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: 160-3570-2
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:
9/26/2013 4:20:36 PM

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Job ID: 160-3570-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

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

Report Number: 160-3570-2

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 08/29/2013; 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 L050101TUB00 (160-3570-1), L050105TUB00 (160-3570-2), L050107TUB00 (160-3570-3), L050109TUB00 (160-3570-4), L050111TUB00 (160-3570-5), L050113TUB00 (160-3570-6), L050115TUB00 (160-3570-7) and L050117TUB00 (160-3570-8) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 08/30/2013, prepared on 09/04/2013 and analyzed on 09/25/2013.

Batch 70612:
For gamma spectroscopy batch 70612, insufficient sample was provided for the following sample to fill a tuna can calibrated for Ra-226 analysis by gamma spectroscopy: L050101TUB00 (160-3570-1). Therefore the sample was placed into a 100 mL geometry. The use of a different geometry could potentially bias the results low due to the loss of radon into the headspace of the container.

Job ID: 160-3570-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

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

3570

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-082913-01 **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)

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
L050101TUB00	8/23/2013	14:45	S	C	X		X	X						1	
L050105TUB00	8/23/2013	13:40	S	C	X		X	X						1	
L050107TUB00	8/23/2013	14:15	S	C	X		X	X						1	
L050109TUB00	8/23/2013	13:05	S	C	X		X	X						1	
L050111TUB00	8/22/2013	15:40	S	C	X		X	X						1	
L050113TUB00	8/22/2013	15:20	S	C	X		X	X						1	
L050115TUB00	8/22/2013	15:02	S	C	X		X	X						1	
L050117TUB00	8/22/2013	14:20	S	C	X		X	X						1	

Relinquished by:	Date/Time: 8/28/13 1600	Received by: Joe Bradshaw	Date/Time 8-29-13 16:	Total 8	Cooler Temperature: Ambient
Company Name: WEC		Company Name: Crossroads		Cooler ID: 0829-04	Shipper and Number:
Received by:	Date/Time	Relinquished by: Joe Bradshaw	Date/Time 8-29 18:30	Comments: Please re-analyze samples after 21 day ingrowth period.	
Company Name:		Company Name: Crossroads			
Relinquished by:	Date/Time	Received by:	Date/Time 8-29-13 18:38	Verified By:	
Company Name:		Company Name: TestAmerica			

COPY

Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-3570-2

Login Number: 3570

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian J

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	
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: 160-3570-2

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: 160-3570-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-3570-1	L050101TUB00	Solid	08/23/13 14:45	08/29/13 18:38
160-3570-2	L050105TUB00	Solid	08/23/13 13:40	08/29/13 18:38
160-3570-3	L050107TUB00	Solid	08/23/13 14:15	08/29/13 18:38
160-3570-4	L050109TUB00	Solid	08/23/13 13:05	08/29/13 18:38
160-3570-5	L050111TUB00	Solid	08/22/13 15:40	08/29/13 18:38
160-3570-6	L050113TUB00	Solid	08/22/13 15:20	08/29/13 18:38
160-3570-7	L050115TUB00	Solid	08/22/13 15:02	08/29/13 18:38
160-3570-8	L050117TUB00	Solid	08/22/13 14:20	08/29/13 18:38

Client Sample ID: L050101TUB00 — **Lab Sample ID: 160-3570-1**
Date Collected: 08/23/13 14:45 — **Matrix: Solid**
Date Received: 08/29/13 18:38

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	0.159	U	0.171	0.171		0.358	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Bismuth 212	-0.0842	U	0.591	0.591		1.07	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Bismuth 214	**1.08**		0.212	0.240		0.197	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Lead 212	**0.147**		0.102	0.104		0.146	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Lead 214	**1.17**		0.196	0.231		0.198	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Potassium 40	0.885	U	0.767	0.772		1.39	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Protactinium 231	-0.436	U	1.35	1.35		2.33	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Radium 226	**1.08**		0.212	0.240	1.00	0.197	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Thorium 232	0.159	U	0.171	0.171		0.358	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Thorium 234	**3.23**		1.30	1.34		1.57	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Uranium 235	**0.829**		0.353	0.363		0.406	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Americium 241	0.0429	U	0.102	0.102		0.172	pCi/g	09/04/13 14:28	09/25/13 03:50	1
Protactinium 234m	1.72	U	6.43	6.43		11.5	pCi/g	09/04/13 14:28	09/25/13 03:50	1

Client Sample ID: L050105TUB00 — **Lab Sample ID: 160-3570-2**
Date Collected: 08/23/13 13:40 — **Matrix: Solid**
Date Received: 08/29/13 18:38

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	**0.204**		0.0814	0.0840		0.127	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Bismuth 212	0.143	U	0.231	0.232		0.391	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Bismuth 214	**0.707**		0.0885	0.115		0.0445	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Lead 212	**0.221**		0.0425	0.0512		0.0488	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Lead 214	**0.732**		0.0779	0.109		0.0619	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Potassium 40	**6.85**		0.823	1.08		0.308	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Protactinium 231	0.0189	U	0.0669	0.0669		0.796	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Radium 226	**0.707**		0.0885	0.115	1.00	0.0445	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Thorium 232	**0.204**		0.0814	0.0840		0.127	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Thorium 234	**1.31**		0.310	0.339		0.665	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Uranium 235	0.115	U	0.102	0.102		0.200	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Americium 241	-0.000848	U	0.0486	0.0486		0.0692	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Protactinium 234m	2.05	U	3.23	3.24		5.09	pCi/g	09/04/13 14:28	09/25/13 08:37	1

Client Sample ID: L050107TUB00 — **Lab Sample ID: 160-3570-3**
Date Collected: 08/23/13 14:15 — **Matrix: Solid**
Date Received: 08/29/13 18:38

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	**0.136**		0.0578	0.0595		0.102	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Bismuth 212	0.0238	U	0.195	0.196		0.359	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Bismuth 214	**0.745**		0.0868	0.116		0.0463	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Lead 212	**0.151**		0.0340	0.0392		0.0412	pCi/g	09/04/13 14:28	09/25/13 08:37	1

Client Sample ID: L050107TUB00 — **Lab Sample ID: 160-3570-3**
Date Collected: 08/23/13 14:15 — **Matrix: Solid**
Date Received: 08/29/13 18:38

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	**0.843**		0.0798	0.119		0.0591	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Potassium 40	**2.58**		0.476	0.544		0.258	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Protactinium 231	-0.191	U	0.419	0.420		0.714	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Radium 226	**0.745**		0.0868	0.116	1.00	0.0463	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Thorium 232	**0.136**		0.0578	0.0595		0.102	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Thorium 234	**1.32**		0.271	0.304		0.634	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Uranium 235	**0.334**		0.134	0.138		0.175	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Americium 241	-0.00119	U	0.0436	0.0436		0.0745	pCi/g	09/04/13 14:28	09/25/13 08:37	1
Protactinium 234m	3.75	U	2.21	2.25		4.33	pCi/g	09/04/13 14:28	09/25/13 08:37	1

Client Sample ID: L050109TUB00 — **Lab Sample ID: 160-3570-4**
Date Collected: 08/23/13 13:05 — **Matrix: Solid**
Date Received: 08/29/13 18:38

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	**0.221**		0.0447	0.0501		0.0237	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Bismuth 212	0.126	U	0.142	0.142		0.229	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Bismuth 214	**0.914**		0.0769	0.122		0.0364	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Lead 212	**0.120**		0.0304	0.0341		0.0419	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Lead 214	**1.04**		0.0774	0.133		0.0414	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Potassium 40	**2.11**		0.339	0.402		0.170	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Protactinium 231	0.0572	U	0.198	0.198		0.520	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Radium 226	**0.914**		0.0769	0.122	1.00	0.0364	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Thorium 232	**0.221**		0.0447	0.0501		0.0237	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Thorium 234	**2.37**		0.563	0.615		0.644	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Uranium 235	**0.457**		0.122	0.130		0.162	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Americium 241	0.000275	U	0.0370	0.0370		0.0630	pCi/g	09/04/13 14:28	09/25/13 08:38	1
Protactinium 234m	**3.57**		2.34	2.36		3.19	pCi/g	09/04/13 14:28	09/25/13 08:38	1

Client Sample ID: L050111TUB00 — **Lab Sample ID: 160-3570-5**
Date Collected: 08/22/13 15:40 — **Matrix: Solid**
Date Received: 08/29/13 18:38

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	**0.264**		0.0531	0.0596		0.0590	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Bismuth 212	0.235	U	0.189	0.190		0.295	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Bismuth 214	**0.685**		0.0669	0.0977		0.0401	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Lead 212	**0.195**		0.0316	0.0404		0.0377	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Lead 214	**0.779**		0.0609	0.101		0.0460	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Potassium 40	**5.56**		0.549	0.790		0.263	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Protactinium 231	0.227	U	0.243	0.244		0.488	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Radium 226	**0.685**		0.0669	0.0977	1.00	0.0401	pCi/g	09/04/13 14:28	09/25/13 09:33	1

Client Sample ID: L050111TUB00

Lab Sample ID: 160-3570-5

Date Collected: 08/22/13 15:40

Matrix: Solid

Date Received: 08/29/13 18:38

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	**0.264**		0.0531	0.0596		0.0590	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Thorium 234	**1.64**		0.433	0.466		0.531	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Uranium 235	**0.318**		0.101	0.106		0.116	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Americium 241	0.0131	U	0.0387	0.0387		0.0649	pCi/g	09/04/13 14:28	09/25/13 09:33	1
Protactinium 234m	2.24	U	1.19	1.21		3.61	pCi/g	09/04/13 14:28	09/25/13 09:33	1

Client Sample ID: L050113TUB00

Lab Sample ID: 160-3570-6

Date Collected: 08/22/13 15:20

Matrix: Solid

Date Received: 08/29/13 18:38

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	**0.197**		0.0594	0.0627		0.0482	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Bismuth 212	0.209	U	0.158	0.159		0.242	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Bismuth 214	**0.718**		0.0635	0.0980		0.0313	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Lead 212	**0.154**		0.0300	0.0360		0.0392	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Lead 214	**0.770**		0.0580	0.0988		0.0401	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Potassium 40	**4.84**		0.501	0.704		0.234	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Protactinium 231	0.146	U	0.153	0.154		0.605	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Radium 226	**0.718**		0.0635	0.0980	1.00	0.0313	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Thorium 232	**0.197**		0.0594	0.0627		0.0482	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Thorium 234	**1.83**		0.494	0.530		0.559	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Uranium 235	**0.256**		0.0915	0.0952		0.167	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Americium 241	0.0332	U	0.0342	0.0344		0.0473	pCi/g	09/04/13 14:28	09/25/13 09:34	1
Protactinium 234m	2.81	U	1.85	1.88		2.96	pCi/g	09/04/13 14:28	09/25/13 09:34	1

Client Sample ID: L050115TUB00

Lab Sample ID: 160-3570-7

Date Collected: 08/22/13 15:02

Matrix: Solid

Date Received: 08/29/13 18:38

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	**0.267**		0.0758	0.0805		0.0727	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Bismuth 212	0.165	U	0.187	0.187		0.303	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Bismuth 214	**0.985**		0.0929	0.138		0.0482	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Lead 212	**0.263**		0.0376	0.0507		0.0414	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Lead 214	**1.05**		0.0712	0.130		0.0507	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Potassium 40	**4.87**		0.564	0.752		0.203	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Protactinium 231	0.210	U	0.208	0.209		0.639	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Radium 226	**0.985**		0.0929	0.138	1.00	0.0482	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Thorium 232	**0.267**		0.0758	0.0805		0.0727	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Thorium 234	**2.10**		0.591	0.630		0.698	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Uranium 235	**0.684**		0.148	0.164		0.195	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Americium 241	0.0167	U	0.0443	0.0443		0.0744	pCi/g	09/04/13 14:28	09/25/13 09:35	1

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

TestAmerica Job ID: 160-3570-2

Client Sample ID: L050115TUB00 — **Lab Sample ID: 160-3570-7**
Date Collected: 08/22/13 15:02 — **Matrix: Solid**
Date Received: 08/29/13 18:38

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	1.98	U	2.14	2.15		3.76	pCi/g	09/04/13 14:28	09/25/13 09:35	1

Client Sample ID: L050117TUB00 — **Lab Sample ID: 160-3570-8**
Date Collected: 08/22/13 14:20 — **Matrix: Solid**
Date Received: 08/29/13 18:38

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	**0.851**		0.127	0.154		0.0406	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Bismuth 212	**1.21**		0.368	0.389		0.302	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Bismuth 214	**0.752**		0.107	0.132		0.0831	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Lead 212	**0.750**		0.0682	0.119		0.0594	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Lead 214	**0.938**		0.0924	0.134		0.0743	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Potassium 40	**13.5**		1.12	1.78		0.279	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Protactinium 231	0.196	U	0.366	0.367		1.13	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Radium 226	**0.752**		0.107	0.132	1.00	0.0831	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Thorium 232	**0.851**		0.127	0.154		0.0406	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Thorium 234	**2.02**		0.913	0.937		1.03	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Uranium 235	**0.433**		0.163	0.169		0.191	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Americium 241	-0.000734	U	0.0638	0.0638		0.108	pCi/g	09/04/13 14:28	09/25/13 09:35	1
Protactinium 234m	1.99	U	2.70	2.71		6.03	pCi/g	09/04/13 14:28	09/25/13 09:35	1

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

Lab Sample ID: MB 160-70612/1-A
Matrix: Solid
Analysis Batch: 74703

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 70612

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.004445	U	0.00986	0.00987		0.0952	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Bismuth 212	-0.06747	U	0.186	0.186		0.332	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Bismuth 214	0.02140	U	0.0234	0.0235		0.0291	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Lead 212	-0.001932	U	0.0215	0.0215		0.0280	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Lead 214	-0.007306	U	0.292	0.292		0.0302	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Potassium 40	0.0000	U	0.0473	0.0473		0.174	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Protactinium 231	0.08279	U	0.146	0.146		0.339	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Radium 226	0.02140	U	0.0234	0.0235	1.00	0.0291	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Thorium 232	0.004445	U	0.00986	0.00987		0.0952	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Thorium 234	0.03776	U	0.0572	0.0573		0.285	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Uranium 235	0.01283	U	0.0284	0.0284		0.0677	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Americium 241	0.004500	U	0.0117	0.0117		0.0208	pCi/g	09/04/13 14:28	09/25/13 03:49	1
Protactinium 234m	0.5413	U	0.809	0.811		1.56	pCi/g	09/04/13 14:28	09/25/13 03:49	1

Lab Sample ID: LCS 160-70612/2-A
Matrix: Solid
Analysis Batch: 74707

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 70612

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium 241			97.7	92.60		9.63		0.458	pCi/g	95	87 - 116		
Cesium 137			31.6	30.41		3.18		0.131	pCi/g	96	87 - 120		
Cobalt 60			24.5	22.88		2.31		0.0618	pCi/g	93	87 - 115		

Lab Sample ID: 160-3570-8 DU
Matrix: Solid
Analysis Batch: 74707

Client Sample ID: L050117TUB00
Prep Type: Total/NA
Prep Batch: 70612

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Actinium 228	0.851			0.7913		0.130		0.103	pCi/g			0.21	1
Bismuth 212	1.21			1.043		0.334		0.289	pCi/g			0.23	1
Bismuth 214	0.752			0.8573		0.125		0.0571	pCi/g			0.41	1
Lead 212	0.750			0.7399		0.112		0.0487	pCi/g			0.05	1
Lead 214	0.938			0.8971		0.124		0.0540	pCi/g			0.16	1
Potassium 40	13.5			15.53		1.86		0.270	pCi/g			0.55	1
Protactinium 231	0.196	U		0.3272	U	0.226		0.963	pCi/g			0.22	1
Radium 226	0.752			0.8573		0.125	1.00	0.0571	pCi/g			0.41	1
Thorium 232	0.851			0.7913		0.130		0.103	pCi/g			0.21	1
Thorium 234	2.02			2.480		0.720		0.796	pCi/g			0.28	1
Uranium 235	0.433			0.4744		0.150		0.162	pCi/g			0.13	1
Americium 241	-0.000734	U		-0.001143	U	0.0607		0.102	pCi/g			0	1
Protactinium 234m	1.99	U		0.4194	U	1.11		5.08	pCi/g			0.41	1

QC Association Summary

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

TestAmerica Job ID: 160-3570-2

Rad

Leach Batch: 69978

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3570-1	L050101TUB00	Total/NA	Solid	Dry and Grind	
160-3570-2	L050105TUB00	Total/NA	Solid	Dry and Grind	
160-3570-3	L050107TUB00	Total/NA	Solid	Dry and Grind	
160-3570-4	L050109TUB00	Total/NA	Solid	Dry and Grind	
160-3570-5	L050111TUB00	Total/NA	Solid	Dry and Grind	
160-3570-6	L050113TUB00	Total/NA	Solid	Dry and Grind	
160-3570-7	L050115TUB00	Total/NA	Solid	Dry and Grind	
160-3570-8	L050117TUB00	Total/NA	Solid	Dry and Grind	
160-3570-8 DU	L050117TUB00	Total/NA	Solid	Dry and Grind	

Prep Batch: 70612

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3570-1	L050101TUB00	Total/NA	Solid	Fill_Geo-21	69978
160-3570-2	L050105TUB00	Total/NA	Solid	Fill_Geo-21	69978
160-3570-3	L050107TUB00	Total/NA	Solid	Fill_Geo-21	69978
160-3570-4	L050109TUB00	Total/NA	Solid	Fill_Geo-21	69978
160-3570-5	L050111TUB00	Total/NA	Solid	Fill_Geo-21	69978
160-3570-6	L050113TUB00	Total/NA	Solid	Fill_Geo-21	69978
160-3570-7	L050115TUB00	Total/NA	Solid	Fill_Geo-21	69978
160-3570-8	L050117TUB00	Total/NA	Solid	Fill_Geo-21	69978
160-3570-8 DU	L050117TUB00	Total/NA	Solid	Fill_Geo-21	69978
LCS 160-70612/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-70612/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	