

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-16779-1

Client Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

For:

Westinghouse Electric Company LLC
3300 State Road P
Festus, Missouri 63028

Attn: Mr. Martin Swanson



Authorized for release by:

4/11/2016 3:21:44 PM

Ivan Vania, Project Manager II
(314)298-8566

ivan.vania@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Job ID: 160-16779-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

Project: HDP RFP-CBA-022 (7 DAY TAT)

Report Number: 160-16779-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 4/4/2016 11:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.0° C.

TECHNETIUM-99 (ICPMS)

Samples L05-04-14-T-S-S-00 (160-16779-1), L05-04-15-T-R-S-00 (160-16779-2), L05-04-17-T-S-S-00 (160-16779-3), L05-04-18-T-R-S-00 (160-16779-4), L05-04-20-T-S-S-00 (160-16779-5), L05-04-21-T-R-S-00 (160-16779-6), L05-04-22-T-E-S-00 (160-16779-7) and L05-04-22-T-E-Q-00 (160-16779-8) were analyzed for Technetium-99 (ICPMS) in accordance with EPA SW-846 Method 6020A. The samples were prepared on 04/05/2016 and analyzed on 04/07/2016.

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

PERCENT SOLIDS

Samples L05-04-14-T-S-S-00 (160-16779-1), L05-04-15-T-R-S-00 (160-16779-2), L05-04-17-T-S-S-00 (160-16779-3), L05-04-18-T-R-S-00 (160-16779-4), L05-04-20-T-S-S-00 (160-16779-5), L05-04-21-T-R-S-00 (160-16779-6), L05-04-22-T-E-S-00

Case Narrative

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Job ID: 160-16779-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

(160-16779-7) and L05-04-22-T-E-Q-00 (160-16779-8) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 04/05/2016.

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

CESIUM-137 & OTHER GAMMA EMITTERS (GS)

Samples L05-04-14-T-S-S-00 (160-16779-1), L05-04-15-T-R-S-00 (160-16779-2), L05-04-17-T-S-S-00 (160-16779-3), L05-04-18-T-R-S-00 (160-16779-4), L05-04-20-T-S-S-00 (160-16779-5), L05-04-21-T-R-S-00 (160-16779-6), L05-04-22-T-E-S-00 (160-16779-7) and L05-04-22-T-E-Q-00 (160-16779-8) were analyzed for Cesium-137 & Other Gamma Emitters (GS) in accordance with DOE GA-01-R. The samples were leached on 04/04/2016, prepared on 04/06/2016 and analyzed on 04/07/2016.

Preparation Batch 160-244596:


Radium-226 is reported in these samples at the client's request. Radium-226 is reported from the 609.31 keV line of bismuth-214. Because the samples have not had 21-days of ingrowth, the activity for radium-226 is an estimated value and may be biased low. This bias is caused by the disruption of secular equilibrium between radium-226 and bismuth-214 by the loss of radon-222 during sample preparation. The samples are reported with the MDC achieved. L05-04-14-T-S-S-00 (160-16779-1), L05-04-15-T-R-S-00 (160-16779-2), L05-04-17-T-S-S-00 (160-16779-3), L05-04-18-T-R-S-00 (160-16779-4), L05-04-20-T-S-S-00 (160-16779-5), L05-04-21-T-R-S-00 (160-16779-6), L05-04-22-T-E-S-00 (160-16779-7), L05-04-22-T-E-Q-00 (160-16779-8), (LCS 160-244596/2-A), (MB 160-244596/1-A), (160-16778-A-1-D) and (160-16778-A-1-E DU)

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

Hematite Decommissioning Project	Procedure HDP-PR-QA-006, Chain of Custody	
	Revision: 4	Page 1 of 1
	Westinghouse Non-Proprietary Class 3	

**FORM HDP-PR-QA-006-1
CHAIN OF CUSTODY**

Instructions: Each time the container is transferred to another organization, a person from each organization should sign the CoC. The Laboratory/End User must verify that the sample is correctly identified before the sample is released for use or analysis and send the completed CoC to HDP.

Chain of Custody ID No. F-040116-02 Page 1/1				Requested Analysis										Laboratory Name:																																						
Project Name: Westinghouse Electric Company				Total Containers 1											Laboratory Address: 13715 Rider Trail North																																					
Contact Person: Clark Evers															Phone No. 314-298-8566																																					
Phone Number: 314-810-3336															Laboratory Contact Person: Ivan Vania																																					
Sampler Name Mike Dekeyser															Phone No. 708-870-8453																																					
														Turn Around Time																																						
														Rush (7 days)																																						
														Remarks																																						
Sample ID	Date	Time	Matrix	Comp (C) or Grab (G)	Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)																																												
L05-04-14-T-S-S-00	4/1/2016	9:10	S	G	X	X	X	X							1	LSA 05-04																																				
L05-04-15-T-R-S-00	4/1/2016	14:00	S	C	X	X	X	X							1	LSA 05-04																																				
L05-04-17-T-S-S-00	4/1/2016	9:15	S	G	X	X	X	X							1	LSA 05-04																																				
L05-04-18-T-R-S-00	4/1/2016	14:55	S	C	X	X	X	X							1	LSA 05-04																																				
L05-04-20-T-S-S-00	4/1/2016	9:25	S	G	X	X	X	X							1	LSA 05-04																																				
L05-04-21-T-R-S-00	4/1/2016	9:40	S	C	X	X	X	X							1	LSA 05-04																																				
L05-04-22-T-E-S-00	4/1/2016	10:10	S	G	X	X	X	X							1	LSA 05-04																																				
L05-04-22-T-E-Q-00	4/1/2016	10:10	S	G	X	X	X	X							1	LSA 05-04																																				
<table border="1"> <tr> <td>Relinquished by: <i>M. DeKeyser</i></td> <td>Date/Time 4-4-16</td> <td>Received by: <i>KG</i></td> <td>Date/Time 4-4-16</td> <td>Total 8</td> <td>Cooler Temperature: Ambient</td> </tr> <tr> <td>Company Name: WEC</td> <td>0900</td> <td>Company Name: CROSS ROAD</td> <td>09100</td> <td>Cooler ID: 0401-02</td> <td>Shipper and Number:</td> </tr> <tr> <td>Received by:</td> <td>Date/Time</td> <td>Relinquished by:</td> <td>Date/Time</td> <td colspan="2">Comments: N/A</td> </tr> <tr> <td>Company Name:</td> <td></td> <td>Company Name:</td> <td></td> <td colspan="2"></td> </tr> <tr> <td>Relinquished by: <i>KG</i></td> <td>Date/Time 4-4-16</td> <td>Received by: <i>KG</i></td> <td>Date/Time 4-4-16</td> <td colspan="2">Verified By: <i>Thomas Y...</i></td> </tr> <tr> <td>Company Name: CROSS ROAD</td> <td>11:00</td> <td>Company Name: CROSS ROAD</td> <td>11:00</td> <td colspan="2">4-3-16</td> </tr> </table>																	Relinquished by: <i>M. DeKeyser</i>	Date/Time 4-4-16	Received by: <i>KG</i>	Date/Time 4-4-16	Total 8	Cooler Temperature: Ambient	Company Name: WEC	0900	Company Name: CROSS ROAD	09100	Cooler ID: 0401-02	Shipper and Number:	Received by:	Date/Time	Relinquished by:	Date/Time	Comments: N/A		Company Name:		Company Name:				Relinquished by: <i>KG</i>	Date/Time 4-4-16	Received by: <i>KG</i>	Date/Time 4-4-16	Verified By: <i>Thomas Y...</i>		Company Name: CROSS ROAD	11:00	Company Name: CROSS ROAD	11:00	4-3-16	
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160-16779 Chain of Custody

Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-16779-1

Login Number: 16779

List Source: TestAmerica St. Louis

List Number: 1

Creator: Dedner, Connie L

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.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
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 $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

Method Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Tc-99	SW846	TAL SL
Moisture	Percent Moisture	EPA	TAL SL
6020A	Metals (ICP/MS), Tc-99 in Activity	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-16779-1	L05-04-14-T-S-S-00	Solid	04/01/16 09:10	04/04/16 11:00
160-16779-2	L05-04-15-T-R-S-00	Solid	04/01/16 14:00	04/04/16 11:00
160-16779-3	L05-04-17-T-S-S-00	Solid	04/01/16 09:15	04/04/16 11:00
160-16779-4	L05-04-18-T-R-S-00	Solid	04/01/16 14:55	04/04/16 11:00
160-16779-5	L05-04-20-T-S-S-00	Solid	04/01/16 09:25	04/04/16 11:00
160-16779-6	L05-04-21-T-R-S-00	Solid	04/01/16 09:40	04/04/16 11:00
160-16779-7	L05-04-22-T-E-S-00	Solid	04/01/16 10:10	04/04/16 11:00
160-16779-8	L05-04-22-T-E-Q-00	Solid	04/01/16 10:10	04/04/16 11:00

Client Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Client Sample ID: L05-04-14-T-S-S-00

Date Collected: 04/01/16 09:10

Date Received: 04/04/16 11:00

Lab Sample ID: 160-16779-1

Matrix: Solid

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.09		0.151	0.187		0.143	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Americium 241	0.00129	U	0.0572	0.0572		0.0969	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Bismuth 212	1.24		0.328	0.352		0.403	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Bismuth 214	0.862		0.0945	0.130		0.0637	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Lead 212	1.02		0.0777	0.154		0.0655	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Lead 214	0.911		0.0868	0.129		0.0735	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Potassium 40	20.3		1.12	2.33		0.336	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Protactinium 231	0.440	U	0.220	0.225		1.17	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Radium 226	0.862		0.0945	0.130	1.00	0.0637	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Thorium 234	0.824		0.257	0.271	1.00	0.683	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Uranium 235	0.215		0.149	0.150		0.170	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Protactinium 234m	1.45	U	2.70	2.70		4.57	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Thorium 232	1.09		0.151	0.187		0.143	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Other Detected Radionuclides			Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pb-210	1.33		0.558	0.579		0.699	pCi/g	04/06/16 10:29	04/07/16 20:11	1
Tl-208	0.373		0.0432	0.0578		0.0326	pCi/g	04/06/16 10:29	04/07/16 20:11	1

Client Sample ID: L05-04-14-T-S-S-00

Date Collected: 04/01/16 09:10

Date Received: 04/04/16 11:00

Lab Sample ID: 160-16779-1

Matrix: Solid

Percent Solids: 75.6

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000070	0.000021	mg/Kg	☆	04/05/16 03:35	04/07/16 11:27	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.0790	U	0.0469	0.0475	1.40	0.239	pCi/g	04/05/16 03:35	04/07/16 11:27	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	95		30 - 110					04/05/16 03:35	04/07/16 11:27	1

Client Sample ID: L05-04-15-T-R-S-00

Date Collected: 04/01/16 14:00

Date Received: 04/04/16 11:00

Lab Sample ID: 160-16779-2

Matrix: Solid

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.01		0.112	0.153		0.111	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Americium 241	0.0181	U	0.0534	0.0535		0.0894	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Bismuth 212	0.979		0.381	0.395		0.374	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Bismuth 214	0.814		0.0877	0.122		0.0590	pCi/g	04/06/16 10:29	04/07/16 20:12	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Client Sample ID: L05-04-15-T-R-S-00

Lab Sample ID: 160-16779-2

Date Collected: 04/01/16 14:00

Matrix: Solid

Date Received: 04/04/16 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead 212	0.969		0.0687	0.143		0.0540	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Lead 214	0.926		0.0763	0.123		0.0711	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Potassium 40	17.6		1.04	2.09		0.320	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Protactinium 231	0.276	U	0.167	0.170		0.931	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Radium 226	0.814		0.0877	0.122	1.00	0.0590	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Thorium 234	0.974		0.513	0.523	1.00	0.706	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Uranium 235	0.0584	U	0.125	0.125		0.218	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Protactinium 234m	0.519	U	2.55	2.55		4.47	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Thorium 232	1.01		0.112	0.153		0.111	pCi/g	04/06/16 10:29	04/07/16 20:12	1
Other Detected Radionuclides										
Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.315		0.0421	0.0533		0.0316	pCi/g	04/06/16 10:29	04/07/16 20:12	1

Client Sample ID: L05-04-15-T-R-S-00

Lab Sample ID: 160-16779-2

Date Collected: 04/01/16 14:00

Matrix: Solid

Date Received: 04/04/16 11:00

Percent Solids: 78.7

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000067	0.000020	mg/Kg	☼	04/05/16 03:35	04/07/16 11:40	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.00459	U	0.0203	0.0203	1.34	0.229	pCi/g	04/05/16 03:35	04/07/16 11:40	1
Carrier										
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	94		30 - 110					04/05/16 03:35	04/07/16 11:40	1

Client Sample ID: L05-04-17-T-S-S-00

Lab Sample ID: 160-16779-3

Date Collected: 04/01/16 09:15

Matrix: Solid

Date Received: 04/04/16 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.239		0.0512	0.0567		0.0588	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Americium 241	-0.000454	U	0.0371	0.0371		0.0635	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Bismuth 212	0.204	U	0.192	0.193		0.300	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Bismuth 214	0.298		0.0566	0.0646		0.0406	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Lead 212	0.228		0.0420	0.0514		0.0384	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Lead 214	0.321		0.0462	0.0570		0.0450	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Potassium 40	5.20		0.638	0.830		0.199	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Protactinium 231	0.282	U	0.247	0.249		0.566	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Radium 226	0.298		0.0566	0.0646	1.00	0.0406	pCi/g	04/06/16 10:29	04/07/16 20:46	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Client Sample ID: L05-04-17-T-S-S-00

Lab Sample ID: 160-16779-3

Date Collected: 04/01/16 09:15

Matrix: Solid

Date Received: 04/04/16 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium 234	1.11		0.330	0.349	1.00	0.480	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Uranium 235	0.355		0.111	0.117		0.150	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Protactinium 234m	0.780	U	2.04	2.04		3.65	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Thorium 232	0.239		0.0512	0.0567		0.0588	pCi/g	04/06/16 10:29	04/07/16 20:46	1
Other Detected Radionuclides										
Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.0833		0.0222	0.0239		0.0141	pCi/g	04/06/16 10:29	04/07/16 20:46	1

Client Sample ID: L05-04-17-T-S-S-00

Lab Sample ID: 160-16779-3

Date Collected: 04/01/16 09:15

Matrix: Solid

Date Received: 04/04/16 11:00

Percent Solids: 88.8

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000059	0.000018	mg/Kg	☼	04/05/16 03:35	04/07/16 11:44	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.131	U	0.0148	0.0191	1.18	0.202	pCi/g	04/05/16 03:35	04/07/16 11:44	1
Carrier										
Re	96		30 - 110					04/05/16 03:35	04/07/16 11:44	1

Client Sample ID: L05-04-18-T-R-S-00

Lab Sample ID: 160-16779-4

Date Collected: 04/01/16 14:55

Matrix: Solid

Date Received: 04/04/16 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.03		0.104	0.148		0.0757	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Americium 241	0.000112	U	0.0575	0.0575		0.0970	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Bismuth 212	0.992		0.289	0.307		0.273	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Bismuth 214	0.785		0.0918	0.123		0.0650	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Lead 212	1.02		0.0717	0.151		0.0588	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Lead 214	0.817		0.0754	0.114		0.0655	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Potassium 40	18.7		1.06	2.19		0.370	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Protactinium 231	0.430	U	0.225	0.230		0.969	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Radium 226	0.785		0.0918	0.123	1.00	0.0650	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Thorium 234	1.03		0.504	0.516	1.00	0.807	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Uranium 235	0.148	U	0.135	0.136		0.190	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Protactinium 234m	0.967	U	2.53	2.53		4.48	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Thorium 232	1.03		0.104	0.148		0.0757	pCi/g	04/06/16 10:29	04/07/16 20:47	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Client Sample ID: L05-04-18-T-R-S-00

Lab Sample ID: 160-16779-4

Date Collected: 04/01/16 14:55

Matrix: Solid

Date Received: 04/04/16 11:00

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.297		0.0377	0.0487		0.0297	pCi/g	04/06/16 10:29	04/07/16 20:47	1

Client Sample ID: L05-04-18-T-R-S-00

Lab Sample ID: 160-16779-4

Date Collected: 04/01/16 14:55

Matrix: Solid

Date Received: 04/04/16 11:00

Percent Solids: 81.5

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000066	0.000020	mg/Kg	☼	04/05/16 03:35	04/07/16 11:48	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.0606	U	0.0752	0.0755	1.31	0.224	pCi/g	04/05/16 03:35	04/07/16 11:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	93		30 - 110					04/05/16 03:35	04/07/16 11:48	1

Client Sample ID: L05-04-20-T-S-S-00

Lab Sample ID: 160-16779-5

Date Collected: 04/01/16 09:25

Matrix: Solid

Date Received: 04/04/16 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.758		0.100	0.127		0.0638	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Americium 241	-0.0450	U	0.0566	0.0568		0.0933	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Bismuth 212	0.384	U	0.275	0.277		0.417	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Bismuth 214	0.528		0.0758	0.0936		0.0543	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Lead 212	0.649		0.0678	0.108		0.0607	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Lead 214	0.660		0.0774	0.103		0.0576	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Potassium 40	12.3		0.997	1.61		0.255	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Protactinium 231	-0.393	U	0.542	0.543		0.897	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Radium 226	0.528		0.0758	0.0936	1.00	0.0543	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Thorium 234	1.52		0.473	0.499	1.00	0.713	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Uranium 235	0.357		0.146	0.151		0.186	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Protactinium 234m	0.000	U	2.04	2.04		5.33	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Thorium 232	0.758		0.100	0.127		0.0638	pCi/g	04/06/16 10:29	04/07/16 20:47	1
Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.242		0.0402	0.0473		0.0312	pCi/g	04/06/16 10:29	04/07/16 20:47	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Client Sample ID: L05-04-20-T-S-S-00

Lab Sample ID: 160-16779-5

Date Collected: 04/01/16 09:25

Matrix: Solid

Date Received: 04/04/16 11:00

Percent Solids: 82.8

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	0.00018		0.000065	0.000019	mg/Kg	☼	04/05/16 03:35	04/07/16 11:53	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	3.03		0.223	0.357	1.30	0.222	pCi/g	04/05/16 03:35	04/07/16 11:53	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Re	93		30 - 110	04/05/16 03:35	04/07/16 11:53	1

Client Sample ID: L05-04-21-T-R-S-00

Lab Sample ID: 160-16779-6

Date Collected: 04/01/16 09:40

Matrix: Solid

Date Received: 04/04/16 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.22		0.134	0.182		0.0981	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Americium 241	-0.0228	U	0.112	0.112		0.0913	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Bismuth 212	1.21		0.327	0.350		0.308	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Bismuth 214	0.807		0.0888	0.122		0.0632	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Lead 212	1.04		0.0747	0.155		0.0637	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Lead 214	0.895		0.0838	0.125		0.0718	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Potassium 40	19.9		1.02	2.25		0.234	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Protactinium 231	0.144	U	0.458	0.458		0.776	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Radium 226	0.807		0.0888	0.122	1.00	0.0632	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Thorium 234	1.02		0.439	0.452	1.00	0.698	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Uranium 235	0.0582	U	0.130	0.130		0.218	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Protactinium 234m	0.828	U	2.76	2.76		4.56	pCi/g	04/06/16 10:29	04/07/16 20:48	1
Thorium 232	1.22		0.134	0.182		0.0981	pCi/g	04/06/16 10:29	04/07/16 20:48	1

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.321		0.0439	0.0549		0.0341	pCi/g	04/06/16 10:29	04/07/16 20:48	1

Client Sample ID: L05-04-21-T-R-S-00

Lab Sample ID: 160-16779-6

Date Collected: 04/01/16 09:40

Matrix: Solid

Date Received: 04/04/16 11:00

Percent Solids: 80.9

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	0.000019	J	0.000064	0.000019	mg/Kg	☼	04/05/16 03:35	04/07/16 11:57	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.325		0.0635	0.0701	1.27	0.218	pCi/g	04/05/16 03:35	04/07/16 11:57	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Client Sample ID: L05-04-21-T-R-S-00

Date Collected: 04/01/16 09:40

Date Received: 04/04/16 11:00

Lab Sample ID: 160-16779-6

Matrix: Solid

Percent Solids: 80.9

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Re	96		30 - 110	04/05/16 03:35	04/07/16 11:57	1

Client Sample ID: L05-04-22-T-E-S-00

Date Collected: 04/01/16 10:10

Date Received: 04/04/16 11:00

Lab Sample ID: 160-16779-7

Matrix: Solid

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.01		0.122	0.160		0.0982	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Americium 241	0.00515	U	0.0579	0.0579		0.0978	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Bismuth 212	1.51		0.382	0.413		0.293	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Bismuth 214	0.661		0.0857	0.110		0.0633	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Lead 212	0.946		0.0728	0.142		0.0554	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Lead 214	0.739		0.0724	0.106		0.0625	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Potassium 40	17.1		1.08	2.05		0.235	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Protactinium 231	0.342	U	0.293	0.296		0.977	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Radium 226	0.661		0.0857	0.110	1.00	0.0633	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Thorium 234	0.888		0.462	0.471	1.00	0.743	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Uranium 235	0.0520	U	0.121	0.121		0.203	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Protactinium 234m	2.18	U	2.74	2.75		5.08	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Thorium 232	1.01		0.122	0.160		0.0982	pCi/g	04/06/16 10:29	04/07/16 20:49	1
Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.274		0.0409	0.0498		0.0323	pCi/g	04/06/16 10:29	04/07/16 20:49	1

Client Sample ID: L05-04-22-T-E-S-00

Date Collected: 04/01/16 10:10

Date Received: 04/04/16 11:00

Lab Sample ID: 160-16779-7

Matrix: Solid

Percent Solids: 78.3

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000066	0.000020	mg/Kg	☼	04/05/16 03:35	04/07/16 12:01	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

			Count Uncert.	Total Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.159	U	0.118	0.119	1.33	0.227	pCi/g	04/05/16 03:35	04/07/16 12:01	1
Carrier	%Yield	Qualifier						Prepared	Analyzed	Dil Fac
Re	96		30 - 110					04/05/16 03:35	04/07/16 12:01	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Client Sample ID: L05-04-22-T-E-Q-00

Lab Sample ID: 160-16779-8

Date Collected: 04/01/16 10:10

Matrix: Solid

Date Received: 04/04/16 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.18		0.176	0.213		0.124	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Americium 241	-0.0255	U	0.0665	0.0665		0.111	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Bismuth 212	1.79		0.546	0.577		0.434	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Bismuth 214	0.791		0.111	0.138		0.0765	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Lead 212	0.983		0.0865	0.154		0.0715	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Lead 214	0.861		0.0903	0.127		0.0828	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Potassium 40	17.7		1.36	2.27		0.410	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Protactinium 231	0.360	U	0.221	0.225		1.42	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Radium 226	0.791		0.111	0.138	1.00	0.0765	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Thorium 234	0.772	U	0.301	0.311	1.00	0.856	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Uranium 235	-0.0124	U	3.37	3.37		0.252	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Protactinium 234m	5.50	U	3.51	3.55		6.76	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Thorium 232	1.18		0.176	0.213		0.124	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pb-210	1.54		0.661	0.686		0.807	pCi/g	04/06/16 10:29	04/07/16 21:22	1
Tl-208	0.418		0.0602	0.0742		0.0382	pCi/g	04/06/16 10:29	04/07/16 21:22	1

Client Sample ID: L05-04-22-T-E-Q-00

Lab Sample ID: 160-16779-8

Date Collected: 04/01/16 10:10

Matrix: Solid

Date Received: 04/04/16 11:00

Percent Solids: 77.3

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000065	0.000020	mg/Kg	☼	04/05/16 03:35	04/07/16 12:06	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.134	U	0.0838	0.0847	1.30	0.223	pCi/g	04/05/16 03:35	04/07/16 12:06	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	99		30 - 110					04/05/16 03:35	04/07/16 12:06	1

TestAmerica St. Louis

QC Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Method: 6020A - Metals (ICP/MS), Tc-99

Lab Sample ID: MB 160-244122/1-A
Matrix: Solid
Analysis Batch: 244891

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 244122

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000054	0.000016	mg/Kg		04/05/16 03:35	04/07/16 11:05	1

Lab Sample ID: LCS 160-244122/2-A
Matrix: Solid
Analysis Batch: 244891

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 244122

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	0.00119	0.00116		mg/Kg		98	80 - 120

Lab Sample ID: 160-16779-1 MS
Matrix: Solid
Analysis Batch: 244891

Client Sample ID: L05-04-14-T-S-S-00
Prep Type: Total/NA
Prep Batch: 244122

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	ND		0.00158	0.00152		mg/Kg	☼	96	75 - 125

Lab Sample ID: 160-16779-1 MSD
Matrix: Solid
Analysis Batch: 244891

Client Sample ID: L05-04-14-T-S-S-00
Prep Type: Total/NA
Prep Batch: 244122

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Technetium 99	ND		0.00158	0.00156		mg/Kg	☼	99	75 - 125	3	30

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Lab Sample ID: MB 160-244122/1-A
Matrix: Solid
Analysis Batch: 244892

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 244122

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-0.005500	U	0.0471	0.0471	1.07	0.183	pCi/g	04/05/16 03:35	04/07/16 11:05	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	93		30 - 110					04/05/16 03:35	04/07/16 11:05	1

Lab Sample ID: LCS 160-244122/2-A
Matrix: Solid
Analysis Batch: 244892

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 244122

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	20.4	19.93		1.88	1.00	0.172	pCi/g	98	80 - 120
Carrier	LCS %Yield	LCS Qualifier	Limits						
Re	100		30 - 110						

TestAmerica St. Louis

QC Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity (Continued)

Lab Sample ID: 160-16779-1 MS

Matrix: Solid

Analysis Batch: 244892

Client Sample ID: L05-04-14-T-S-S-00

Prep Type: Total/NA

Prep Batch: 244122

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	0.0790	U	27.0	25.97		2.41	1.43	0.245	pCi/g	96	75 - 125
Carrier											
	MS	MS									
	%Yield	Qualifier	Limits								
Re	93		30 - 110								

Lab Sample ID: 160-16779-1 MSD

Matrix: Solid

Analysis Batch: 244892

Client Sample ID: L05-04-14-T-S-S-00

Prep Type: Total/NA

Prep Batch: 244122

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Technetium 99	0.0790	U	27.0	26.78		2.47	1.37	0.235	pCi/g	99	75 - 125	0.17	1
Carrier													
	MSD	MSD											
	%Yield	Qualifier	Limits										
Re	97		30 - 110										

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-244596/1-A

Matrix: Solid

Analysis Batch: 244918

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 244596

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.009173	U	0.0404	0.0404		0.0774	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Americium 241	0.002315	U	0.0110	0.0110		0.0203	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Bismuth 212	-0.03238	U	0.158	0.158		0.296	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Bismuth 214	-0.002624	U	0.0200	0.0200		0.0513	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Lead 212	0.003367	U	0.0141	0.0141		0.0279	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Lead 214	-0.001690	U	0.0276	0.0276		0.0398	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Potassium 40	-0.06207	U	2.48	2.48		0.547	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Protactinium 231	-0.007936	U	0.159	0.159		0.316	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Radium 226	-0.002624	U	0.0200	0.0200	1.00	0.0513	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Thorium 234	0.08533	U	0.132	0.133	1.00	0.245	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Uranium 235	-0.0005953	U	0.00324	0.00324		0.0673	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Protactinium 234m	-0.1169	U	0.532	0.532		1.90	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Thorium 232	-0.009173	U	0.0404	0.0404		0.0774	pCi/g	04/06/16 10:29	04/07/16 17:52	1
Other Detected Radionuclides										
	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/g	04/06/16 10:29	04/07/16 17:52	1

TestAmerica St. Louis

QC Sample Results

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-244596/2-A
Matrix: Solid
Analysis Batch: 244920

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 244596

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	101	103.2		10.8		0.522	pCi/g	103	87 - 116
Cesium 137	34.1	37.79		3.90	0.200	0.141	pCi/g	111	87 - 120
Cobalt 60	31.6	34.25		3.40		0.0991	pCi/g	108	87 - 115

Lab Sample ID: 160-16778-A-1-E DU
Matrix: Solid
Analysis Batch: 244919

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 244596

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium 228	0.999		1.097		0.162		0.0786	pCi/g	0.31	1
Americium 241	-0.0151	U	0.01561	U	0.0545		0.0914	pCi/g	0.28	1
Bismuth 212	1.14		1.464		0.475		0.401	pCi/g	0.34	1
Bismuth 214	0.666		0.8268		0.135		0.0750	pCi/g	0.65	1
Lead 212	1.04		0.9966		0.152		0.0694	pCi/g	0.13	1
Lead 214	0.817		0.8406		0.123		0.0600	pCi/g	0.10	1
Potassium 40	18.5		18.58		2.26		0.400	pCi/g	0.01	1
Protactinium 231	0.603	U	0.3956	U	0.207		0.927	pCi/g	0.45	1
Radium 226	0.666		0.8268		0.135	1.00	0.0750	pCi/g	0.65	1
Thorium 234	1.38		0.8684		0.311	1.00	0.793	pCi/g	0.65	1
Uranium 235	0.167	U	0.2754		0.149		0.193	pCi/g	0.40	1
Protactinium 234m	1.99	U	0.0000	U	1.04		3.46	pCi/g	0.56	1
Thorium 232	0.999		1.097		0.162		0.0786	pCi/g	0.31	1
Total										
Other Detected Radionuclides	Sample Result	Sample Qual	DU Result	DU Qual	Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Tl-208	0.318		0.3383		0.0585		0.0319	pCi/g	0.18	1

QC Association Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Metals

Prep Batch: 244122

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16779-1	L05-04-14-T-S-S-00	Total/NA	Solid	None	
160-16779-1 MS	L05-04-14-T-S-S-00	Total/NA	Solid	None	
160-16779-1 MSD	L05-04-14-T-S-S-00	Total/NA	Solid	None	
160-16779-2	L05-04-15-T-R-S-00	Total/NA	Solid	None	
160-16779-3	L05-04-17-T-S-S-00	Total/NA	Solid	None	
160-16779-4	L05-04-18-T-R-S-00	Total/NA	Solid	None	
160-16779-5	L05-04-20-T-S-S-00	Total/NA	Solid	None	
160-16779-6	L05-04-21-T-R-S-00	Total/NA	Solid	None	
160-16779-7	L05-04-22-T-E-S-00	Total/NA	Solid	None	
160-16779-8	L05-04-22-T-E-Q-00	Total/NA	Solid	None	
LCS 160-244122/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-244122/1-A	Method Blank	Total/NA	Solid	None	

Analysis Batch: 244891

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16779-1	L05-04-14-T-S-S-00	Total/NA	Solid	6020A	244122
160-16779-1 MS	L05-04-14-T-S-S-00	Total/NA	Solid	6020A	244122
160-16779-1 MSD	L05-04-14-T-S-S-00	Total/NA	Solid	6020A	244122
160-16779-2	L05-04-15-T-R-S-00	Total/NA	Solid	6020A	244122
160-16779-3	L05-04-17-T-S-S-00	Total/NA	Solid	6020A	244122
160-16779-4	L05-04-18-T-R-S-00	Total/NA	Solid	6020A	244122
160-16779-5	L05-04-20-T-S-S-00	Total/NA	Solid	6020A	244122
160-16779-6	L05-04-21-T-R-S-00	Total/NA	Solid	6020A	244122
160-16779-7	L05-04-22-T-E-S-00	Total/NA	Solid	6020A	244122
160-16779-8	L05-04-22-T-E-Q-00	Total/NA	Solid	6020A	244122
LCS 160-244122/2-A	Lab Control Sample	Total/NA	Solid	6020A	244122
MB 160-244122/1-A	Method Blank	Total/NA	Solid	6020A	244122

General Chemistry

Analysis Batch: 244119

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16779-1	L05-04-14-T-S-S-00	Total/NA	Solid	Moisture	
160-16779-2	L05-04-15-T-R-S-00	Total/NA	Solid	Moisture	
160-16779-3	L05-04-17-T-S-S-00	Total/NA	Solid	Moisture	
160-16779-4	L05-04-18-T-R-S-00	Total/NA	Solid	Moisture	
160-16779-5	L05-04-20-T-S-S-00	Total/NA	Solid	Moisture	
160-16779-6	L05-04-21-T-R-S-00	Total/NA	Solid	Moisture	
160-16779-7	L05-04-22-T-E-S-00	Total/NA	Solid	Moisture	
160-16779-8	L05-04-22-T-E-Q-00	Total/NA	Solid	Moisture	
160-16779-8 DU	L05-04-22-T-E-Q-00	Total/NA	Solid	Moisture	

Rad

Leach Batch: 244065

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16778-A-1-E DU	Duplicate	Total/NA	Solid	Dry and Grind	
160-16779-1	L05-04-14-T-S-S-00	Total/NA	Solid	Dry and Grind	
160-16779-2	L05-04-15-T-R-S-00	Total/NA	Solid	Dry and Grind	
160-16779-3	L05-04-17-T-S-S-00	Total/NA	Solid	Dry and Grind	

TestAmerica St. Louis

QC Association Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Rad (Continued)

Leach Batch: 244065 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16779-4	L05-04-18-T-R-S-00	Total/NA	Solid	Dry and Grind	
160-16779-5	L05-04-20-T-S-S-00	Total/NA	Solid	Dry and Grind	
160-16779-6	L05-04-21-T-R-S-00	Total/NA	Solid	Dry and Grind	
160-16779-7	L05-04-22-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-16779-8	L05-04-22-T-E-Q-00	Total/NA	Solid	Dry and Grind	

Prep Batch: 244122

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16779-1	L05-04-14-T-S-S-00	Total/NA	Solid	None	
160-16779-1 MS	L05-04-14-T-S-S-00	Total/NA	Solid	None	
160-16779-1 MSD	L05-04-14-T-S-S-00	Total/NA	Solid	None	
160-16779-2	L05-04-15-T-R-S-00	Total/NA	Solid	None	
160-16779-3	L05-04-17-T-S-S-00	Total/NA	Solid	None	
160-16779-4	L05-04-18-T-R-S-00	Total/NA	Solid	None	
160-16779-5	L05-04-20-T-S-S-00	Total/NA	Solid	None	
160-16779-6	L05-04-21-T-R-S-00	Total/NA	Solid	None	
160-16779-7	L05-04-22-T-E-S-00	Total/NA	Solid	None	
160-16779-8	L05-04-22-T-E-Q-00	Total/NA	Solid	None	
LCS 160-244122/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-244122/1-A	Method Blank	Total/NA	Solid	None	

Prep Batch: 244596

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16778-A-1-E DU	Duplicate	Total/NA	Solid	Fill_Geo-0	244065
160-16779-1	L05-04-14-T-S-S-00	Total/NA	Solid	Fill_Geo-0	244065
160-16779-2	L05-04-15-T-R-S-00	Total/NA	Solid	Fill_Geo-0	244065
160-16779-3	L05-04-17-T-S-S-00	Total/NA	Solid	Fill_Geo-0	244065
160-16779-4	L05-04-18-T-R-S-00	Total/NA	Solid	Fill_Geo-0	244065
160-16779-5	L05-04-20-T-S-S-00	Total/NA	Solid	Fill_Geo-0	244065
160-16779-6	L05-04-21-T-R-S-00	Total/NA	Solid	Fill_Geo-0	244065
160-16779-7	L05-04-22-T-E-S-00	Total/NA	Solid	Fill_Geo-0	244065
160-16779-8	L05-04-22-T-E-Q-00	Total/NA	Solid	Fill_Geo-0	244065
LCS 160-244596/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-244596/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Tracer/Carrier Summary

Client: Westinghouse Electric Company LLC
Project/Site: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16779-1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Matrix: Solid

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Re (30-110)
160-16779-1	L05-04-14-T-S-S-00	95
160-16779-1 MS	L05-04-14-T-S-S-00	93
160-16779-1 MSD	L05-04-14-T-S-S-00	97
160-16779-2	L05-04-15-T-R-S-00	94
160-16779-3	L05-04-17-T-S-S-00	96
160-16779-4	L05-04-18-T-R-S-00	93
160-16779-5	L05-04-20-T-S-S-00	93
160-16779-6	L05-04-21-T-R-S-00	96
160-16779-7	L05-04-22-T-E-S-00	96
160-16779-8	L05-04-22-T-E-Q-00	99
LCS 160-244122/2-A	Lab Control Sample	100
MB 160-244122/1-A	Method Blank	93

Tracer/Carrier Legend

Re = Re