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: 160-6589-2
Client Project/Site: RFP-CBA-022 (7 DAY TAT)

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

Attn: Mr. Martin Swanson

Authorized for release by:
6/6/2014 2:14:40 PM

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Job ID: 160-6589-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

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

Report Number: 160-6589-2

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 05/08/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 20.3 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples L100529BSB00 (160-6589-1), L100530BSB00 (160-6589-2), L100531BSB00 (160-6589-3), L100532BSB00 (160-6589-4), L100533BSB00 (160-6589-5), L100534BSB00 (160-6589-6), L100535BSB00 (160-6589-7) and L100536BSB00 (160-6589-8) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 05/12/2014, prepared on 05/14/2014 and analyzed on 06/05/2014.

Preparation Batch 122007:
The RER was outside of the acceptance limits of 1 for protactinium-231. Both the sample and duplicate activity were less than the MDC.

Lead-214 analyzed by gamma spectroscopy was detected above the MDC in the method blank. Variations in Compton backgrounds and statistical analyses allow for small area counts in the ROIs of this nuclide. Other Uranium decay chain products are not present in the

Job ID: 160-6589-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

blank to support Lead-214 identification. The data is reported. (160-6589-1 DU), (LCS 160-122007/2-A), (MB 160-122007/1-A), L100529BSB00 (160-6589-1), L100530BSB00 (160-6589-2), L100531BSB00 (160-6589-3), L100532BSB00 (160-6589-4), L100533BSB00 (160-6589-5), L100534BSB00 (160-6589-6), L100535BSB00 (160-6589-7), L100536BSB00 (160-6589-8)

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.

Chain of Cutody ID No. F-050614-01 **Page** 1/1

Project Name:
Westinghouse Electric Company

Contact Person:
Clark Evers

Phone Number:
314-810-3336

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)	Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)	Total Containers	Remarks
L100529BSB00	5/6/2014	10:30	S	G	X		X		1	TSA10-05 INV. samples after flood
L100530BSB00	5/6/2014	10:35	S	G	X		X		1	"
L100531BSB00	5/6/2014	10:40	S	G	X		X		1	"
L100532BSB00	5/6/2014	10:45	S	G	X		X		1	"
L100533BSB00	5/6/2014	10:50	S	G	X		X		1	"
L100534BSB00	5/6/2014	10:55	S	G	X		X		1	"
L100535BSB00	5/6/2014	11:00	S	G	X		X		1	"
L100536BSB00	5/6/2014	11:05	S	G	X		X		1	TSA10-05 INV. samples after flood

Relinquished by: [signature]	Date/Time 5-8-14 0755	Received by: [signature]	Date/Time 5-8-14 755	Total 8	Cooler Temperature: Ambient
Company Name: WEC		Company Name:		Cooler ID: 0506-03	Shipper and Number:
Received by:	Date/Time	Relinquished by: [signature]	Date/Time 5-8-14 1130	Comments: Report Radium Ingrowth at 30 days	
Company Name:		Company Name:			
Relinquished by:	Date/Time	Received by: [signature]	Date/Time 5-8-14 1130	Verified By: Curtis Wilder	
Company Name:		Company Name:			

160-6589 Chain of Custody

Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-6589-2

Login Number: 6589

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	

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

TestAmerica Job ID: 160-6589-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
F	Duplicate RPD exceeds the control limit

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
CFL	Contains Free Liquid
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: 160-6589-2

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: 160-6589-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-6589-1	L100529BSB00	Solid	05/06/14 10:30	05/08/14 11:30
160-6589-2	L100530BSB00	Solid	05/06/14 10:35	05/08/14 11:30
160-6589-3	L100531BSB00	Solid	05/06/14 10:40	05/08/14 11:30
160-6589-4	L100532BSB00	Solid	05/06/14 10:45	05/08/14 11:30
160-6589-5	L100533BSB00	Solid	05/06/14 10:50	05/08/14 11:30
160-6589-6	L100534BSB00	Solid	05/06/14 10:55	05/08/14 11:30
160-6589-7	L100535BSB00	Solid	05/06/14 11:00	05/08/14 11:30
160-6589-8	L100536BSB00	Solid	05/06/14 11:05	05/08/14 11:30

Client Sample ID: L100529BSB00

Date Collected: 05/06/14 10:30
Date Received: 05/08/14 11:30

Lab Sample ID: 160-6589-1
Matrix: Solid

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**		0.151	0.190		0.128	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Bismuth 212	**1.85**		0.500	0.531		0.388	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Bismuth 214	**0.975**		0.117	0.151		0.0877	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Lead 212	**1.27**		0.0871	0.211		0.0648	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Lead 214	**1.25**		0.116	0.179		0.0931	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Potassium 40	**20.5**		1.35	2.39		0.457	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Protactinium 231	0.782	U	0.319	0.332		1.11	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Radium 226	**0.975**		0.117	0.151	1.00	0.0877	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Thorium 232	**1.18**		0.151	0.190		0.128	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Thorium 234	**1.21**		0.563	0.576		0.894	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Uranium 235	0.100	U	0.169	0.169		0.294	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Americium 241	0.0192	U	0.0643	0.0643		0.108	pCi/g	05/14/14 12:24	06/05/14 01:37	1
Protactinium 234m	2.36	U	3.70	3.70		6.20	pCi/g	05/14/14 12:24	06/05/14 01:37	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.381*		*0.0506*	*0.0627*		*0.0372*	*pCi/g*	*05/14/14 12:24*	*06/05/14 01:37*	*1*

Client Sample ID: L100530BSB00

Date Collected: 05/06/14 10:35
Date Received: 05/08/14 11:30

Lab Sample ID: 160-6589-2
Matrix: Solid

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	**1.19**		0.155	0.193		0.142	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Bismuth 212	**1.42**		0.356	0.382		0.244	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Bismuth 214	**0.829**		0.113	0.139		0.0824	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Lead 212	**1.18**		0.0868	0.154		0.0776	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Lead 214	**0.936**		0.107	0.140		0.0901	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Potassium 40	**17.8**		1.28	2.14		0.252	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Protactinium 231	0.779	U	0.409	0.416		0.882	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Radium 226	**0.829**		0.113	0.139	1.00	0.0824	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Thorium 232	**1.19**		0.155	0.193		0.142	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Thorium 234	0.730	U	0.341	0.349		0.883	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Uranium 235	0.0782	U	0.183	0.184		0.296	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Americium 241	-0.0371	U	0.0748	0.0749		0.124	pCi/g	05/14/14 12:24	06/05/14 01:39	1
Protactinium 234m	1.09	U	3.76	3.76		6.56	pCi/g	05/14/14 12:24	06/05/14 01:39	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.445*		*0.0657*	*0.0787*		*0.0492*	*pCi/g*	*05/14/14 12:24*	*06/05/14 01:39*	*1*

Client Sample ID: L100531BSB00

Lab Sample ID: 160-6589-3

Date Collected: 05/06/14 10:40

Matrix: Solid

Date Received: 05/08/14 11:30

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	**1.40**		0.163	0.211		0.0813	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Bismuth 212	**1.35**		0.397	0.418		0.491	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Bismuth 214	**1.03**		0.110	0.149		0.0681	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Lead 212	**1.29**		0.0836	0.162		0.0588	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Lead 214	**1.18**		0.0975	0.150		0.0768	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Potassium 40	**21.5**		1.35	2.47		0.420	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Protactinium 231	0.365	U	0.221	0.224		1.26	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Radium 226	**1.03**		0.110	0.149	1.00	0.0681	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Thorium 232	**1.40**		0.163	0.211		0.0813	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Thorium 234	**0.980**		0.311	0.325		0.839	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Uranium 235	0.182	U	0.152	0.153		0.205	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Americium 241	0.00404	U	0.0585	0.0585		0.0990	pCi/g	05/14/14 12:24	06/05/14 01:40	1
Protactinium 234m	2.48	U	3.30	3.31		5.46	pCi/g	05/14/14 12:24	06/05/14 01:40	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.350*		*0.0498*	*0.0603*		*0.0378*	*pCi/g*	*05/14/14 12:24*	*06/05/14 01:40*	*1*

Client Sample ID: L100532BSB00

Lab Sample ID: 160-6589-4

Date Collected: 05/06/14 10:45

Matrix: Solid

Date Received: 05/08/14 11:30

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	**1.13**		0.146	0.186		0.111	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Bismuth 212	**1.39**		0.375	0.402		0.344	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Bismuth 214	**1.05**		0.111	0.155		0.0702	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Lead 212	**1.11**		0.0777	0.163		0.0648	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Lead 214	**1.15**		0.100	0.156		0.0810	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Potassium 40	**20.0**		1.27	2.41		0.257	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Protactinium 231	0.390	U	0.247	0.251		1.24	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Radium 226	**1.05**		0.111	0.155	1.00	0.0702	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Thorium 232	**1.13**		0.146	0.186		0.111	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Thorium 234	**1.45**		0.525	0.547		0.810	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Uranium 235	**0.283**		0.126	0.129		0.193	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Americium 241	-0.0151	U	0.0633	0.0633		0.106	pCi/g	05/14/14 12:24	06/05/14 13:16	1
Protactinium 234m	0.923	U	3.23	3.23		5.64	pCi/g	05/14/14 12:24	06/05/14 13:16	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.379*		*0.0470*	*0.0613*		*0.0292*	*pCi/g*	*05/14/14 12:24*	*06/05/14 13:16*	*1*

Client Sample ID: L100533BSB00

Lab Sample ID: 160-6589-5

Date Collected: 05/06/14 10:50

Matrix: Solid

Date Received: 05/08/14 11:30

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	**1.05**		0.140	0.177		0.117	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Bismuth 212	**1.29**		0.504	0.522		0.485	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Bismuth 214	**0.944**		0.109	0.146		0.0709	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Lead 212	**1.06**		0.0761	0.157		0.0622	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Lead 214	**1.02**		0.0947	0.142		0.0749	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Potassium 40	**19.8**		1.27	2.39		0.262	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Protactinium 231	0.535	U	0.306	0.311		1.15	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Radium 226	**0.944**		0.109	0.146	1.00	0.0709	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Thorium 232	**1.05**		0.140	0.177		0.117	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Thorium 234	**1.22**		0.542	0.557		0.854	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Uranium 235	0.154	U	0.139	0.139		0.230	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Americium 241	0.00149	U	0.0619	0.0619		0.105	pCi/g	05/14/14 12:24	06/05/14 13:58	1
Protactinium 234m	0.639	U	3.29	3.29		5.80	pCi/g	05/14/14 12:24	06/05/14 13:58	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.364*		*0.0528*	*0.0649*		*0.0382*	*pCi/g*	*05/14/14 12:24*	*06/05/14 13:58*	*1*

Client Sample ID: L100534BSB00

Lab Sample ID: 160-6589-6

Date Collected: 05/06/14 10:55

Matrix: Solid

Date Received: 05/08/14 11:30

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**		0.150	0.193		0.0886	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Bismuth 212	**0.887**		0.303	0.317		0.397	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Bismuth 214	**0.982**		0.0999	0.143		0.0617	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Lead 212	**1.12**		0.0714	0.161		0.0566	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Lead 214	**0.968**		0.0879	0.134		0.0608	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Potassium 40	**19.6**		1.14	2.30		0.308	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Protactinium 231	**0.775**		0.367	0.377		0.533	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Radium 226	**0.982**		0.0999	0.143	1.00	0.0617	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Thorium 232	**1.18**		0.150	0.193		0.0886	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Thorium 234	**1.14**		0.298	0.321		0.789	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Uranium 235	0.175	U	0.132	0.134		0.224	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Americium 241	0.00212	U	0.0632	0.0632		0.106	pCi/g	05/14/14 12:24	06/05/14 13:59	1
Protactinium 234m	2.55	U	3.08	3.09		5.39	pCi/g	05/14/14 12:24	06/05/14 13:59	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.348*		*0.0484*	*0.0604*		*0.0381*	*pCi/g*	*05/14/14 12:24*	*06/05/14 13:59*	*1*

Client Sample ID: L100535BSB00

Lab Sample ID: 160-6589-7

Date Collected: 05/06/14 11:00

Matrix: Solid

Date Received: 05/08/14 11:30

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	**1.30**		0.169	0.215		0.140	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Bismuth 212	**1.66**		0.609	0.633		0.519	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Bismuth 214	**1.17**		0.129	0.177		0.0647	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Lead 212	**1.20**		0.0890	0.178		0.0702	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Lead 214	**1.14**		0.123	0.171		0.0928	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Potassium 40	**17.7**		1.43	2.31		0.460	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Protactinium 231	-0.669	U	0.954	0.956		1.58	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Radium 226	**1.17**		0.129	0.177	1.00	0.0647	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Thorium 232	**1.30**		0.169	0.215		0.140	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Thorium 234	**1.41**		0.638	0.655		1.01	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Uranium 235	0.232	U	0.209	0.210		0.254	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Americium 241	0.0269	U	0.0667	0.0668		0.112	pCi/g	05/14/14 12:24	06/05/14 14:38	1
Protactinium 234m	1.68	U	3.83	3.83		6.69	pCi/g	05/14/14 12:24	06/05/14 14:38	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.394*		*0.0573*	*0.0703*		*0.0394*	*pCi/g*	*05/14/14 12:24*	*06/05/14 14:38*	*1*

Client Sample ID: L100536BSB00

Lab Sample ID: 160-6589-8

Date Collected: 05/06/14 11:05

Matrix: Solid

Date Received: 05/08/14 11:30

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	**1.30**		0.143	0.191		0.104	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Bismuth 212	**1.83**		0.479	0.511		0.369	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Bismuth 214	**1.13**		0.124	0.166		0.0837	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Lead 212	**1.32**		0.0877	0.219		0.0650	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Lead 214	**1.16**		0.111	0.169		0.0819	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Potassium 40	**15.6**		1.15	1.89		0.377	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Protactinium 231	0.422	U	0.293	0.297		1.31	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Radium 226	**1.13**		0.124	0.166	1.00	0.0837	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Thorium 232	**1.30**		0.143	0.191		0.104	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Thorium 234	0.812	U	0.292	0.302		0.837	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Uranium 235	0.179	U	0.115	0.116		0.180	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Americium 241	0.00671	U	0.0621	0.0621		0.105	pCi/g	05/14/14 12:24	06/05/14 14:33	1
Protactinium 234m	2.77	U	3.08	3.09		4.99	pCi/g	05/14/14 12:24	06/05/14 14:33	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.405*		*0.0575*	*0.0697*		*0.0422*	*pCi/g*	*05/14/14 12:24*	*06/05/14 14:33*	*1*

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

Lab Sample ID: MB 160-122007/1-A
Matrix: Solid
Analysis Batch: 125288

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 122007

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.007468	U	0.0282	0.0282		0.0527	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Bismuth 212	0.0000	U	0.0538	0.0538		0.161	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Bismuth 214	0.0001964	U	0.000383	0.000384		0.0353	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Lead 212	0.004458	U	0.0119	0.0120		0.0231	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Lead 214	0.02820		0.0156	0.0159		0.0202	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Potassium 40	-0.07779	U	1.44	1.44		0.283	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Protactinium 231	0.02002	U	0.106	0.106		0.338	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Radium 226	0.0001964	U	0.000383	0.000384	1.00	0.0353	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Thorium 232	0.007468	U	0.0282	0.0282		0.0527	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Thorium 234	0.1034	U	0.141	0.142		0.267	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Uranium 235	0.01135	U	0.0383	0.0383		0.0711	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Americium 241	0.0004633	U	0.0111	0.0111		0.0204	pCi/g	05/14/14 12:24	06/04/14 23:01	1
Protactinium 234m	0.6374	U	0.943	0.945		1.58	pCi/g	05/14/14 12:24	06/04/14 23:01	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*05/14/14 12:24*	*06/04/14 23:01*	*1*

Lab Sample ID: LCS 160-122007/2-A
Matrix: Solid
Analysis Batch: 125670

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 122007

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	101	104.2		10.8		0.629	pCi/g	103	87 - 116
Cesium 137	35.5	36.00		3.78		0.234	pCi/g	101	87 - 120
Cobalt 60	40.3	40.32		4.07		0.129	pCi/g	100	87 - 115

Lab Sample ID: 160-6589-1 DU
Matrix: Solid
Analysis Batch: 125665

Client Sample ID: L100529BSB00
Prep Type: Total/NA
Prep Batch: 122007

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium 228	1.18		1.156		0.176		0.137	pCi/g	0.05	1
Bismuth 212	1.85		1.521		0.480		0.414	pCi/g	0.32	1
Bismuth 214	0.975		1.203		0.179		0.0903	pCi/g	0.69	1
Lead 212	1.27		1.169		0.152		0.0696	pCi/g	0.27	1
Lead 214	1.25		1.230		0.157		0.0812	pCi/g	0.06	1
Potassium 40	20.5		20.70		2.40		0.311	pCi/g	0.04	1
Protactinium 231	0.782	U	-0.5922	U F	0.774		1.27	pCi/g	1.24	1
Radium 226	0.975		1.203		0.179	1.00	0.0903	pCi/g	0.69	1
Thorium 232	1.18		1.156		0.176		0.137	pCi/g	0.05	1
Thorium 234	1.21		0.9648		0.631		0.869	pCi/g	0.20	1
Uranium 235	0.100	U	0.08579	U	0.153		0.262	pCi/g	0.04	1
Americium 241	0.0192	U	0.001242	U	0.0632		0.107	pCi/g	0.14	1

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

TestAmerica Job ID: 160-6589-2

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

Lab Sample ID: 160-6589-1 DU
Matrix: Solid
Analysis Batch: 125665

Client Sample ID: L100529BSB00
Prep Type: Total/NA
Prep Batch: 122007

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Protactinium 234m	2.36	U		0.7311	U	2.87		5.08	pCi/g			0.25	1

QC Association Summary

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

TestAmerica Job ID: 160-6589-2

Rad

Leach Batch: 121572

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6589-1	L100529BSB00	Total/NA	Solid	Dry and Grind	
160-6589-1 DU	L100529BSB00	Total/NA	Solid	Dry and Grind	
160-6589-2	L100530BSB00	Total/NA	Solid	Dry and Grind	
160-6589-3	L100531BSB00	Total/NA	Solid	Dry and Grind	
160-6589-4	L100532BSB00	Total/NA	Solid	Dry and Grind	
160-6589-5	L100533BSB00	Total/NA	Solid	Dry and Grind	
160-6589-6	L100534BSB00	Total/NA	Solid	Dry and Grind	
160-6589-7	L100535BSB00	Total/NA	Solid	Dry and Grind	
160-6589-8	L100536BSB00	Total/NA	Solid	Dry and Grind	

Prep Batch: 122007

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-6589-1	L100529BSB00	Total/NA	Solid	Fill_Geo-21	121572
160-6589-1 DU	L100529BSB00	Total/NA	Solid	Fill_Geo-21	121572
160-6589-2	L100530BSB00	Total/NA	Solid	Fill_Geo-21	121572
160-6589-3	L100531BSB00	Total/NA	Solid	Fill_Geo-21	121572
160-6589-4	L100532BSB00	Total/NA	Solid	Fill_Geo-21	121572
160-6589-5	L100533BSB00	Total/NA	Solid	Fill_Geo-21	121572
160-6589-6	L100534BSB00	Total/NA	Solid	Fill_Geo-21	121572
160-6589-7	L100535BSB00	Total/NA	Solid	Fill_Geo-21	121572
160-6589-8	L100536BSB00	Total/NA	Solid	Fill_Geo-21	121572
LCS 160-122007/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-122007/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	