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: 160-3504-2
Client Project/Site: RFP-CBA-022 (21 DAY TAT)

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

Attn: Martin Swanson

Authorized for release by:
9/22/2013 7:47:37 PM

Ivan Vania, Project Manager I
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Job ID: 160-3504-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

Project: RFP-CBA-022 (21 DAY TAT)

Report Number: 160-3504-2

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 08/23/2013; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 18.0 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples L050333PUB00 (160-3504-1), L050334PUB00 (160-3504-2), L050335PUB00 (160-3504-3), L050336PUB00 (160-3504-4), L050337PUB00 (160-3504-5), L050338PUB00 (160-3504-6), L050339PUB00 (160-3504-7) and L050340PUB00 (160-3504-8) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 08/26/2013, prepared on 08/28/2013 and analyzed on 09/18/2013.

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-082313-01 **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
L050333PUB00	8/22/2013	11:20	S	C	X		X	X						1	LSA 05-03 Bias
L050334PUB00	8/22/2013	11:25	S	C	X		X	X						1	LSA 05-03 Bias
L050335PUB00	8/22/2013	11:33	S	C	X		X	X						1	LSA 05-03 Bias
L050336PUB00	8/22/2013	11:40	S	C	X		X	X						1	LSA 05-03 Bias
L050337PUB00	8/22/2013	11:45	S	C	X		X	X						1	LSA 05-03 Bias
L050338PUB00	8/23/2013	8:20	S	C	X		X	X						1	LSA 05-03 Bias
L050339PUB00	8/23/2013	8:25	S	C	X		X	X						1	LSA 05-03 Bias
L050340PUB00	8/23/2013	8:30	S	C	X		X	X						1	LSA 05-03 Bias

Relinquished by: [signature]	Date/Time 8-23-13 1605	Received by: Joe Broadhead	Date/Time 8-23 16:10	Total 8	Cooler Temperature: Ambient
Company Name: WEC		Company Name: Crossroads		Cooler ID: 0823-02	Shipper and Number:
Received by:	Date/Time	Relinquished by: Joe Broadhead	Date/Time 8-23 17:40	Comments: Please re-analyze samples after 21-day ingrowth period.	
Company Name:		Company Name: Crossroads			
Relinquished by:	Date/Time	Received by: RM	Date/Time 8-23 17:50	Verified By:	
Company Name:		Company Name: TA			

3504

Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-3504-2

Login Number: 3504

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	
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 (21 DAY TAT)

TestAmerica Job ID: 160-3504-2

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 (21 DAY TAT)

TestAmerica Job ID: 160-3504-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-3504-1	L050333PUB00	Solid	08/22/13 11:20	08/23/13 17:50
160-3504-2	L050334PUB00	Solid	08/22/13 11:25	08/23/13 17:50
160-3504-3	L050335PUB00	Solid	08/22/13 11:33	08/23/13 17:50
160-3504-4	L050336PUB00	Solid	08/22/13 11:40	08/23/13 17:50
160-3504-5	L050337PUB00	Solid	08/22/13 11:45	08/23/13 17:50
160-3504-6	L050338PUB00	Solid	08/23/13 08:20	08/23/13 17:50
160-3504-7	L050339PUB00	Solid	08/23/13 08:25	08/23/13 17:50
160-3504-8	L050340PUB00	Solid	08/23/13 08:30	08/23/13 17:50

Client Sample ID: L050333PUB00

Lab Sample ID: 160-3504-1

Date Collected: 08/22/13 11:20

Matrix: Solid

Date Received: 08/23/13 17:50

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	0.628		0.109	0.127		0.113	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Bismuth 212	0.784		0.370	0.379		0.377	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Bismuth 214	0.961		0.101	0.142		0.0671	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Lead 212	0.848		0.0630	0.127		0.0510	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Lead 214	1.09		0.0865	0.142		0.0590	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Potassium 40	17.2		1.06	2.05		0.207	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Protactinium 231	0.480	U	0.271	0.276		0.659	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Radium 226	0.961		0.101	0.142	1.00	0.0671	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Thorium 232	0.628		0.109	0.127		0.113	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Thorium 234	5.39		0.961	1.11		1.06	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Uranium 235	1.18		0.201	0.234		0.223	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Americium 241	-0.0422	U	0.0716	0.0717		0.119	pCi/g	08/28/13 15:38	09/18/13 17:50	1
Protactinium 234m	10.8		3.52	3.69		3.09	pCi/g	08/28/13 15:38	09/18/13 17:50	1

Client Sample ID: L050334PUB00

Lab Sample ID: 160-3504-2

Date Collected: 08/22/13 11:25

Matrix: Solid

Date Received: 08/23/13 17:50

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	1.24		0.179	0.219		0.211	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Bismuth 212	1.32		0.491	0.509		0.460	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Bismuth 214	1.14		0.139	0.183		0.0876	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Lead 212	1.06		0.0903	0.165		0.0818	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Lead 214	1.38		0.145	0.204		0.110	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Potassium 40	22.1		1.58	2.76		0.210	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Protactinium 231	0.401	U	0.259	0.263		1.58	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Radium 226	1.14		0.139	0.183	1.00	0.0876	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Thorium 232	1.24		0.179	0.219		0.211	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Thorium 234	23.5		1.89	3.10		1.92	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Uranium 235	4.61		0.378	0.603		0.421	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Americium 241	0.110	U	0.101	0.102		0.165	pCi/g	08/28/13 15:38	09/18/13 18:46	1
Protactinium 234m	33.7		8.19	8.87		5.73	pCi/g	08/28/13 15:38	09/18/13 18:46	1

Client Sample ID: L050335PUB00

Lab Sample ID: 160-3504-3

Date Collected: 08/22/13 11:33

Matrix: Solid

Date Received: 08/23/13 17:50

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	1.21		0.167	0.207		0.0827	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Bismuth 212	1.29		0.489	0.507		0.450	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Bismuth 214	1.16		0.116	0.167		0.0745	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Lead 212	1.12		0.0768	0.164		0.0606	pCi/g	08/28/13 15:38	09/18/13 18:44	1

Client Sample ID: L050335PUB00 — **Lab Sample ID: 160-3504-3**
Date Collected: 08/22/13 11:33 — **Matrix: Solid**
Date Received: 08/23/13 17:50

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	1.42		0.106	0.181		0.0759	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Potassium 40	22.4		1.31	2.64		0.402	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Protactinium 231	0.347	U	0.244	0.246		1.26	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Radium 226	1.16		0.116	0.167	1.00	0.0745	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Thorium 232	1.21		0.167	0.207		0.0827	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Thorium 234	6.90		1.02	1.25		1.11	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Uranium 235	1.42		0.236	0.277		0.274	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Americium 241	0.0362	U	0.0823	0.0824		0.137	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Protactinium 234m	7.40		4.12	4.19		6.26	pCi/g	08/28/13 15:38	09/18/13 18:44	1

Client Sample ID: L050336PUB00 — **Lab Sample ID: 160-3504-4**
Date Collected: 08/22/13 11:40 — **Matrix: Solid**
Date Received: 08/23/13 17:50

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		0.164	0.197		0.131	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Bismuth 212	1.18		0.396	0.414		0.386	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Bismuth 214	1.15		0.111	0.163		0.0729	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Lead 212	1.01		0.0816	0.154		0.0871	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Lead 214	1.25		0.113	0.172		0.0845	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Potassium 40	20.8		1.24	2.46		0.400	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Protactinium 231	-0.587	U	0.757	0.759		1.25	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Radium 226	1.15		0.111	0.163	1.00	0.0729	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Thorium 232	1.08		0.164	0.197		0.131	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Thorium 234	4.70		0.952	1.07		1.06	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Uranium 235	0.197	U	0.170	0.171		0.264	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Americium 241	0.0318	U	0.0751	0.0751		0.125	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Protactinium 234m	6.72		3.39	3.46		5.08	pCi/g	08/28/13 15:38	09/18/13 18:43	1

Client Sample ID: L050337PUB00 — **Lab Sample ID: 160-3504-5**
Date Collected: 08/22/13 11:45 — **Matrix: Solid**
Date Received: 08/23/13 17:50

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		0.143	0.180		0.123	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Bismuth 212	1.22		0.563	0.577		0.566	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Bismuth 214	1.11		0.136	0.178		0.0978	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Lead 212	1.24		0.0870	0.183		0.0681	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Lead 214	1.33		0.102	0.171		0.0823	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Potassium 40	20.0		1.37	2.47		0.294	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Protactinium 231	0.508	U	0.291	0.297		1.28	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Radium 226	1.11		0.136	0.178	1.00	0.0978	pCi/g	08/28/13 15:38	09/18/13 18:44	1

Client Sample ID: L050337PUB00

Lab Sample ID: 160-3504-5

Date Collected: 08/22/13 11:45

Matrix: Solid

Date Received: 08/23/13 17:50

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	**1.08**		0.143	0.180		0.123	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Thorium 234	**3.53**		0.871	0.946		1.04	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Uranium 235	0.214	U	0.159	0.161		0.217	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Americium 241	0.00629	U	0.0612	0.0612		0.104	pCi/g	08/28/13 15:38	09/18/13 18:44	1
Protactinium 234m	3.50	U	4.12	4.13		7.23	pCi/g	08/28/13 15:38	09/18/13 18:44	1

Client Sample ID: L050338PUB00

Lab Sample ID: 160-3504-6

Date Collected: 08/23/13 08:20

Matrix: Solid

Date Received: 08/23/13 17:50

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	**1.16**		0.165	0.203		0.117	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Bismuth 212	**1.37**		0.447	0.469		0.396	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Bismuth 214	**1.27**		0.135	0.189		0.105	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Lead 212	**1.10**		0.0922	0.169		0.0829	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Lead 214	**1.41**		0.127	0.194		0.0937	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Potassium 40	**20.8**		1.53	2.62		0.339	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Protactinium 231	-0.764	U	1.03	1.03		1.70	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Radium 226	**1.27**		0.135	0.189	1.00	0.105	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Thorium 232	**1.16**		0.165	0.203		0.117	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Thorium 234	**10.1**		1.31	1.68		1.39	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Uranium 235	**1.73**		0.325	0.370		0.336	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Americium 241	-0.0228	U	0.105	0.105		0.175	pCi/g	08/28/13 15:38	09/18/13 18:45	1
Protactinium 234m	**18.5**		5.29	5.62		4.08	pCi/g	08/28/13 15:38	09/18/13 18:45	1

Client Sample ID: L050339PUB00

Lab Sample ID: 160-3504-7

Date Collected: 08/23/13 08:25

Matrix: Solid

Date Received: 08/23/13 17:50

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	**1.21**		0.142	0.184		0.155	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Bismuth 212	**1.50**		0.606	0.624		0.554	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Bismuth 214	**1.20**		0.128	0.174		0.0889	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Lead 212	**1.27**		0.0881	0.162		0.0741	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Lead 214	**1.44**		0.110	0.178		0.0966	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Potassium 40	**22.6**		1.41	2.59		0.444	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Protactinium 231	0.868	U	0.478	0.486		1.31	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Radium 226	**1.20**		0.128	0.174	1.00	0.0889	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Thorium 232	**1.21**		0.142	0.184		0.155	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Thorium 234	**11.0**		1.24	1.64		1.31	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Uranium 235	**2.57**		0.325	0.409		0.367	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Americium 241	-0.0289	U	1.65	1.65		0.162	pCi/g	08/28/13 15:38	09/18/13 18:43	1

Client: Westinghouse Electric Company LLC
Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-3504-2

Client Sample ID: L050339PUB00 — **Lab Sample ID: 160-3504-7**
Date Collected: 08/23/13 08:25 — **Matrix: Solid**
Date Received: 08/23/13 17:50

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	21.5		6.67	6.98		5.03	pCi/g	08/28/13 15:38	09/18/13 18:43	1

Client Sample ID: L050340PUB00 — **Lab Sample ID: 160-3504-8**
Date Collected: 08/23/13 08:30 — **Matrix: Solid**
Date Received: 08/23/13 17:50

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		0.135	0.175		0.117	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Bismuth 212	1.44		0.562	0.582		0.511	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Bismuth 214	1.27		0.125	0.181		0.0793	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Lead 212	1.15		0.0821	0.170		0.0713	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Lead 214	1.40		0.105	0.179		0.0795	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Potassium 40	22.3		1.37	2.66		0.473	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Protactinium 231	0.465	U	0.281	0.286		1.34	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Radium 226	1.27		0.125	0.181	1.00	0.0793	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Thorium 232	1.08		0.135	0.175		0.117	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Thorium 234	12.7		1.17	1.77		1.22	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Uranium 235	2.48		0.265	0.366		0.332	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Americium 241	-0.0156	U	0.0911	0.0911		0.152	pCi/g	08/28/13 15:38	09/18/13 18:43	1
Protactinium 234m	11.6		4.62	4.76		5.80	pCi/g	08/28/13 15:38	09/18/13 18:43	1

Client: Westinghouse Electric Company LLC
Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-3504-2

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

Lab Sample ID: MB 160-69157/1-A
Matrix: Solid
Analysis Batch: 73103

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 69157

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.01526	U	0.0264	0.0264		0.0422	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Bismuth 212	0.0000	U	0.0703	0.0703		0.276	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Bismuth 214	0.006060	U	0.0209	0.0209		0.0387	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Lead 212	-0.003530	U	0.0344	0.0344		0.0291	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Lead 214	-0.007280	U	8.71	8.71		0.0360	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Potassium 40	0.07050	U	0.168	0.168		0.307	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Protactinium 231	0.001341	U	0.209	0.209		0.402	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Radium 226	0.006060	U	0.0209	0.0209	1.00	0.0387	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Thorium 232	0.01526	U	0.0264	0.0264		0.0422	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Thorium 234	-0.07160	U	0.261	0.261		0.286	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Uranium 235	-0.005515	U	0.0376	0.0376		0.0690	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Americium 241	0.002366	U	0.0122	0.0122		0.0223	pCi/g	08/28/13 15:38	09/18/13 20:43	1
Protactinium 234m	0.0000	U	1.04	1.04		5.04	pCi/g	08/28/13 15:38	09/18/13 20:43	1

Lab Sample ID: LCS 160-69157/2-A
Matrix: Solid
Analysis Batch: 73116

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 69157

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium 241			97.7	87.98		9.16		0.563	pCi/g	90	87 - 116		
Cesium 137			31.6	29.82		3.13		0.161	pCi/g	94	87 - 120		
Cobalt 60			24.6	23.17		2.35		0.104	pCi/g	94	87 - 115		

Lab Sample ID: 160-3504-1 DU
Matrix: Solid
Analysis Batch: 73103

Client Sample ID: L050333PUB00
Prep Type: Total/NA
Prep Batch: 69157

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Actinium 228	0.628			0.8294		0.152		0.113	pCi/g			0.72	1
Bismuth 212	0.784			0.9735		0.402		0.501	pCi/g			0.24	1
Bismuth 214	0.961			0.9842		0.151		0.0472	pCi/g			0.08	1
Lead 212	0.848			0.7594		0.124		0.0711	pCi/g			0.35	1
Lead 214	1.09			1.026		0.159		0.0853	pCi/g			0.21	1
Potassium 40	17.2			17.25		2.26		0.387	pCi/g			0.01	1
Protactinium 231	0.480	U		0.4221	U	0.280		1.43	pCi/g			0.10	1
Radium 226	0.961			0.9842		0.151	1.00	0.0472	pCi/g			0.08	1
Thorium 232	0.628			0.8294		0.152		0.113	pCi/g			0.72	1
Thorium 234	5.39			6.371		1.17		1.07	pCi/g			0.43	1
Uranium 235	1.18			1.087		0.247		0.261	pCi/g			0.18	1
Americium 241	-0.0422	U		-0.01350	U	0.0801		0.135	pCi/g			0.19	1
Protactinium 234m	10.8			7.599		5.01		7.13	pCi/g			0.36	1

QC Association Summary

Client: Westinghouse Electric Company LLC
Project/Site: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-3504-2

Rad

Leach Batch: 68464

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3504-1	L050333PUB00	Total/NA	Solid	Dry and Grind	
160-3504-1 DU	L050333PUB00	Total/NA	Solid	Dry and Grind	
160-3504-2	L050334PUB00	Total/NA	Solid	Dry and Grind	
160-3504-3	L050335PUB00	Total/NA	Solid	Dry and Grind	
160-3504-4	L050336PUB00	Total/NA	Solid	Dry and Grind	
160-3504-5	L050337PUB00	Total/NA	Solid	Dry and Grind	
160-3504-6	L050338PUB00	Total/NA	Solid	Dry and Grind	
160-3504-7	L050339PUB00	Total/NA	Solid	Dry and Grind	
160-3504-8	L050340PUB00	Total/NA	Solid	Dry and Grind	

Prep Batch: 69157

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3504-1	L050333PUB00	Total/NA	Solid	Fill_Geo-21	68464
160-3504-1 DU	L050333PUB00	Total/NA	Solid	Fill_Geo-21	68464
160-3504-2	L050334PUB00	Total/NA	Solid	Fill_Geo-21	68464
160-3504-3	L050335PUB00	Total/NA	Solid	Fill_Geo-21	68464
160-3504-4	L050336PUB00	Total/NA	Solid	Fill_Geo-21	68464
160-3504-5	L050337PUB00	Total/NA	Solid	Fill_Geo-21	68464
160-3504-6	L050338PUB00	Total/NA	Solid	Fill_Geo-21	68464
160-3504-7	L050339PUB00	Total/NA	Solid	Fill_Geo-21	68464
160-3504-8	L050340PUB00	Total/NA	Solid	Fill_Geo-21	68464
LCS 160-69157/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-69157/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	