print First and Last Name Signature Date/Time			Print First and Last Name Signature Date/Time			SO = Solid T = Tissue		
Relinquished By:			Received By:			SL = Sludge WI = Wipe		
Print First and Last Name Signature Date/Time			Print First and Last Name Signature Date/Time			W = Water L = Liquid		
Relinquished By:			Received By:			O = Oil V = Vegetation		
Print First and Last Name Signature Date/Time			Print First and Last Name Signature Date/Time			A = Air X = Other		
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):				Disposed By:		Date/Time:

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W08292

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C.# I19-002-106				
				Page 1 of 1				
Collector: Kevin Patterson /CHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650				
SAF No.: I19-002		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071				
Project Title: AEA, OCTOBER 2018		Logbook No.: HNF-N-506 -106/116		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: 30 Days		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
B3L9W2	N		OCT 05 2018	0750	1x500-mL G/P	C14_LSC: COMMON	6 Months	None

Relinquished By: Kevin Patterson /CHPRC			Received By: Malcom Chunn			Matrix *		
Print First and Last Name Signature Date/Time			Print First and Last Name Signature Date/Time			S = Soil DS = Drum Solids		
Relinquished By: Malcom Chunn			Received By: T. Holm			SE = Sediment DL = Drum Liquids		
Print First and Last Name Signature Date/Time			Print First and Last Name Signature Date/Time			SO = Solid T = Tissue		
Relinquished By:			Received By:			SL = Sludge WI = Wipe		
Print First and Last Name Signature Date/Time			Print First and Last Name Signature Date/Time			W = Water L = Liquid		
Relinquished By:			Received By:			O = Oil V = Vegetation		
Print First and Last Name Signature Date/Time			Print First and Last Name Signature Date/Time			A = Air X = Other		
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):				Disposed By:		Date/Time:

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W08292

Rev. 0

Nov. 19, 2018

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		C.O.C. # I19-002-124				
Collector: Daniel Klug CHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650				
SAF No.: I19-002		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071				
Project Title: AEA, OCTOBER 2018		Logbook No.: HNF-N-506-101-48		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: 30 Days		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
B3L9X3	N	W	10-5-14	0817	1x250-mL P	906.0_TRITIUM_LSC: COMMON	6 Months	None
B3L9X3	N	W	10-5-14	0817	1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B3L9X3	N	W	10-5-14	0817	1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2

8346
WOB292

Relinquished By: Daniel Klug CHPRC Print First and Last Name Signature Date/Time		Received By: MRCH Malcom Chum CHPRC Print First and Last Name 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			
Relinquished By: MRCH Malcom Chum CHPRC Print First and Last Name Signature Date/Time		Received By: T. Holm TARL Print First and Last Name Signature Date/Time					
Relinquished By: Print First and Last Name Signature Date/Time		Received By: Print First and Last Name Signature Date/Time					
Relinquished By: Print First and Last Name Signature Date/Time		Received By: Print First and Last Name Signature Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method (e.g., Return to customer, per lab procedure, used in process):		Disposed By:		Date/Time:	

11/19/2018

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CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				C.O.C. # I19-002-121		
Collector: Daniel Klug CHPRC		Contact/Requester: Karen Waters-Husted		Telephone No.: 509-376-4650				
SAF No.: I19-002		Sampling Origin: Hanford Site		Purchase Order/Charge Code: 300071				
Project Title: AEA, OCTOBER 2018		Logbook No.: HNF-N-506 - 101-48		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: 30 Days		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
B3L9K7	N	W	10-5-18	0853	1x1-L G/P	AMCMISO_EIE_PLATE_AEA: COMMON; PU241_IE_LSC: COMMON; PUISO_PLATE_AEA: COMMON	6 Months	HNO3 to pH <2
B3L9K7	N	W	10-5-18	0853	1x4-L G/P	GAMMA_GS: COMMON; GAMMA_GS: GW 01	6 Months	HNO3 to pH <2
B3L9K7	N	W	10-5-18	0853	1x500-mL G/P	SE79_SEP_IE_LSC: COMMON	6 Months	HNO3 to pH <2
B3L9K7	N	W	10-5-18	0853	1x1-L G/P	SRISO_SEP_PRECIP_GPC: COMMON	6 Months	HNO3 to pH <2
B3L9K7	N	W	10-5-18	0853	1x500-mL P	TC99_ETVDSK_LSC: COMMON	6 Months	HCl to pH <2

8346
W08792

Relinquished By: Daniel Klug CHPRC	OCT 05 2018 1000	Received By: Malcom Chunn CHPRC	OCT 05 2018 1000	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
Print First and Last Name Signature Date/Time		Print First and Last Name Signature Date/Time		
Relinquished By: Malcom Chunn	OCT 05 2018 1435	Received By: T. Holm	OCT 05 2018 1435	
Print First and Last Name Signature Date/Time		Print First and Last Name Signature Date/Time		
Relinquished By:		Received By:		
Print First and Last Name Signature Date/Time		Print First and Last Name Signature Date/Time		
Relinquished By:		Received By:		
Print First and Last Name Signature Date/Time		Print First and Last Name Signature Date/Time		
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process):		Disposed By:	Date/Time:

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-8346-1

SDG Number: W08292

Login Number: 8346

List Number: 1

Creator: Holm, Tina R

List Source: TestAmerica Richland

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ 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.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	False	Thermal preservation not required.
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.	N/A	
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 $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	