

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: 160-17806-2

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:
7/11/2016 5:36:18 PM

Ivan Vania, Project Manager II
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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: 160-17806-2

Job ID: 160-17806-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Westinghouse Electric Company LLC

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

Report Number: 160-17806-2

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 6/15/2016 11:11 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.0° C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples L12-01-25-P-S-B-00 (160-17806-1), L12-02-25-P-S-B-00 (160-17806-2), L12-03-25-P-S-B-00 (160-17806-3), L12-03-26-P-S-B-00 (160-17806-4), L12-04-25-P-S-B-00 (160-17806-5), L12-05-25-P-S-B-00 (160-17806-6), L12-06-25-P-S-B-00 (160-17806-7), L12-07-25-P-S-B-00 (160-17806-8), L12-08-25-P-S-B-00 (160-17806-9), L12-09-25-P-S-B-00 (160-17806-10) and L12-09-26-P-S-B-00 (160-17806-11) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were leached on 06/15/2016, prepared on 06/17/2016 and analyzed on 07/08/2016.

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

**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-061416-02 **Page** 1/1
Project Name: Westinghouse Electric Company
Contact Person: Clark Evers
Phone Number: 314-810-3336
Sampler Name: John Michel

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: (7 days)
 Rush
 Remarks

| Sample ID | Date | Time | Matrix | Comp (C) or Grab (G) | Gamma Spec | Isotopic Uranium | Tc-99 | Gamma Spec (21 day Ingrowth for Ra-226) | Requested Analysis | Total Containers | Remarks |
|--------------------|-----------|-------|--------|----------------------|------------|------------------|-------|---|--------------------|------------------|-----------|
| L12-01-25-P-S-B-00 | 6/14/2016 | 16:05 | S | G | X | X | X | X | | 1 | LSA 12-01 |
| L12-02-25-P-S-B-00 | 6/14/2016 | 15:13 | S | G | X | X | X | X | | 1 | LSA 12-02 |
| L12-03-25-P-S-B-00 | 6/14/2016 | 15:20 | S | G | X | X | X | X | | 1 | LSA 12-03 |
| L12-03-26-P-S-B-00 | 6/14/2016 | 15:25 | S | G | X | X | X | X | | 1 | LSA 12-03 |
| L12-04-25-P-S-B-00 | 6/14/2016 | 15:30 | S | G | X | X | X | X | | 1 | LSA 12-04 |
| L12-05-25-P-S-B-00 | 6/14/2016 | 15:35 | S | G | X | X | X | X | | 1 | LSA 12-05 |
| L12-06-25-P-S-B-00 | 6/14/2016 | 15:33 | S | G | X | X | X | X | | 1 | LSA 12-06 |
| L12-07-25-P-S-B-00 | 6/14/2016 | 16:00 | S | G | X | X | X | X | | 1 | LSA 12-07 |
| L12-08-25-P-S-B-00 | 6/14/2016 | 15:55 | S | G | X | X | X | X | | 1 | LSA 12-08 |
| L12-09-25-P-S-B-00 | 6/14/2016 | 15:45 | S | G | X | X | X | X | | 1 | LSA 12-09 |
| L12-09-26-P-S-B-00 | 6/14/2016 | 15:50 | S | G | X | X | X | X | | 1 | LSA 12-09 |



Relinquished by: *C. Goeman*
Company Name: *WEC*
Received by:
Company Name:

Relinquished by: *WEC*
Company Name: *CROSS ROADS*
Received by: *C. Goeman*
Company Name: *TA - St. Louis*

Date/Time: 6-15-16 09:15
Date/Time: 6-15-16 09:15
Date/Time: 6-15-16 11:11
Date/Time: 6-15-16 11:11

Total: 11
Cooler ID: 0614-01
Shipper and Number:
Comments: N/A
Verified By: *C. Goeman*
Chief - 6-15-16



Login Sample Receipt Checklist

Client: Westinghouse Electric Company LLC

Job Number: 160-17806-2

Login Number: 17806

List Source: TestAmerica St. Louis

List Number: 1

Creator: Dedner, Connie L

| 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. | 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 (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: 160-17806-2

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: 160-17806-2

| 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: 160-17806-2

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---------------|--------------------|--------|----------------|----------------|
| 160-17806-1 | L12-01-25-P-S-B-00 | Solid | 06/14/16 16:05 | 06/15/16 11:11 |
| 160-17806-2 | L12-02-25-P-S-B-00 | Solid | 06/14/16 15:13 | 06/15/16 11:11 |
| 160-17806-3 | L12-03-25-P-S-B-00 | Solid | 06/14/16 15:20 | 06/15/16 11:11 |
| 160-17806-4 | L12-03-26-P-S-B-00 | Solid | 06/14/16 15:25 | 06/15/16 11:11 |
| 160-17806-5 | L12-04-25-P-S-B-00 | Solid | 06/14/16 15:30 | 06/15/16 11:11 |
| 160-17806-6 | L12-05-25-P-S-B-00 | Solid | 06/14/16 15:35 | 06/15/16 11:11 |
| 160-17806-7 | L12-06-25-P-S-B-00 | Solid | 06/14/16 15:33 | 06/15/16 11:11 |
| 160-17806-8 | L12-07-25-P-S-B-00 | Solid | 06/14/16 16:00 | 06/15/16 11:11 |
| 160-17806-9 | L12-08-25-P-S-B-00 | Solid | 06/14/16 15:55 | 06/15/16 11:11 |
| 160-17806-10 | L12-09-25-P-S-B-00 | Solid | 06/14/16 15:45 | 06/15/16 11:11 |
| 160-17806-11 | L12-09-26-P-S-B-00 | Solid | 06/14/16 15:50 | 06/15/16 11:11 |

Client Sample Results

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

TestAmerica Job ID: 160-17806-2

Client Sample ID: L12-01-25-P-S-B-00

Lab Sample ID: 160-17806-1

Date Collected: 06/14/16 16:05

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 0.782 | | 0.121 | 0.145 | | 0.135 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Bismuth 212 | 1.25 | | 0.453 | 0.472 | | 0.383 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Bismuth 214 | 0.970 | | 0.105 | 0.145 | | 0.0750 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Lead 212 | 0.852 | | 0.0724 | 0.132 | | 0.0648 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Lead 214 | 0.937 | | 0.115 | 0.151 | | 0.0932 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Potassium 40 | 16.6 | | 1.27 | 2.12 | | 0.419 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Protactinium 231 | 0.452 | U | 1.45 | 1.45 | | 2.42 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Radium 226 | 0.970 | | 0.105 | 0.145 | 1.00 | 0.0750 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Thorium 232 | 0.782 | | 0.121 | 0.145 | | 0.135 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Thorium 234 | 1.04 | | 0.324 | 0.342 | | 0.856 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Uranium 235 | 0.0518 | U | 0.0631 | 0.0633 | | 0.627 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Americium 241 | 0.0610 | U | 0.0507 | 0.0511 | | 0.0821 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Protactinium 234m | 0.398 | U | 0.644 | 0.646 | | 12.0 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |
| Other Detected Radionuclides | | | Count Uncert. (2σ+/-) | Total Uncert. (2σ+/-) | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| Tl-208 | 0.297 | | 0.0532 | 0.0614 | | 0.0394 | pCi/g | 06/17/16 14:18 | 07/08/16 18:02 | 1 |

Client Sample ID: L12-02-25-P-S-B-00

Lab Sample ID: 160-17806-2

Date Collected: 06/14/16 15:13

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 1.05 | | 0.123 | 0.162 | | 0.0948 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Bismuth 212 | 1.35 | | 0.499 | 0.518 | | 0.425 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Bismuth 214 | 0.909 | | 0.0939 | 0.132 | | 0.0639 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Lead 212 | 0.942 | | 0.0660 | 0.139 | | 0.0547 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Lead 214 | 1.01 | | 0.0864 | 0.136 | | 0.0627 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Potassium 40 | 17.1 | | 1.04 | 2.02 | | 0.298 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Protactinium 231 | -0.487 | U | 1.41 | 1.41 | | 2.35 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Radium 226 | 0.909 | | 0.0939 | 0.132 | 1.00 | 0.0639 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Thorium 232 | 1.05 | | 0.123 | 0.162 | | 0.0948 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Thorium 234 | 1.41 | | 0.467 | 0.490 | | 0.706 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Uranium 235 | 0.159 | U | 0.138 | 0.139 | | 0.175 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Americium 241 | -0.0352 | U | 0.0468 | 0.0470 | | 0.146 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Protactinium 234m | 2.20 | U | 3.29 | 3.30 | | 7.12 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Other Detected Radionuclides | | | Count Uncert. (2σ+/-) | Total Uncert. (2σ+/-) | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| Pb-210 | 1.81 | | 0.477 | 0.522 | | 0.684 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |
| Tl-208 | 0.297 | | 0.0413 | 0.0513 | | 0.0331 | pCi/g | 06/17/16 14:18 | 07/08/16 18:05 | 1 |

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-17806-2

Client Sample ID: L12-03-25-P-S-B-00

Lab Sample ID: 160-17806-3

Date Collected: 06/14/16 15:20

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 1.11 | | 0.149 | 0.183 | | 0.142 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Bismuth 212 | 1.52 | | 0.481 | 0.503 | | 0.386 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Bismuth 214 | 0.828 | | 0.123 | 0.147 | | 0.0840 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Lead 212 | 0.972 | | 0.0842 | 0.134 | | 0.0753 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Lead 214 | 0.982 | | 0.101 | 0.139 | | 0.0767 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Potassium 40 | 18.0 | | 1.36 | 2.21 | | 0.321 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Protactinium 231 | 0.000 | U | 0.420 | 0.420 | | 2.22 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Radium 226 | 0.828 | | 0.123 | 0.147 | 1.00 | 0.0840 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Thorium 232 | 1.11 | | 0.149 | 0.183 | | 0.142 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Thorium 234 | 1.07 | | 0.330 | 0.346 | | 0.867 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Uranium 235 | 0.168 | U | 0.160 | 0.161 | | 0.213 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Americium 241 | -0.00240 | U | 0.0810 | 0.0810 | | 0.115 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Protactinium 234m | 1.33 | U | 2.40 | 2.40 | | 9.46 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Other Detected | | | Count | Total | | | | | | |
| Radionuclides | | | Uncert. | Uncert. | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| | | | (2σ+/-) | (2σ+/-) | | | | | | |
| Pb-210 | 1.80 | | 0.692 | 0.730 | | 0.848 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |
| Tl-208 | 0.362 | | 0.0516 | 0.0624 | | 0.0323 | pCi/g | 06/17/16 14:18 | 07/08/16 20:12 | 1 |

Client Sample ID: L12-03-26-P-S-B-00

Lab Sample ID: 160-17806-4

Date Collected: 06/14/16 15:25

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 1.14 | | 0.190 | 0.223 | | 0.121 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Bismuth 212 | 1.23 | | 0.413 | 0.432 | | 0.383 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Bismuth 214 | 1.08 | | 0.113 | 0.160 | | 0.0672 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Lead 212 | 0.982 | | 0.0795 | 0.150 | | 0.0742 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Lead 214 | 1.15 | | 0.0915 | 0.151 | | 0.0869 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Potassium 40 | 18.4 | | 1.26 | 2.26 | | 0.272 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Protactinium 231 | 0.000 | U | 0.471 | 0.471 | | 2.20 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Radium 226 | 1.08 | | 0.113 | 0.160 | 1.00 | 0.0672 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Thorium 232 | 1.14 | | 0.190 | 0.223 | | 0.121 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Thorium 234 | 1.46 | | 0.528 | 0.550 | | 0.801 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Uranium 235 | 0.370 | | 0.162 | 0.166 | | 0.190 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Americium 241 | -0.0194 | U | 0.0820 | 0.0821 | | 0.116 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Protactinium 234m | 4.34 | U | 5.38 | 5.40 | | 9.42 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Other Detected | | | Count | Total | | | | | | |
| Radionuclides | | | Uncert. | Uncert. | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| | | | (2σ+/-) | (2σ+/-) | | | | | | |
| Pb-210 | 1.72 | | 0.592 | 0.625 | | 0.785 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Tl-208 | 0.282 | | 0.0502 | 0.0581 | | 0.0430 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-17806-2

Client Sample ID: L12-04-25-P-S-B-00

Lab Sample ID: 160-17806-5

Date Collected: 06/14/16 15:30

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 0.848 | | 0.121 | 0.149 | | 0.113 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Bismuth 212 | 0.992 | | 0.361 | 0.375 | | 0.351 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Bismuth 214 | 0.869 | | 0.110 | 0.142 | | 0.0759 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Lead 212 | 0.859 | | 0.0722 | 0.133 | | 0.0659 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Lead 214 | 0.997 | | 0.0911 | 0.138 | | 0.0799 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Potassium 40 | 15.0 | | 1.16 | 1.92 | | 0.300 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Protactinium 231 | 0.470 | U | 1.07 | 1.07 | | 2.40 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Radium 226 | 0.869 | | 0.110 | 0.142 | 1.00 | 0.0759 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Thorium 232 | 0.848 | | 0.121 | 0.149 | | 0.113 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Thorium 234 | 1.20 | | 0.560 | 0.574 | | 0.878 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Uranium 235 | 0.0965 | U | 0.0967 | 0.0972 | | 0.608 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Americium 241 | -0.0228 | U | 0.0973 | 0.0973 | | 0.162 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Protactinium 234m | 1.81 | U | 2.67 | 2.67 | | 9.19 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |
| Other Detected Radionuclides | | | Count | Total | | | | | | |
| | Result | Qualifier | Uncert. | Uncert. | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| Tl-208 | 0.302 | | 0.0443 | 0.0543 | | 0.0309 | pCi/g | 06/17/16 14:18 | 07/08/16 18:54 | 1 |

Client Sample ID: L12-05-25-P-S-B-00

Lab Sample ID: 160-17806-6

Date Collected: 06/14/16 15:35

Matrix: Solid

Date Received: 06/15/16 11:11

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 | | 0.102 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Bismuth 212 | 1.46 | | 0.457 | 0.481 | | 0.383 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Bismuth 214 | 0.930 | | 0.0977 | 0.137 | | 0.0669 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Lead 212 | 1.08 | | 0.0690 | 0.156 | | 0.0542 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Lead 214 | 1.10 | | 0.0977 | 0.151 | | 0.0697 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Potassium 40 | 18.5 | | 1.09 | 2.16 | | 0.353 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Protactinium 231 | 0.000 | U | 0.181 | 0.181 | | 2.10 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Radium 226 | 0.930 | | 0.0977 | 0.137 | 1.00 | 0.0669 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Thorium 232 | 1.02 | | 0.140 | 0.173 | | 0.102 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Thorium 234 | 1.07 | | 0.288 | 0.309 | | 0.796 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Uranium 235 | -0.0199 | U | 0.0447 | 0.0448 | | 0.543 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Americium 241 | -0.0489 | U | 0.0545 | 0.0548 | | 0.156 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Protactinium 234m | 1.96 | U | 2.86 | 2.87 | | 8.23 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Other Detected Radionuclides | | | Count | Total | | | | | | |
| | Result | Qualifier | Uncert. | Uncert. | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| Pb-210 | 1.50 | | 0.558 | 0.585 | | 0.706 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |
| Tl-208 | 0.368 | | 0.0505 | 0.0631 | | 0.0375 | pCi/g | 06/17/16 14:18 | 07/08/16 18:53 | 1 |

Client Sample Results

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

TestAmerica Job ID: 160-17806-2

Client Sample ID: L12-06-25-P-S-B-00

Lab Sample ID: 160-17806-7

Date Collected: 06/14/16 15:33

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 1.08 | | 0.130 | 0.171 | | 0.108 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Bismuth 212 | 0.994 | | 0.441 | 0.453 | | 0.445 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Bismuth 214 | 1.95 | | 0.153 | 0.254 | | 0.0922 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Lead 212 | 1.02 | | 0.0769 | 0.152 | | 0.0715 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Lead 214 | 2.22 | | 0.135 | 0.267 | | 0.0911 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Potassium 40 | 18.4 | | 1.20 | 2.23 | | 0.246 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Protactinium 231 | 0.201 | U | 0.707 | 0.707 | | 2.24 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Radium 226 | 1.95 | | 0.153 | 0.254 | 1.00 | 0.0922 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Thorium 232 | 1.08 | | 0.130 | 0.171 | | 0.108 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Thorium 234 | 1.49 | | 0.548 | 0.570 | | 0.842 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Uranium 235 | 0.280 | | 0.141 | 0.144 | | 0.194 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Americium 241 | 0.00877 | U | 0.0878 | 0.0878 | | 0.124 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Protactinium 234m | 3.45 | U | 6.37 | 6.38 | | 9.41 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Other Detected | | | Count | Total | | | | | | |
| Radionuclides | | | Uncert. | Uncert. | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| | | | (2σ+/-) | (2σ+/-) | | | | | | |
| Pb-210 | 2.01 | | 0.636 | 0.678 | | 0.822 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Tl-208 | 0.324 | | 0.0540 | 0.0636 | | 0.0452 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |

Client Sample ID: L12-07-25-P-S-B-00

Lab Sample ID: 160-17806-8

Date Collected: 06/14/16 16:00

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 1.01 | | 0.146 | 0.178 | | 0.101 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Bismuth 212 | 0.0399 | U | 0.541 | 0.541 | | 0.934 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Bismuth 214 | 0.884 | | 0.115 | 0.147 | | 0.0771 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Lead 212 | 0.815 | | 0.0733 | 0.128 | | 0.0684 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Lead 214 | 0.913 | | 0.104 | 0.141 | | 0.0766 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Potassium 40 | 15.9 | | 1.24 | 2.04 | | 0.325 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Protactinium 231 | 0.492 | U | 1.13 | 1.13 | | 2.52 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Radium 226 | 0.884 | | 0.115 | 0.147 | 1.00 | 0.0771 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Thorium 232 | 1.01 | | 0.146 | 0.178 | | 0.101 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Thorium 234 | 1.24 | | 0.569 | 0.583 | | 0.888 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Uranium 235 | 0.0227 | U | 0.123 | 0.123 | | 0.598 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Americium 241 | 0.0404 | U | 0.0960 | 0.0961 | | 0.160 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Protactinium 234m | 2.24 | U | 3.84 | 3.85 | | 9.99 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |
| Other Detected | | | Count | Total | | | | | | |
| Radionuclides | | | Uncert. | Uncert. | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| | | | (2σ+/-) | (2σ+/-) | | | | | | |
| Tl-208 | 0.258 | | 0.0462 | 0.0534 | | 0.0365 | pCi/g | 06/17/16 14:18 | 07/08/16 19:33 | 1 |

Client Sample Results

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

TestAmerica Job ID: 160-17806-2

Client Sample ID: L12-08-25-P-S-B-00

Lab Sample ID: 160-17806-9

Date Collected: 06/14/16 15:55

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 1.01 | | 0.113 | 0.152 | | 0.121 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Bismuth 212 | 0.320 | U | 0.541 | 0.542 | | 0.900 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Bismuth 214 | 0.890 | | 0.0949 | 0.132 | | 0.0671 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Lead 212 | 0.964 | | 0.0661 | 0.141 | | 0.0563 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Lead 214 | 1.12 | | 0.0897 | 0.147 | | 0.0567 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Potassium 40 | 19.1 | | 1.08 | 2.21 | | 0.286 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Protactinium 231 | 0.401 | U | 0.897 | 0.898 | | 2.00 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Radium 226 | 0.890 | | 0.0949 | 0.132 | 1.00 | 0.0671 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Thorium 232 | 1.01 | | 0.113 | 0.152 | | 0.121 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Thorium 234 | 1.24 | | 0.277 | 0.306 | | 0.743 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Uranium 235 | -0.125 | U | 0.558 | 0.559 | | 0.511 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Americium 241 | 0.0313 | U | 0.0909 | 0.0910 | | 0.151 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Protactinium 234m | 3.33 | U | 3.87 | 3.89 | | 6.83 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |
| Other Detected Radionuclides | | | Count | Total | | | | | | |
| | Result | Qualifier | Uncert. | Uncert. | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| | | | (2σ+/-) | (2σ+/-) | | | | | | |
| Tl-208 | 0.314 | | 0.0527 | 0.0619 | | 0.0404 | pCi/g | 06/17/16 14:18 | 07/08/16 19:34 | 1 |

Client Sample ID: L12-09-25-P-S-B-00

Lab Sample ID: 160-17806-10

Date Collected: 06/14/16 15:45

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 1.04 | | 0.137 | 0.173 | | 0.0768 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Bismuth 212 | 0.326 | U | 0.515 | 0.517 | | 0.859 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Bismuth 214 | 0.793 | | 0.0957 | 0.126 | | 0.0675 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Lead 212 | 0.924 | | 0.0760 | 0.142 | | 0.0664 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Lead 214 | 1.01 | | 0.0978 | 0.144 | | 0.0827 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Potassium 40 | 14.7 | | 1.18 | 1.91 | | 0.298 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Protactinium 231 | 0.313 | U | 0.984 | 0.985 | | 2.41 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Radium 226 | 0.793 | | 0.0957 | 0.126 | 1.00 | 0.0675 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Thorium 232 | 1.04 | | 0.137 | 0.173 | | 0.0768 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Thorium 234 | 1.24 | | 0.346 | 0.370 | | 0.843 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Uranium 235 | 0.294 | | 0.166 | 0.169 | | 0.235 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Americium 241 | 0.0446 | U | 0.0969 | 0.0970 | | 0.161 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Protactinium 234m | 2.91 | U | 4.92 | 4.93 | | 7.80 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |
| Other Detected Radionuclides | | | Count | Total | | | | | | |
| | Result | Qualifier | Uncert. | Uncert. | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| | | | (2σ+/-) | (2σ+/-) | | | | | | |
| Tl-208 | 0.316 | | 0.0566 | 0.0654 | | 0.0439 | pCi/g | 06/17/16 14:18 | 07/08/16 20:11 | 1 |

Client Sample Results

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

TestAmerica Job ID: 160-17806-2

Client Sample ID: L12-09-26-P-S-B-00

Lab Sample ID: 160-17806-11

Date Collected: 06/14/16 15:50

Matrix: Solid

Date Received: 06/15/16 11:11

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 | 0.968 | | 0.120 | 0.155 | | 0.125 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Bismuth 212 | 1.08 | | 0.330 | 0.349 | | 0.425 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Bismuth 214 | 0.979 | | 0.102 | 0.144 | | 0.0666 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Lead 212 | 1.02 | | 0.0691 | 0.149 | | 0.0580 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Lead 214 | 1.14 | | 0.0864 | 0.147 | | 0.0700 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Potassium 40 | 18.3 | | 1.11 | 2.15 | | 0.398 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Protactinium 231 | -0.467 | U | 1.37 | 1.37 | | 2.29 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Radium 226 | 0.979 | | 0.102 | 0.144 | 1.00 | 0.0666 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Thorium 232 | 0.968 | | 0.120 | 0.155 | | 0.125 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Thorium 234 | 1.33 | | 0.519 | 0.537 | | 0.806 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Uranium 235 | 0.231 | | 0.179 | 0.181 | | 0.193 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Americium 241 | -0.0303 | U | 0.0595 | 0.0596 | | 0.151 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Protactinium 234m | 2.21 | U | 3.45 | 3.46 | | 8.10 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |
| Other Detected | | | Count | Total | | | | | | |
| Radionuclides | | | Uncert. | Uncert. | | | | | | |
| | Result | Qualifier | (2σ+/-) | (2σ+/-) | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| Tl-208 | 0.341 | | 0.0498 | 0.0609 | | 0.0380 | pCi/g | 06/17/16 14:18 | 07/08/16 20:09 | 1 |

QC Sample Results

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

TestAmerica Job ID: 160-17806-2

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

Lab Sample ID: MB 160-256926/1-A
Matrix: Solid
Analysis Batch: 259785

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 256926

| Analyte | MB MB | | Count | Total | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
|------------------------------|------------|-----------|-----------------|-----------------|------|--------|-------|----------------|----------------|---------|
| | Result | Qualifier | Uncert. (2σ+/-) | Uncert. (2σ+/-) | | | | | | |
| Actinium 228 | -0.002269 | U | 0.00541 | 0.00542 | | 0.0741 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Bismuth 212 | -0.1042 | U | 0.125 | 0.125 | | 0.431 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Bismuth 214 | -0.03388 | U | 0.0203 | 0.0206 | | 0.116 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Lead 212 | -0.01401 | U | 0.0200 | 0.0200 | | 0.0447 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Lead 214 | 0.02052 | U | 0.0222 | 0.0223 | | 0.0350 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Potassium 40 | 0.007605 | U | 0.116 | 0.116 | | 0.232 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Protactinium 231 | 0.03437 | U | 0.198 | 0.198 | | 0.667 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Radium 226 | -0.03388 | U | 0.0203 | 0.0206 | 1.00 | 0.116 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Thorium 232 | -0.002269 | U | 0.00541 | 0.00542 | | 0.0741 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Thorium 234 | -0.1185 | U | 0.180 | 0.180 | | 0.333 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Uranium 235 | -0.003651 | U | 0.0623 | 0.0623 | | 0.133 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Americium 241 | -0.0009154 | U | 0.0201 | 0.0201 | | 0.0301 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Protactinium 234m | -0.3880 | U | 2.40 | 2.40 | | 4.31 | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |
| Other Detected Radionuclides | | MB MB | Count | Total | RL | MDC | Unit | Prepared | Analyzed | Dil Fac |
| | | Result | Qualifier | Uncert. (2σ+/-) | | | | | | |
| Other Detected Radionuclide | | None | | | | | pCi/g | 06/17/16 14:18 | 07/08/16 17:30 | 1 |

Lab Sample ID: LCS 160-256926/2-A
Matrix: Solid
Analysis Batch: 259735

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 256926

| Analyte | Spike Added | LCS Result | LCS Qual | Total | RL | MDC | Unit | %Rec | %Rec. |
|---------------|-------------|------------|----------|-----------------|----|-------|-------|------|----------|
| | | | | Uncert. (2σ+/-) | | | | | Limits |
| Americium 241 | 101 | 104.9 | | 10.9 | | 0.610 | pCi/g | 104 | 87 - 116 |
| Cesium 137 | 33.9 | 34.01 | | 3.57 | | 0.200 | pCi/g | 100 | 87 - 120 |
| Cobalt 60 | 30.6 | 30.96 | | 3.13 | | 0.115 | pCi/g | 101 | 87 - 115 |

Lab Sample ID: 160-17803-A-1-I DU
Matrix: Solid
Analysis Batch: 259841

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 256926

| Analyte | Sample Result | Sample Qual | DU Result | DU Qual | Total | RL | MDC | Unit | RER | RER |
|------------------|---------------|-------------|-----------|---------|-----------------|------|--------|-------|------|-------|
| | | | | | Uncert. (2σ+/-) | | | | | Limit |
| Actinium 228 | 0.903 | | 1.135 | | 0.162 | | 0.0668 | pCi/g | 0.67 | 1 |
| Bismuth 212 | 1.10 | | 1.196 | | 0.333 | | 0.367 | pCi/g | 0.14 | 1 |
| Bismuth 214 | 0.926 | | 1.021 | | 0.147 | | 0.0686 | pCi/g | 0.35 | 1 |
| Lead 212 | 0.959 | | 1.030 | | 0.150 | | 0.0596 | pCi/g | 0.24 | 1 |
| Lead 214 | 1.02 | | 1.091 | | 0.146 | | 0.0663 | pCi/g | 0.24 | 1 |
| Potassium 40 | 19.2 | | 21.96 | | 2.50 | | 0.343 | pCi/g | 0.58 | 1 |
| Protactinium 231 | 0.189 | U | -0.00000 | U | 1.25 | | 2.11 | pCi/g | 0.10 | 1 |
| Radium 226 | 0.926 | | 1.021 | | 0.147 | 1.00 | 0.0686 | pCi/g | 0.35 | 1 |
| Thorium 232 | 0.903 | | 1.135 | | 0.162 | | 0.0668 | pCi/g | 0.67 | 1 |
| Thorium 234 | 1.52 | | 1.459 | | 0.340 | | 0.813 | pCi/g | 0.07 | 1 |
| Uranium 235 | 0.256 | | 0.3328 | | 0.130 | | 0.169 | pCi/g | 0.30 | 1 |
| Americium 241 | 0.0357 | U | -0.05006 | U | 0.0546 | | 0.166 | pCi/g | 0.60 | 1 |

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-17806-2

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

Lab Sample ID: 160-17803-A-1-I DU
Matrix: Solid
Analysis Batch: 259841

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 256926

| Analyte | Sample | Sample | DU | DU | Total | RL | MDC | Unit | RER | RER |
|-------------------------------------|----------------------|--------------------|------------------|----------------|------------------------|-----------|------------|-------------|------------|------------------|
| | Result | Qual | Result | Qual | Uncert. (2σ+/-) | | | | | |
| Protactinium 234m | 1.94 | U | 2.351 | U | 3.25 | | 7.84 | pCi/g | 0.07 | 1 |
| <i>Total</i> | | | | | | | | | | |
| <i>Other Detected Radionuclides</i> | <i>Sample Result</i> | <i>Sample Qual</i> | <i>DU Result</i> | <i>DU Qual</i> | <i>Uncert. (2σ+/-)</i> | <i>RL</i> | <i>MDC</i> | <i>Unit</i> | <i>RER</i> | <i>RER Limit</i> |
| <i>Pb-210</i> | 1.65 | | 1.406 | | 0.582 | | 0.727 | pCi/g | 0.19 | 1 |
| <i>Tl-208</i> | 0.295 | | 0.3655 | | 0.0611 | | 0.0341 | pCi/g | 0.63 | 1 |



QC Association Summary

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

TestAmerica Job ID: 160-17806-2

Rad

Leach Batch: 256533

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|--------------------|--------------------|-----------|--------|---------------|------------|
| 160-17803-A-1-I DU | Duplicate | Total/NA | Solid | Dry and Grind | |
| 160-17806-1 | L12-01-25-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-2 | L12-02-25-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-3 | L12-03-25-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-4 | L12-03-26-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-5 | L12-04-25-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-6 | L12-05-25-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-7 | L12-06-25-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-8 | L12-07-25-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-9 | L12-08-25-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-10 | L12-09-25-P-S-B-00 | Total/NA | Solid | Dry and Grind | |
| 160-17806-11 | L12-09-26-P-S-B-00 | Total/NA | Solid | Dry and Grind | |

Prep Batch: 256926

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|--------------------|--------------------|-----------|--------|-------------|------------|
| 160-17803-A-1-I DU | Duplicate | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-1 | L12-01-25-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-2 | L12-02-25-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-3 | L12-03-25-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-4 | L12-03-26-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-5 | L12-04-25-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-6 | L12-05-25-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-7 | L12-06-25-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-8 | L12-07-25-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-9 | L12-08-25-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-10 | L12-09-25-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| 160-17806-11 | L12-09-26-P-S-B-00 | Total/NA | Solid | Fill_Geo-21 | 256533 |
| LCS 160-256926/2-A | Lab Control Sample | Total/NA | Solid | Fill_Geo-21 | |
| MB 160-256926/1-A | Method Blank | Total/NA | Solid | Fill_Geo-21 | |