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: 160-16768-2
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

Authorized for release by:
4/28/2016 9:43:55 AM

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

Table of Contents

Job ID: 160-16768-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

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

Report Number: 160-16768-2

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 4/1/2016 3:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.1º C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples L08-09-10-T-E-B-00 (160-16768-1), L08-09-11-T-E-B-00 (160-16768-2), L08-09-12-T-E-B-00 (160-16768-3), L08-09-13-T-E-B-00 (160-16768-4), L08-09-14-T-E-B-00 (160-16768-5) and L08-09-15-T-E-B-00 (160-16768-6) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 04/04/2016, prepared on 04/05/2016 and analyzed on 04/26/2016.

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

Hematite Decommissioning Project	Procedure HDP-PR-QA-006, *Chain of Custody*	
	Revision: 4	Page 1 of 1
	Westinghouse Non-Proprietary Class 3	

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-033116-01 **Page** 1/1

Project Name:
Westinghouse Electric Company

Contact Person:
Clark Evers

Phone Number:
314-810-3336

Sampler Name
J. Willams

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
L08-09-10-T-E-B-00	3/31/2016	9:20	S	G	X		X	X	1	LSA-08-09 Bias
L08-09-11-T-E-B-00	3/31/2016	9:40	S	G	X		X	X	1	LSA-08-09 Bias
L08-09-12-T-E-B-00	3/31/2016	9:30	S	G	X	N	X	X	1	LSA-08-09 Bias
L08-09-13-T-E-B-00	3/31/2016	9:25	S	G	X		X	X	1	LSA-08-09 Bias
L08-09-14-T-E-B-00	3/31/2016	9:15	S	G	X		X	X	1	LSA-08-09 Bias
L08-09-15-T-E-B-00	3/31/2016	9:35	S	G	X		X	X	1	LSA-08-09 Bias
						N		A		

Laboratory Name:
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)

160-16768 Chain of Custody

Relinquished by	Date/Time	Received by	Date/Time	Total	Cooler Temperature
Thomas Yardley	4-1-16/1355	[illegible] 1318	1355/4/1/16	6	Ambient
Company Name: WEC		Company Name: Crosroads		Cooler ID: 0401-01	Shipper and Number:
Received by: [illegible]	Date/Time 040116 1530	Relinquished by: [illegible]	Date/Time 330/4/1/16	Comments: N/A	
Company Name: TASTL		Company Name: Crosroads			
Relinquished by:	Date/Time	Received by: [illegible]	Date/Time 04-01-16	Verified By: Thomas Yardley [illegible] 4-1-16	
Company Name:		Company Name: TA-St. Louis	15:30		

Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-16768-2

Login Number: 16768
List Number: 1
Creator: Dedner, Connie L

List Source: TestAmerica St. Louis

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.	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 <6mm (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: 160-16768-2

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: 160-16768-2

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: 160-16768-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-16768-1	L08-09-10-T-E-B-00	Solid	03/31/16 09:20	04/01/16 15:30
160-16768-2	L08-09-11-T-E-B-00	Solid	03/31/16 09:40	04/01/16 15:30
160-16768-3	L08-09-12-T-E-B-00	Solid	03/31/16 09:30	04/01/16 15:30
160-16768-4	L08-09-13-T-E-B-00	Solid	03/31/16 09:25	04/01/16 15:30
160-16768-5	L08-09-14-T-E-B-00	Solid	03/31/16 09:15	04/01/16 15:30
160-16768-6	L08-09-15-T-E-B-00	Solid	03/31/16 09:35	04/01/16 15:30

Client Sample ID: L08-09-10-T-E-B-00

Lab Sample ID: 160-16768-1

Date Collected: 03/31/16 09:20

Matrix: Solid

Date Received: 04/01/16 15:30

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	**1.21**		0.171	0.211		0.151	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Bismuth 212	**1.45**		0.480	0.503		0.446	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Bismuth 214	**1.18**		0.120	0.172		0.0750	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Lead 212	**1.03**		0.0817	0.157		0.0701	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Lead 214	**1.24**		0.0954	0.160		0.0809	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Potassium 40	**19.6**		1.21	2.35		0.218	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Protactinium 231	0.480	U	0.265	0.270		1.12	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Radium 226	**1.18**		0.120	0.172	1.00	0.0750	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Thorium 232	**1.21**		0.171	0.211		0.151	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Thorium 234	**1.18**		0.684	0.695		0.890	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Uranium 235	**0.230**		0.141	0.143		0.175	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Americium 241	0.0532	U	0.0587	0.0589		0.0964	pCi/g	04/05/16 14:12	04/26/16 17:11	1
Protactinium 234m	0.173	U	3.22	3.22		5.74	pCi/g	04/05/16 14:12	04/26/16 17:11	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.357*		*0.0592*	*0.0698*		*0.0471*	*pCi/g*	*04/05/16 14:12*	*04/26/16 17:11*	*1*

Client Sample ID: L08-09-11-T-E-B-00

Lab Sample ID: 160-16768-2

Date Collected: 03/31/16 09:40

Matrix: Solid

Date Received: 04/01/16 15:30

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	**1.01**		0.122	0.160		0.115	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Bismuth 212	**1.22**		0.320	0.344		0.286	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Bismuth 214	**1.05**		0.104	0.151		0.0649	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Lead 212	**1.03**		0.0752	0.153		0.0619	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Lead 214	**1.15**		0.0817	0.145		0.0607	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Potassium 40	**17.3**		1.04	2.05		0.334	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Protactinium 231	0.537	U	0.296	0.302		0.833	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Radium 226	**1.05**		0.104	0.151	1.00	0.0649	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Thorium 232	**1.01**		0.122	0.160		0.115	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Thorium 234	**1.27**		0.452	0.471		0.705	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Uranium 235	0.0575	U	0.130	0.130		0.217	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Americium 241	-0.000779	U	0.0551	0.0551		0.0930	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Protactinium 234m	**6.48**		2.75	2.83		4.25	pCi/g	04/05/16 14:12	04/26/16 09:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.325*		*0.0389*	*0.0515*		*0.0271*	*pCi/g*	*04/05/16 14:12*	*04/26/16 09:35*	*1*

Client Sample ID: L08-09-12-T-E-B-00

Lab Sample ID: 160-16768-3
Date Collected: 03/31/16 09:30
Matrix: Solid
Date Received: 04/01/16 15:30

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	**1.54**		0.183	0.240		0.161	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Bismuth 212	**1.37**		0.539	0.557		0.529	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Bismuth 214	**1.44**		0.120	0.191		0.0726	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Lead 212	**1.48**		0.0970	0.215		0.0798	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Lead 214	**1.73**		0.130	0.222		0.0907	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Potassium 40	**20.4**		1.20	2.38		0.314	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Protactinium 231	0.345	U	0.235	0.238		1.54	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Radium 226	**1.44**		0.120	0.191	1.00	0.0726	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Thorium 232	**1.54**		0.183	0.240		0.161	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Thorium 234	**1.32**		0.765	0.777		0.978	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Uranium 235	0.0970	U	0.188	0.188		0.294	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Americium 241	0.0292	U	0.0645	0.0646		0.108	pCi/g	04/05/16 14:12	04/26/16 09:37	1
Protactinium 234m	-1.28	U	3.80	3.80		6.52	pCi/g	04/05/16 14:12	04/26/16 09:37	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.478*		*0.0611*	*0.0784*		*0.0497*	*pCi/g*	*04/05/16 14:12*	*04/26/16 09:37*	*1*

Client Sample ID: L08-09-13-T-E-B-00

Lab Sample ID: 160-16768-4
Date Collected: 03/31/16 09:25
Matrix: Solid
Date Received: 04/01/16 15:30

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	**1.33**		0.181	0.226		0.162	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Bismuth 212	**1.28**		0.489	0.507		0.474	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Bismuth 214	**1.30**		0.155	0.206		0.0995	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Lead 212	**1.11**		0.107	0.180		0.0943	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Lead 214	**1.32**		0.123	0.184		0.0989	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Potassium 40	**19.7**		1.53	2.53		0.458	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Protactinium 231	0.000	U	0.758	0.758		1.32	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Radium 226	**1.30**		0.155	0.206	1.00	0.0995	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Thorium 232	**1.33**		0.181	0.226		0.162	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Thorium 234	**1.11**		0.621	0.632		0.999	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Uranium 235	0.148	U	0.163	0.164		0.281	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Americium 241	0.000	U	0.0351	0.0351		0.123	pCi/g	04/05/16 14:12	04/26/16 10:29	1
Protactinium 234m	1.31	U	4.12	4.12		7.19	pCi/g	04/05/16 14:12	04/26/16 10:29	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.380*		*0.0643*	*0.0754*		*0.0522*	*pCi/g*	*04/05/16 14:12*	*04/26/16 10:29*	*1*

Client Sample ID: L08-09-14-T-E-B-00

Lab Sample ID: 160-16768-5

Date Collected: 03/31/16 09:15

Matrix: Solid

Date Received: 04/01/16 15:30

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	**1.09**		0.153	0.189		0.104	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Bismuth 212	**1.37**		0.484	0.504		0.424	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Bismuth 214	**0.995**		0.118	0.157		0.0807	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Lead 212	**0.981**		0.0839	0.152		0.0722	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Lead 214	**1.08**		0.105	0.153		0.0727	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Potassium 40	**17.1**		1.24	2.14		0.416	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Protactinium 231	0.333	U	0.235	0.238		1.23	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Radium 226	**0.995**		0.118	0.157	1.00	0.0807	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Thorium 232	**1.09**		0.153	0.189		0.104	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Thorium 234	0.795	U	0.284	0.296		0.822	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Uranium 235	0.0802	U	0.123	0.124		0.238	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Americium 241	-0.00481	U	0.0539	0.0539		0.0913	pCi/g	04/05/16 14:12	04/26/16 22:50	1
Protactinium 234m	4.95	U	3.06	3.10		5.69	pCi/g	04/05/16 14:12	04/26/16 22:50	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.342*		*0.0530*	*0.0638*		*0.0413*	*pCi/g*	*04/05/16 14:12*	*04/26/16 22:50*	*1*

Client Sample ID: L08-09-15-T-E-B-00

Lab Sample ID: 160-16768-6

Date Collected: 03/31/16 09:35

Matrix: Solid

Date Received: 04/01/16 15:30

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	**1.02**		0.124	0.162		0.103	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Bismuth 212	**1.12**		0.401	0.418		0.386	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Bismuth 214	**1.13**		0.116	0.165		0.0719	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Lead 212	**1.05**		0.0886	0.162		0.0783	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Lead 214	**1.27**		0.100	0.166		0.0799	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Potassium 40	**18.6**		1.25	2.28		0.241	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Protactinium 231	0.690	U	0.352	0.360		1.21	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Radium 226	**1.13**		0.116	0.165	1.00	0.0719	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Thorium 232	**1.02**		0.124	0.162		0.103	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Thorium 234	**1.33**		0.537	0.555		0.839	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Uranium 235	0.0471	U	0.146	0.146		0.246	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Americium 241	-0.0160	U	0.0643	0.0643		0.108	pCi/g	04/05/16 14:12	04/26/16 10:27	1
Protactinium 234m	4.81	U	3.05	3.09		6.21	pCi/g	04/05/16 14:12	04/26/16 10:27	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.388*		*0.0500*	*0.0643*		*0.0332*	*pCi/g*	*04/05/16 14:12*	*04/26/16 10:27*	*1*

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

Lab Sample ID: MB 160-244360/1-A
Matrix: Solid
Analysis Batch: 247702

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 244360

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.006979	U	0.0132	0.0132		0.0414	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Bismuth 212	0.007523	U	0.153	0.153		0.296	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Bismuth 214	0.01168	U	0.0256	0.0256		0.0450	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Lead 212	-0.006365	U	0.0584	0.0584		0.0265	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Lead 214	-0.006316	U	5.48	5.48		0.0329	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Potassium 40	-0.02043	U	0.389	0.389		0.403	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Protactinium 231	-0.03816	U	0.210	0.210		0.391	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Radium 226	0.01168	U	0.0256	0.0256	1.00	0.0450	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Thorium 232	0.006979	U	0.0132	0.0132		0.0414	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Thorium 234	-0.01740	U	0.164	0.164		0.294	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Uranium 235	-0.008515	U	0.110	0.110		0.0710	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Americium 241	0.008710	U	0.0124	0.0125		0.0207	pCi/g	04/05/16 14:12	04/26/16 09:35	1
Protactinium 234m	-0.4364	U	1.68	1.68		3.15	pCi/g	04/05/16 14:12	04/26/16 09:35	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*	*04/05/16 14:12*	*04/26/16 09:35*	*1*

Lab Sample ID: LCS 160-244360/2-A
Matrix: Solid
Analysis Batch: 247688

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 244360

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	101	98.85		10.3		0.512	pCi/g	98	87 - 116
Cesium 137	34.0	33.15		3.47		0.153	pCi/g	97	87 - 120
Cobalt 60	31.4	30.25		3.05		0.130	pCi/g	96	87 - 115

Lab Sample ID: 160-16768-1 DU
Matrix: Solid
Analysis Batch: 247692

Client Sample ID: L08-09-10-T-E-B-00
Prep Type: Total/NA
Prep Batch: 244360

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium 228	1.21		1.221		0.166		0.101	pCi/g	0.04	1
Bismuth 212	1.45		1.342		0.463		0.408	pCi/g	0.11	1
Bismuth 214	1.18		1.278		0.172		0.0728	pCi/g	0.28	1
Lead 212	1.03		1.129		0.168		0.0723	pCi/g	0.30	1
Lead 214	1.24		1.515		0.195		0.0768	pCi/g	0.79	1
Potassium 40	19.6		22.55		2.55		0.329	pCi/g	0.60	1
Protactinium 231	0.480	U	0.4830	U	0.218		1.24	pCi/g	0.01	1
Radium 226	1.18		1.278		0.172	1.00	0.0728	pCi/g	0.28	1
Thorium 232	1.21		1.221		0.166		0.101	pCi/g	0.04	1
Thorium 234	1.18		1.310		0.551		0.848	pCi/g	0.10	1
Uranium 235	0.230		0.07609	U	0.148		0.250	pCi/g	0.53	1
Americium 241	0.0532	U	-0.03427	U	0.102		0.0986	pCi/g	0.54	1

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

TestAmerica Job ID: 160-16768-2

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

Lab Sample ID: 160-16768-1 DU
Matrix: Solid
Analysis Batch: 247692

Client Sample ID: L08-09-10-T-E-B-00
Prep Type: Total/NA
Prep Batch: 244360

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Protactinium 234m	0.173	U		2.332	U	3.17		5.23	pCi/g			0.34	1

Other Detected Radionuclides	*Sample Result*	*Sample Qual*		*DU Result*	*DU Qual*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*			*RER*	*RER Limit*
Tl-208	*0.357*			*0.4039*		*0.0668*		*0.0395*	*pCi/g*			*0.35*	*1*

QC Association Summary

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

TestAmerica Job ID: 160-16768-2

Rad

Leach Batch: 243455

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16768-1	L08-09-10-T-E-B-00	Total/NA	Solid	Dry and Grind	
160-16768-1 DU	L08-09-10-T-E-B-00	Total/NA	Solid	Dry and Grind	
160-16768-2	L08-09-11-T-E-B-00	Total/NA	Solid	Dry and Grind	
160-16768-3	L08-09-12-T-E-B-00	Total/NA	Solid	Dry and Grind	
160-16768-4	L08-09-13-T-E-B-00	Total/NA	Solid	Dry and Grind	
160-16768-5	L08-09-14-T-E-B-00	Total/NA	Solid	Dry and Grind	
160-16768-6	L08-09-15-T-E-B-00	Total/NA	Solid	Dry and Grind	

Prep Batch: 244360

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-16768-1	L08-09-10-T-E-B-00	Total/NA	Solid	Fill_Geo-21	243455
160-16768-1 DU	L08-09-10-T-E-B-00	Total/NA	Solid	Fill_Geo-21	243455
160-16768-2	L08-09-11-T-E-B-00	Total/NA	Solid	Fill_Geo-21	243455
160-16768-3	L08-09-12-T-E-B-00	Total/NA	Solid	Fill_Geo-21	243455
160-16768-4	L08-09-13-T-E-B-00	Total/NA	Solid	Fill_Geo-21	243455
160-16768-5	L08-09-14-T-E-B-00	Total/NA	Solid	Fill_Geo-21	243455
160-16768-6	L08-09-15-T-E-B-00	Total/NA	Solid	Fill_Geo-21	243455
LCS 160-244360/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-244360/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	