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: 160-4764-2
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 9:23:03 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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Job ID: 160-4764-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

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

Report Number: 160-4764-2

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 12/04/2013 and 12/04/2013; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 20.2 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples L100701BUI01 (160-4764-1), L100701BUI02 (160-4764-2), L100701BUI03 (160-4764-3), L100701BUI04 (160-4764-4), L100715BUB00 (160-4764-5), L100716BUB00 (160-4764-6), L100610BUB00 (160-4764-7), L100611BUB00 (160-4764-8) and L100612BUB00 (160-4764-9) 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 01/10/2014 and 01/11/2014.

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.

4764

Chain of Cutody ID No. F-120413-02 **Page** 1/1

Project Name:
Westinghouse Electric Company

Contact Person:
Gerald Rood

Phone Number:
314-810-3382

Sampler Name
Scott Jenkins

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)

Sample ID	Date	Time	Matrix	Comp (C) or Grab (G)	Requested Analysis: Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)						Total Containers	Remarks
L100701BUI01	12/3/2013	14:50	S	C			X	X						1	LSA-10-07 Investigation
L100701BUI02	12/3/2013	14:55	S	C			X	X						1	LSA-10-07 Investigation
L100701BUI03	12/3/2013	15:05	S	C			X	X						1	LSA-10-07 Investigation
L100701BUI04	12/3/2013	15:10	S	C			X	X						1	LSA-10-07 Investigation
L100715BUB00	12/3/2013	14:40	S	C			X	X						1	LSA-10-07 Bias Samples
L100716BUB00	12/3/2013	15:30	S	C			X	X						1	LSA-10-07 Bias Samples

Relinquished by:	Date/Time 12-4-13 1645	Received by:	Date/Time 12-4 16:45	Total 6	Cooler Temperature: Ambient
Company Name: WEL		Company Name: Crossroads		Cooler ID: 1204-02	Shipper and Number:
Received by:	Date/Time	Relinquished by:	Date/Time 12-4 1845	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:	Date/Time 12/4/13 1845	Verified By:	
Company Name:		Company Name: FT			

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 Cutody ID No. F-120413-01 **Page** 1/1

Project Name:
Westinghouse Electric Company

Contact Person:
Gerald Rood

Phone Number:
314-810-3382

Sampler Name
Scott Jenkins

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)

Sample ID	Date	Time	Matrix	Comp (C) or Grab (G)	Requested Analysis: Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)						Total Containers	Remarks
L100610BUB00	12/3/2013	16:05	S	C			X	X						1	LSA-10-06 Bias Samples
L100611BUB00	12/3/2013	15:50	S	C			X	X						1	LSA-10-06 Bias Samples
L100612BUB00	12/3/2013	15:40	S	C			X	X						1	LSA-10-06 Bias Samples

Relinquished by: [signature]	Date/Time 12-4-13 1645	Received by: [signature]	Date/Time 12-4 1645	Total 3	Cooler Temperature: Ambient
Company Name: WEC		Company Name: Crossroads		Cooler ID: 1204-02	Shipper and Number:
Received by:	Date/Time	Relinquished by: [signature]	Date/Time 12-4 1845	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: [signature]	Date/Time 12/4/13 1845	Verified By: [signature]	
Company Name:		Company Name: IA			

Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-4764-2

Login Number: 4764

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	

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: 160-4764-2

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: 160-4764-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-4764-1	L100701BUI01	Solid	12/03/13 14:50	12/04/13 18:30
160-4764-2	L100701BUI02	Solid	12/03/13 14:55	12/04/13 18:30
160-4764-3	L100701BUI03	Solid	12/03/13 15:05	12/04/13 18:30
160-4764-4	L100701BUI04	Solid	12/03/13 15:10	12/04/13 18:30
160-4764-5	L100715BUB00	Solid	12/03/13 14:40	12/04/13 18:30
160-4764-6	L100716BUB00	Solid	12/03/13 15:30	12/04/13 18:30
160-4764-7	L100610BUB00	Solid	12/03/13 16:05	12/04/13 18:45
160-4764-8	L100611BUB00	Solid	12/03/13 15:50	12/04/13 18:45
160-4764-9	L100612BUB00	Solid	12/03/13 15:40	12/04/13 18:45

Client Sample ID: L100701BUI01 — **Lab Sample ID: 160-4764-1**
Date Collected: 12/03/13 14:50 — **Matrix: Solid**
Date Received: 12/04/13 18:30

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	1.18		0.144	0.187		0.0566	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Bismuth 212	1.38		0.415	0.439		0.364	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Bismuth 214	1.26		0.117	0.176		0.0690	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Lead 212	1.11		0.0769	0.163		0.0634	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Lead 214	1.25		0.107	0.169		0.0794	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Potassium 40	19.6		1.26	2.37		0.341	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Protactinium 231	0.582	U	0.335	0.341		0.930	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Radium 226	1.26		0.117	0.176	1.00	0.0690	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Thorium 232	1.18		0.144	0.187		0.0566	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Thorium 234	1.13		0.340	0.360		0.865	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Uranium 235	0.214		0.157	0.158		0.213	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Americium 241	0.00448	U	0.0585	0.0585		0.0992	pCi/g	12/20/13 10:21	01/10/14 18:25	1
Protactinium 234m	-0.220	U	3.70	3.70		6.54	pCi/g	12/20/13 10:21	01/10/14 18:25	1

Client Sample ID: L100701BUI02 — **Lab Sample ID: 160-4764-2**
Date Collected: 12/03/13 14:55 — **Matrix: Solid**
Date Received: 12/04/13 18:30

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		0.132	0.167		0.169	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Bismuth 212	1.50		0.454	0.480		0.370	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Bismuth 214	1.06		0.117	0.161		0.0757	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Lead 212	0.937		0.0769	0.144		0.0720	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Lead 214	1.21		0.106	0.165		0.0739	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Potassium 40	17.9		1.30	2.25		0.392	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Protactinium 231	0.420	U	0.251	0.256		1.28	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Radium 226	1.06		0.117	0.161	1.00	0.0757	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Thorium 232	1.00		0.132	0.167		0.169	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Thorium 234	1.62		0.764	0.783		0.941	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Uranium 235	0.132	U	0.129	0.129		0.213	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Americium 241	0.00847	U	0.0674	0.0674		0.113	pCi/g	12/20/13 10:21	01/10/14 18:26	1
Protactinium 234m	4.60	U	2.33	2.37		7.66	pCi/g	12/20/13 10:21	01/10/14 18:26	1

Client Sample ID: L100701BUI03 — **Lab Sample ID: 160-4764-3**
Date Collected: 12/03/13 15:05 — **Matrix: Solid**
Date Received: 12/04/13 18:30

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	1.12		0.126	0.170		0.105	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Bismuth 212	1.08		0.343	0.361		0.460	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Bismuth 214	1.13		0.0994	0.154		0.0649	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Lead 212	1.05		0.0686	0.153		0.0567	pCi/g	12/20/13 10:21	01/10/14 18:27	1

Client Sample ID: L100701BUI03 — **Lab Sample ID: 160-4764-3**
Date Collected: 12/03/13 15:05 — **Matrix: Solid**
Date Received: 12/04/13 18:30

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
Lead 214	1.22		0.0888	0.155		0.0660	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Potassium 40	19.7		1.10	2.30		0.260	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Protactinium 231	0.415	U	0.197	0.202		1.01	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Radium 226	1.13		0.0994	0.154	1.00	0.0649	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Thorium 232	1.12		0.126	0.170		0.105	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Thorium 234	1.36		0.617	0.634		0.821	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Uranium 235	0.0755	U	0.146	0.146		0.229	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Americium 241	0.000553	U	0.0615	0.0615		0.104	pCi/g	12/20/13 10:21	01/10/14 18:27	1
Protactinium 234m	1.82	U	2.73	2.73		4.64	pCi/g	12/20/13 10:21	01/10/14 18:27	1

Client Sample ID: L100701BUI04 — **Lab Sample ID: 160-4764-4**
Date Collected: 12/03/13 15:10 — **Matrix: Solid**
Date Received: 12/04/13 18:30

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		0.163	0.202		0.121	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Bismuth 212	1.47		0.494	0.517		0.441	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Bismuth 214	1.21		0.130	0.181		0.0764	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Lead 212	1.17		0.0901	0.177		0.0791	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Lead 214	1.27		0.117	0.177		0.0965	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Potassium 40	20.4		1.50	2.57		0.463	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Protactinium 231	0.465	U	0.270	0.275		1.50	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Radium 226	1.21		0.130	0.181	1.00	0.0764	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Thorium 232	1.17		0.163	0.202		0.121	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Thorium 234	1.82		0.781	0.804		1.00	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Uranium 235	0.0575	U	0.174	0.174		0.269	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Americium 241	0.0703	U	0.0676	0.0680		0.0934	pCi/g	12/20/13 10:21	01/11/14 02:01	1
Protactinium 234m	1.53	U	3.82	3.83		6.61	pCi/g	12/20/13 10:21	01/11/14 02:01	1

Client Sample ID: L100715BUB00 — **Lab Sample ID: 160-4764-5**
Date Collected: 12/03/13 14:40 — **Matrix: Solid**
Date Received: 12/04/13 18:30

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		0.148	0.189		0.0908	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Bismuth 212	0.973		0.337	0.351		0.459	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Bismuth 214	1.21		0.111	0.167		0.0744	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Lead 212	1.13		0.0704	0.163		0.0540	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Lead 214	1.22		0.0983	0.161		0.0810	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Potassium 40	18.1		1.10	2.15		0.384	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Protactinium 231	0.465	U	0.422	0.425		0.708	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Radium 226	1.21		0.111	0.167	1.00	0.0744	pCi/g	12/20/13 10:21	01/11/14 01:56	1

Client Sample ID: L100715BUB00

Lab Sample ID: 160-4764-5

Date Collected: 12/03/13 14:40

Matrix: Solid

Date Received: 12/04/13 18:30

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	**1.15**		0.148	0.189		0.0908	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Thorium 234	0.971	U	0.401	0.414		0.985	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Uranium 235	**1.87**		0.228	0.297		0.232	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Americium 241	0.0181	U	0.0702	0.0702		0.117	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Protactinium 234m	0.623	U	2.83	2.83		5.05	pCi/g	12/20/13 10:21	01/11/14 01:56	1

Client Sample ID: L100716BUB00

Lab Sample ID: 160-4764-6

Date Collected: 12/03/13 15:30

Matrix: Solid

Date Received: 12/04/13 18:30

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	**1.14**		0.124	0.170		0.132	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Bismuth 212	**0.832**		0.321	0.332		0.444	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Bismuth 214	**1.16**		0.0985	0.156		0.0509	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Lead 212	**1.09**		0.0802	0.162		0.0829	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Lead 214	**1.31**		0.0906	0.164		0.0806	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Potassium 40	**21.3**		1.19	2.48		0.298	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Protactinium 231	-0.698	U	0.786	0.790		1.29	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Radium 226	**1.16**		0.0985	0.156	1.00	0.0509	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Thorium 232	**1.14**		0.124	0.170		0.132	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Thorium 234	**0.949**		0.655	0.663		0.883	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Uranium 235	0.164	U	0.138	0.139		0.201	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Americium 241	0.0136	U	0.0676	0.0676		0.113	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Protactinium 234m	0.156	U	1.47	1.47		3.92	pCi/g	12/20/13 10:21	01/11/14 01:57	1

Client Sample ID: L100610BUB00

Lab Sample ID: 160-4764-7

Date Collected: 12/03/13 16:05

Matrix: Solid

Date Received: 12/04/13 18:45

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	**1.26**		0.137	0.188		0.139	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Bismuth 212	**1.48**		0.410	0.438		0.367	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Bismuth 214	**1.05**		0.111	0.155		0.0675	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Lead 212	**1.13**		0.0794	0.167		0.0669	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Lead 214	**1.18**		0.0968	0.156		0.0773	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Potassium 40	**20.9**		1.33	2.51		0.362	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Protactinium 231	-0.756	U	0.829	0.833		1.36	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Radium 226	**1.05**		0.111	0.155	1.00	0.0675	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Thorium 232	**1.26**		0.137	0.188		0.139	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Thorium 234	**0.924**		0.311	0.326		0.807	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Uranium 235	0.123	U	0.161	0.161		0.244	pCi/g	12/20/13 10:21	01/11/14 01:55	1
Americium 241	0.0122	U	0.0545	0.0546		0.0923	pCi/g	12/20/13 10:21	01/11/14 01:55	1

Client Sample ID: L100610BUB00 — **Lab Sample ID: 160-4764-7**
Date Collected: 12/03/13 16:05 — **Matrix: Solid**
Date Received: 12/04/13 18:45

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	1.09	U	3.05	3.05		5.29	pCi/g	12/20/13 10:21	01/11/14 01:55	1

Client Sample ID: L100611BUB00 — **Lab Sample ID: 160-4764-8**
Date Collected: 12/03/13 15:50 — **Matrix: Solid**
Date Received: 12/04/13 18:45

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	**1.03**		0.176	0.205		0.137	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Bismuth 212	**1.53**		0.585	0.606		0.507	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Bismuth 214	**1.13**		0.116	0.165		0.0651	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Lead 212	**1.10**		0.0844	0.166		0.0728	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Lead 214	**1.24**		0.106	0.167		0.0946	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Potassium 40	**18.3**		1.33	2.30		0.275	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Protactinium 231	0.330	U	0.242	0.245		1.34	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Radium 226	**1.13**		0.116	0.165	1.00	0.0651	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Thorium 232	**1.03**		0.176	0.205		0.137	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Thorium 234	**3.01**		0.886	0.940		1.06	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Uranium 235	**0.889**		0.256	0.271		0.265	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Americium 241	-0.00860	U	0.0799	0.0799		0.134	pCi/g	12/20/13 10:21	01/11/14 01:56	1
Protactinium 234m	2.15	U	3.85	3.85		6.51	pCi/g	12/20/13 10:21	01/11/14 01:56	1

Client Sample ID: L100612BUB00 — **Lab Sample ID: 160-4764-9**
Date Collected: 12/03/13 15:40 — **Matrix: Solid**
Date Received: 12/04/13 18:45

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	**1.08**		0.134	0.174		0.119	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Bismuth 212	**1.35**		0.448	0.470		0.408	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Bismuth 214	**0.997**		0.0980	0.143		0.0662	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Lead 212	**1.10**		0.0715	0.160		0.0558	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Lead 214	**1.14**		0.0903	0.149		0.0594	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Potassium 40	**18.1**		1.10	2.16		0.287	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Protactinium 231	0.357	U	0.398	0.400		1.00	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Radium 226	**0.997**		0.0980	0.143	1.00	0.0662	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Thorium 232	**1.08**		0.134	0.174		0.119	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Thorium 234	**1.34**		0.695	0.709		0.886	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Uranium 235	0.143	U	0.135	0.136		0.221	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Americium 241	-0.0190	U	0.0551	0.0551		0.0922	pCi/g	12/20/13 10:21	01/11/14 01:57	1
Protactinium 234m	0.0867	U	2.94	2.94		5.33	pCi/g	12/20/13 10:21	01/11/14 01:57	1

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

TestAmerica Job ID: 160-4764-2

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

Lab Sample ID: MB 160-93557/1-A
Matrix: Solid
Analysis Batch: 97316

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 93557

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0000	U	0.0222	0.0222		0.0537	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Bismuth 212	0.02844	U	0.0829	0.0829		0.152	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Bismuth 214	-0.002331	U	0.0208	0.0208		0.0360	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Lead 212	-0.005957	U	0.0322	0.0322		0.0244	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Lead 214	-0.01237	U	0.119	0.119		0.0323	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Potassium 40	-0.07423	U	2.97	2.97		0.182	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Protactinium 231	0.009655	U	0.0847	0.0847		0.300	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Radium 226	-0.002331	U	0.0208	0.0208	1.00	0.0360	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Thorium 232	0.0000	U	0.0222	0.0222		0.0537	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Thorium 234	-0.01643	U	0.175	0.175		0.273	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Uranium 235	0.02249	U	0.0371	0.0372		0.0579	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Americium 241	0.0000	U	0.0126	0.0126		0.0291	pCi/g	12/20/13 10:21	01/10/14 17:04	1
Protactinium 234m	0.0000	U	0.241	0.241		2.86	pCi/g	12/20/13 10:21	01/10/14 17:04	1

Lab Sample ID: LCS 160-93557/2-A
Matrix: Solid
Analysis Batch: 97309

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 93557

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium 241			101	99.73		10.4		0.492	pCi/g	99	87 - 116		
Cesium 137			35.9	35.17		3.69		0.202	pCi/g	98	87 - 120		
Cobalt 60			42.5	41.32		4.17		0.117	pCi/g	97	87 - 115		

Lab Sample ID: 160-4704-A-1-I DU
Matrix: Solid
Analysis Batch: 97314

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 93557

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Actinium 228	1.04			1.033		0.167		0.0602	pCi/g			0.01	1
Bismuth 212	0.819			1.068		0.381		0.361	pCi/g			0.34	1
Bismuth 214	1.26			1.402		0.182		0.0605	pCi/g			0.37	1
Lead 212	1.00			1.028		0.149		0.0509	pCi/g			0.09	1
Lead 214	1.44			1.485		0.187		0.0806	pCi/g			0.13	1
Potassium 40	16.6			17.24		2.05		0.312	pCi/g			0.16	1
Protactinium 231	-0.591	U		-0.6256	U	0.716		1.17	pCi/g			0.02	1
Radium 226	1.26			1.402		0.182	1.00	0.0605	pCi/g			0.37	1
Thorium 232	1.04			1.033		0.167		0.0602	pCi/g			0.01	1
Thorium 234	1.84			1.457		0.707		0.871	pCi/g			0.24	1
Uranium 235	0.142	U		0.09667	U	0.141		0.242	pCi/g			0.15	1
Americium 241	0.000206	U		-0.01055	U	0.0639		0.107	pCi/g			0.08	1
Protactinium 234m	0.0192	U		0.7795	U	2.86		5.05	pCi/g			0.12	1

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

TestAmerica Job ID: 160-4764-2

Rad

Leach Batch: 92866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4704-A-1-I DU	Duplicate	Total/NA	Solid	Dry and Grind	

Leach Batch: 92876

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4764-1	L100701BUI01	Total/NA	Solid	Dry and Grind	
160-4764-2	L100701BUI02	Total/NA	Solid	Dry and Grind	
160-4764-3	L100701BUI03	Total/NA	Solid	Dry and Grind	
160-4764-4	L100701BUI04	Total/NA	Solid	Dry and Grind	
160-4764-5	L100715BUB00	Total/NA	Solid	Dry and Grind	
160-4764-6	L100716BUB00	Total/NA	Solid	Dry and Grind	
160-4764-7	L100610BUB00	Total/NA	Solid	Dry and Grind	
160-4764-8	L100611BUB00	Total/NA	Solid	Dry and Grind	
160-4764-9	L100612BUB00	Total/NA	Solid	Dry and Grind	

Prep Batch: 93557

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4704-A-1-I DU	Duplicate	Total/NA	Solid	Fill_Geo-21	92866
160-4764-1	L100701BUI01	Total/NA	Solid	Fill_Geo-21	92876
160-4764-2	L100701BUI02	Total/NA	Solid	Fill_Geo-21	92876
160-4764-3	L100701BUI03	Total/NA	Solid	Fill_Geo-21	92876
160-4764-4	L100701BUI04	Total/NA	Solid	Fill_Geo-21	92876
160-4764-5	L100715BUB00	Total/NA	Solid	Fill_Geo-21	92876
160-4764-6	L100716BUB00	Total/NA	Solid	Fill_Geo-21	92876
160-4764-7	L100610BUB00	Total/NA	Solid	Fill_Geo-21	92876
160-4764-8	L100611BUB00	Total/NA	Solid	Fill_Geo-21	92876
160-4764-9	L100612BUB00	Total/NA	Solid	Fill_Geo-21	92876
LCS 160-93557/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-93557/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	