

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: 160-4779-2

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

For:

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

Attn: Martin Swanson



Authorized for release by:

1/14/2014 9:35:14 AM

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

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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 (7 DAY TAT)

TestAmerica Job ID: 160-4779-2

Job ID: 160-4779-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

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

Report Number: 160-4779-2

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 12/05/2013; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 18.0 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples L101001BRS00 (160-4779-1), L101002BES00 (160-4779-2), L101003BRS00 (160-4779-3), L101005BRS00 (160-4779-4), L101006BES00 (160-4779-5), L101007BRS00 (160-4779-6), L101008BES00 (160-4779-7), L101009BSS00 (160-4779-8), L101010BRS00 (160-4779-9), L101011BSQ00 (160-4779-10), L101011BSS00 (160-4779-11), L101012BRS00 (160-4779-12), L101013BSS00 (160-4779-13), L101014BRS00 (160-4779-14) and L101015BES00 (160-4779-15) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 12/18/2013, prepared on 12/20/2013 and analyzed on 01/11/2014.

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

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-120513-01 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:																Phone No.	
314-810-3382																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	C			X	X							1	LSA-10-10 Sys. Samples	
L101001BRS00	12/4/2013	10:15	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101002BES00	12/4/2013	10:20	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101003BRS00	12/4/2013	10:45	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101005BRS00	12/4/2013	11:00	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101006BES00	12/4/2013	11:05	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101007BRS00	12/4/2013	13:55	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101008BES00	12/4/2013	14:00	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101009BSS00	12/4/2013	14:10	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101010BRS00	12/4/2013	14:25	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101011BSQ00	12/4/2013	14:45	S	C			X	X							1	LSA-10-10 QC Sample	
L101011BSS00	12/4/2013	14:45	S	C			X	X							1	LSA-10-10 Sys. Samples	
L101012BRS00	12/4/2013	14:55	S	C			X	X							1	LSA-10-10 Sys. Samples	

Relinquished by:	Date/Time	Received by:	Date/Time	Total	Cooler Temperature:
Company Name:	12-5-13 1555	Company Name:	12-5 1555	15	4 Degrees C
Received by:	Date/Time	Relinquished by:	Date/Time	Cooler ID:	Shipper and Number:
Company Name:		Company Name:	12-5 1745	1205-02	
Relinquished by:	Date/Time	Received by:	Date/Time	Comments: Please analyze the samples for Tc-99 on a 7 day TAT. Please analyze the samples for gamma spec after a 21 day ingrowth period.	
Company Name:		Company Name:	12-5-13 1600	Verified By:	

4279

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-120513-01	Page	2/2										
Project Name: Westinghouse Electric Company																		
Contact Person: Gerald Rood																		
Phone Number: 314-810-3382																		
Sampler Name Scott Jenkins																		
							Total Containers	Laboratory Name:										
								TA-MO										
								Laboratory Address:										
								13715 Rider Trail North										
								Phone No.										
								314-298-8566										
								Laboratory Contact Person:										
								Joe Walker										
								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 ingrowth for Ra-226)										
L101013BSS00	12/4/2013	15:05	S	C	X	X											1	LSA-10-10 Sys. Samples
L101014BRS00	12/4/2013	15:15	S	C	X	X											1	LSA-10-10 Sys. Samples
L101015BES00	12/4/2013	9:45	S	C	X	X											1	LSA-10-10 Sys. Samples
Relinquished by:	Date/Time		Received by:		Date/Time		Total		Cooler Temperature:									
Company Name:	12-5-13 1555 WEL		Crossroads		12-5 1555		15		4 Degrees C									
Received by:	Date/Time		Relinquished by:		Date/Time		Cooler ID:		Shipper and Number:									
Company Name:	12-5-13 1755 Crossroads		Crossroads		12-5 1755		1205-02											
Comments:	Please analyze the samples for Tc-99 on a 7 day TAT. Please analyze the samples for gamma spec after a 21 day ingrowth period.																	
Verified By:																		

Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-4779-2

Login Number: 4779

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.	False	
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 (7 DAY TAT)

TestAmerica Job ID: 160-4779-2

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.
α	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 (7 DAY TAT)

TestAmerica Job ID: 160-4779-2

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 (7 DAY TAT)

TestAmerica Job ID: 160-4779-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-4779-1	L101001BRS00	Solid	12/04/13 10:15	12/05/13 18:00
160-4779-2	L101002BES00	Solid	12/04/13 10:20	12/05/13 18:00
160-4779-3	L101003BRS00	Solid	12/04/13 10:45	12/05/13 18:00
160-4779-4	L101005BRS00	Solid	12/04/13 11:00	12/05/13 18:00
160-4779-5	L101006BES00	Solid	12/04/13 11:05	12/05/13 18:00
160-4779-6	L101007BRS00	Solid	12/04/13 13:55	12/05/13 18:00
160-4779-7	L101008BES00	Solid	12/04/13 14:00	12/05/13 18:00
160-4779-8	L101009BSS00	Solid	12/04/13 14:10	12/05/13 18:00
160-4779-9	L101010BRS00	Solid	12/04/13 14:25	12/05/13 18:00
160-4779-10	L101011BSQ00	Solid	12/04/13 14:45	12/05/13 18:00
160-4779-11	L101011BSS00	Solid	12/04/13 14:45	12/05/13 18:00
160-4779-12	L101012BRS00	Solid	12/04/13 14:55	12/05/13 18:00
160-4779-13	L101013BSS00	Solid	12/04/13 15:05	12/05/13 18:00
160-4779-14	L101014BRS00	Solid	12/04/13 15:15	12/05/13 18:00
160-4779-15	L101015BES00	Solid	12/04/13 09:45	12/05/13 18:00

Client Sample Results

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

TestAmerica Job ID: 160-4779-2

Client Sample ID: L101001BRS00

Lab Sample ID: 160-4779-1

Date Collected: 12/04/13 10:15

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.15		0.125	0.171		0.117	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Bismuth 212	1.54		0.462	0.489		0.406	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Bismuth 214	1.07		0.0964	0.147		0.0614	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Lead 212	1.00		0.0724	0.148		0.0722	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Lead 214	1.22		0.0913	0.156		0.0813	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Potassium 40	20.1		1.14	2.35		0.346	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Protactinium 231	0.455	U	0.248	0.253		1.08	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Radium 226	1.07		0.0964	0.147	1.00	0.0614	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Thorium 232	1.15		0.125	0.171		0.117	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Thorium 234	0.812	U	0.307	0.319		1.04	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Uranium 235	0.134	U	0.167	0.168		0.235	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Americium 241	0.000250	U	0.0596	0.0596		0.101	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Protactinium 234m	2.48	U	2.70	2.71		4.38	pCi/g	12/20/13 15:39	01/11/14 02:36	1

Client Sample ID: L101002BES00

Lab Sample ID: 160-4779-2

Date Collected: 12/04/13 10:20

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.991		0.115	0.153		0.125	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Bismuth 212	1.58		0.444	0.473		0.376	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Bismuth 214	1.14		0.112	0.163		0.0709	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Lead 212	1.00		0.0728	0.149		0.0603	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Lead 214	1.28		0.0933	0.162		0.0691	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Potassium 40	17.1		1.20	2.12		0.411	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Protactinium 231	-0.624	U	0.741	0.744		1.22	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Radium 226	1.14		0.112	0.163	1.00	0.0709	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Thorium 232	0.991		0.115	0.153		0.125	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Thorium 234	0.870		0.320	0.333		0.863	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Uranium 235	0.0667	U	0.129	0.129		0.223	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Americium 241	-0.00175	U	0.0808	0.0808		0.0805	pCi/g	12/20/13 15:39	01/11/14 02:34	1
Protactinium 234m	3.38	U	3.18	3.20		5.57	pCi/g	12/20/13 15:39	01/11/14 02:34	1

Client Sample ID: L101003BRS00

Lab Sample ID: 160-4779-3

Date Collected: 12/04/13 10:45

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.00		0.157	0.187		0.0949	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Bismuth 212	1.35		0.478	0.498		0.398	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Bismuth 214	1.04		0.128	0.168		0.0850	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Lead 212	0.866		0.0757	0.135		0.0727	pCi/g	12/20/13 15:39	01/11/14 02:35	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-4779-2

Client Sample ID: L101003BRS00

Lab Sample ID: 160-4779-3

Date Collected: 12/04/13 10:45

Matrix: Solid

Date Received: 12/05/13 18:00

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	1.14		0.111	0.163		0.0769	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Potassium 40	15.5		1.19	1.98		0.258	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Protactinium 231	0.131	U	0.183	0.184		1.18	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Radium 226	1.04		0.128	0.168	1.00	0.0850	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Thorium 232	1.00		0.157	0.187		0.0949	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Thorium 234	1.65		0.804	0.822		0.950	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Uranium 235	0.172	U	0.132	0.133		0.185	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Americium 241	0.00189	U	0.0593	0.0593		0.100	pCi/g	12/20/13 15:39	01/11/14 02:35	1
Protactinium 234m	0.165	U	3.36	3.36		6.05	pCi/g	12/20/13 15:39	01/11/14 02:35	1

Client Sample ID: L101005BRS00

Lab Sample ID: 160-4779-4

Date Collected: 12/04/13 11:00

Matrix: Solid

Date Received: 12/05/13 18:00

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	0.808		0.0910	0.123		0.0922	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Bismuth 212	0.870		0.258	0.274		0.313	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Bismuth 214	0.874		0.0848	0.124		0.0539	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Lead 212	0.860		0.0595	0.126		0.0497	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Lead 214	0.992		0.0822	0.132		0.0682	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Potassium 40	13.0		0.924	1.62		0.386	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Protactinium 231	0.353	U	0.192	0.196		0.843	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Radium 226	0.874		0.0848	0.124	1.00	0.0539	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Thorium 232	0.808		0.0910	0.123		0.0922	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Thorium 234	1.34		0.551	0.568		0.710	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Uranium 235	0.155		0.0870	0.0885		0.141	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Americium 241	-0.0241	U	0.0548	0.0549		0.0914	pCi/g	12/20/13 15:39	01/11/14 02:36	1
Protactinium 234m	-0.485	U	19.4	19.4		3.45	pCi/g	12/20/13 15:39	01/11/14 02:36	1

Client Sample ID: L101006BES00

Lab Sample ID: 160-4779-5

Date Collected: 12/04/13 11:05

Matrix: Solid

Date Received: 12/05/13 18:00

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	0.704		0.123	0.142		0.0786	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Bismuth 212	0.898		0.266	0.282		0.217	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Bismuth 214	0.693		0.0703	0.101		0.0460	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Lead 212	0.650		0.0490	0.0974		0.0398	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Lead 214	0.805		0.0707	0.110		0.0492	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Potassium 40	9.53		0.716	1.21		0.261	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Protactinium 231	0.235	U	0.137	0.139		0.891	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Radium 226	0.693		0.0703	0.101	1.00	0.0460	pCi/g	12/20/13 15:39	01/11/14 03:14	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-4779-2

Client Sample ID: L101006BES00

Lab Sample ID: 160-4779-5

Date Collected: 12/04/13 11:05

Matrix: Solid

Date Received: 12/05/13 18:00

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	0.704		0.123	0.142		0.0786	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Thorium 234	0.638	U	0.223	0.233		0.644	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Uranium 235	0.0513	U	0.102	0.102		0.171	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Americium 241	0.0304	U	0.0460	0.0461		0.0761	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Protactinium 234m	0.965	U	1.99	1.99		3.50	pCi/g	12/20/13 15:39	01/11/14 03:14	1

Client Sample ID: L101007BRS00

Lab Sample ID: 160-4779-6

Date Collected: 12/04/13 13:55

Matrix: Solid

Date Received: 12/05/13 18:00

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	1.00		0.150	0.182		0.121	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Bismuth 212	1.17		0.305	0.329		0.347	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Bismuth 214	1.11		0.103	0.154		0.0649	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Lead 212	1.00		0.0750	0.150		0.0756	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Lead 214	1.22		0.0919	0.157		0.0808	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Potassium 40	19.3		1.17	2.29		0.411	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Protactinium 231	0.298	U	0.197	0.200		1.13	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Radium 226	1.11		0.103	0.154	1.00	0.0649	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Thorium 232	1.00		0.150	0.182		0.121	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Thorium 234	1.48		0.694	0.711		0.874	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Uranium 235	0.166		0.101	0.103		0.159	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Americium 241	0.0288	U	0.0615	0.0616		0.102	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Protactinium 234m	5.06	U	3.12	3.16		5.22	pCi/g	12/20/13 15:39	01/11/14 03:15	1

Client Sample ID: L101008BES00

Lab Sample ID: 160-4779-7

Date Collected: 12/04/13 14:00

Matrix: Solid

Date Received: 12/05/13 18:00

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		0.122	0.168		0.0886	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Bismuth 212	1.37		0.494	0.514		0.467	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Bismuth 214	1.17		0.109	0.163		0.0619	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Lead 212	1.08		0.0727	0.157		0.0514	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Lead 214	1.20		0.0954	0.157		0.0818	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Potassium 40	18.6		1.24	2.27		0.347	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Protactinium 231	0.105	U	1.00	1.00		0.669	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Radium 226	1.17		0.109	0.163	1.00	0.0619	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Thorium 232	1.14		0.122	0.168		0.0886	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Thorium 234	0.906		0.304	0.319		0.816	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Uranium 235	0.0672	U	0.146	0.146		0.245	pCi/g	12/20/13 15:39	01/11/14 03:13	1
Americium 241	0.000123	U	0.0415	0.0415		0.0715	pCi/g	12/20/13 15:39	01/11/14 03:13	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-4779-2

Client Sample ID: L101008BES00

Lab Sample ID: 160-4779-7

Date Collected: 12/04/13 14:00

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Protactinium 234m	1.91	U	2.75	2.75		4.58	pCi/g	12/20/13 15:39	01/11/14 03:13	1

Client Sample ID: L101009BSS00

Lab Sample ID: 160-4779-8

Date Collected: 12/04/13 14:10

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.05		0.139	0.175		0.161	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Bismuth 212	2.30		0.498	0.552		0.279	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Bismuth 214	1.04		0.127	0.167		0.0848	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Lead 212	1.00		0.0900	0.158		0.0895	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Lead 214	1.24		0.120	0.177		0.0735	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Potassium 40	17.3		1.42	2.27		0.517	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Protactinium 231	0.679	U	0.378	0.385		1.03	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Radium 226	1.04		0.127	0.167	1.00	0.0848	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Thorium 232	1.05		0.139	0.175		0.161	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Thorium 234	1.38		0.783	0.796		0.997	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Uranium 235	0.159	U	0.106	0.107		0.188	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Americium 241	0.0211	U	0.0733	0.0733		0.123	pCi/g	12/20/13 15:39	01/11/14 03:14	1
Protactinium 234m	0.652	U	4.17	4.17		7.39	pCi/g	12/20/13 15:39	01/11/14 03:14	1

Client Sample ID: L101010BRS00

Lab Sample ID: 160-4779-9

Date Collected: 12/04/13 14:25

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.17		0.145	0.187		0.106	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Bismuth 212	1.21		0.378	0.398		0.344	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Bismuth 214	1.09		0.116	0.162		0.0806	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Lead 212	1.10		0.0753	0.161		0.0631	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Lead 214	1.19		0.0892	0.153		0.0641	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Potassium 40	20.4		1.23	2.42		0.379	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Protactinium 231	-0.460	U	0.656	0.658		1.09	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Radium 226	1.09		0.116	0.162	1.00	0.0806	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Thorium 232	1.17		0.145	0.187		0.106	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Thorium 234	1.61		0.643	0.664		0.848	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Uranium 235	0.153	U	0.131	0.132		0.237	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Americium 241	0.0319	U	0.0566	0.0567		0.0941	pCi/g	12/20/13 15:39	01/11/14 03:15	1
Protactinium 234m	2.17	U	3.08	3.09		5.23	pCi/g	12/20/13 15:39	01/11/14 03:15	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-4779-2

Client Sample ID: L101011BSQ00

Lab Sample ID: 160-4779-10

Date Collected: 12/04/13 14:45

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.28		0.181	0.223		0.128	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Bismuth 212	1.07		0.488	0.500		0.675	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Bismuth 214	1.26		0.143	0.194		0.0784	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Lead 212	1.12		0.0967	0.174		0.0851	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Lead 214	1.27		0.157	0.206		0.121	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Potassium 40	19.5		1.61	2.56		0.530	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Protactinium 231	-0.744	U	0.927	0.930		1.53	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Radium 226	1.26		0.143	0.194	1.00	0.0784	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Thorium 232	1.28		0.181	0.223		0.128	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Thorium 234	1.26		0.418	0.438		1.09	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Uranium 235	0.139	U	0.182	0.182		0.300	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Americium 241	0.0178	U	0.0806	0.0807		0.136	pCi/g	12/20/13 15:39	01/11/14 03:53	1
Protactinium 234m	4.83	U	4.53	4.56		7.34	pCi/g	12/20/13 15:39	01/11/14 03:53	1

Client Sample ID: L101011BSS00

Lab Sample ID: 160-4779-11

Date Collected: 12/04/13 14:45

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.938		0.131	0.162		0.104	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Bismuth 212	1.29		0.442	0.461		0.389	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Bismuth 214	1.13		0.112	0.162		0.0730	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Lead 212	1.13		0.0752	0.164		0.0591	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Lead 214	1.30		0.0920	0.163		0.0761	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Potassium 40	18.7		1.16	2.24		0.354	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Protactinium 231	0.373	U	0.185	0.190		1.28	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Radium 226	1.13		0.112	0.162	1.00	0.0730	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Thorium 232	0.938		0.131	0.162		0.104	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Thorium 234	1.71		0.782	0.802		0.962	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Uranium 235	0.157	U	0.122	0.123		0.173	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Americium 241	0.0290	U	0.0667	0.0668		0.111	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Protactinium 234m	0.185	U	2.89	2.89		5.29	pCi/g	12/20/13 15:39	01/11/14 03:49	1

Client Sample ID: L101012BRS00

Lab Sample ID: 160-4779-12

Date Collected: 12/04/13 14:55

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.05		0.141	0.177		0.0957	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Bismuth 212	1.21		0.446	0.463		0.431	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Bismuth 214	1.18		0.108	0.163		0.0658	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Lead 212	0.987		0.0745	0.148		0.0773	pCi/g	12/20/13 15:39	01/11/14 03:49	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-4779-2

Client Sample ID: L101012BRS00

Lab Sample ID: 160-4779-12

Date Collected: 12/04/13 14:55

Matrix: Solid

Date Received: 12/05/13 18:00

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	1.14		0.0995	0.155		0.0751	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Potassium 40	19.9		1.18	2.35		0.438	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Protactinium 231	0.456	U	0.232	0.238		1.19	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Radium 226	1.18		0.108	0.163	1.00	0.0658	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Thorium 232	1.05		0.141	0.177		0.0957	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Thorium 234	1.02		0.302	0.320		0.795	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Uranium 235	0.0617	U	0.151	0.151		0.251	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Americium 241	-0.00931	U	0.0604	0.0604		0.101	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Protactinium 234m	0.372	U	1.94	1.95		6.49	pCi/g	12/20/13 15:39	01/11/14 03:49	1

Client Sample ID: L101013BSS00

Lab Sample ID: 160-4779-13

Date Collected: 12/04/13 15:05

Matrix: Solid

Date Received: 12/05/13 18:00

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	1.16		0.132	0.177		0.121	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Bismuth 212	1.38		0.500	0.521		0.478	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Bismuth 214	1.16		0.128	0.176		0.0836	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Lead 212	1.05		0.0821	0.158		0.0709	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Lead 214	1.14		0.105	0.159		0.0721	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Potassium 40	20.0		1.36	2.46		0.292	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Protactinium 231	-0.574	U	0.776	0.779		1.28	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Radium 226	1.16		0.128	0.176	1.00	0.0836	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Thorium 232	1.16		0.132	0.177		0.121	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Thorium 234	1.78		0.604	0.632		0.814	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Uranium 235	0.160	U	0.139	0.139		0.187	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Americium 241	0.0376	U	0.0656	0.0657		0.109	pCi/g	12/20/13 15:39	01/11/14 03:48	1
Protactinium 234m	0.690	U	3.43	3.43		6.07	pCi/g	12/20/13 15:39	01/11/14 03:48	1

Client Sample ID: L101014BRS00

Lab Sample ID: 160-4779-14

Date Collected: 12/04/13 15:15

Matrix: Solid

Date Received: 12/05/13 18:00

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	1.03		0.140	0.175		0.143	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Bismuth 212	0.656		0.405	0.410		0.613	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Bismuth 214	1.12		0.127	0.172		0.0809	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Lead 212	0.940		0.0795	0.145		0.0744	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Lead 214	1.18		0.100	0.158		0.0826	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Potassium 40	16.9		1.29	2.16		0.395	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Protactinium 231	0.486	U	0.217	0.223		1.33	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Radium 226	1.12		0.127	0.172	1.00	0.0809	pCi/g	12/20/13 15:39	01/11/14 03:49	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-4779-2

Client Sample ID: L101014BRS00

Lab Sample ID: 160-4779-14

Date Collected: 12/04/13 15:15

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium 232	1.03		0.140	0.175		0.143	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Thorium 234	1.51		0.787	0.802		0.953	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Uranium 235	0.0722	U	0.158	0.158		0.281	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Americium 241	0.0137	U	0.0660	0.0660		0.111	pCi/g	12/20/13 15:39	01/11/14 03:49	1
Protactinium 234m	0.000	U	1.20	1.20		7.90	pCi/g	12/20/13 15:39	01/11/14 03:49	1

Client Sample ID: L101015BES00

Lab Sample ID: 160-4779-15

Date Collected: 12/04/13 09:45

Matrix: Solid

Date Received: 12/05/13 18:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.23		0.124	0.176		0.0881	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Bismuth 212	1.47		0.407	0.434		0.355	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Bismuth 214	1.06		0.0935	0.144		0.0662	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Lead 212	1.10		0.0708	0.159		0.0532	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Lead 214	1.25		0.108	0.169		0.0784	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Potassium 40	19.7		1.16	2.33		0.347	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Protactinium 231	0.358	U	0.190	0.194		1.10	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Radium 226	1.06		0.0935	0.144	1.00	0.0662	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Thorium 232	1.23		0.124	0.176		0.0881	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Thorium 234	1.79		0.716	0.740		0.879	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Uranium 235	0.0629	U	0.142	0.142		0.237	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Americium 241	0.0288	U	0.0611	0.0612		0.102	pCi/g	12/20/13 15:39	01/11/14 03:50	1
Protactinium 234m	1.84	U	2.94	2.94		5.02	pCi/g	12/20/13 15:39	01/11/14 03:50	1

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-4779-2

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

Lab Sample ID: MB 160-93852/1-A

Matrix: Solid

Analysis Batch: 97574

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 93852

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.004657	U	0.0375	0.0375		0.0746	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Bismuth 212	0.0000	U	0.0352	0.0352		0.276	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Bismuth 214	0.004073	U	0.0254	0.0254		0.0495	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Lead 212	-0.001058	U	0.0177	0.0177		0.0281	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Lead 214	0.008294	U	0.0160	0.0160		0.0355	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Potassium 40	-0.09901	U	3.96	3.96		0.290	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Protactinium 231	-0.05956	U	0.231	0.231		0.420	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Radium 226	0.004073	U	0.0254	0.0254	1.00	0.0495	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Thorium 232	0.004657	U	0.0375	0.0375		0.0746	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Thorium 234	-0.1341	U	0.737	0.737		0.317	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Uranium 235	0.01321	U	0.0388	0.0389		0.0693	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Americium 241	0.002359	U	0.0139	0.0139		0.0252	pCi/g	12/20/13 15:39	01/11/14 02:40	1
Protactinium 234m	0.09068	U	0.944	0.944		1.56	pCi/g	12/20/13 15:39	01/11/14 02:40	1

Lab Sample ID: LCS 160-93852/2-A

Matrix: Solid

Analysis Batch: 97576

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 93852

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	101	98.68		10.3		0.565	pCi/g	98	87 - 116
Cesium 137	35.9	34.77		3.64		0.145	pCi/g	97	87 - 120
Cobalt 60	42.5	40.13		4.04		0.0874	pCi/g	94	87 - 115

Lab Sample ID: 160-4779-1 DU

Matrix: Solid

Analysis Batch: 97574

Client Sample ID: L101001BRS00

Prep Type: Total/NA

Prep Batch: 93852

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	Limit
Actinium 228	1.15		1.094		0.209		0.144	pCi/g	0.15	1
Bismuth 212	1.54		1.571		0.466		0.319	pCi/g	0.03	1
Bismuth 214	1.07		1.158		0.176		0.0741	pCi/g	0.26	1
Lead 212	1.00		1.118		0.170		0.0786	pCi/g	0.37	1
Lead 214	1.22		1.317		0.182		0.0950	pCi/g	0.30	1
Potassium 40	20.1		16.96		2.25		0.569	pCi/g	0.68	1
Protactinium 231	0.455	U	0.7831	U	0.365		1.40	pCi/g	0.53	1
Radium 226	1.07		1.158		0.176	1.00	0.0741	pCi/g	0.26	1
Thorium 232	1.15		1.094		0.209		0.144	pCi/g	0.15	1
Thorium 234	0.812	U	1.745		0.811		0.993	pCi/g	0.83	1
Uranium 235	0.134	U	0.09598	U	0.165		0.267	pCi/g	0.11	1
Americium 241	0.000250	U	-0.02177	U	0.0767		0.128	pCi/g	0.16	1
Protactinium 234m	2.48	U	0.09730	U	4.32		7.75	pCi/g	0.34	1

TestAmerica St. Louis

QC Association Summary

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

TestAmerica Job ID: 160-4779-2

Rad

Leach Batch: 92870

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4779-1	L101001BRS00	Total/NA	Solid	Dry and Grind	
160-4779-1 DU	L101001BRS00	Total/NA	Solid	Dry and Grind	
160-4779-2	L101002BES00	Total/NA	Solid	Dry and Grind	
160-4779-3	L101003BRS00	Total/NA	Solid	Dry and Grind	
160-4779-4	L101005BRS00	Total/NA	Solid	Dry and Grind	
160-4779-5	L101006BES00	Total/NA	Solid	Dry and Grind	
160-4779-6	L101007BRS00	Total/NA	Solid	Dry and Grind	
160-4779-7	L101008BES00	Total/NA	Solid	Dry and Grind	
160-4779-8	L101009BSS00	Total/NA	Solid	Dry and Grind	
160-4779-9	L101010BRS00	Total/NA	Solid	Dry and Grind	
160-4779-10	L101011BSQ00	Total/NA	Solid	Dry and Grind	
160-4779-11	L101011BSS00	Total/NA	Solid	Dry and Grind	
160-4779-12	L101012BRS00	Total/NA	Solid	Dry and Grind	
160-4779-13	L101013BSS00	Total/NA	Solid	Dry and Grind	
160-4779-14	L101014BRS00	Total/NA	Solid	Dry and Grind	
160-4779-15	L101015BES00	Total/NA	Solid	Dry and Grind	

Prep Batch: 93852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4779-1	L101001BRS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-1 DU	L101001BRS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-2	L101002BES00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-3	L101003BRS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-4	L101005BRS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-5	L101006BES00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-6	L101007BRS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-7	L101008BES00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-8	L101009BSS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-9	L101010BRS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-10	L101011BSQ00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-11	L101011BSS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-12	L101012BRS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-13	L101013BSS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-14	L101014BRS00	Total/NA	Solid	Fill_Geo-21	92870
160-4779-15	L101015BES00	Total/NA	Solid	Fill_Geo-21	92870
LCS 160-93852/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-93852/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

TestAmerica St. Louis