

# 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: 160-4886-2

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

For:

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

Attn: Martin Swanson



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Authorized for release by:  
1/17/2014 10:53:10 AM

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### LINKS

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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: 160-4886-2

**Job ID: 160-4886-2**

**Laboratory: TestAmerica St. Louis**

**Narrative**

## CASE NARRATIVE

**Client: Westinghouse Electric Company LLC**

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

**Report Number: 160-4886-2**

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 12/12/2013; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 13.9 C.

### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Samples L101016BUB00 (160-4886-1), L101016BUI01 (160-4886-2), L101016BUI02 (160-4886-3), L101016BUI03 (160-4886-4) and L101016BUI04 (160-4886-5) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were leached on 12/19/2013, prepared on 12/22/2013 and analyzed on 01/13/2014.

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

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.

<b>Chain of Custody ID No.</b>	F-121113-01	<b>Page</b>	1/1	<b>Requested Analysis</b>								<b>Laboratory Name:</b>			
<b>Project Name:</b> Westinghouse Electric Company				Comp (C) or Grab (G)	Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)					Total Containers	TA-MO	
<b>Contact Person:</b> Gerald Rood														<b>Laboratory Address:</b> 13715 Rider Trail North	
<b>Phone Number:</b> 314-810-3382														<b>Phone No.</b> 314-298-8566	
<b>Sampler Name:</b> Scott Jenkins														<b>Laboratory Contact Person:</b> Joe Walker	
				<b>Phone No.</b> 708-870-8453		<b>Turn Around Time</b>									
				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)						Total Containers	Remarks
L101016BUB00	12/9/2013	15:35	S	C			X	X						1	LSA-10-10 Bias Sample
L101016BUI01	12/10/2013	10:45	S	C			X	X						1	LSA-10-10 Investigation Sample
L101016BUI02	12/10/2013	13:50	S	C			X	X						1	
L101016BUI03	12/10/2013	14:00	S	C			X	X						1	
L101016BUI04	12/10/2013	14:45	S	C			X	X						1	LSA-10-10 Investigation Sample

Relinquished by:	<i>[Signature]</i>	Date/Time	12-12-13 1640	Received by:	<i>[Signature]</i>	Date/Time	12-12-13 1640	Total	5	Cooler Temperature:	Ambient
Company Name:	WEC			Company Name:	Crossroads			Cooler ID:	1211-03	Shipper and Number:	
Received by:		Date/Time		Relinquished by:	<i>[Signature]</i>	Date/Time	12-12-13 1817	Comments: Please analyze samples for Tc-99 on a 7 day TAT. Please analyze samples for Gamma Spec. after a 21 day ingrowth period.			
Company Name:				Company Name:	Crossroads						
Relinquished by:		Date/Time		Received by:	PM	Date/Time	12-12-13 18-20	Verified By:			
Company Name:				Company Name:	TA			<i>[Signature]</i>			

48810

↑  
LSA-10-10 Investigation Sample  
↓  
LSA-10-10 Investigation Sample



## Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-4886-2

**Login Number: 4886**

**List Source: TestAmerica St. Louis**

**List Number: 1**

**Creator: Clarke, Jill C**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	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	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	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: 160-4886-2

### 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.
▫	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: 160-4886-2

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

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**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: 160-4886-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-4886-1	L101016BUB00	Solid	12/09/13 15:35	12/12/13 18:20
160-4886-2	L101016BUI01	Solid	12/10/13 10:45	12/12/13 18:20
160-4886-3	L101016BUI02	Solid	12/10/13 13:50	12/12/13 18:20
160-4886-4	L101016BUI03	Solid	12/10/13 14:00	12/12/13 18:20
160-4886-5	L101016BUI04	Solid	12/10/13 14:45	12/12/13 18:20

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# Client Sample Results

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

TestAmerica Job ID: 160-4886-2

**Client Sample ID: L101016BUB00**

**Lab Sample ID: 160-4886-1**

Date Collected: 12/09/13 15:35

Matrix: Solid

Date Received: 12/12/13 18:20

**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	1.36		0.146	0.202		0.138	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Bismuth 212	1.76		0.510	0.542		0.465	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Bismuth 214	1.16		0.127	0.175		0.0869	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Lead 212	1.50		0.0918	0.214		0.0717	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Lead 214	1.25		0.113	0.172		0.0818	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Potassium 40	19.7		1.30	2.40		0.264	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Protactinium 231	0.656	U	0.285	0.294		1.39	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Radium 226	1.16		0.127	0.175	1.00	0.0869	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Thorium 232	1.36		0.146	0.202		0.138	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Thorium 234	4.82		0.990	1.11		1.15	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Uranium 235	0.612		0.203	0.212		0.257	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Americium 241	0.0319	U	0.0740	0.0740		0.123	pCi/g	12/22/13 14:33	01/13/14 12:36	1
Protactinium 234m	3.66	U	3.80	3.81		6.41	pCi/g	12/22/13 14:33	01/13/14 12:36	1

**Client Sample ID: L101016BUI01**

**Lab Sample ID: 160-4886-2**

Date Collected: 12/10/13 10:45

Matrix: Solid

Date Received: 12/12/13 18:20

**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		0.193	0.222		0.165	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Bismuth 212	0.807		0.430	0.438		0.625	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Bismuth 214	1.19		0.144	0.190		0.0903	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Lead 212	0.993		0.0882	0.156		0.0841	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Lead 214	1.29		0.122	0.181		0.0958	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Potassium 40	18.7		1.46	2.41		0.484	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Protactinium 231	0.583	U	0.391	0.397		1.20	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Radium 226	1.19		0.144	0.190	1.00	0.0903	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Thorium 232	1.07		0.193	0.222		0.165	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Thorium 234	1.82		0.839	0.860		1.05	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Uranium 235	0.125	U	0.109	0.110		0.306	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Americium 241	0.0431	U	0.0775	0.0777		0.129	pCi/g	12/22/13 14:33	01/13/14 12:37	1
Protactinium 234m	0.438	U	4.39	4.39		7.90	pCi/g	12/22/13 14:33	01/13/14 12:37	1

**Client Sample ID: L101016BUI02**

**Lab Sample ID: 160-4886-3**

Date Collected: 12/10/13 13:50

Matrix: Solid

Date Received: 12/12/13 18:20

**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	1.04		0.131	0.168		0.0941	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Bismuth 212	1.39		0.511	0.531		0.506	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Bismuth 214	1.24		0.124	0.179		0.0678	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Lead 212	1.08		0.0843	0.163		0.0703	pCi/g	12/22/13 14:33	01/13/14 14:13	1

TestAmerica St. Louis

# Client Sample Results

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

TestAmerica Job ID: 160-4886-2

**Client Sample ID: L101016BUJ02**

**Lab Sample ID: 160-4886-3**

Date Collected: 12/10/13 13:50

Matrix: Solid

Date Received: 12/12/13 18:20

**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	1.18		0.100	0.159		0.0972	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Potassium 40	18.6		1.37	2.34		0.402	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Protactinium 231	0.468	U	0.294	0.298		1.34	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Radium 226	1.24		0.124	0.179	1.00	0.0678	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Thorium 232	1.04		0.131	0.168		0.0941	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Thorium 234	1.32		0.391	0.415		0.987	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Uranium 235	0.209	U	0.176	0.177		0.231	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Americium 241	-0.0284	U	0.0679	0.0679		0.113	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Protactinium 234m	1.75	U	3.33	3.33		5.68	pCi/g	12/22/13 14:33	01/13/14 14:13	1

**Client Sample ID: L101016BUJ03**

**Lab Sample ID: 160-4886-4**

Date Collected: 12/10/13 14:00

Matrix: Solid

Date Received: 12/12/13 18:20

**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		0.157	0.195		0.171	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Bismuth 212	0.797		0.456	0.463		0.667	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Bismuth 214	1.26		0.163	0.204		0.104	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Lead 212	1.08		0.0958	0.151		0.0867	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Lead 214	1.24		0.130	0.177		0.0870	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Potassium 40	19.6		1.56	2.46		0.415	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Protactinium 231	0.779	U	0.501	0.506		1.45	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Radium 226	1.26		0.163	0.204	1.00	0.104	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Thorium 232	1.20		0.157	0.195		0.171	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Thorium 234	1.80		0.490	0.521		1.16	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Uranium 235	1.09		0.266	0.286		0.347	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Americium 241	0.0224	U	0.0773	0.0773		0.130	pCi/g	12/22/13 14:33	01/13/14 14:13	1
Protactinium 234m	-0.344	U	16.1	16.1		7.77	pCi/g	12/22/13 14:33	01/13/14 14:13	1

**Client Sample ID: L101016BUJ04**

**Lab Sample ID: 160-4886-5**

Date Collected: 12/10/13 14:45

Matrix: Solid

Date Received: 12/12/13 18:20

**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	1.28		0.139	0.187		0.138	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Bismuth 212	1.86		0.530	0.560		0.440	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Bismuth 214	1.25		0.126	0.175		0.0790	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Lead 212	1.21		0.0873	0.157		0.0734	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Lead 214	1.42		0.108	0.175		0.0896	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Potassium 40	20.3		1.32	2.35		0.315	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Protactinium 231	-0.722	U	0.803	0.806		1.32	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Radium 226	1.25		0.126	0.175	1.00	0.0790	pCi/g	12/22/13 14:33	01/13/14 14:14	1

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# Client Sample Results

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

TestAmerica Job ID: 160-4886-2

**Client Sample ID: L101016BUJ04**

**Lab Sample ID: 160-4886-5**

Date Collected: 12/10/13 14:45

Matrix: Solid

Date Received: 12/12/13 18:20

**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	1.28		0.139	0.187		0.138	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Thorium 234	1.15		0.344	0.362		0.873	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Uranium 235	0.222	U	0.151	0.153		0.226	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Americium 241	-0.0271	U	0.0646	0.0646		0.108	pCi/g	12/22/13 14:33	01/13/14 14:14	1
Protactinium 234m	0.755	U	1.31	1.32		7.19	pCi/g	12/22/13 14:33	01/13/14 14:14	1



# QC Sample Results

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

TestAmerica Job ID: 160-4886-2

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

**Lab Sample ID: MB 160-94214/1-A**  
**Matrix: Solid**  
**Analysis Batch: 97886**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 94214**

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.006816	U	0.00862	0.00865		0.0537	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Bismuth 212	-0.0008134	U	0.114	0.114		0.216	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Bismuth 214	-0.003982	U	0.0148	0.0148		0.0381	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Lead 212	0.005171	U	0.0136	0.0137		0.0228	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Lead 214	-0.01449	U	27.2	27.2		0.0346	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Potassium 40	-0.08869	U	1.94	1.94		0.299	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Protactinium 231	0.1075	U	0.178	0.179		0.302	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Radium 226	-0.003982	U	0.0148	0.0148	1.00	0.0381	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Thorium 232	0.006816	U	0.00862	0.00865		0.0537	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Thorium 234	-0.07545	U	0.361	0.361		0.273	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Uranium 235	0.01745	U	0.0308	0.0309		0.0611	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Americium 241	-0.0007443	U	0.0147	0.0147		0.0263	pCi/g	12/22/13 14:33	01/13/14 14:10	1
Protactinium 234m	-0.5770	U	35.1	35.1		2.10	pCi/g	12/22/13 14:33	01/13/14 14:10	1

**Lab Sample ID: LCS 160-94214/2-A**  
**Matrix: Solid**  
**Analysis Batch: 98433**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 94214**

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec.
				Uncert. (2σ+/-)					Limits
Americium 241	101	96.66		10.1		0.478	pCi/g	96	87 - 116
Cesium 137	35.9	33.26		3.48		0.164	pCi/g	93	87 - 120
Cobalt 60	42.4	38.75		3.90		0.113	pCi/g	91	87 - 115

**Lab Sample ID: 160-4881-A-1-G DU**  
**Matrix: Solid**  
**Analysis Batch: 98128**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 94214**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total	RL	MDC	Unit	RER	RER
					Uncert. (2σ+/-)					Limit
Actinium 228	0.945		1.016		0.162		0.119	pCi/g	0.21	1
Bismuth 212	1.54		1.037		0.405		0.519	pCi/g	0.57	1
Bismuth 214	1.05		1.154		0.167		0.0664	pCi/g	0.30	1
Lead 212	0.904		0.9491		0.144		0.0636	pCi/g	0.16	1
Lead 214	1.10		1.200		0.159		0.0873	pCi/g	0.30	1
Potassium 40	18.1		18.78		2.32		0.278	pCi/g	0.14	1
Protactinium 231	-0.737	U	0.5499	U	0.373		1.30	pCi/g	1.04	1
Radium 226	1.05		1.154		0.167	1.00	0.0664	pCi/g	0.30	1
Thorium 232	0.945		1.016		0.162		0.119	pCi/g	0.21	1
Thorium 234	2.53		2.623		0.816		0.953	pCi/g	0.05	1
Uranium 235	0.526		0.6243		0.184		0.210	pCi/g	0.28	1
Americium 241	-0.0157	U	-0.01084	U	0.0664		0.112	pCi/g	0.03	1
Protactinium 234m	7.96		5.213	U	3.65		6.14	pCi/g	0.35	1

# QC Association Summary

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

TestAmerica Job ID: 160-4886-2

## Rad

### Leach Batch: 93345

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4881-A-1-G DU	Duplicate	Total/NA	Solid	Dry and Grind	

### Leach Batch: 93354

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4886-1	L101016BUB00	Total/NA	Solid	Dry and Grind	
160-4886-2	L101016BUI01	Total/NA	Solid	Dry and Grind	
160-4886-3	L101016BUI02	Total/NA	Solid	Dry and Grind	
160-4886-4	L101016BUI03	Total/NA	Solid	Dry and Grind	
160-4886-5	L101016BUI04	Total/NA	Solid	Dry and Grind	

### Prep Batch: 94214

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4881-A-1-G DU	Duplicate	Total/NA	Solid	Fill_Geo-21	93345
160-4886-1	L101016BUB00	Total/NA	Solid	Fill_Geo-21	93354
160-4886-2	L101016BUI01	Total/NA	Solid	Fill_Geo-21	93354
160-4886-3	L101016BUI02	Total/NA	Solid	Fill_Geo-21	93354
160-4886-4	L101016BUI03	Total/NA	Solid	Fill_Geo-21	93354
160-4886-5	L101016BUI04	Total/NA	Solid	Fill_Geo-21	93354
LCS 160-94214/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-94214/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	