

# 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: 160-12884-1

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:

7/27/2015 3:14:49 PM

Rhonda Ridenhower, Manager of Project Management  
[rhonda.ridenhower@testamericainc.com](mailto:rhonda.ridenhower@testamericainc.com)

Designee for

Ivan Vania, Project Manager II  
(314)298-8566  
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### LINKS

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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: 160-12884-1

**Job ID: 160-12884-1**

**Laboratory: TestAmerica St. Louis**

**Narrative**

## CASE NARRATIVE

**Client: Westinghouse Electric Company LLC**

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

**Report Number: 160-12884-1**

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 07/21/2015; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 21.3 C.

### **TECHNETIUM-99 (ICPMS)**

Sample 2386-SS-150720-01-01 (160-12884-1) was analyzed for Technetium-99 (ICPMS) in accordance with EPA SW-846 Method 6020A. The samples were prepared on 07/21/2015 and analyzed on 07/22/2015.

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

### **PERCENT SOLIDS**

Sample 2386-SS-150720-01-01 (160-12884-1) was analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 07/22/2015.

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: 160-12884-1

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## Job ID: 160-12884-1 (Continued)

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### Laboratory: TestAmerica St. Louis (Continued)

#### CESIUM-137 & OTHER GAMMA EMITTERS (GS)

Sample 2386-SS-150720-01-01 (160-12884-1) was analyzed for Cesium-137 & Other Gamma Emitters (GS) in accordance with DOE GA-01-R. The samples were leached on 07/22/2015, and prepared and analyzed on 07/24/2015.

Radium-226 is reported in these samples at the clients request. Radium-226 is reported from the 609.31 keV line of bismuth-214. Because the samples have not had 21-days of ingrowth, the activity for radium-226 is an estimated value and may be biased low. This bias is caused by the disruption of secular equilibrium between radium-226 and bismuth-214 by the loss of radon-222 during sample preparation. The samples are reported with the MDC achieved. 2386-SS-150720-01-01 (160-12884-1), (LCS 160-202105/2-A), (MB 160-202105/1-A) and (160-12884-A-1-E DU)

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

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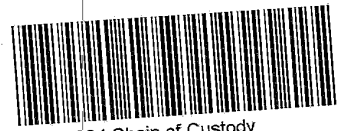
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Hematite Decommissioning Project	Procedure HDP-PR-QA-006, Chain of Custody		Page 1 of 1
	Revision: 3		
	Westinghouse Non-Proprietary Class 3		

**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.

<b>Chain of Custody ID No.</b> 072015-05 Page 1/1				<b>Requested Analysis</b>								<b>Laboratory Name:</b>			
<b>Project Name:</b> Westinghouse Electric Company				Comp (C) or Grab (G)	Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)					Total Containers	TA-MO	
<b>Contact Person:</b> W. Clark Evers														<b>Laboratory Address:</b> 13715 Rider Trail North Earth City, MO 63045	
<b>Phone Number:</b> 314-810-3336														<b>Phone No.</b> 314-298-8566	
<b>Sampler Name:</b> Jeff Hoffman														<b>Laboratory Contact Person:</b> Joe Walker	
<b>Phone No.</b> 708-870-8453				<b>Turn Around Time</b>											
				Rush (7 days)											
				Remarks											
<b>Sample ID</b>	<b>Date</b>	<b>Time</b>	<b>Matrix</b>												
2386-SS-150720-01-01	7/20/2015	16:40	S	G	X		X					1	SWTP Contents		



<b>Relinquished by:</b> <i>[Signature]</i>	<b>Date/Time:</b> 7-21-15 0845	<b>Received by:</b> <i>[Signature]</i>	<b>Date/Time:</b> 7/21/15 0845	<b>Total Number of Containers:</b> 1	<b>Cooler Temperature:</b> Ambient
<b>Company Name:</b> WEL		<b>Company Name:</b> Crossroads		<b>Container ID:</b> 0720-02	<b>Shipper and Number:</b>
<b>Received by:</b>	<b>Date/Time:</b>	<b>Relinquished by:</b> <i>[Signature]</i>	<b>Date/Time:</b> 7/21/15 0945	<b>Comments:</b> PO #4500404709	
<b>Company Name:</b>		<b>Company Name:</b> Crossroads			
<b>Relinquished by:</b>	<b>Date/Time:</b>	<b>Received by:</b> <i>[Signature]</i>	<b>Date/Time:</b> 7-21-15 0945	<b>Verified By:</b> <i>[Signature]</i> Wilder	
<b>Company Name:</b>		<b>Company Name:</b> Crossroads			

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7/27/2015

Quality Record



## Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-12884-1

**Login Number: 12884**  
**List Number: 1**  
**Creator: Daniels, Brian J**

**List Source: TestAmerica St. Louis**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> 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.	N/A	
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 <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: 160-12884-1

## 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: 160-12884-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Tc-99	SW846	TAL SL
Moisture	Percent Moisture	EPA	TAL SL
6020A	Metals (ICP/MS), Tc-99 in Activity	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL

#### Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### 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: 160-12884-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-12884-1	2386-SS-150720-01-01	Solid	07/20/15 16:40	07/21/15 09:45

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# Client Sample Results

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

TestAmerica Job ID: 160-12884-1

**Client Sample ID: 2386-SS-150720-01-01**

**Lab Sample ID: 160-12884-1**

Date Collected: 07/20/15 16:40

Matrix: Solid

Date Received: 07/21/15 09:45

**Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Actinium 228</b>	<b>0.858</b>		0.144	0.169		0.130	pCi/g	07/24/15 09:56	07/24/15 13:24	1
Americium 241	0.00667	U	0.0617	0.0617		0.104	pCi/g	07/24/15 09:56	07/24/15 13:24	1
<b>Bismuth 212</b>	<b>1.44</b>		0.490	0.512		0.426	pCi/g	07/24/15 09:56	07/24/15 13:24	1
<b>Bismuth 214</b>	<b>0.767</b>		0.0999	0.128		0.0717	pCi/g	07/24/15 09:56	07/24/15 13:24	1
<b>Lead 212</b>	<b>0.876</b>		0.0855	0.142		0.0800	pCi/g	07/24/15 09:56	07/24/15 13:24	1
<b>Lead 214</b>	<b>0.804</b>		0.0844	0.119		0.0791	pCi/g	07/24/15 09:56	07/24/15 13:24	1
<b>Potassium 40</b>	<b>16.8</b>		1.23	2.11		0.366	pCi/g	07/24/15 09:56	07/24/15 13:24	1
Protactinium 231	0.357	U	0.196	0.200		1.30	pCi/g	07/24/15 09:56	07/24/15 13:24	1
<b>Radium 226</b>	<b>0.767</b>		0.0999	0.128	1.00	0.0717	pCi/g	07/24/15 09:56	07/24/15 13:24	1
<b>Thorium 234</b>	<b>1.40</b>		0.595	0.613	1.00	0.782	pCi/g	07/24/15 09:56	07/24/15 13:24	1
Uranium 235	0.128	U	0.144	0.144		0.252	pCi/g	07/24/15 09:56	07/24/15 13:24	1
Protactinium 234m	0.464	U	3.50	3.50		6.19	pCi/g	07/24/15 09:56	07/24/15 13:24	1
<b>Thorium 232</b>	<b>0.858</b>		0.144	0.169		0.130	pCi/g	07/24/15 09:56	07/24/15 13:24	1
<b>Other Detected Radionuclides</b>			<b>Count</b>	<b>Total</b>						
	<b>Result</b>	<b>Qualifier</b>	<b>Uncert. (2σ+/-)</b>	<b>Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Tl-208	0.322		0.0498	0.0599		0.0392	pCi/g	07/24/15 09:56	07/24/15 13:24	1

**Client Sample ID: 2386-SS-150720-01-01**

**Lab Sample ID: 160-12884-1**

Date Collected: 07/20/15 16:40

Matrix: Solid

Date Received: 07/21/15 09:45

Percent Solids: 74.9

**Method: 6020A - Metals (ICP/MS), Tc-99**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99		ND	0.000078	0.000023	mg/Kg	☼	07/21/15 17:04	07/22/15 20:29	1

**Method: 6020A - Metals (ICP/MS), Tc-99 in Activity**

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Technetium 99</b>	<b>0.307</b>		0.0887	0.0931	1.55	0.265	pCi/g	07/21/15 17:04	07/22/15 20:29	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Re	86		30 - 110					07/21/15 17:04	07/22/15 20:29	1

# QC Sample Results

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

TestAmerica Job ID: 160-12884-1

## Method: 6020A - Metals (ICP/MS), Tc-99

**Lab Sample ID: MB 160-201393/1-A**  
**Matrix: Solid**  
**Analysis Batch: 202138**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 201393**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000055	0.000016	mg/Kg		07/21/15 16:20	07/22/15 19:29	1

**Lab Sample ID: LCS 160-201393/2-A**  
**Matrix: Solid**  
**Analysis Batch: 202138**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 201393**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Technetium 99	0.00123	0.00128		mg/Kg		104	80 - 120

**Lab Sample ID: 160-12883-A-1-B MS**  
**Matrix: Solid**  
**Analysis Batch: 202138**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 201393**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Technetium 99	0.000044	J	0.00143	0.00154		mg/Kg	☼	104	75 - 125

**Lab Sample ID: 160-12883-A-1-C MSD**  
**Matrix: Solid**  
**Analysis Batch: 202138**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 201393**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Technetium 99	0.000044	J	0.00144	0.00155		mg/Kg	☼	105	75 - 125	1	30

## Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

**Lab Sample ID: MB 160-201393/1-A**  
**Matrix: Solid**  
**Analysis Batch: 202139**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 201393**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.03440	U	0.0440	0.0441	1.09	0.187	pCi/g	07/21/15 16:20	07/22/15 19:29	1
Carrier	MB %Yield	MB Qualifier	Limits							
Re	92		30 - 110							
								Prepared	Analyzed	Dil Fac
								07/21/15 16:20	07/22/15 19:29	1

**Lab Sample ID: LCS 160-201393/2-A**  
**Matrix: Solid**  
**Analysis Batch: 202139**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 201393**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Limits
Technetium 99	21.0	21.98		2.07	1.10	0.189	pCi/g	104	80 - 120
Carrier	LCS %Yield	LCS Qualifier	Limits						
Re	91		30 - 110						

TestAmerica St. Louis

# QC Sample Results

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

TestAmerica Job ID: 160-12884-1

## Method: 6020A - Metals (ICP/MS), Tc-99 in Activity (Continued)

**Lab Sample ID: 160-12883-A-1-B MS**  
**Matrix: Solid**  
**Analysis Batch: 202139**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 201393**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	0.752		24.5	26.32		2.62	1.32	0.226	pCi/g	104	75 - 125
<b>Carrier</b>	<b>%Yield</b>	<b>MS Qualifier</b>	<b>Limits</b>								
Re	88		30 - 110								

**Lab Sample ID: 160-12883-A-1-C MSD**  
**Matrix: Solid**  
**Analysis Batch: 202139**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 201393**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Technetium 99	0.752		24.6	26.49		2.49	1.33	0.228	pCi/g	105	75 - 125	0.03	1
<b>Carrier</b>	<b>%Yield</b>	<b>MSD Qualifier</b>	<b>Limits</b>										
Re	88		30 - 110										

## Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

**Lab Sample ID: MB 160-202105/1-A**  
**Matrix: Solid**  
**Analysis Batch: 202202**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 202105**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.006565	U	0.0123	0.0124		0.0582	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Americium 241	-0.004939	U	0.0399	0.0399		0.0273	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Bismuth 212	0.0000	U	0.0215	0.0215		0.220	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Bismuth 214	0.002265	U	0.0206	0.0206		0.0416	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Lead 212	-0.002800	U	0.0210	0.0210		0.0245	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Lead 214	0.01642	U	0.0152	0.0153		0.0247	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Potassium 40	-0.003190	U	0.132	0.132		0.296	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Protactinium 231	0.07846	U	0.181	0.181		0.316	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Radium 226	0.002265	U	0.0206	0.0206	1.00	0.0416	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Thorium 234	-0.04818	U	0.221	0.221	1.00	0.266	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Uranium 235	0.002201	U	0.0348	0.0348		0.0630	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Protactinium 234m	0.4445	U	0.953	0.954		1.71	pCi/g	07/24/15 09:56	07/24/15 13:22	1
Thorium 232	0.006565	U	0.0123	0.0124		0.0582	pCi/g	07/24/15 09:56	07/24/15 13:22	1
<b>Other Detected Radionuclides</b>	<b>MB Result</b>	<b>MB Qualifier</b>	<b>Count Uncert. (2σ+/-)</b>	<b>Total Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Other Detected Radionuclide	None						pCi/g	07/24/15 09:56	07/24/15 13:22	1

TestAmerica St. Louis

# QC Sample Results

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

TestAmerica Job ID: 160-12884-1

## Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID: LCS 160-202105/2-A**  
**Matrix: Solid**  
**Analysis Batch: 202200**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 202105**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	101	100.2		10.4		0.489	pCi/g	99	87 - 116
Cesium 137	34.6	34.52		3.61	0.200	0.153	pCi/g	100	87 - 120
Cobalt 60	34.7	33.50		3.38		0.109	pCi/g	96	87 - 115

**Lab Sample ID: 160-12884-1 DU**  
**Matrix: Solid**  
**Analysis Batch: 202203**

**Client Sample ID: 2386-SS-150720-01-01**  
**Prep Type: Total/NA**  
**Prep Batch: 202105**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium 228	0.858		1.018		0.188		0.0947	pCi/g	0.45	1
Americium 241	0.00667	U	0.001936	U	0.0550		0.0929	pCi/g	0.04	1
Bismuth 212	1.44		1.450		0.412		0.328	pCi/g	0.01	1
Bismuth 214	0.767		0.7489		0.119		0.0600	pCi/g	0.07	1
Lead 212	0.876		0.9765		0.149		0.0660	pCi/g	0.35	1
Lead 214	0.804		0.7889		0.119		0.0650	pCi/g	0.06	1
Potassium 40	16.8		16.72		2.03		0.201	pCi/g	0.01	1
Protactinium 231	0.357	U	-0.5528	U	0.636		1.04	pCi/g	1.09	1
Radium 226	0.767		0.7489		0.119	1.00	0.0600	pCi/g	0.07	1
Thorium 234	1.40		1.178		0.506	1.00	0.770	pCi/g	0.20	1
Uranium 235	0.128	U	0.1300	U	0.126		0.204	pCi/g	0.01	1
Protactinium 234m	0.464	U	2.226	U	3.09		4.48	pCi/g	0.27	1
Thorium 232	0.858		1.018		0.188		0.0947	pCi/g	0.45	1
<b>Other Detected Radionuclides</b>	<b>Sample Result</b>	<b>Sample Qual</b>	<b>DU Result</b>	<b>DU Qual</b>	<b>Total Uncert. (2σ+/-)</b>	<b>RL</b>	<b>MDC</b>	<b>Unit</b>	<b>RER</b>	<b>RER Limit</b>
Tl-208	0.322		0.3221		0.0601		0.0387	pCi/g	0	1

# QC Association Summary

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

TestAmerica Job ID: 160-12884-1

## Metals

### Prep Batch: 201393

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-12883-A-1-B MS	Matrix Spike	Total/NA	Solid	None	
160-12883-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	None	
160-12884-1	2386-SS-150720-01-01	Total/NA	Solid	None	
LCS 160-201393/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-201393/1-A	Method Blank	Total/NA	Solid	None	

### Analysis Batch: 202138

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-12883-A-1-B MS	Matrix Spike	Total/NA	Solid	6020A	201393
160-12883-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	6020A	201393
160-12884-1	2386-SS-150720-01-01	Total/NA	Solid	6020A	201393
LCS 160-201393/2-A	Lab Control Sample	Total/NA	Solid	6020A	201393
MB 160-201393/1-A	Method Blank	Total/NA	Solid	6020A	201393

## General Chemistry

### Analysis Batch: 201606

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-12859-C-1 DU	Duplicate	Total/NA	Solid	Moisture	
160-12884-1	2386-SS-150720-01-01	Total/NA	Solid	Moisture	

## Rad

### Prep Batch: 201393

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-12883-A-1-B MS	Matrix Spike	Total/NA	Solid	None	
160-12883-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	None	
160-12884-1	2386-SS-150720-01-01	Total/NA	Solid	None	
LCS 160-201393/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-201393/1-A	Method Blank	Total/NA	Solid	None	

### Leach Batch: 201686

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-12884-1	2386-SS-150720-01-01	Total/NA	Solid	Dry and Grind	
160-12884-1 DU	2386-SS-150720-01-01	Total/NA	Solid	Dry and Grind	

### Prep Batch: 202105

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-12884-1	2386-SS-150720-01-01	Total/NA	Solid	Fill_Geo-0	201686
160-12884-1 DU	2386-SS-150720-01-01	Total/NA	Solid	Fill_Geo-0	201686
LCS 160-202105/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-202105/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

# Tracer/Carrier Summary

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

TestAmerica Job ID: 160-12884-1

**Method: 6020A - Metals (ICP/MS), Tc-99 in Activity**

**Matrix: Solid**

**Prep Type: Total/NA**

## Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Re (30-110)
160-12883-A-1-B MS	Matrix Spike	88
160-12883-A-1-C MSD	Matrix Spike Duplicate	88
160-12884-1	2386-SS-150720-01-01	86
LCS 160-201393/2-A	Lab Control Sample	91
MB 160-201393/1-A	Method Blank	92

### Tracer/Carrier Legend

Re = Re