

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: 160-16071-2

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

For:

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

Attn: Mr. Martin Swanson

Rhonda Ridenhower

Authorized for release by:

3/8/2016 3:12:35 PM

Rhonda Ridenhower, Manager of Project Management
rhonda.ridenhower@testamericainc.com

Designee for

Ivan Vania, Project Manager II
(314)298-8566
ivan.vania@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

TestAmerica Job ID: 160-16071-2

Job ID: 160-16071-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

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

Report Number: 160-16071-2

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 02/11/2016; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 18.3 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples L040401PRS00 (160-16071-1), L040402PES00 (160-16071-2), L040403PRQ00 (160-16071-3), L040403PRS00 (160-16071-4), L040404PES00 (160-16071-5), L040405PSS00 (160-16071-6), L040406PRS00 (160-16071-7), L040407PES00 (160-16071-8), L040408PSS00 (160-16071-9), L040409PRQ00 (160-16071-10), L040409PRS00 (160-16071-11), L040410PES00 (160-16071-12), L040411PRS00 (160-16071-13), L040412PES00 (160-16071-14), L040413PSS00 (160-16071-15), L040414PRS00 (160-16071-16), L040415PES00 (160-16071-17), L040416PRS00 (160-16071-18), L040417PES00 (160-16071-19), L040418PSS00 (160-16071-20), L040419PRS00 (160-16071-21) and L040420PES00 (160-16071-22) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 02/11/2016, prepared on 02/15/2016 and analyzed on 03/07/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Case Narrative

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

TestAmerica Job ID: 160-16071-2

Job ID: 160-16071-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

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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 Custody ID No. F-021016-02	Page 1/2	Requested Analysis								Laboratory Name: TA-MO		
Project Name: Westinghouse Electric Company		Comp (C) or Grab (G)	Gamma Spec	Isotopic Uranium	Pu-99	Gamma Spec (21 day ingrow for Ra-226)					Total Containers	Laboratory Address: 13715 Rider Trail North
Contact Person: Gerald Rood												Phone No. 314-298-8566
Phone Number: 314-810-3382												Laboratory Contact Person: Ivan Vania
Sampler Name: Williams												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	Pu-99	Gamma Spec (21 day ingrow for Ra-226)													
L040401PRS00	2/8/2016	15:20	S	C	X		X	X												1	LSA 04-04
L040402PES00	2/8/2016	15:25	S	G	X		X	X												1	LSA 04-04
L040403PRQ00	2/8/2016	16:15	S	C	X		X	X												1	LSA 04-04
L040403PRS00	2/8/2016	16:15	S	C	X		X	X												1	LSA 04-04
L040404PES00	2/8/2016	16:20	S	G	X		X	X												1	LSA 04-04
L040405PSS00	2/9/2016	9:10	S	G	X		X	X												1	LSA 04-04
L040406PRS00	2/9/2016	9:35	S	C	X		X	X												1	LSA 04-04
L040407PES00	2/9/2016	9:40	S	G	X		X	X												1	LSA 04-04
L040408PSS00	2/9/2016	10:05	S	G	X		X	X												1	LSA 04-04
L040409PRQ00	2/9/2016	10:30	S	C	X		X	X												1	LSA 04-04
L040409PRS00	2/9/2016	10:30	S	C	X		X	X												1	LSA 04-04
L040410PES00	2/9/2016	10:35	S	G	X		X	X												1	LSA 04-04



Relinquished by: <i>[Signature]</i>	Date/Time: 2-11-16	Received by: <i>[Signature]</i>	Date/Time: 2-11-16	Total: 22	Cooler Temperature: Ambient
Company Name: WEC	0905	Company Name: 09:05		Cooler ID: 0210-	Shipper and Number:
Received by: <i>[Signature]</i>	Date/Time:	Relinquished by:	Date/Time:	Comments: Cooler #s 0210-01/03/10	
Company Name:		Company Name:			
Relinquished by: <i>[Signature]</i> 3815	Date/Time: 2-11-16	Received by: <i>[Signature]</i>	Date/Time: 2-11-16	Verified By: <i>[Signature]</i> <i>[Signature]</i>	
Company Name: CROSS ROADS	10:45	Company Name: <i>[Signature]</i>	10:45		



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 Custody ID No. F-021016-02 Page 2/2				Requested Analysis										Laboratory Name:			
Project Name: Westinghouse Electric Company Contact Person: Gerald Rood Phone Number: 314-810-3382 Sampler Name: Williams				Comp (C) or Grab (G)	Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)							Total Containers	TA-MO	
																Laboratory Address: 13715 Rider Trail North	
																Phone No. 314-298-8566	
																Laboratory Contact Person: Ivan Vania	
															Phone No. 708-870-8453		
															Turn Around Time		
															Rush	(7 days)	
															Remarks		
Sample ID	Date	Time	Matrix														
L040411PRS00	2/9/2016	13:25	S	C	X		X	X							1	LSA 04-04	
L040412PES00	2/9/2016	13:30	S	G	X		X	X							1	LSA 04-04	
L040413PSS00	2/9/2016	13:55	S	G	X		X	X							1	LSA 04-04	
L040414PRS00	2/9/2016	14:25	S	C	X		X	X							1	LSA 04-04	
L040415PES00	2/9/2016	14:30	S	G	X		X	X							1	LSA 04-04	
L040416PRS00	2/9/2016	15:00	S	C	X		X	X							1	LSA 04-04	
L040417PES00	2/9/2016	15:05	S	G	X		X	X							1	LSA 04-04	
L040418PSS00	2/9/2016	15:50	S	G	X		X	X							1	LSA 04-04	
L040419PRS00	2/9/2016	16:10	S	C	X		X	X							1	LSA 04-04	
L040420PES00	2/9/2016	16:15	S	G	X		X	X							1	LSA 04-04	

Relinquished by: <i>[Signature]</i>	Date/Time: 2-11-16 09:05	Received by: <i>[Signature]</i>	Date/Time: 2-11-16 10:45	Total: 22	Cooler Temperature: Ambient
Company Name: WEC		Company Name: 09.05		Cooler ID: 0210-	Shipper and Number:
Received by:	Date/Time:	Relinquished by:	Date/Time:	Comments: Cooler #s 0210-01/03/10	
Company Name:		Company Name:			
Relinquished by: <i>[Signature]</i>	Date/Time: 2-11-16 10:45	Received by: <i>[Signature]</i>	Date/Time: 2-11-16 10:45	Verified By: <i>[Signature]</i> <i>[Signature]</i>	
Company Name: CROSS ROADS		Company Name: T/STOWA			



Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-16071-2

Login Number: 16071

List Source: TestAmerica St. Louis

List Number: 1

Creator: Dedner, Connie L

Question	Answer	Comment
Radioactivity wasn't checked or is \leq 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.	True	
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 (excluding tests with immediate HTs)	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 <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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

TestAmerica Job ID: 160-16071-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection 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: HDP RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-16071-2

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

TestAmerica Job ID: 160-16071-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-16071-1	L040401PRS00	Solid	02/08/16 15:20	02/11/16 10:22
160-16071-2	L040402PES00	Solid	02/08/16 15:25	02/11/16 10:22
160-16071-3	L040403PRQ00	Solid	02/08/16 16:15	02/11/16 10:22
160-16071-4	L040403PRS00	Solid	02/08/16 16:15	02/11/16 10:22
160-16071-5	L040404PES00	Solid	02/08/16 16:20	02/11/16 10:22
160-16071-6	L040405PSS00	Solid	02/09/16 09:10	02/11/16 10:22
160-16071-7	L040406PRS00	Solid	02/09/16 09:35	02/11/16 10:22
160-16071-8	L040407PES00	Solid	02/09/16 09:40	02/11/16 10:22
160-16071-9	L040408PSS00	Solid	02/09/16 10:05	02/11/16 10:22
160-16071-10	L040409PRQ00	Solid	02/09/16 10:30	02/11/16 10:22
160-16071-11	L040409PRS00	Solid	02/09/16 10:30	02/11/16 10:22
160-16071-12	L040410PES00	Solid	02/09/16 10:35	02/11/16 10:22
160-16071-13	L040411PRS00	Solid	02/09/16 13:25	02/11/16 10:22
160-16071-14	L040412PES00	Solid	02/09/16 13:30	02/11/16 10:22
160-16071-15	L040413PSS00	Solid	02/09/16 13:55	02/11/16 10:22
160-16071-16	L040414PRS00	Solid	02/09/16 14:25	02/11/16 10:22
160-16071-17	L040415PES00	Solid	02/09/16 14:30	02/11/16 10:22
160-16071-18	L040416PRS00	Solid	02/09/16 15:00	02/11/16 10:22
160-16071-19	L040417PES00	Solid	02/09/16 15:05	02/11/16 10:22
160-16071-20	L040418PSS00	Solid	02/09/16 15:50	02/11/16 10:22
160-16071-21	L040419PRS00	Solid	02/09/16 16:10	02/11/16 10:22
160-16071-22	L040420PES00	Solid	02/09/16 16:15	02/11/16 10:22

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040401PRS00

Lab Sample ID: 160-16071-1

Date Collected: 02/08/16 15:20

Matrix: Solid

Date Received: 02/11/16 10:22

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		0.106	0.147		0.0963	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Bismuth 212	1.29		0.415	0.436		0.391	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Bismuth 214	1.16		0.0946	0.153		0.0495	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Lead 212	1.07		0.0727	0.156		0.0573	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Lead 214	1.21		0.0805	0.149		0.0660	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Potassium 40	18.4		1.04	2.15		0.261	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Protactinium 231	0.468	U	0.293	0.298		1.02	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Radium 226	1.16		0.0946	0.153	1.00	0.0495	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Thorium 232	1.00		0.106	0.147		0.0963	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Thorium 234	1.28		0.454	0.473		0.707	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Uranium 235	0.0680	U	0.134	0.134		0.213	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Americium 241	0.0115	U	0.0564	0.0564		0.0946	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Protactinium 234m	1.40	U	2.46	2.47		4.16	pCi/g	02/15/16 13:15	03/07/16 10:16	1
Other Detected Radionuclides			Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.321		0.0423	0.0538		0.0343	pCi/g	02/15/16 13:15	03/07/16 10:16	1

Client Sample ID: L040402PES00

Lab Sample ID: 160-16071-2

Date Collected: 02/08/16 15:25

Matrix: Solid

Date Received: 02/11/16 10:22

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	1.01		0.181	0.208		0.114	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Bismuth 212	1.35		0.584	0.600		0.528	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Bismuth 214	1.27		0.137	0.190		0.0861	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Lead 212	1.12		0.0957	0.174		0.0813	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Lead 214	1.33		0.113	0.179		0.101	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Potassium 40	18.5		1.39	2.35		0.266	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Protactinium 231	0.535	U	0.253	0.260		1.37	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Radium 226	1.27		0.137	0.190	1.00	0.0861	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Thorium 232	1.01		0.181	0.208		0.114	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Thorium 234	0.905	U	0.326	0.340		0.971	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Uranium 235	-0.0275	U	0.539	0.539		0.288	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Americium 241	0.0266	U	0.0725	0.0726		0.121	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Protactinium 234m	0.346	U	4.33	4.33		7.77	pCi/g	02/15/16 13:15	03/07/16 10:35	1
Other Detected Radionuclides			Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.375		0.0650	0.0757		0.0514	pCi/g	02/15/16 13:15	03/07/16 10:35	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040403PRQ00

Lab Sample ID: 160-16071-3

Date Collected: 02/08/16 16:15

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.15		0.129	0.173		0.0950	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Bismuth 212	1.27		0.492	0.509		0.435	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Bismuth 214	1.24		0.103	0.164		0.0603	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Lead 212	1.11		0.0854	0.167		0.0754	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Lead 214	1.38		0.101	0.176		0.0745	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Potassium 40	21.3		1.13	2.42		0.339	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Protactinium 231	-0.503	U	0.696	0.699		1.15	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Radium 226	1.24		0.103	0.164	1.00	0.0603	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Thorium 232	1.15		0.129	0.173		0.0950	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Thorium 234	0.845		0.260	0.274		0.723	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Uranium 235	0.0507	U	0.158	0.158		0.248	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Americium 241	-0.00948	U	1.38	1.38		0.104	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Protactinium 234m	7.48		2.77	2.86		5.08	pCi/g	02/15/16 13:15	03/07/16 11:04	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
TI-208	0.373		0.0521	0.0647		0.0402	pCi/g	02/15/16 13:15	03/07/16 11:04	1

Client Sample ID: L040403PRS00

Lab Sample ID: 160-16071-4

Date Collected: 02/08/16 16:15

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.818		0.0968	0.128		0.0886	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Bismuth 212	1.41		0.454	0.477		0.378	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Bismuth 214	0.847		0.0809	0.120		0.0475	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Lead 212	0.831		0.0622	0.124		0.0492	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Lead 214	0.915		0.0750	0.121		0.0620	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Potassium 40	15.4		0.974	1.85		0.330	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Protactinium 231	0.403	U	0.192	0.197		0.951	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Radium 226	0.847		0.0809	0.120	1.00	0.0475	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Thorium 232	0.818		0.0968	0.128		0.0886	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Thorium 234	1.37		0.429	0.452		0.658	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Uranium 235	0.143	U	0.127	0.128		0.195	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Americium 241	-0.00595	U	0.0511	0.0511		0.0861	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Protactinium 234m	4.46		2.22	2.26		3.85	pCi/g	02/15/16 13:15	03/07/16 11:05	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
TI-208	0.277		0.0362	0.0462		0.0270	pCi/g	02/15/16 13:15	03/07/16 11:05	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040404PES00

Lab Sample ID: 160-16071-5

Date Collected: 02/08/16 16:20

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.15		0.144	0.186		0.111	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Bismuth 212	1.32		0.574	0.590		0.546	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Bismuth 214	1.17		0.131	0.179		0.0821	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Lead 212	1.07		0.0953	0.168		0.0842	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Lead 214	1.27		0.121	0.179		0.0901	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Potassium 40	18.4		1.38	2.33		0.468	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Protactinium 231	0.380	U	0.273	0.276		1.38	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Radium 226	1.17		0.131	0.179	1.00	0.0821	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Thorium 232	1.15		0.144	0.186		0.111	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Thorium 234	1.55		0.711	0.729		0.936	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Uranium 235	0.132	U	0.153	0.154		0.268	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Americium 241	0.0253	U	0.0699	0.0700		0.117	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Protactinium 234m	0.604	U	4.19	4.19		7.11	pCi/g	02/15/16 13:15	03/07/16 11:15	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.355		0.0515	0.0633		0.0351	pCi/g	02/15/16 13:15	03/07/16 11:15	1

Client Sample ID: L040405PSS00

Lab Sample ID: 160-16071-6

Date Collected: 02/09/16 09:10

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.819		0.103	0.133		0.0859	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Bismuth 212	0.856		0.298	0.311		0.273	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Bismuth 214	0.766		0.0825	0.115		0.0559	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Lead 212	0.719		0.0639	0.113		0.0566	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Lead 214	0.909		0.0804	0.124		0.0538	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Potassium 40	14.1		0.939	1.72		0.332	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Protactinium 231	0.301	U	0.193	0.196		0.978	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Radium 226	0.766		0.0825	0.115	1.00	0.0559	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Thorium 232	0.819		0.103	0.133		0.0859	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Thorium 234	0.700	U	0.248	0.258		0.745	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Uranium 235	0.0990	U	0.116	0.116		0.213	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Americium 241	0.0112	U	0.0549	0.0549		0.0922	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Protactinium 234m	1.48	U	1.66	1.66		4.39	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pb-210	1.50		0.637	0.661		0.743	pCi/g	02/15/16 13:15	03/07/16 11:59	1
Tl-208	0.254		0.0397	0.0477		0.0318	pCi/g	02/15/16 13:15	03/07/16 11:59	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040406PRS00

Lab Sample ID: 160-16071-7

Date Collected: 02/09/16 09:35

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.02		0.140	0.173		0.0960	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Bismuth 212	1.48		0.497	0.520		0.413	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Bismuth 214	1.10		0.0926	0.146		0.0607	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Lead 212	0.923		0.0828	0.146		0.0756	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Lead 214	1.22		0.0846	0.153		0.0707	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Potassium 40	19.0		1.05	2.19		0.349	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Protactinium 231	0.342	U	0.190	0.194		1.16	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Radium 226	1.10		0.0926	0.146	1.00	0.0607	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Thorium 232	1.02		0.140	0.173		0.0960	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Thorium 234	1.38		0.486	0.507		0.762	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Uranium 235	0.0784	U	0.137	0.137		0.218	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Americium 241	0.00421	U	0.0576	0.0576		0.0971	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Protactinium 234m	6.08		2.58	2.65		4.94	pCi/g	02/15/16 13:15	03/07/16 12:00	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
TI-208	0.387		0.0484	0.0626		0.0337	pCi/g	02/15/16 13:15	03/07/16 12:00	1

Client Sample ID: L040407PES00

Lab Sample ID: 160-16071-8

Date Collected: 02/09/16 09:40

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.16		0.118	0.167		0.0876	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Bismuth 212	1.62		0.428	0.460		0.352	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Bismuth 214	1.03		0.0977	0.145		0.0638	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Lead 212	1.07		0.0788	0.159		0.0633	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Lead 214	1.24		0.0905	0.158		0.0592	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Potassium 40	17.5		1.02	2.06		0.264	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Protactinium 231	-0.202	U	0.572	0.573		0.966	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Radium 226	1.03		0.0977	0.145	1.00	0.0638	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Thorium 232	1.16		0.118	0.167		0.0876	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Thorium 234	0.947		0.248	0.267		0.709	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Uranium 235	0.135	U	0.127	0.128		0.198	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Americium 241	0.0200	U	0.0557	0.0557		0.0930	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Protactinium 234m	0.652	U	2.63	2.63		4.58	pCi/g	02/15/16 13:15	03/07/16 12:01	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
TI-208	0.344		0.0452	0.0576		0.0354	pCi/g	02/15/16 13:15	03/07/16 12:01	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040408PSS00

Lab Sample ID: 160-16071-9

Date Collected: 02/09/16 10:05

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.897		0.161	0.185		0.124	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Bismuth 212	1.55		0.675	0.694		0.606	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Bismuth 214	1.24		0.153	0.200		0.0939	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Lead 212	0.977		0.0946	0.158		0.0790	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Lead 214	1.38		0.124	0.190		0.0782	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Potassium 40	19.2		1.50	2.48		0.301	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Protactinium 231	0.493	U	0.308	0.313		1.63	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Radium 226	1.24		0.153	0.200	1.00	0.0939	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Thorium 232	0.897		0.161	0.185		0.124	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Thorium 234	1.98		0.677	0.707		1.04	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Uranium 235	0.886		0.193	0.213		0.251	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Americium 241	0.0135	U	0.0666	0.0666		0.112	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Protactinium 234m	2.69	U	4.71	4.72		7.20	pCi/g	02/15/16 13:15	03/07/16 12:02	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.293		0.0579	0.0654		0.0483	pCi/g	02/15/16 13:15	03/07/16 12:02	1

Client Sample ID: L040409PRQ00

Lab Sample ID: 160-16071-10

Date Collected: 02/09/16 10:30

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.09		0.116	0.161		0.106	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Bismuth 212	1.24		0.516	0.532		0.461	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Bismuth 214	1.14		0.106	0.160		0.0684	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Lead 212	0.995		0.0762	0.150		0.0658	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Lead 214	1.27		0.0894	0.159		0.0718	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Potassium 40	18.9		1.12	2.24		0.417	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Protactinium 231	-0.524	U	0.671	0.674		1.11	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Radium 226	1.14		0.106	0.160	1.00	0.0684	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Thorium 232	1.09		0.116	0.161		0.106	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Thorium 234	0.870		0.281	0.295		0.816	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Uranium 235	0.0935	U	0.148	0.148		0.246	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Americium 241	0.00493	U	0.0628	0.0628		0.106	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Protactinium 234m	0.974	U	2.79	2.79		4.86	pCi/g	02/15/16 13:15	03/07/16 12:32	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.352		0.0446	0.0576		0.0331	pCi/g	02/15/16 13:15	03/07/16 12:32	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040409PRS00

Lab Sample ID: 160-16071-11

Date Collected: 02/09/16 10:30

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.21		0.152	0.195		0.123	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Bismuth 212	1.43		0.429	0.454		0.378	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Bismuth 214	1.28		0.111	0.172		0.0748	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Lead 212	1.13		0.0877	0.171		0.0752	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Lead 214	1.39		0.0870	0.169		0.0740	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Potassium 40	20.9		1.08	2.37		0.248	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Protactinium 231	0.386	U	0.226	0.230		1.16	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Radium 226	1.28		0.111	0.172	1.00	0.0748	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Thorium 232	1.21		0.152	0.195		0.123	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Thorium 234	1.36		0.494	0.514		0.776	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Uranium 235	0.102	U	0.146	0.146		0.243	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Americium 241	0.00395	U	0.0578	0.0578		0.0975	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Protactinium 234m	2.36	U	2.86	2.87		4.70	pCi/g	02/15/16 13:15	03/07/16 12:33	1
Other Detected			Count	Total						
Radionuclides			Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<i>Tl-208</i>			<i>0.0535</i>	<i>0.0655</i>		<i>0.0435</i>	<i>pCi/g</i>	<i>02/15/16 13:15</i>	<i>03/07/16 12:33</i>	<i>1</i>

Client Sample ID: L040410PES00

Lab Sample ID: 160-16071-12

Date Collected: 02/09/16 10:35

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.02		0.114	0.154		0.107	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Bismuth 212	1.25		0.466	0.484		0.434	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Bismuth 214	1.23		0.104	0.165		0.0599	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Lead 212	1.01		0.0814	0.154		0.0686	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Lead 214	1.23		0.0878	0.155		0.0659	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Potassium 40	17.8		1.06	2.11		0.316	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Protactinium 231	-0.556	U	0.667	0.670		1.10	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Radium 226	1.23		0.104	0.165	1.00	0.0599	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Thorium 232	1.02		0.114	0.154		0.107	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Thorium 234	1.14		0.483	0.498		0.767	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Uranium 235	0.104	U	0.137	0.137		0.218	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Americium 241	-0.0460	U	0.0590	0.0592		0.0973	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Protactinium 234m	0.247	U	3.00	3.00		5.27	pCi/g	02/15/16 13:15	03/07/16 12:34	1
Other Detected			Count	Total						
Radionuclides			Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<i>Tl-208</i>			<i>0.0477</i>	<i>0.0594</i>		<i>0.0357</i>	<i>pCi/g</i>	<i>02/15/16 13:15</i>	<i>03/07/16 12:34</i>	<i>1</i>

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040411PRS00

Lab Sample ID: 160-16071-13

Date Collected: 02/09/16 13:25

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.21		0.169	0.209		0.146	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Bismuth 212	1.39		0.613	0.630		0.569	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Bismuth 214	1.28		0.146	0.198		0.0946	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Lead 212	1.06		0.107	0.174		0.0942	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Lead 214	1.40		0.114	0.185		0.0862	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Potassium 40	18.0		1.42	2.32		0.512	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Protactinium 231	0.539	U	0.298	0.303		1.50	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Radium 226	1.28		0.146	0.198	1.00	0.0946	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Thorium 232	1.21		0.169	0.209		0.146	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Thorium 234	0.906		0.332	0.345		0.906	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Uranium 235	0.0892	U	0.164	0.164		0.281	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Americium 241	0.0440	U	0.0663	0.0665		0.0955	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Protactinium 234m	1.31	U	3.50	3.50		6.91	pCi/g	02/15/16 13:15	03/07/16 12:41	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.411		0.0633	0.0763		0.0438	pCi/g	02/15/16 13:15	03/07/16 12:41	1

Client Sample ID: L040412PES00

Lab Sample ID: 160-16071-14

Date Collected: 02/09/16 13:30

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.934		0.143	0.172		0.103	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Bismuth 212	1.28		0.381	0.403		0.343	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Bismuth 214	1.12		0.101	0.154		0.0670	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Lead 212	0.988		0.0815	0.152		0.0700	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Lead 214	1.25		0.0860	0.156		0.0661	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Potassium 40	18.7		1.04	2.18		0.255	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Protactinium 231	0.375	U	0.281	0.284		1.09	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Radium 226	1.12		0.101	0.154	1.00	0.0670	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Thorium 232	0.934		0.143	0.172		0.103	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Thorium 234	0.829		0.271	0.285		0.688	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Uranium 235	0.176	U	0.128	0.129		0.179	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Americium 241	0.0153	U	0.0614	0.0614		0.103	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Protactinium 234m	5.88		2.13	2.21		4.59	pCi/g	02/15/16 13:15	03/07/16 13:04	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.346		0.0505	0.0619		0.0378	pCi/g	02/15/16 13:15	03/07/16 13:04	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040413PSS00

Lab Sample ID: 160-16071-15

Date Collected: 02/09/16 13:55

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.861		0.114	0.143		0.0804	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Bismuth 212	1.01		0.285	0.303		0.250	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Bismuth 214	0.886		0.0918	0.129		0.0637	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Lead 212	0.726		0.0666	0.115		0.0605	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Lead 214	0.993		0.0840	0.133		0.0599	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Potassium 40	15.7		0.945	1.84		0.253	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Protactinium 231	-0.526	U	0.618	0.621		1.02	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Radium 226	0.886		0.0918	0.129	1.00	0.0637	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Thorium 232	0.861		0.114	0.143		0.0804	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Thorium 234	1.04		0.449	0.462		0.713	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Uranium 235	0.143	U	0.129	0.130		0.211	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Americium 241	-0.0312	U	0.0912	0.0912		0.0875	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Protactinium 234m	1.59	U	2.67	2.68		4.49	pCi/g	02/15/16 13:15	03/07/16 13:06	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.260		0.0348	0.0439		0.0264	pCi/g	02/15/16 13:15	03/07/16 13:06	1

Client Sample ID: L040414PRS00

Lab Sample ID: 160-16071-16

Date Collected: 02/09/16 14:25

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.00		0.124	0.161		0.0904	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Bismuth 212	1.03		0.413	0.427		0.381	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Bismuth 214	1.06		0.0969	0.146		0.0628	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Lead 212	0.965		0.0755	0.146		0.0612	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Lead 214	1.17		0.0797	0.146		0.0657	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Potassium 40	17.9		1.04	2.10		0.267	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Protactinium 231	-0.573	U	0.621	0.624		1.02	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Radium 226	1.06		0.0969	0.146	1.00	0.0628	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Thorium 232	1.00		0.124	0.161		0.0904	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Thorium 234	0.846		0.244	0.259		0.683	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Uranium 235	0.100	U	0.0893	0.0899		0.143	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Americium 241	-0.0257	U	0.0546	0.0547		0.0909	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Protactinium 234m	0.560	U	2.57	2.57		4.50	pCi/g	02/15/16 13:15	03/07/16 13:07	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.314		0.0392	0.0509		0.0281	pCi/g	02/15/16 13:15	03/07/16 13:07	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040415PES00

Lab Sample ID: 160-16071-17

Date Collected: 02/09/16 14:30

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.911		0.165	0.189		0.115	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Bismuth 212	0.968		0.419	0.431		0.442	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Bismuth 214	1.04		0.115	0.158		0.0752	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Lead 212	0.978		0.0843	0.152		0.0710	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Lead 214	1.29		0.112	0.175		0.103	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Potassium 40	17.2		1.32	2.20		0.469	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Protactinium 231	0.252	U	0.194	0.196		1.41	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Radium 226	1.04		0.115	0.158	1.00	0.0752	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Thorium 232	0.911		0.165	0.189		0.115	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Thorium 234	0.916	U	0.365	0.377		1.12	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Uranium 235	0.118	U	0.150	0.151		0.253	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Americium 241	-0.0565	U	0.0741	0.0744		0.122	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Protactinium 234m	3.64	U	3.16	3.18		6.24	pCi/g	02/15/16 13:15	03/07/16 23:18	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.371		0.0514	0.0642		0.0357	pCi/g	02/15/16 13:15	03/07/16 23:18	1

Client Sample ID: L040416PRS00

Lab Sample ID: 160-16071-18

Date Collected: 02/09/16 15:00

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.12		0.116	0.162		0.103	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Bismuth 212	1.44		0.426	0.451		0.356	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Bismuth 214	1.24		0.109	0.169		0.0673	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Lead 212	1.09		0.0785	0.162		0.0666	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Lead 214	1.31		0.0864	0.161		0.0528	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Potassium 40	19.4		1.11	2.27		0.366	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Protactinium 231	0.432	U	0.369	0.372		0.694	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Radium 226	1.24		0.109	0.169	1.00	0.0673	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Thorium 232	1.12		0.116	0.162		0.103	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Thorium 234	1.22		0.641	0.654		0.832	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Uranium 235	0.128	U	0.150	0.151		0.240	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Americium 241	-0.00111	U	0.0667	0.0667		0.112	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Protactinium 234m	-0.359	U	14.4	14.4		6.09	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pb-210	1.41		0.529	0.554		0.695	pCi/g	02/15/16 13:15	03/07/16 19:29	1
Tl-208	0.335		0.0433	0.0555		0.0340	pCi/g	02/15/16 13:15	03/07/16 19:29	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040417PES00

Lab Sample ID: 160-16071-19

Date Collected: 02/09/16 15:05

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.23		0.121	0.173		0.112	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Bismuth 212	1.42		0.454	0.476		0.417	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Bismuth 214	1.21		0.102	0.161		0.0654	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Lead 212	1.14		0.0837	0.170		0.0723	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Lead 214	1.41		0.0947	0.175		0.0713	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Potassium 40	20.3		1.09	2.32		0.262	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Protactinium 231	0.437	U	0.239	0.244		1.24	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Radium 226	1.21		0.102	0.161	1.00	0.0654	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Thorium 232	1.23		0.121	0.173		0.112	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Thorium 234	1.32		0.503	0.522		0.792	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Uranium 235	0.0664	U	0.163	0.163		0.260	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Americium 241	0.000559	U	0.0631	0.0631		0.106	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Protactinium 234m	2.67	U	3.14	3.15		5.14	pCi/g	02/15/16 13:15	03/07/16 19:30	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.406		0.0520	0.0666		0.0401	pCi/g	02/15/16 13:15	03/07/16 19:30	1

Client Sample ID: L040418PSS00

Lab Sample ID: 160-16071-20

Date Collected: 02/09/16 15:50

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.137		0.0310	0.0340		0.0191	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Bismuth 212	0.153		0.0861	0.0875		0.0831	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Bismuth 214	0.139		0.0346	0.0375		0.0303	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Lead 212	0.105		0.0219	0.0258		0.0226	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Lead 214	0.215		0.0295	0.0370		0.0235	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Potassium 40	2.83		0.352	0.456		0.149	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Protactinium 231	0.0632	U	0.104	0.105		0.377	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Radium 226	0.139		0.0346	0.0375	1.00	0.0303	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Thorium 232	0.137		0.0310	0.0340		0.0191	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Thorium 234	0.241	U	0.191	0.193		0.289	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Uranium 235	0.0357	U	0.0531	0.0533		0.0904	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Americium 241	0.00653	U	0.0191	0.0191		0.0324	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Protactinium 234m	0.000	U	1.07	1.07		2.87	pCi/g	02/15/16 13:15	03/07/16 19:31	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.0311		0.00979	0.0103		0.00896	pCi/g	02/15/16 13:15	03/07/16 19:31	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-16071-2

Client Sample ID: L040419PRS00

Lab Sample ID: 160-16071-21

Date Collected: 02/09/16 16:10

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.966		0.105	0.144		0.109	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Bismuth 212	1.49		0.424	0.451		0.374	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Bismuth 214	1.09		0.0969	0.149		0.0571	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Lead 212	1.04		0.0702	0.151		0.0527	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Lead 214	1.23		0.0876	0.155		0.0721	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Potassium 40	18.7		1.13	2.22		0.403	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Protactinium 231	-0.559	U	0.634	0.637		1.04	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Radium 226	1.09		0.0969	0.149	1.00	0.0571	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Thorium 232	0.966		0.105	0.144		0.109	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Thorium 234	1.37		0.440	0.462		0.675	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Uranium 235	0.0857	U	0.128	0.128		0.219	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Americium 241	-0.00933	U	0.0492	0.0492		0.0828	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Protactinium 234m	4.73		1.96	2.01		3.94	pCi/g	02/15/16 12:46	03/07/16 09:37	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
TI-208	0.332		0.0458	0.0573		0.0362	pCi/g	02/15/16 12:46	03/07/16 09:37	1

Client Sample ID: L040420PES00

Lab Sample ID: 160-16071-22

Date Collected: 02/09/16 16:15

Matrix: Solid

Date Received: 02/11/16 10:22

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.16		0.182	0.217		0.142	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Bismuth 212	1.62		0.703	0.723		0.591	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Bismuth 214	1.26		0.139	0.191		0.0888	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Lead 212	1.07		0.0916	0.166		0.0796	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Lead 214	1.33		0.123	0.185		0.0869	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Potassium 40	18.5		1.34	2.32		0.248	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Protactinium 231	-0.619	U	0.814	0.817		1.34	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Radium 226	1.26		0.139	0.191	1.00	0.0888	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Thorium 232	1.16		0.182	0.217		0.142	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Thorium 234	1.41		0.589	0.607		0.926	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Uranium 235	0.0857	U	0.122	0.122		0.278	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Americium 241	0.0113	U	0.0686	0.0686		0.115	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Protactinium 234m	3.26	U	4.19	4.21		6.99	pCi/g	02/15/16 12:46	03/07/16 09:55	1
Other Detected Radionuclides			Count	Total						
	Result	Qualifier	Uncert.	Uncert.	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
TI-208	0.346		0.0591	0.0692		0.0469	pCi/g	02/15/16 12:46	03/07/16 09:55	1

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-16071-2

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

Lab Sample ID: MB 160-236808/1-A

Matrix: Solid

Analysis Batch: 239441

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 236808

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Actinium 228	0.009681	U	0.0218	0.0218		0.0395	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Bismuth 212	-0.01154	U	0.0951	0.0951		0.180	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Bismuth 214	-0.008905	U	0.0944	0.0944		0.0372	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Lead 212	-0.01267	U	0.0945	0.0945		0.0247	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Lead 214	0.006876	U	0.0133	0.0133		0.0309	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Potassium 40	-0.06570	U	2.63	2.63		0.322	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Protactinium 231	0.01587	U	0.173	0.173		0.318	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Radium 226	-0.008905	U	0.0944	0.0944	1.00	0.0372	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Thorium 232	0.009681	U	0.0218	0.0218		0.0395	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Thorium 234	0.004379	U	0.120	0.120		0.243	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Uranium 235	0.01574	U	0.0292	0.0292		0.0624	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Americium 241	0.004575	U	0.0127	0.0127		0.0222	pCi/g	02/15/16 12:46	03/07/16 08:35	1
Protactinium 234m	-0.4442	U	7.34	7.34		2.28	pCi/g	02/15/16 12:46	03/07/16 08:35	1

Other Detected Radionuclides	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Other Detected Radionuclide	None						pCi/g	02/15/16 12:46	03/07/16 08:35	1

Lab Sample ID: LCS 160-236808/2-A

Matrix: Solid

Analysis Batch: 239444

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 236808

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec.
				Uncert. (2σ+/-)					Limits
Americium 241	101	100.9		10.5		0.530	pCi/g	100	87 - 116
Cesium 137	34.1	36.74		3.80		0.142	pCi/g	108	87 - 120
Cobalt 60	32.0	34.02		3.37		0.0928	pCi/g	106	87 - 115

Lab Sample ID: 160-16068-A-1-I DU

Matrix: Solid

Analysis Batch: 239441

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 236808

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total	RL	MDC	Unit	RER	RER
					Uncert. (2σ+/-)					Limit
Actinium 228	0.873		0.9139		0.153		0.0977	pCi/g	0.13	1
Bismuth 212	0.747		1.109		0.342		0.268	pCi/g	0.54	1
Bismuth 214	0.863		0.8469		0.136		0.0761	pCi/g	0.06	1
Lead 212	0.909		0.8784		0.135		0.0620	pCi/g	0.11	1
Lead 214	1.00		1.008		0.132		0.0590	pCi/g	0.03	1
Potassium 40	15.5		15.21		1.83		0.271	pCi/g	0.07	1
Protactinium 231	0.370	U	0.2825	U	0.172		0.920	pCi/g	0.24	1
Radium 226	0.863		0.8469		0.136	1.00	0.0761	pCi/g	0.06	1
Thorium 232	0.873		0.9139		0.153		0.0977	pCi/g	0.13	1
Thorium 234	2.62		2.682		0.619		0.802	pCi/g	0.05	1
Uranium 235	0.769		0.7596		0.182		0.224	pCi/g	0.02	1
Americium 241	0.0402	U	0.01740	U	0.0631		0.106	pCi/g	0.19	1

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-16071-2

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

Lab Sample ID: 160-16068-A-1-I DU
Matrix: Solid
Analysis Batch: 239441

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 236808

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Protactinium 234m	4.84		5.064		2.40		4.91	pCi/g	0.04	1

Other Detected Radionuclides	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Tl-208	0.248		0.2706		0.0508		0.0331	pCi/g	0.23	1

Lab Sample ID: MB 160-236813/1-A
Matrix: Solid
Analysis Batch: 239441

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 236813

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Count Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.002743	U	0.0104	0.0104		0.0236	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Bismuth 212	0.01716	U	0.0769	0.0770		0.147	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Bismuth 214	-0.005564	U	0.0417	0.0417		0.0376	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Lead 212	0.007574	U	0.0124	0.0124		0.0230	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Lead 214	-0.0008235	U	0.00411	0.00411		0.0282	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Potassium 40	0.01259	U	0.0920	0.0920		0.211	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Protactinium 231	0.02499	U	0.0558	0.0559		0.290	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Radium 226	-0.005564	U	0.0417	0.0417	1.00	0.0376	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Thorium 232	0.002743	U	0.0104	0.0104		0.0236	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Thorium 234	0.01804	U	0.132	0.132		0.258	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Uranium 235	-0.004781	U	0.147	0.147		0.0613	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Americium 241	-0.001668	U	0.0146	0.0146		0.0259	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Protactinium 234m	0.04745	U	0.959	0.959		2.02	pCi/g	02/15/16 13:15	03/07/16 10:12	1
Other Detected Radionuclides	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Count Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/g	02/15/16 13:15	03/07/16 10:12	1

Lab Sample ID: LCS 160-236813/2-A
Matrix: Solid
Analysis Batch: 239444

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 236813

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Americium 241	101	101.1		10.5		0.507	pCi/g	100	87 - 116
Cesium 137	34.1	36.73		3.80		0.151	pCi/g	108	87 - 120
Cobalt 60	32.0	34.02		3.37		0.0938	pCi/g	106	87 - 115

QC Sample Results

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

TestAmerica Job ID: 160-16071-2

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

Lab Sample ID: 160-16071-1 DU
Matrix: Solid
Analysis Batch: 239441

Client Sample ID: L040401PRS00
Prep Type: Total/NA
Prep Batch: 236813

Analyte	Sample		DU		Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual						
Actinium 228	1.00		1.067		0.157		0.100	pCi/g	0.21	1
Bismuth 212	1.29		1.454		0.433		0.341	pCi/g	0.19	1
Bismuth 214	1.16		1.102		0.150		0.0591	pCi/g	0.18	1
Lead 212	1.07		0.9481		0.142		0.0620	pCi/g	0.40	1
Lead 214	1.21		1.267		0.155		0.0569	pCi/g	0.20	1
Potassium 40	18.4		17.80		2.10		0.370	pCi/g	0.13	1
Protactinium 231	0.468	U	-0.5228	U	0.679		1.12	pCi/g	1.02	1
Radium 226	1.16		1.102		0.150	1.00	0.0591	pCi/g	0.18	1
Thorium 232	1.00		1.067		0.157		0.100	pCi/g	0.21	1
Thorium 234	1.28		1.269		0.507		0.769	pCi/g	0.01	1
Uranium 235	0.0680	U	0.04911	U	0.0622		0.213	pCi/g	0.1	1
Americium 241	0.0115	U	-0.01125	U	0.0598		0.100	pCi/g	0.20	1
Protactinium 234m	1.40	U	3.046	U	2.00		4.41	pCi/g	0.37	1
Other Detected Radionuclides	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Tl-208	0.321		0.3621		0.0573		0.0295	pCi/g	0.37	1

QC Association Summary

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

TestAmerica Job ID: 160-16071-2

Rad

Leach Batch: 236447

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16068-A-1-I DU	Duplicate	Total/NA	Solid	Dry and Grind	
160-16071-1	L040401PRS00	Total/NA	Solid	Dry and Grind	
160-16071-1 DU	L040401PRS00	Total/NA	Solid	Dry and Grind	
160-16071-2	L040402PES00	Total/NA	Solid	Dry and Grind	
160-16071-3	L040403PRQ00	Total/NA	Solid	Dry and Grind	
160-16071-4	L040403PRS00	Total/NA	Solid	Dry and Grind	
160-16071-5	L040404PES00	Total/NA	Solid	Dry and Grind	
160-16071-6	L040405PSS00	Total/NA	Solid	Dry and Grind	
160-16071-7	L040406PRS00	Total/NA	Solid	Dry and Grind	
160-16071-8	L040407PES00	Total/NA	Solid	Dry and Grind	
160-16071-9	L040408PSS00	Total/NA	Solid	Dry and Grind	
160-16071-10	L040409PRQ00	Total/NA	Solid	Dry and Grind	
160-16071-11	L040409PRS00	Total/NA	Solid	Dry and Grind	
160-16071-12	L040410PES00	Total/NA	Solid	Dry and Grind	
160-16071-13	L040411PRS00	Total/NA	Solid	Dry and Grind	
160-16071-14	L040412PES00	Total/NA	Solid	Dry and Grind	
160-16071-15	L040413PSS00	Total/NA	Solid	Dry and Grind	
160-16071-16	L040414PRS00	Total/NA	Solid	Dry and Grind	
160-16071-17	L040415PES00	Total/NA	Solid	Dry and Grind	
160-16071-18	L040416PRS00	Total/NA	Solid	Dry and Grind	
160-16071-19	L040417PES00	Total/NA	Solid	Dry and Grind	
160-16071-20	L040418PSS00	Total/NA	Solid	Dry and Grind	
160-16071-21	L040419PRS00	Total/NA	Solid	Dry and Grind	
160-16071-22	L040420PES00	Total/NA	Solid	Dry and Grind	

Prep Batch: 236808

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16068-A-1-I DU	Duplicate	Total/NA	Solid	Fill_Geo-21	236447
160-16071-21	L040419PRS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-22	L040420PES00	Total/NA	Solid	Fill_Geo-21	236447
LCS 160-236808/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-236808/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 236813

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16071-1	L040401PRS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-1 DU	L040401PRS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-2	L040402PES00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-3	L040403PRQ00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-4	L040403PRS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-5	L040404PES00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-6	L040405PSS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-7	L040406PRS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-8	L040407PES00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-9	L040408PSS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-10	L040409PRQ00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-11	L040409PRS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-12	L040410PES00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-13	L040411PRS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-14	L040412PES00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-15	L040413PSS00	Total/NA	Solid	Fill_Geo-21	236447

TestAmerica St. Louis

QC Association Summary

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

TestAmerica Job ID: 160-16071-2

Rad (Continued)

Prep Batch: 236813 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16071-16	L040414PRS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-17	L040415PES00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-18	L040416PRS00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-19	L040417PES00	Total/NA	Solid	Fill_Geo-21	236447
160-16071-20	L040418PSS00	Total/NA	Solid	Fill_Geo-21	236447
LCS 160-236813/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-236813/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

