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: 160-4106-1
Client Project/Site: RFP-CBA-022 (7 DAY TAT)

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

Attn: Martin Swanson

Authorized for release by:
10/18/2013 3:22:27 PM

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Table of Contents

Job ID: 160-4106-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

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

Report Number: 160-4106-1

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 10/14/2013; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 4.0 C.

TECHNETIUM-99 (ICPMS)

Samples L050349PUB00 (160-4106-1), L050350PUB00 (160-4106-2) and L050351PUB00 (160-4106-3) were analyzed for Technetium-99 (ICPMS) in accordance with EPA SW-846 Method 6020A. The samples were prepared and analyzed on 10/15/2013.

No difficulties were encountered during the Tc-99 analysis. All quality control parameters were within the acceptance limits.

PERCENT SOLIDS

Samples L050349PUB00 (160-4106-1), L050350PUB00 (160-4106-2) and L050351PUB00 (160-4106-3) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 10/15/2013.

No difficulties were encountered during the % solids analysis. All quality control parameters were within the acceptance limits.

Job ID: 160-4106-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

CESIUM-137 & OTHER GAMMA EMITTERS (GS)

Samples L050349PUB00 (160-4106-1), L050350PUB00 (160-4106-2) and L050351PUB00 (160-4106-3) were analyzed for Cesium-137 & Other Gamma Emitters (GS) in accordance with DOE GA-01-R. The samples were leached on 10/15/2013, and prepared and analyzed on 10/17/2013.

Preparation Batch 79501:
Radium-226 is reported in these samples at the client's request. Radium-226 is reported from the 609.31 keV line of bismuth-214. Because the samples have not had a 21-day 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. (160-4106-1 DU), (LCS 160-79501/2-A), (MB 160-79501/1-A), L050349PUB00 (160-4106-1), L050350PUB00 (160-4106-2), L050351PUB00 (160-4106-3)

No other difficulties were encountered during the Gamma spec analysis. All other quality control parameters were within the acceptance limits.

Hematite Decommissioning Project	Procedure HDP-PR-QA-006, *Chain of Custody*	
	Revision: 3	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-101113-01 **Page** 1/1

Project Name:
Westinghouse Electric Company

Contact Person:
Gerald Rood

Phone Number:
314-810-3382

Sampler Name
Jeff Hoffman

Laboratory Name:
TA-MO

Laboratory Address:
13715 Rider Trail North

Phone No.
314-298-8566

Laboratory Contact Person:
Joe Walker

Phone No.
708-870-8453

Turn Around Time
Rush (7 days)

Sample ID	Date	Time	Matrix	Comp (C) or Grab (G)	Requested Analysis: Gamma Spec	Isotopic Uranium	Tc-99	Gamma Spec (21 day ingrow for Ra-226)					Total Containers	Remarks
L050349PUB00	10/11/2013	15:20	S	C	X		X	X					1	LSA 05-03 Bias
L050350PUB00	10/11/2013	15:32	S	C	X		X	X					1	LSA 05-03 Bias
L050351PUB00	10/11/2013	15:39	S	C	X		X	X					1	LSA 05-03 Bias

Relinquished by:	Date/Time	Received by:	Date/Time	Total	Cooler Temperature:
Company Name: WEC	10-14-13 16:55	Company Name: Crossroads	10-14 16:55	3	Ambient
Received by:	Date/Time	Relinquished by:	Date/Time	Cooler ID: 1011-01	Shipper and Number:
Company Name:		Company Name: Crossroads	10-14 18:30	Comments: Please re-analyze samples after 21-days ingrowth period.	
Relinquished by:	Date/Time	Received by:	Date/Time	Verified By:	
Company Name:		Company Name: TestAmerica	10-15-13 18:30		

H106

Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-4106-1

Login Number: 4106

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Qualifiers

Rad

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

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

TestAmerica Job ID: 160-4106-1

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: RFP-CBA-022 (7 DAY TAT)

TestAmerica Job ID: 160-4106-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-4106-1	L050349PUB00	Solid	10/11/13 15:20	10/14/13 18:30
160-4106-2	L050350PUB00	Solid	10/11/13 15:32	10/14/13 18:30
160-4106-3	L050351PUB00	Solid	10/11/13 15:39	10/14/13 18:30

Client Sample ID: L050349PUB00

Lab Sample ID: 160-4106-1
Date Collected: 10/11/13 15:20
Matrix: Solid
Date Received: 10/14/13 18:30
Percent Solids: 85.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000065	0.000020	mg/Kg	☼	10/15/13 08:48	10/15/13 19:14	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-0.00761	U	-0.0152	0.0170	1.31	0.224	pCi/g	10/15/13 08:48	10/15/13 19:14	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*90*		*30 - 110*	*10/15/13 08:48*	*10/15/13 19:14*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.13**		0.120	0.166		0.0962	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Americium 241	0.0404	U	0.0609	0.0610		0.101	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Bismuth 212	**1.28**		0.408	0.429		0.373	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Bismuth 214	**0.808**		0.0905	0.123		0.0631	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Lead 212	**1.07**		0.0765	0.159		0.0778	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Lead 214	**0.921**		0.0987	0.137		0.0773	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Potassium 40	**20.4**		1.20	2.41		0.450	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Protactinium 231	0.347	U	0.447	0.448		0.737	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Radium 226	**0.808**		0.0905	0.123	1.00	0.0631	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Thorium 234	**1.73**		0.661	0.685	1.00	0.821	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Uranium 235	0.154	U	0.128	0.129		0.226	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Protactinium 234m	3.65	U	3.03	3.06		4.52	pCi/g	10/17/13 11:12	10/17/13 18:26	1
Thorium 232	**1.13**		0.120	0.166		0.0962	pCi/g	10/17/13 11:12	10/17/13 18:26	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.358*		*0.0482*	*0.0608*		*0.0348*	*pCi/g*	*10/17/13 11:12*	*10/17/13 18:26*	*1*

Client Sample ID: L050350PUB00

Lab Sample ID: 160-4106-2
Date Collected: 10/11/13 15:32
Matrix: Solid
Date Received: 10/14/13 18:30
Percent Solids: 85.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000067	0.000020	mg/Kg	☼	10/15/13 08:48	10/15/13 19:17	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-0.0475	U	-0.0156	0.0187	1.35	0.231	pCi/g	10/15/13 08:48	10/15/13 19:17	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*87*		*30 - 110*	*10/15/13 08:48*	*10/15/13 19:17*	*1*

Client Sample ID: L050350PUB00

Lab Sample ID: 160-4106-2

Date Collected: 10/11/13 15:32

Matrix: Solid

Date Received: 10/14/13 18:30

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.20**		0.149	0.193		0.117	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Americium 241	-0.00613	U	1.37	1.37		0.107	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Bismuth 212	**1.29**		0.450	0.470		0.431	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Bismuth 214	**0.772**		0.102	0.130		0.0745	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Lead 212	**1.20**		0.0812	0.175		0.0608	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Lead 214	**0.951**		0.0964	0.138		0.0710	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Potassium 40	**21.8**		1.36	2.61		0.269	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Protactinium 231	0.521	U	0.257	0.264		1.22	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Radium 226	**0.772**		0.102	0.130	1.00	0.0745	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Thorium 234	0.771	U	0.331	0.341	1.00	0.866	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Uranium 235	0.152	U	0.145	0.146		0.228	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Protactinium 234m	5.20	U	3.41	3.45		5.79	pCi/g	10/17/13 11:12	10/17/13 18:27	1
Thorium 232	**1.20**		0.149	0.193		0.117	pCi/g	10/17/13 11:12	10/17/13 18:27	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.401*		*0.0517*	*0.0664*		*0.0349*	*pCi/g*	*10/17/13 11:12*	*10/17/13 18:27*	*1*

Client Sample ID: L050351PUB00

Lab Sample ID: 160-4106-3

Date Collected: 10/11/13 15:39

Matrix: Solid

Date Received: 10/14/13 18:30

Percent Solids: 89.8

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000062	0.000019	mg/Kg	☼	10/15/13 08:48	10/15/13 19:21	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-0.0418	U	-0.0184	0.0210	1.24	0.212	pCi/g	10/15/13 08:48	10/15/13 19:21	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*90*		*30 - 110*	*10/15/13 08:48*	*10/15/13 19:21*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.03**		0.147	0.181		0.134	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Americium 241	-0.0375	U	0.0745	0.0746		0.124	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Bismuth 212	**1.27**		0.402	0.423		0.349	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Bismuth 214	**0.795**		0.101	0.131		0.0660	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Lead 212	**1.05**		0.0807	0.158		0.0655	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Lead 214	**0.903**		0.0900	0.130		0.0771	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Potassium 40	**19.7**		1.43	2.47		0.486	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Protactinium 231	-0.582	U	0.807	0.810		1.34	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Radium 226	**0.795**		0.101	0.131	1.00	0.0660	pCi/g	10/17/13 11:12	10/17/13 18:28	1

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

TestAmerica Job ID: 160-4106-1

Client Sample ID: L050351PUB00
Date Collected: 10/11/13 15:39
Date Received: 10/14/13 18:30

Lab Sample ID: 160-4106-3
Matrix: Solid

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium 234	**1.09**		0.378	0.394	1.00	0.952	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Uranium 235	0.199	U	0.166	0.167		0.275	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Protactinium 234m	2.95	U	3.55	3.56		5.81	pCi/g	10/17/13 11:12	10/17/13 18:28	1
Thorium 232	**1.03**		0.147	0.181		0.134	pCi/g	10/17/13 11:12	10/17/13 18:28	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.340*		*0.0563*	*0.0664*		*0.0434*	*pCi/g*	*10/17/13 11:12*	*10/17/13 18:28*	*1*

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

Lab Sample ID: MB 160-78991/1-A
Matrix: Solid
Analysis Batch: 79106

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 78991

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000054	0.000016	mg/Kg		10/15/13 08:48	10/15/13 18:35	1

Lab Sample ID: LCS 160-78991/2-A
Matrix: Solid
Analysis Batch: 79106

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 78991

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	0.00234	0.00222		mg/Kg		95	80 - 120

Lab Sample ID: 160-4070-A-1-D MS
Matrix: Solid
Analysis Batch: 79106

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 78991

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	ND		0.00304	0.00277		mg/Kg	☼	91	75 - 125

Lab Sample ID: 160-4070-A-1-E MSD
Matrix: Solid
Analysis Batch: 79106

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 78991

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Technetium 99	ND		0.00304	0.00294		mg/Kg	☼	97	75 - 125	6	30

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

Lab Sample ID: MB 160-78991/1-A
Matrix: Solid
Analysis Batch: 79107

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 78991

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-0.04511	U	-0.00720	0.00895	1.08	0.186	pCi/g	10/15/13 08:48	10/15/13 18:35	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*93*		*30 - 110*	*10/15/13 08:48*	*10/15/13 18:35*	*1*

Lab Sample ID: LCS 160-78991/2-A
Matrix: Solid
Analysis Batch: 79107

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 78991

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	40.1	38.03		3.73	1.04	0.178	pCi/g	95	80 - 120

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Re	*97*		*30 - 110*

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

Lab Sample ID: 160-4070-A-1-D MS | **Client Sample ID: Matrix Spike**
Matrix: Solid | **Prep Type: Total/NA**
Analysis Batch: 79107 | **Prep Batch: 78991**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	-0.0493	U	52.1	47.43		5.05	1.41	0.241	pCi/g	91	75 - 125

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Re	*93*		*30 - 110*

Lab Sample ID: 160-4070-A-1-E MSD | **Client Sample ID: Matrix Spike Duplicate**
Matrix: Solid | **Prep Type: Total/NA**
Analysis Batch: 79107 | **Prep Batch: 78991**

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	-0.0493	U	52.0	50.27		5.12	1.42	0.243	pCi/g	97	75 - 125	0.28	1

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Re	*91*		*30 - 110*

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

Lab Sample ID: MB 160-79501/1-A | **Client Sample ID: Method Blank**
Matrix: Solid | **Prep Type: Total/NA**
Analysis Batch: 79554 | **Prep Batch: 79501**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.001687	U	0.0159	0.0159		0.0414	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Americium 241	0.002547	U	0.0129	0.0129		0.0235	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Bismuth 212	0.0000	U	0.0352	0.0352		0.130	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Bismuth 214	-0.01219	U	0.488	0.488		0.0322	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Lead 212	-0.004140	U	0.0426	0.0426		0.0267	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Lead 214	0.001151	U	0.0146	0.0146		0.0286	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Potassium 40	-0.08670	U	3.47	3.47		0.560	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Protactinium 231	-0.002253	U	0.199	0.199		0.386	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Radium 226	-0.01219	U	0.488	0.488	1.00	0.0322	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Thorium 234	-0.1788	U	2.62	2.62	1.00	0.311	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Uranium 235	0.04254	U	0.0341	0.0344		0.0498	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Protactinium 234m	1.093	U	1.31	1.32		2.04	pCi/g	10/17/13 11:12	10/17/13 18:20	1
Thorium 232	0.001687	U	0.0159	0.0159		0.0414	pCi/g	10/17/13 11:12	10/17/13 18:20	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*	*10/17/13 11:12*	*10/17/13 18:20*	*1*

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

Lab Sample ID: LCS 160-79501/2-A
Matrix: Solid
Analysis Batch: 79494

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 79501

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium 241			97.7	90.52		9.42		0.477	pCi/g	93	87 - 116		
Cesium 137			31.6	30.08		3.15	0.200	0.117	pCi/g	95	87 - 120		
Cobalt 60			24.3	22.72		2.29		0.0516	pCi/g	93	87 - 115		

Lab Sample ID: 160-4106-1 DU
Matrix: Solid
Analysis Batch: 79494

Client Sample ID: L050349PUB00
Prep Type: Total/NA
Prep Batch: 79501

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Actinium 228	1.13			1.199		0.196		0.0776	pCi/g			0.20	1
Americium 241	0.0404	U		0.02742	U	0.0616		0.102	pCi/g			0.11	1
Bismuth 212	1.28			1.597		0.479		0.371	pCi/g			0.35	1
Bismuth 214	0.808			0.7293		0.118		0.0669	pCi/g			0.32	1
Lead 212	1.07			1.148		0.165		0.0549	pCi/g			0.23	1
Lead 214	0.921			0.8624		0.125		0.0743	pCi/g			0.22	1
Potassium 40	20.4			20.83		2.43		0.265	pCi/g			0.09	1
Protactinium 231	0.347	U		0.3749	U	0.463		0.759	pCi/g			0.03	1
Radium 226	0.808			0.7293		0.118	1.00	0.0669	pCi/g			0.32	1
Thorium 234	1.73			1.839		0.756	1.00	0.892	pCi/g			0.07	1
Uranium 235	0.154	U		0.1226	U	0.152		0.254	pCi/g			0.11	1
Protactinium 234m	3.65	U		5.942		3.23		4.78	pCi/g			0.36	1
Thorium 232	1.13			1.199		0.196		0.0776	pCi/g			0.20	1

Metals

Prep Batch: 78991

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4070-A-1-D MS	Matrix Spike	Total/NA	Solid	None	
160-4070-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	None	
160-4106-1	L050349PUB00	Total/NA	Solid	None	
160-4106-2	L050350PUB00	Total/NA	Solid	None	
160-4106-3	L050351PUB00	Total/NA	Solid	None	
LCS 160-78991/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-78991/1-A	Method Blank	Total/NA	Solid	None	

Analysis Batch: 79106

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4070-A-1-D MS	Matrix Spike	Total/NA	Solid	6020A	78991
160-4070-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	6020A	78991
160-4106-1	L050349PUB00	Total/NA	Solid	6020A	78991
160-4106-2	L050350PUB00	Total/NA	Solid	6020A	78991
160-4106-3	L050351PUB00	Total/NA	Solid	6020A	78991
LCS 160-78991/2-A	Lab Control Sample	Total/NA	Solid	6020A	78991
MB 160-78991/1-A	Method Blank	Total/NA	Solid	6020A	78991

General Chemistry

Analysis Batch: 78976

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4105-A-1 DU	Duplicate	Total/NA	Solid	Moisture	
160-4106-1	L050349PUB00	Total/NA	Solid	Moisture	
160-4106-2	L050350PUB00	Total/NA	Solid	Moisture	
160-4106-3	L050351PUB00	Total/NA	Solid	Moisture	

Rad

Prep Batch: 78991

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4070-A-1-D MS	Matrix Spike	Total/NA	Solid	None	
160-4070-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	None	
160-4106-1	L050349PUB00	Total/NA	Solid	None	
160-4106-2	L050350PUB00	Total/NA	Solid	None	
160-4106-3	L050351PUB00	Total/NA	Solid	None	
LCS 160-78991/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-78991/1-A	Method Blank	Total/NA	Solid	None	

Leach Batch: 79041

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4106-1	L050349PUB00	Total/NA	Solid	Dry and Grind	
160-4106-1 DU	L050349PUB00	Total/NA	Solid	Dry and Grind	
160-4106-2	L050350PUB00	Total/NA	Solid	Dry and Grind	
160-4106-3	L050351PUB00	Total/NA	Solid	Dry and Grind	

Prep Batch: 79501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4106-1	L050349PUB00	Total/NA	Solid	Fill_Geo-0	79041
160-4106-1 DU	L050349PUB00	Total/NA	Solid	Fill_Geo-0	79041

Rad (Continued)

Prep Batch: 79501 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-4106-2	L050350PUB00	Total/NA	Solid	Fill_Geo-0	79041
160-4106-3	L050351PUB00	Total/NA	Solid	Fill_Geo-0	79041
LCS 160-79501/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-79501/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Tracer/Carrier Summary

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

TestAmerica Job ID: 160-4106-1

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

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Re							
Lab Sample ID	Client Sample ID	(30-110)							
160-4070-A-1-D MS	Matrix Spike	93							
160-4070-A-1-E MSD	Matrix Spike Duplicate	91							
160-4106-1	L050349PUB00	90							
160-4106-2	L050350PUB00	87							
160-4106-3	L050351PUB00	90							
LCS 160-78991/2-A	Lab Control Sample	97							
MB 160-78991/1-A	Method Blank	93							

Tracer/Carrier Legend

Re = Re