

# 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: 160-3458-2

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:  
9/19/2013 6:12:05 AM

Ivan Vania, Project Manager I  
[ivan.vania@testamericainc.com](mailto: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: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-3458-2

**Job ID: 160-3458-2**

**Laboratory: TestAmerica St. Louis**

**Narrative**

### CASE NARRATIVE

**Client: Westinghouse Electric Company LLC**

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

**Report Number: 160-3458-2**

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 08/21/2013; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 5.4 C.

#### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Sample L050269PUB00 (160-3458-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were leached on 08/22/2013, prepared on 08/23/2013 and analyzed on 09/13/2013.

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 Custody ID No.		F-082113-01		Page 1/1														
<b>Project Name:</b> Westinghouse Electric Company				<div>Total Containers</div>														
<b>Contact Person:</b> Gerald Rood																		
<b>Phone Number:</b> 314-810-3382																		
<b>Sampler Name:</b> Scott Jenkins																		
Sample ID		Date	Time	Matrix	Comp (C) or Grab (G)	Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)									
L050269PUB00		8/20/2013	14:40	S	C	X		X	X									1
Relinquished by:		Date/Time		Received by:		Date/Time		Total		Cooler Temperature:								
Company Name:		8-21-13 1605		Joe Bradshaw		8-21 16:10		1		Ambient								
Received by:		Date/Time		Relinquished by:		Date/Time		Cooler ID:		Shipper and Number:								
Company Name:				Joe Bradshaw		8-21 18:45		0820-01										
Relinquished by:		Date/Time		Received by:		Date/Time		Comments: Please re-analyze sample after 21 day ingrowth period.		Verified By:								
Company Name:				TC Stanek		8-21-13 1848												

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## Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-3458-2

Login Number: 3458

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

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.	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 $<6\text{mm}$ (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: RFP-CBA-022 (21 DAY TAT)

TestAmerica Job ID: 160-3458-2

### 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.
α	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: 160-3458-2

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: 160-3458-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-3458-1	L050269PUB00	Solid	08/20/13 14:40	08/21/13 18:48



# Client Sample Results

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

TestAmerica Job ID: 160-3458-2

**Client Sample ID: L050269PUB00**

**Lab Sample ID: 160-3458-1**

**Date Collected: 08/20/13 14:40**

**Matrix: Solid**

**Date Received: 08/21/13 18:48**

## 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		0.164	0.205		0.139	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Bismuth 212	1.49		0.532	0.554		0.451	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Bismuth 214	1.11		0.145	0.185		0.0955	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Lead 212	1.14		0.0966	0.176		0.0837	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Lead 214	1.29		0.124	0.183		0.102	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Potassium 40	19.2		1.61	2.54		0.436	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Protactinium 231	0.391	U	0.257	0.261		1.67	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Radium 226	1.11		0.145	0.185	1.00	0.0955	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Thorium 232	1.21		0.164	0.205		0.139	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Thorium 234	0.954	U	0.437	0.448		1.16	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Uranium 235	0.217	U	0.166	0.168		0.277	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Americium 241	0.00743	U	0.0765	0.0765		0.130	pCi/g	08/23/13 11:50	09/13/13 15:12	1
Protactinium 234m	0.000	U	3.93	3.93		9.65	pCi/g	08/23/13 11:50	09/13/13 15:12	1

# QC Sample Results

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

TestAmerica Job ID: 160-3458-2

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

Lab Sample ID: MB 160-68366/1-A

Matrix: Solid

Analysis Batch: 72483

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 68366

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0000	U	0.0225	0.0225		0.0952	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Bismuth 212	0.0000	U	0.0352	0.0352		0.276	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Bismuth 214	-0.0002383	U	0.0221	0.0221		0.0430	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Lead 212	-0.005378	U	0.0634	0.0634		0.0291	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Lead 214	-0.004825	U	0.0783	0.0783		0.0357	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Potassium 40	0.0000	U	0.0473	0.0473		0.174	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Protactinium 231	-0.001682	U	0.240	0.240		0.453	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Radium 226	-0.0002383	U	0.0221	0.0221	1.00	0.0430	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Thorium 232	0.0000	U	0.0225	0.0225		0.0952	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Thorium 234	0.03965	U	0.184	0.184		0.302	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Uranium 235	0.02812	U	0.0368	0.0369		0.0605	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Americium 241	-0.004336	U	0.0134	0.0134		0.0238	pCi/g	08/23/13 11:49	09/13/13 12:44	1
Protactinium 234m	0.2159	U	0.835	0.835		1.76	pCi/g	08/23/13 11:49	09/13/13 12:44	1

Lab Sample ID: LCS 160-68366/2-A

Matrix: Solid

Analysis Batch: 72490

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 68366

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	97.7	94.07		9.79		0.480	pCi/g	96	87 - 116
Cesium 137	31.6	31.01		3.24		0.135	pCi/g	98	87 - 120
Cobalt 60	24.6	23.50		2.37		0.0590	pCi/g	95	87 - 115

Lab Sample ID: 160-3435-A-31-G DU

Matrix: Solid

Analysis Batch: 72490

Client Sample ID: Duplicate

Prep Type: Total/NA

Prep Batch: 68366

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	Limit
Actinium 228	0.358		0.3490		0.0698		0.0573	pCi/g	0.06	1
Bismuth 212	0.196	U	0.1733	U	0.160		0.250	pCi/g	0.06	1
Bismuth 214	0.619		0.5104		0.0855		0.0495	pCi/g	0.59	1
Lead 212	0.267		0.3105		0.0543		0.0361	pCi/g	0.39	1
Lead 214	0.612		0.5822		0.0813		0.0500	pCi/g	0.17	1
Potassium 40	5.03		5.101		0.740		0.234	pCi/g	0.04	1
Protactinium 231	0.0893	U	0.1458	U	0.144		0.560	pCi/g	0.20	1
Radium 226	0.619		0.5104		0.0855	1.00	0.0495	pCi/g	0.59	1
Thorium 232	0.358		0.3490		0.0698		0.0573	pCi/g	0.06	1
Thorium 234	0.745		0.7734		0.224		0.518	pCi/g	0.04	1
Uranium 235	0.165	U	0.1904		0.0880		0.123	pCi/g	0.12	1
Americium 241	0.000	U	0.01365	U	0.0370		0.0621	pCi/g	0.18	1
Protactinium 234m	0.264	U	2.015	U	1.59		3.22	pCi/g	0.45	1

TestAmerica St. Louis

## QC Association Summary

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

TestAmerica Job ID: 160-3458-2

### Rad

#### Leach Batch: 67776

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3435-A-31-G DU	Duplicate	Total/NA	Solid	Dry and Grind	

#### Prep Batch: 68366

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3435-A-31-G DU	Duplicate	Total/NA	Solid	Fill_Geo-21	67776
160-3458-1	L050269PUB00	Total/NA	Solid	Fill_Geo-21	68369
LCS 160-68366/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-68366/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

#### Leach Batch: 68369

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3458-1	L050269PUB00	Total/NA	Solid	Dry and Grind	