

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: 160-4745-1

Client Project/Site: RFP-CBA-022 (21 DAY TAT)

For:

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

Attn: Martin Swanson



Authorized for release by:
1/13/2014 4:43:29 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: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Job ID: 160-4745-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

Project: RFP-CBA-022 (21 DAY TAT)

Report Number: 160-4745-1

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 12/03/2013; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 20.0 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples L100701BUB00 (160-4745-1), L100702BES00 (160-4745-2), L100703BSS00 (160-4745-3), L100704BRQ00 (160-4745-4), L100704BRS00 (160-4745-5), L100705BES00 (160-4745-6), L100706BRS00 (160-4745-7), L100707BES00 (160-4745-8), L100708BES00 (160-4745-9), L100709BRS00 (160-4745-10), L100710BES00 (160-4745-11), L100711BRS00 (160-4745-12), L100712BES00 (160-4745-13), L100713BRS00 (160-4745-14) and L100714BES00 (160-4745-15) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 12/17/2013, prepared on 12/19/2013 and analyzed on 01/10/2014.

No other difficulties were encountered during the Radium 226 analysis. All other quality control parameters were within the acceptance limits.

Hematite Decommissioning Project

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

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-120213-01 Page 1/2				Requested Analysis								Laboratory Name:			
Project Name:				Comp (C) or Grab (G)	Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)					Total Containers	TA-MO	
Westinghouse Electric Company														Laboratory Address:	
Contact Person:														13715 Rider Trail North	
Phone Number:														314-298-8566	
Sampler Name:														Laboratory Contact Person:	
Scott Jenkins														Joe Walker	
														Phone No.	
														708-870-8453	
														Turn Around Time	
														Rush (7 days)	
														Remarks	
Sample ID	Date	Time	Matrix												
L100701BUB00	11/20/2013	9:45	S	C			X	X					1		LSA 10-07 Bias
L100702BES00	11/26/2013	16:00	S	C			X	X					1		LSA 10-07 Sys.
L100703BSS00	11/27/2013	14:30	S	C			X	X					1		LSA 10-07 Sys
L100704BRQ00	11/27/2013	14:50	S	C			X	X					1		LSA 10-07 Q.C.
L100704BRS00	11/27/2013	14:50	S	C			X	X					1		LSA 10-07 Sys
L100705BES00	11/26/2013	15:50	S	C			X	X					1		
L100706BRS00	11/27/2013	14:10	S	C			X	X					1		
L100707BES00	11/27/2013	14:15	S	C			X	X					1		
L100708BES00	11/27/2013	10:00	S	C			X	X					1		
L100709BRS00	11/26/2013	15:30	S	C			X	X					1		
L100710BES00	11/26/2013	15:35	S	C			X	X					1		
L100711BRS00	11/27/2013	10:20	S	C			X	X					1		LSA 10-07 Sys
Relinquished by: <i>[Signature]</i>		Date/Time: 12-3-13 1605		Received by: <i>[Signature]</i>		Date/Time: 12-3-13 1605		Total: 15		Cooler Temperature: Ambient					
Company Name: WEL				Company Name: Crossroads				Cooler ID: 1202-02		Shipper and Number:					
Received by:		Date/Time:		Relinquished by: <i>[Signature]</i>		Date/Time: 12-3-13 1810		Comments: Please analyze samples for Tc-99 on a 7 TAT. Please analyze samples for Gamma Spec after a 21 day ingrowth period.							
Company Name:				Company Name: Crossroads											
Relinquished by:		Date/Time:		Received by: <i>[Signature]</i>		Date/Time: 12-03-13 18:10		Verified By: <i>[Signature]</i>							
Company Name:				Company Name: T.J. Analytics											

1-7-15

Hematite Decommissioning Project

Procedure HDP-PR-QA-006, Chain of Custody

Revision: 3

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-120213-01 Page 2/2				Requested Analysis										Laboratory Name: TA-MO				
Project Name: Westinghouse Electric Company				Comp (C) or Grab (G)	Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)								Total Containers	Laboratory Address: 13715 Rider Trail North	
Contact Person: Gerald Rood																	Phone No. 314-298-8566	
Phone Number: 314-810-3382																	Laboratory Contact Person: Joe Walker	
Sampler Name: Scott Jenkins																	Phone No. 708-870-8453	
														Turn Around Time				
														Rush (7 days)				
														Remarks				
Sample ID	Date	Time	Matrix															
L100712BES00	11/27/2013	10:25	S	C			X	X							1		LSA 10-07 Sys	
L100713BRS00	11/27/2013	10:50	S	C			X	X							1		LSA 10-07 Sys	
L100714BES00	11/27/2013	11:00	S	C			X	X							1		LSA 10-07 Sys	

Relinquished by: <i>[Signature]</i>	Date/Time 12-3-13 1605	Received by: <i>[Signature]</i>	Date/Time 12-3 1605	Total 15	Cooler Temperature: Ambient
Company Name: WEC		Company Name: Crossroads		Cooler ID: 1202-02	Comments: Please analyze samples for Tc-99 on a 7 TAT. Please analyze samples for Gamma Spec after a 21 day ingrowth period.
Received by:	Date/Time	Relinquished by: <i>[Signature]</i>	Date/Time 12-3 1810	Verified By: <i>[Signature]</i>	
Company Name:		Company Name: Crossroads			
Relinquished by:	Date/Time	Received by: <i>[Signature]</i>	Date/Time 12-03-13 18:10		
Company Name:		Company Name: RESTANCO			



Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-4745-1

Login Number: 4745

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

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.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	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: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Qualifiers

Rad

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
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: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

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: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-4745-1	L100701BUB00	Solid	11/20/13 09:45	12/03/13 18:10
160-4745-2	L100702BES00	Solid	11/26/13 16:00	12/03/13 18:10
160-4745-3	L100703BSS00	Solid	11/27/13 14:30	12/03/13 18:10
160-4745-4	L100704BRQ00	Solid	11/27/13 14:50	12/03/13 18:10
160-4745-5	L100704BRS00	Solid	11/27/13 14:50	12/03/13 18:10
160-4745-6	L100705BES00	Solid	11/26/13 15:50	12/03/13 18:10
160-4745-7	L100706BRS00	Solid	11/27/13 14:10	12/03/13 18:10
160-4745-8	L100707BES00	Solid	11/27/13 14:15	12/03/13 18:10
160-4745-9	L100708BES00	Solid	11/27/13 10:00	12/03/13 18:10
160-4745-10	L100709BRS00	Solid	11/26/13 15:30	12/03/13 18:10
160-4745-11	L100710BES00	Solid	11/26/13 15:35	12/03/13 18:10
160-4745-12	L100711BRS00	Solid	11/27/13 10:20	12/03/13 18:10
160-4745-13	L100712BES00	Solid	11/27/13 10:25	12/03/13 18:10
160-4745-14	L100713BRS00	Solid	11/27/13 10:50	12/03/13 18:10
160-4745-15	L100714BES00	Solid	11/27/13 11:00	12/03/13 18:10

Client Sample Results

Client: Westinghouse Electric Company LLC
 Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Client Sample ID: L100701BUB00

Lab Sample ID: 160-4745-1

Date Collected: 11/20/13 09:45

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.20		0.166	0.206		0.0955	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Bismuth 212	1.79		0.559	0.589		0.470	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Bismuth 214	1.39		0.141	0.201		0.0893	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Lead 212	1.22		0.0932	0.184		0.0821	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Lead 214	1.46		0.125	0.196		0.100	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Potassium 40	19.9		1.42	2.48		0.317	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Protactinium 231	0.666	U	0.350	0.358		1.51	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Radium 226	1.39		0.141	0.201	1.00	0.0893	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Thorium 232	1.20		0.166	0.206		0.0955	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Thorium 234	3.35		1.11	1.17		1.96	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Uranium 235	31.8		0.767	3.32		0.568	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Americium 241	-0.00577	U	0.779	0.779		0.248	pCi/g	12/19/13 12:55	01/10/14 12:44	1
Protactinium 234m	0.000	U	1.57	1.57		8.50	pCi/g	12/19/13 12:55	01/10/14 12:44	1

Client Sample ID: L100702BES00

Lab Sample ID: 160-4745-2

Date Collected: 11/26/13 16:00

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.09		0.164	0.198		0.187	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Bismuth 212	1.28		0.431	0.451		0.539	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Bismuth 214	1.15		0.133	0.179		0.0883	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Lead 212	1.16		0.0895	0.175		0.0773	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Lead 214	1.21		0.106	0.164		0.107	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Potassium 40	17.7		1.42	2.30		0.524	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Protactinium 231	0.670	U	0.328	0.336		1.57	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Radium 226	1.15		0.133	0.179	1.00	0.0883	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Thorium 232	1.09		0.164	0.198		0.187	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Thorium 234	1.64		0.779	0.798		0.982	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Uranium 235	0.120	U	0.149	0.150		0.295	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Americium 241	-0.0233	U	0.0788	0.0788		0.132	pCi/g	12/19/13 12:55	01/10/14 12:45	1
Protactinium 234m	1.05	U	4.22	4.22		7.38	pCi/g	12/19/13 12:55	01/10/14 12:45	1

Client Sample ID: L100703BSS00

Lab Sample ID: 160-4745-3

Date Collected: 11/27/13 14:30

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.09		0.115	0.160		0.0831	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Bismuth 212	1.51		0.387	0.418		0.310	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Bismuth 214	1.08		0.102	0.151		0.0643	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Lead 212	1.04		0.0705	0.152		0.0550	pCi/g	12/19/13 12:55	01/10/14 12:46	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
 Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Client Sample ID: L100703BSS00

Lab Sample ID: 160-4745-3

Date Collected: 11/27/13 14:30

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Lead 214	1.23		0.0929	0.158		0.0616	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Potassium 40	18.4		1.16	2.21		0.376	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Protactinium 231	0.368	U	0.217	0.221		1.02	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Radium 226	1.08		0.102	0.151	1.00	0.0643	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Thorium 232	1.09		0.115	0.160		0.0831	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Thorium 234	1.56		0.631	0.652		0.833	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Uranium 235	0.204		0.145	0.146		0.184	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Americium 241	-0.0152	U	0.0652	0.0653		0.109	pCi/g	12/19/13 12:55	01/10/14 12:46	1
Protactinium 234m	4.52	U	2.63	2.67		5.37	pCi/g	12/19/13 12:55	01/10/14 12:46	1

Client Sample ID: L100704BRQ00

Lab Sample ID: 160-4745-4

Date Collected: 11/27/13 14:50

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.08		0.161	0.195		0.169	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Bismuth 212	1.55		0.470	0.497		0.419	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Bismuth 214	1.16		0.130	0.178		0.0784	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Lead 212	1.13		0.0895	0.172		0.0745	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Lead 214	1.36		0.134	0.195		0.104	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Potassium 40	19.2		1.56	2.51		0.602	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Protactinium 231	0.832	U	0.467	0.475		1.44	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Radium 226	1.16		0.130	0.178	1.00	0.0784	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Thorium 232	1.08		0.161	0.195		0.169	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Thorium 234	0.806	U	0.389	0.398		1.26	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Uranium 235	0.0729	U	0.166	0.166		0.294	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Americium 241	0.0213	U	0.0757	0.0757		0.127	pCi/g	12/19/13 12:55	01/10/14 12:48	1
Protactinium 234m	-0.153	U	4.93	4.93		8.78	pCi/g	12/19/13 12:55	01/10/14 12:48	1

Client Sample ID: L100704BRS00

Lab Sample ID: 160-4745-5

Date Collected: 11/27/13 14:50

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.11		0.123	0.167		0.117	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Bismuth 212	1.17		0.452	0.469		0.427	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Bismuth 214	1.05		0.0923	0.143		0.0694	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Lead 212	1.17		0.0716	0.168		0.0533	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Lead 214	1.25		0.104	0.166		0.0756	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Potassium 40	19.2		1.09	2.25		0.256	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Protactinium 231	0.544	U	0.298	0.304		1.17	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Radium 226	1.05		0.0923	0.143	1.00	0.0694	pCi/g	12/19/13 12:55	01/10/14 14:40	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
 Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Client Sample ID: L100704BRS00

Lab Sample ID: 160-4745-5

Date Collected: 11/27/13 14:50

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Thorium 232	1.11		0.123	0.167		0.117	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Thorium 234	0.907		0.303	0.317		0.778	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Uranium 235	0.220		0.152	0.154		0.196	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Americium 241	-0.000114	U	0.0640	0.0640		0.108	pCi/g	12/19/13 12:55	01/10/14 14:40	1
Protactinium 234m	3.67	U	3.16	3.19		4.83	pCi/g	12/19/13 12:55	01/10/14 14:40	1

Client Sample ID: L100705BES00

Lab Sample ID: 160-4745-6

Date Collected: 11/26/13 15:50

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.975		0.162	0.190		0.125	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Bismuth 212	1.30		0.338	0.364		0.273	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Bismuth 214	0.982		0.0961	0.140		0.0951	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Lead 212	1.02		0.0729	0.151		0.0729	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Lead 214	1.33		0.102	0.171		0.0769	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Potassium 40	21.0		1.15	2.44		0.331	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Protactinium 231	0.553	U	0.281	0.287		1.06	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Radium 226	0.982		0.0961	0.140	1.00	0.0951	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Thorium 232	0.975		0.162	0.190		0.125	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Thorium 234	2.03		0.785	0.813		0.936	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Uranium 235	0.496		0.139	0.148		0.217	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Americium 241	-0.00733	U	0.0594	0.0594		0.100	pCi/g	12/19/13 12:55	01/10/14 14:41	1
Protactinium 234m	7.33		3.08	3.17		4.52	pCi/g	12/19/13 12:55	01/10/14 14:41	1

Client Sample ID: L100706BRS00

Lab Sample ID: 160-4745-7

Date Collected: 11/27/13 14:10

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.26		0.162	0.207		0.0758	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Bismuth 212	1.42		0.431	0.455		0.521	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Bismuth 214	1.31		0.136	0.192		0.0891	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Lead 212	1.20		0.0876	0.178		0.0698	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Lead 214	1.41		0.113	0.185		0.0995	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Potassium 40	20.9		1.45	2.58		0.406	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Protactinium 231	0.323	U	0.392	0.393		0.705	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Radium 226	1.31		0.136	0.192	1.00	0.0891	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Thorium 232	1.26		0.162	0.207		0.0758	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Thorium 234	0.917	U	0.355	0.367		0.960	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Uranium 235	0.134	U	0.140	0.140		0.219	pCi/g	12/19/13 12:55	01/10/14 14:36	1
Americium 241	-0.0325	U	0.118	0.118		0.119	pCi/g	12/19/13 12:55	01/10/14 14:36	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
 Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Client Sample ID: L100706BRS00

Lab Sample ID: 160-4745-7

Date Collected: 11/27/13 14:10

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Protactinium 234m	2.59	U	3.96	3.97		6.62	pCi/g	12/19/13 12:55	01/10/14 14:36	1

Client Sample ID: L100707BES00

Lab Sample ID: 160-4745-8

Date Collected: 11/27/13 14:15

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.29		0.256	0.288		0.198	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Bismuth 212	2.21		0.656	0.695		0.504	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Bismuth 214	1.44		0.174	0.230		0.114	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Lead 212	1.22		0.103	0.188		0.0906	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Lead 214	1.44		0.137	0.203		0.112	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Potassium 40	19.9		1.60	2.59		0.366	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Protactinium 231	0.386	U	0.782	0.783		1.32	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Radium 226	1.44		0.174	0.230	1.00	0.114	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Thorium 232	1.29		0.256	0.288		0.198	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Thorium 234	0.899	U	0.388	0.399		1.03	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Uranium 235	0.138	U	0.198	0.199		0.352	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Americium 241	-0.0719	U	0.0924	0.0927		0.152	pCi/g	12/19/13 12:55	01/10/14 14:37	1
Protactinium 234m	0.246	U	4.70	4.70		8.47	pCi/g	12/19/13 12:55	01/10/14 14:37	1

Client Sample ID: L100708BES00

Lab Sample ID: 160-4745-9

Date Collected: 11/27/13 10:00

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.14		0.148	0.188		0.0783	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Bismuth 212	0.709		0.366	0.373		0.540	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Bismuth 214	1.01		0.108	0.151		0.0994	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Lead 212	1.18		0.0813	0.173		0.0665	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Lead 214	1.36		0.104	0.175		0.0826	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Potassium 40	20.1		1.26	2.41		0.380	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Protactinium 231	0.452	U	0.259	0.263		1.34	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Radium 226	1.01		0.108	0.151	1.00	0.0994	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Thorium 232	1.14		0.148	0.188		0.0783	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Thorium 234	1.88		0.843	0.866		1.01	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Uranium 235	0.125	U	0.168	0.169		0.278	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Americium 241	-0.0133	U	0.0701	0.0701		0.118	pCi/g	12/19/13 12:55	01/10/14 16:26	1
Protactinium 234m	-0.541	U	18.1	18.1		6.54	pCi/g	12/19/13 12:55	01/10/14 16:26	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
 Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Client Sample ID: L100709BRS00

Lab Sample ID: 160-4745-10

Date Collected: 11/26/13 15:30

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.32		0.145	0.198		0.0804	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Bismuth 212	1.60		0.478	0.506		0.410	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Bismuth 214	1.18		0.117	0.169		0.0788	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Lead 212	1.12		0.0873	0.169		0.0897	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Lead 214	1.32		0.117	0.181		0.0839	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Potassium 40	21.2		1.30	2.53		0.407	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Protactinium 231	0.217	U	0.189	0.191		1.34	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Radium 226	1.18		0.117	0.169	1.00	0.0788	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Thorium 232	1.32		0.145	0.198		0.0804	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Thorium 234	1.30		0.829	0.840		1.04	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Uranium 235	-0.00449	U	0.0315	0.0315		0.292	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Americium 241	0.00888	U	0.0523	0.0523		0.0887	pCi/g	12/19/13 12:55	01/10/14 16:27	1
Protactinium 234m	0.997	U	3.41	3.41		6.16	pCi/g	12/19/13 12:55	01/10/14 16:27	1

Client Sample ID: L100710BES00

Lab Sample ID: 160-4745-11

Date Collected: 11/26/13 15:35

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.17		0.134	0.179		0.111	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Bismuth 212	1.33		0.413	0.436		0.373	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Bismuth 214	1.28		0.132	0.188		0.0869	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Lead 212	1.14		0.0787	0.167		0.0604	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Lead 214	1.33		0.109	0.175		0.0837	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Potassium 40	19.2		1.27	2.34		0.265	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Protactinium 231	-0.668	U	0.811	0.814		1.33	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Radium 226	1.28		0.132	0.188	1.00	0.0869	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Thorium 232	1.17		0.134	0.179		0.111	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Thorium 234	1.06		0.639	0.649		1.04	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Uranium 235	0.0885	U	0.0966	0.0970		0.282	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Americium 241	0.0486	U	0.0754	0.0756		0.100	pCi/g	12/19/13 12:55	01/10/14 16:28	1
Protactinium 234m	0.686	U	2.82	2.82		5.53	pCi/g	12/19/13 12:55	01/10/14 16:28	1

Client Sample ID: L100711BRS00

Lab Sample ID: 160-4745-12

Date Collected: 11/27/13 10:20

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.07		0.159	0.193		0.111	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Bismuth 212	0.732		0.413	0.420		0.619	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Bismuth 214	1.07		0.113	0.159		0.0682	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Lead 212	1.06		0.0815	0.160		0.0723	pCi/g	12/19/13 12:55	01/10/14 16:29	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
 Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Client Sample ID: L100711BRS00

Lab Sample ID: 160-4745-12

Date Collected: 11/27/13 10:20

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Lead 214	1.32		0.115	0.179		0.0743	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Potassium 40	16.6		1.30	2.14		0.515	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Protactinium 231	0.600	U	0.399	0.404		1.29	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Radium 226	1.07		0.113	0.159	1.00	0.0682	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Thorium 232	1.07		0.159	0.193		0.111	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Thorium 234	0.744	U	0.311	0.321		0.801	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Uranium 235	0.125	U	0.131	0.132		0.212	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Americium 241	-0.0228	U	0.0702	0.0703		0.117	pCi/g	12/19/13 12:55	01/10/14 16:29	1
Protactinium 234m	5.11	U	3.31	3.35		6.06	pCi/g	12/19/13 12:55	01/10/14 16:29	1

Client Sample ID: L100712BES00

Lab Sample ID: 160-4745-13

Date Collected: 11/27/13 10:25

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	1.16		0.158	0.197		0.128	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Bismuth 212	1.46		0.365	0.395		0.317	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Bismuth 214	1.13		0.103	0.156		0.0711	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Lead 212	1.17		0.0808	0.171		0.0686	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Lead 214	1.29		0.0996	0.167		0.0922	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Potassium 40	20.1		1.27	2.42		0.405	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Protactinium 231	0.342	U	0.236	0.239		1.24	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Radium 226	1.13		0.103	0.156	1.00	0.0711	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Thorium 232	1.16		0.158	0.197		0.128	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Thorium 234	1.15		0.616	0.627		0.874	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Uranium 235	0.144	U	0.154	0.155		0.268	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Americium 241	0.00108	U	0.0685	0.0685		0.116	pCi/g	12/19/13 12:55	01/10/14 16:30	1
Protactinium 234m	0.703	U	3.13	3.13		5.60	pCi/g	12/19/13 12:55	01/10/14 16:30	1

Client Sample ID: L100713BRS00

Lab Sample ID: 160-4745-14

Date Collected: 11/27/13 10:50

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	1.15		0.158	0.197		0.176	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Bismuth 212	1.29		0.642	0.656		0.612	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Bismuth 214	1.19		0.145	0.191		0.0958	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Lead 212	1.15		0.0925	0.175		0.0781	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Lead 214	1.16		0.122	0.172		0.0872	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Potassium 40	17.9		1.49	2.36		0.496	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Protactinium 231	0.524	U	0.334	0.339		1.46	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Radium 226	1.19		0.145	0.191	1.00	0.0958	pCi/g	12/19/13 12:55	01/10/14 16:32	1

TestAmerica St. Louis

Client Sample Results

Client: Westinghouse Electric Company LLC
 Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Client Sample ID: L100713BRS00

Lab Sample ID: 160-4745-14

Date Collected: 11/27/13 10:50

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium 232	1.15		0.158	0.197		0.176	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Thorium 234	1.64		0.846	0.863		1.07	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Uranium 235	0.139	U	0.150	0.151		0.246	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Americium 241	-0.00932	U	0.0692	0.0692		0.117	pCi/g	12/19/13 12:55	01/10/14 16:32	1
Protactinium 234m	1.33	U	4.28	4.28		7.49	pCi/g	12/19/13 12:55	01/10/14 16:32	1

Client Sample ID: L100714BES00

Lab Sample ID: 160-4745-15

Date Collected: 11/27/13 11:00

Matrix: Solid

Date Received: 12/03/13 18:10

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	2.01		0.270	0.339		0.172	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Bismuth 212	2.88		0.792	0.847		0.686	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Bismuth 214	2.08		0.194	0.291		0.123	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Lead 212	2.12		0.140	0.308		0.112	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Lead 214	2.27		0.188	0.302		0.133	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Potassium 40	33.1		1.96	3.91		0.477	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Protactinium 231	1.34	U	0.694	0.709		2.08	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Radium 226	2.08		0.194	0.291	1.00	0.123	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Thorium 232	2.01		0.270	0.339		0.172	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Thorium 234	3.14		1.51	1.55		1.96	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Uranium 235	0.262	U	0.280	0.281		0.494	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Americium 241	-0.0194	U	0.137	0.137		0.230	pCi/g	12/19/13 12:55	01/10/14 17:03	1
Protactinium 234m	-0.548	U	13.7	13.7		9.95	pCi/g	12/19/13 12:55	01/10/14 17:03	1

QC Sample Results

Client: Westinghouse Electric Company LLC
 Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-93355/1-A

Matrix: Solid

Analysis Batch: 97314

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 93355

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Actinium 228	0.01730	U	0.0193	0.0194		0.0500	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Bismuth 212	0.0000	U	0.0219	0.0219		0.227	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Bismuth 214	0.002622	U	0.0177	0.0177		0.0386	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Lead 212	-0.0008681	U	0.0160	0.0160		0.0273	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Lead 214	-0.01201	U	0.0672	0.0672		0.0364	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Potassium 40	-0.007341	U	0.153	0.153		0.304	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Protactinium 231	0.01680	U	0.0386	0.0386		0.323	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Radium 226	0.002622	U	0.0177	0.0177	1.00	0.0386	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Thorium 232	0.01730	U	0.0193	0.0194		0.0500	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Thorium 234	-0.02474	U	0.171	0.171		0.259	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Uranium 235	0.01620	U	0.0307	0.0307		0.0639	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Americium 241	0.003283	U	0.0113	0.0113		0.0201	pCi/g	12/19/13 12:55	01/10/14 12:42	1
Protactinium 234m	-0.6016	U	24.1	24.1		3.40	pCi/g	12/19/13 12:55	01/10/14 12:42	1

Lab Sample ID: LCS 160-93355/2-A

Matrix: Solid

Analysis Batch: 97316

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 93355

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec.
				Uncert. (2σ+/-)					Limits
Americium 241	101	97.60		10.2		0.530	pCi/g	97	87 - 116
Cesium 137	35.9	33.91		3.55		0.165	pCi/g	95	87 - 120
Cobalt 60	42.5	39.54		3.98		0.148	pCi/g	93	87 - 115

Lab Sample ID: 160-4745-2 DU

Matrix: Solid

Analysis Batch: 97307

Client Sample ID: L100702BES00

Prep Type: Total/NA

Prep Batch: 93355

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total	RL	MDC	Unit	RER	RER
					Uncert. (2σ+/-)					Limit
Actinium 228	1.09		1.256		0.222		0.142	pCi/g	0.40	1
Bismuth 212	1.28		1.862		0.635		0.493	pCi/g	0.53	1
Bismuth 214	1.15		1.186		0.181		0.0793	pCi/g	0.11	1
Lead 212	1.16		1.231		0.185		0.0796	pCi/g	0.20	1
Lead 214	1.21		1.377		0.196		0.106	pCi/g	0.47	1
Potassium 40	17.7		20.08		2.55		0.344	pCi/g	0.49	1
Protactinium 231	0.670	U	1.223		0.500		0.872	pCi/g	0.66	1
Radium 226	1.15		1.186		0.181	1.00	0.0793	pCi/g	0.11	1
Thorium 232	1.09		1.256		0.222		0.142	pCi/g	0.40	1
Thorium 234	1.64		1.438		0.799		1.05	pCi/g	0.13	1
Uranium 235	0.120	U	0.08798	U	0.171		0.307	pCi/g	0.1	1
Americium 241	-0.0233	U	-0.01141	U	0.0799		0.134	pCi/g	0.08	1
Protactinium 234m	1.05	U	0.1095	U	4.72		8.44	pCi/g	0.11	1

TestAmerica St. Louis

QC Association Summary

Client: Westinghouse Electric Company LLC
 Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-4745-1

Rad

Leach Batch: 92616

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4745-1	L100701BUB00	Total/NA	Solid	Dry and Grind	
160-4745-2	L100702BES00	Total/NA	Solid	Dry and Grind	
160-4745-2 DU	L100702BES00	Total/NA	Solid	Dry and Grind	
160-4745-3	L100703BSS00	Total/NA	Solid	Dry and Grind	
160-4745-4	L100704BRQ00	Total/NA	Solid	Dry and Grind	
160-4745-5	L100704BRS00	Total/NA	Solid	Dry and Grind	
160-4745-6	L100705BES00	Total/NA	Solid	Dry and Grind	
160-4745-7	L100706BRS00	Total/NA	Solid	Dry and Grind	
160-4745-8	L100707BES00	Total/NA	Solid	Dry and Grind	
160-4745-9	L100708BES00	Total/NA	Solid	Dry and Grind	
160-4745-10	L100709BRS00	Total/NA	Solid	Dry and Grind	
160-4745-11	L100710BES00	Total/NA	Solid	Dry and Grind	
160-4745-12	L100711BRS00	Total/NA	Solid	Dry and Grind	
160-4745-13	L100712BES00	Total/NA	Solid	Dry and Grind	
160-4745-14	L100713BRS00	Total/NA	Solid	Dry and Grind	
160-4745-15	L100714BES00	Total/NA	Solid	Dry and Grind	

Prep Batch: 93355

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4745-1	L100701BUB00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-2	L100702BES00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-2 DU	L100702BES00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-3	L100703BSS00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-4	L100704BRQ00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-5	L100704BRS00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-6	L100705BES00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-7	L100706BRS00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-8	L100707BES00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-9	L100708BES00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-10	L100709BRS00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-11	L100710BES00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-12	L100711BRS00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-13	L100712BES00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-14	L100713BRS00	Total/NA	Solid	Fill_Geo-21	92616
160-4745-15	L100714BES00	Total/NA	Solid	Fill_Geo-21	92616
LCS 160-93355/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-93355/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	