ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17284-1
Client Project/Site: Blue Ridge Landfill

For:
Commonwealth of Kentucky
130 Eagle Nest Drive
Paducah, Kentucky 42003

Attn: Gaye Brewer

Authorized for release by:
6/13/2016 10:06:41 AM
Rhonda Ridenhower, Manager of Project Management
(314)298-8566
rhonda.ridenhower@testamericainc.com

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: Commonwealth of Kentucky

Project: Blue Ridge Landfill

Report Number: 160-17284-1

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 05/06/2016; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 6 coolers at receipt time were 20.0º C, 20.0º C, 20.0º C, 20.0º C, 20.0º C and 22.0º C.

Receipt Exceptions: Samples ADS BRL-LT-LIQ and Leachate Effluent received with pH at 7. Added nitric. lot 832829 and pH remains at 7 for all sample bottles.

2XLP for MW-17R received with pH at 7. Added nitric, lot 832829 and pH is now below 2 for both bottles.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY-Solids

Samples #7 FILTER CAKE (160-17284-12), ADS BRL-LT-LIQ (160-17284-16), POND 3 SEDIMENT (160-17284-20), POND 3 SEDIMENT DUP (160-17284-22), DRY BRANCH CREEK UPSTREAM SED (160-17284-24), DRY BRANCH CREEK DOWNSTREAM SED (160-17284-26), DRY BRANCH CREEK DOWNSTREAM SED DUP (160-17284-27), POND 4 SEDIMENT (160-17284-30), POND 4 SED SILT FENCE (160-17284-31), SED POND 1 SEDIMENT (160-17284-33) and POND 2 SEDIMENT (160-17284-38) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with EPA 900.0. The samples were dried on 05/09/2016, prepared on 05/16/2016 and
Case Narrative

Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

Job ID: 160-17284-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

analyzed on 05/17/2016.

Gross Beta was detected in method blank MB 160-251280/1-A at a level exceeding the reporting limit. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

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

GROSS ALPHA AND GROSS BETA RADIOACTIVITY-Waters
Samples MW-17R-AKGWA 8003-8393 (160-17284-1), MW-10-AKGWA 8001-0201 (160-17284-2), MW-13-AKGWA 8001-2025 (160-17284-3), MW-15R-AKGWA 8003-3579 (160-17284-4), MW-7-AKGWA 8001-0205 (160-17284-5), #1 UV EFFLUENT CHANNEL 37 DEGREES 42.086’ (160-17284-6), #3 WWTP INFLUENT (160-17284-8), DRY BRANCH CREEK DOWNSTREAM DUP (160-17284-13), POND 3 ABOVE OUTFALL (160-17284-14), ADS BRL-LT-LIQ (160-17284-15), ADS BRL UNDERDRAIN (160-17284-17), POND 3 (160-17284-18), POND 3 OUTFALL (160-17284-19), POND 3 DUP (160-17284-21), DRY BRANCH CREEK UPSTREAM (160-17284-23), DRY BRANCH CREEK DOWNSTREAM (160-17284-25), OUTFALL 004 (160-17284-28), POND 4 (160-17284-29), SED POND 1 (160-17284-32), OUTFALL 001 (160-17284-34), LEACHATE EFFLEUNT (160-17284-35), POND 2 (160-17284-36) and POND 2 OUTFALL (160-17284-37) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with USEPA Method 900.0. The samples were prepared on 06/03/2016 and analyzed on 06/09/2016.

Prep Batch 254725
The gross alpha and gross beta detection goals were not met for the following samples due to a reduction of the sample size attributed to high residual mass: LEACHATE EFFLEUNT (160-17284-35) and POND 2 (160-17284-36). Analytical results are reported with the detection limit achieved.

The gross alpha detection goal was not met for the following samples due to a reduction of the sample size attributed to high residual mass: POND 2 OUTFALL (160-17284-37) and (160-17627-B-1-B DU). Analytical results are reported with the detection limit achieved.

Prep Batch 254724
The gross alpha and gross beta detection goals were not met for the following samples due to a reduction of the sample size attributed to high residual mass: MW-17R-AKGWA 8003-8393 (160-17284-1), MW-10-AKGWA 8001-0201 (160-17284-2), MW-13-AKGWA 8001-2025 (160-17284-3), MW-15R-AKGWA 8003-3579 (160-17284-4), MW-7-AKGWA 8001-0205 (160-17284-5), #3 WWTP INFLUENT (160-17284-8), POND 3 ABOVE OUTFALL (160-17284-14), ADS BRL-LT-LIQ (160-17284-15), ADS BRL UNDERDRAIN (160-17284-17), POND 3 (160-17284-18), POND 3 OUTFALL (160-17284-19), POND 3 DUP (160-17284-21), DRY BRANCH CREEK UPSTREAM (160-17284-23), DRY BRANCH CREEK DOWNSTREAM (160-17284-25), OUTFALL 004 (160-17284-28), POND 4 (160-17284-29), SED POND 1 (160-17284-32), OUTFALL 001 (160-17284-34), LEACHATE EFFLEUNT (160-17284-35), POND 2 (160-17284-36) and POND 2 OUTFALL (160-17284-37) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with USEPA Method 900.0. The samples were prepared on 06/03/2016 and analyzed on 06/09/2016.

Prep Batch 250875
Insufficient samples were provided for the following samples to fill a tuna can geometry calibrated for Ra-226 analysis by gamma spectroscopy: #5 FILTER CAKE (160-17284-10) and #6 FILTER CAKE (160-17284-11). The use of a different geometry could potentially bias the results low due to the loss of radon into the headspace of the container. Samples were placed in a 25mL geometry instead.

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

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)
Samples #5 FILTER CAKE (160-17284-10), #6 FILTER CAKE (160-17284-11), ADS BRL-LT-SL (160-17284-16), POND 3 SEDIMENT (160-17284-17), POND 3 SEDIMENT DUP (160-17284-22), DRY BRANCH CREEK UPSTREAM SED (160-17284-24), DRY BRANCH CREEK DOWNSTREAM SED (160-17284-26), DRY BRANCH CREEK DOWNSTREAM SED DUP (160-17284-27), POND 4 SEDIMENT (160-17284-30), POND 4 SED SILT FENCE (160-17284-31), SED POND 1 SEDIMENT (160-17284-33) and POND 2 SEDIMENT (160-17284-38) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA 901.1. The samples were dried on 05/09/2016, prepared on 05/12/2016 and analyzed on 06/02/2016.

Batch 250875
Insufficient samples were provided for the following samples to fill a tuna can geometry calibrated for Ra-226 analysis by gamma spectroscopy: #5 FILTER CAKE (160-17284-10) and #6 FILTER CAKE (160-17284-11). The use of a different geometry could potentially bias the results low due to the loss of radon into the headspace of the container. Samples were placed in a 25mL geometry instead.

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

Client: Commonwealth of Kentucky  TestAmerica Job ID: 160-17284-1
Project/Site: Blue Ridge Landfill

Job ID: 160-17284-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

RADIUM-226 (GFPC)
Samples MW-17R-AKGWA 8003-8393 (160-17284-1), MW-10-AKGWA 8001-0201 (160-17284-2), MW-13-AKGWA 8001-2025 (160-17284-3), MW-15R-AKGWA 8003-3579 (160-17284-4), MW-7-AKGWA 8001-0205 (160-17284-5), #2 UV EFFLUENT CHANNEL83 DEGREES 58.917 (160-17284-7), #4 WWTP INFUENT (160-17284-9), DRY BRANCH CREEK DOWNSTREAM DUP (160-17284-13), POND 3 ABOVE OUTFALL (160-17284-14), ADS BRL-LT-LIQ (160-17284-15), ADS BRL UNDERDRAIN (160-17284-17), POND 3 (160-17284-18), POND 3 OUTFALL (160-17284-19), POND 3 DUP (160-17284-21), DRY BRANCH CREEK UPSTREAM (160-17284-23), DRY BRANCH CREEK DOWNSTREAM (160-17284-25), OUTFALL 004 (160-17284-28), POND 4 (160-17284-29), SED POND 1 (160-17284-32), OUTFALL 001 (160-17284-34), LEACHATE EFFLEUNT (160-17284-35), POND 2 (160-17284-36) and POND 2 OUTFALL (160-17284-37) were analyzed for Radium-226 (GFPC) in accordance with EPA Method 903.0. The samples were prepared on 05/10/2016 and 05/17/2016 and analyzed on 06/01/2016, 06/02/2016 and 06/10/2016.

Prep Batch 250365
The Laboratory Control Sample (LCS) spike recovery (140%) associated with the following samples is outside the upper QC limit of 137% indicating a potential positive bias for that analyte: POND 2 (160-17284-36), POND 2 OUTFALL (160-17284-37), (LCS 160-250356/2-A), (LCSD 160-250356/3-A). This analyte was not observed above the requested limit in the associated samples; therefore the sample data was not adversely affected by this excursion. The data have been qualified and reported.

Prep Batch 251589
A deviation from the Standard Operating Procedure (SOP) occurred in preparation of the following samples: ADS BRL-LT-LIQ (160-17284-15) and LEACHATE EFFLEUNT (160-17284-35). The samples were deep brown to black in coloring with some sediment. Initial preparation of the samples left little to no barium sulfate following the analysis. Per instructions from the Technical Director, the samples were re-prepared at a reduced aliquot, cooked to dryness, muffled, and wet ashed to remove all organics interfering with normal preparation. This was successful, and the samples behaved normally through the rest of the analysis. To avoid matrix interference with homogeneity, a laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP).

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

RADIUM-228 (GFPC)
Samples MW-17R-AKGWA 8003-8393 (160-17284-1), MW-10-AKGWA 8001-0201 (160-17284-2), MW-13-AKGWA 8001-2025 (160-17284-3), MW-15R-AKGWA 8003-3579 (160-17284-4), MW-7-AKGWA 8001-0205 (160-17284-5), #2 UV EFFLUENT CHANNEL83 DEGREES 58.917 (160-17284-7), #4 WWTP INFUENT (160-17284-9), DRY BRANCH CREEK DOWNSTREAM DUP (160-17284-13), POND 3 ABOVE OUTFALL (160-17284-14), ADS BRL-LT-LIQ (160-17284-15), ADS BRL UNDERDRAIN (160-17284-17), POND 3 (160-17284-18), POND 3 OUTFALL (160-17284-19), POND 3 DUP (160-17284-21), DRY BRANCH CREEK UPSTREAM (160-17284-23), DRY BRANCH CREEK DOWNSTREAM (160-17284-25), OUTFALL 004 (160-17284-28), POND 4 (160-17284-29), SED POND 1 (160-17284-32), OUTFALL 001 (160-17284-34), LEACHATE EFFLEUNT (160-17284-35), POND 2 (160-17284-36) and POND 2 OUTFALL (160-17284-37) were analyzed for Radium-228 (GFPC) in accordance with EPA Method 904. The samples were prepared on 05/10/2016 and 05/19/2016 and analyzed on 05/17/2016 and 05/27/2016.

Prep Batch 250391
The radium-228 MDC (2.19) did not meet the requested limit (1.00 pCi/L). However, the activity is well above the MDC achieved. In addition, the barium recovery was low (40.7%) potentially increasing the MDC.

Prep Batch 232055
A deviation from the Standard Operating Procedure (SOP) occurred in preparation of the following samples: ADS BRL-LT-LIQ (160-17284-15) and LEACHATE EFFLEUNT (160-17284-35). The samples were deep brown to black in coloring with some sediment. Initial preparation of the samples left little to no barium sulfate following the analysis. Per instructions from the Technical Director, the samples were re-prepared at a reduced aliquot, cooked to dryness, muffled, and wet ashed to remove all organics interfering with normal preparation. This was successful, and the samples behaved normally through the rest of the analysis. To avoid matrix interference with homogeneity, a laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.
<table>
<thead>
<tr>
<th>Sample Identification</th>
<th>Sample Date</th>
<th>Sample Time</th>
<th>Sample Type</th>
<th>Matrix</th>
<th># of Cust.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-17 (8003-8393)</td>
<td>5/18/16</td>
<td>10:45</td>
<td>G</td>
<td>W</td>
<td>✔</td>
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<td>MW-10 (8001-0201)</td>
<td>5/18/16</td>
<td>11:33</td>
<td>G</td>
<td>W</td>
<td>✔ ✔</td>
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<tr>
<td>MW-13 (8001-2025)</td>
<td>5/18/16</td>
<td>14:46</td>
<td>G</td>
<td>W</td>
<td>✔ ✔</td>
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<tr>
<td>MW-15 (8003-3579)</td>
<td>5/18/16</td>
<td>15:45</td>
<td>G</td>
<td>W</td>
<td>✔ ✔</td>
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<td>MW-7 (8001-0205)</td>
<td>5/18/16</td>
<td>16:55</td>
<td>G</td>
<td>W</td>
<td>✔ ✔</td>
</tr>
</tbody>
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Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other

Possible Hazard Identification
- Non-Hazard
- Flammable
- Skin Irritant
- Poison B
- Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
- Return To Client
- Disposal By Lab
- Archive For

Special Instructions/OC Requirements & Comments:
- As 226/122 B - gamma spec method EPA 903.0 and 903.0
- Master Agreement #: 0076
- SWAT waters - method EPA 900.0

Relinquished by: [Signatures]

Company: [Signatures]

Date/Time: [Signatures]

Received by: [Signatures]

Company: [Signatures]

Date/Time: [Signatures]

Company: [Signatures]

Date/Time: [Signatures]

Company: [Signatures]

Date/Time: [Signatures]
### Chain of Custody Record

**Client Contact**

- **Name:** R. Ridenhour
- **Phone:** 270-878-8468
- **Fax:**

**Project Name:** Blue Ridge Landfill

**Site:**

**F O #**

<table>
<thead>
<tr>
<th>Sample Identification</th>
<th>Sample Date</th>
<th>Sample Time</th>
<th>Sample Type</th>
<th>Matrix</th>
<th># of Cont.</th>
<th>Special Instructions/QC Requirements &amp; Comments</th>
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</thead>
<tbody>
<tr>
<td>UV Effluent Channel 1</td>
<td>5/3/16</td>
<td>11:03 AM</td>
<td>WWTP</td>
<td>G</td>
<td>1</td>
<td>Master agreement method 9011.1, 9030 and 9040</td>
</tr>
<tr>
<td>WWTP Effluent</td>
<td>5/3/16</td>
<td>11:45 AM</td>
<td>WWTP</td>
<td>G</td>
<td>1</td>
<td>CKPN 0064 2</td>
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<tr>
<td>Filter Cake</td>
<td>5/3/16</td>
<td>12:00 PM</td>
<td>WWTP</td>
<td>G</td>
<td>1</td>
<td>CKPN 0070 2</td>
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**Preservation Used:** 
- 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other

**Possible Hazard Identification:**
- Non-Hazard
- Flammable
- Skin Irritant
- Poison
- Unknown

**Sample Disposal:**
- Return To Client
- Disposal By Lab
- Archive For Months

**Special Instructions/QC Requirements & Comments:**
- Rejected by: KYDWM
- Date/Time: 5/3/16 11:03
- Received by: R. Ridenhour
- Date/Time: 5/3/16 12:00
- Rejected by: KYDWM
- Date/Time: 5/5/16 13:00
- Received by: R. Ridenhour
- Date/Time: 5/5/16 09:10

**COCs**

- Job No.
- SDG No.

**Form No. CA-C-WI-002, dated 04/07/2011**
# Chain of Custody Record

<table>
<thead>
<tr>
<th>Client Contact</th>
<th>Project Manager: Gare Breviur</th>
<th>Site Contact: Same</th>
<th>Date: 5-5-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ky Div. of Waste Mgmt.</td>
<td>Tel/Fax: 270-898-8468</td>
<td>Lab Contact: R. Ridenhauer</td>
<td>Carrier: FedEx</td>
</tr>
<tr>
<td>Paducah, Ky 42003</td>
<td>Phone: 270-898-8468</td>
<td>FAX: 270-898-8468</td>
<td>Job No.</td>
</tr>
<tr>
<td>Project Name: Blue Ridge Landfill</td>
<td>Site:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site:</td>
<td>PO #:</td>
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## Sample Identification

<table>
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<tr>
<th>Sample Identification</th>
<th>Sample Date</th>
<th>Sample Time</th>
<th>Sample Type</th>
<th>Matrix</th>
<th># of Cont.</th>
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</thead>
<tbody>
<tr>
<td>Dry Branch Creek Downstream</td>
<td>5-3-16</td>
<td>8:35</td>
<td>G</td>
<td>W</td>
<td>2</td>
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<tr>
<td>Pond 3 Above Outfall</td>
<td>5-3-16</td>
<td>17:05</td>
<td>G</td>
<td>W</td>
<td>2</td>
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</table>

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other

Possible Hazard Identification

- [ ] Non-Hazard
- [ ] Flammable
- [ ] Skin Irritants
- Poison B
- [ ] Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

- [ ] Return To Client
- [ ] Disposal By Lab
- [ ] Archive For __________ Months

Special Instructions/QC Requirements & Comments:

- [ ] ABT Method EPA 900.0
- [ ] 226/228 oxntxw GFPC method EPA 903.0 and 9040 Master Agreement Method CKW 0076

Relinquished by: Gare Breviur

| Company: KYDWM | Date/Time: 5/16/16 1300 | Received by: B |

| Company: | Date/Time: | Received by: |

| Company: | Date/Time: | Received by: |

Form No. CA-C-WI-002, dated 04/07/2011
# Chain of Custody Record

**Client Contact**

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>FAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>KY Div of Waste Mgmt</td>
<td>270-898-8468</td>
<td></td>
</tr>
<tr>
<td>Paducah, KY</td>
<td>42003</td>
<td></td>
</tr>
</tbody>
</table>

**Site Contact**

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>FAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dave Brewer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Analysis Turnaround Time**

- Calendar Days: 30

**Sample Identification**

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Sample Date</th>
<th>Sample Time</th>
<th>Sample Type</th>
<th>Matrix</th>
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<td>2</td>
<td>1</td>
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<td>ADS BRL-LT-SC</td>
<td>5/16/16</td>
<td>11:20</td>
<td>Sludge</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>AD BRL-LT-SELF</td>
<td>5/14/16</td>
<td>3:00</td>
<td>Liquid</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**Preservation Used:** 1 = Ice, 2 = HCl; 3 = H2SO4; 4 = HNO3; 5 = NaOH; 6 = Other

**Possible Hazard Identification**

- Non-Hazard
- Flammable
- Skin Irritant
- Poison B
- Unknown

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**

- Return To Client
- Disposal By Lab
- Archive For [ ] Months

**Special Instructions/QC Requirements & Comments:**

- Radioactive Sample
- Gamma spectrometry method EPA 9011 and EML BASE GCE GA-01
- Radon 222/228 on soils – Gamma spectrometry method EPA 9011 and 9040, or 50346 9735 and 9726
- Radon 222/228 on waters – GFC method EPA 9030 and 9040 or 50346 9735 and 9726

**Re relinquished by:**

- [Signature]

**Company:** KYDWM

**Date/Time:** 5/16/16 3:25

**Received by:**

- [Signature]

**Company:** Dave Brewer

**Date/Time:** 5/14/16 3:00

**Re relinquished by:**

- [Signature]

**Company:** KYDWM

**Date/Time:** 5/16/16 3:25

**Received by:**

- [Signature]

**Company:** TA

**Date/Time:** 5/16/16 9:10

**Form No. CA-C-WI-002, dated 04/07/2011**
## Chain of Custody Record

### Sample Identification

<table>
<thead>
<tr>
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<th>Sample Type</th>
<th>Matrix</th>
<th># of Cont.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow Hill Underground 491B</td>
<td>5-3-16</td>
<td>1620</td>
<td>G</td>
<td>W</td>
<td>2</td>
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<td>Pond 1</td>
<td>5-3-16</td>
<td>1620</td>
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<td>W</td>
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<tr>
<td>Pond 3 Outfall</td>
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<td>1650</td>
<td>G</td>
<td>W</td>
<td>2</td>
</tr>
<tr>
<td>Pond 3 Sediment</td>
<td>5-3-16</td>
<td>1600</td>
<td>G</td>
<td>Sed</td>
<td>3</td>
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<td>Pond 3 Dup</td>
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<td>1620</td>
<td>G</td>
<td>W</td>
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<tr>
<td>Pond 3 Sediment Dup</td>
<td>5-3-16</td>
<td>1600</td>
<td>G</td>
<td>C</td>
<td>Sed</td>
</tr>
<tr>
<td>Day Branch Creek Upstream</td>
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<td>1753</td>
<td>G</td>
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<tr>
<td>Sed</td>
<td>5-3-16</td>
<td>1753</td>
<td>C</td>
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<tr>
<td>Downstream</td>
<td>5-3-16</td>
<td>1935</td>
<td>G</td>
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<td>Sed</td>
<td>5-3-16</td>
<td>1855</td>
<td>C</td>
<td>Sed</td>
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<td>Dup</td>
<td>5-3-16</td>
<td>1855</td>
<td>C</td>
<td>Sed</td>
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</tr>
</tbody>
</table>

### Preservation Used

1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other

### Possible Hazard Identification

- [ ] Non-Hazard
- [ ] Flammable
- [ ] Skin Irritant
- [ ] Poison B
- [ ] Unknown

### Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

- [ ] Return To Client
- [ ] Disposal By Lab
- [ ] Archive For ___ Months

### Special Instructions/QC Requirements & Comments

- Gamma Spectrometer Method EPA 9011
- Master Agreement Method CKPN 0044
- CKPN 0076
- RST Walsco & Soil Method EPA 900.0

### Relinquished By:

- *Byrge Bannister*
  - Company: KYDWM
  - Date/Time: 5/5/16 1300
  - Received by: ___

- *Byrge Bannister*
  - Company: ___
  - Date/Time: ___
  - Received by: ___

- *Byrge Bannister*
  - Company: ___
  - Date/Time: ___
  - Received by: ___

- *Byrge Bannister*
  - Company: ___
  - Date/Time: ___
  - Received by: ___

---

Form No. CA-C-WI-002, dated 04/07/2011
# Chain of Custody Record

**Client Contact**

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>KYDWM</td>
<td>180 Eagle Nest Dr.</td>
<td>270 898 9468</td>
<td>270 898 9468</td>
</tr>
</tbody>
</table>

**Analysis Turnaround Time**

- Calendar Work Days (W)

**Site Contact**

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same</td>
<td></td>
</tr>
</tbody>
</table>

**Project Name**

**Site**

**PO #**

**Sample Identification**

<table>
<thead>
<tr>
<th>Sample Identification</th>
<th>Sample Date</th>
<th>Sample Time</th>
<th>Sample Type</th>
<th>Matrix</th>
<th># of Cont.</th>
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<tbody>
<tr>
<td>Outfall 001</td>
<td>5-3-16</td>
<td>1115</td>
<td>G</td>
<td>W</td>
<td>2</td>
</tr>
<tr>
<td>Pond 4</td>
<td>5-3-16</td>
<td>1130</td>
<td>G</td>
<td>W</td>
<td>2</td>
</tr>
<tr>
<td>Pond 4 Sediment</td>
<td>5-3-16</td>
<td>1210</td>
<td>GC</td>
<td>Sed</td>
<td>3</td>
</tr>
<tr>
<td>Pond 4 Sediment Fence</td>
<td>5-3-16</td>
<td>1145</td>
<td>GC</td>
<td>Sed</td>
<td>3</td>
</tr>
<tr>
<td>Sed Pond 1</td>
<td>5-3-16</td>
<td>1410</td>
<td>G</td>
<td>W</td>
<td>2</td>
</tr>
<tr>
<td>Sed &amp; Pond 1 Sediment</td>
<td>5-3-16</td>
<td>1450</td>
<td>GC</td>
<td>Sed</td>
<td>3</td>
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<tr>
<td>Outfall 001</td>
<td>5-3-16</td>
<td>1445</td>
<td>G</td>
<td>W</td>
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<tr>
<td>Leachate Effluent</td>
<td>5-3-16</td>
<td>1500</td>
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<td>W</td>
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<td>Pond 2</td>
<td>5-3-16</td>
<td>1620</td>
<td>G</td>
<td>W</td>
<td>2</td>
</tr>
<tr>
<td>Pond 2 Outfall</td>
<td>5-3-16</td>
<td>1650</td>
<td>G</td>
<td>W</td>
<td>2</td>
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<td>Pond 2 Sediment</td>
<td>5-3-16</td>
<td>1250</td>
<td>C</td>
<td>Sed</td>
<td>3</td>
</tr>
</tbody>
</table>

**Preservation Used:**

1. Ice
2. HCl
3. H2SO4
4. HNO3
5. NaOH
6. Other

**Possible Hazard Identification**

- Non-Hazard
- Flammable
- Skin Irritant
- Poison B
- Unknown

**Special Instructions/QC Requirements & Comments:**

- ASTM E1228 on Soils, Gamma Spec. Method EPA 901.1
- Master Agreement Method CR400064
- CR400076
- ABT Waters & Soils Method EPA 900.0

**Relinquished by**

- George Brewer
- Company: KYDWM
- Date/Time: 5/3/16 1230

**Received by**

- Company: T4
- Date/Time: 5/6/16 0930
## Login Sample Receipt Checklist

**Client:** Commonwealth of Kentucky  
**Login Number:** 17284  
**List Number:** 1  
**Creator:** Daniels, Brian J  
**List Source:** TestAmerica St. Louis  
**Job Number:** 160-17284-1

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radioactivity wasn't checked or is ( \leq ) background as measured by a survey meter.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>The cooler's custody seal, if present, is intact.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Sample custody seals, if present, are intact.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>The cooler or samples do not appear to have been compromised or tampered with.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Samples were received on ice.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Cooler Temperature is acceptable.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Cooler Temperature is recorded.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>COC is present.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>COC is filled out in ink and legible.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>COC is filled out with all pertinent information.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Is the Field Sampler’s name present on COC?</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>There are no discrepancies between the containers received and the COC.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Samples are received within Holding Time (excluding tests with immediate HTs)</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Sample containers have legible labels.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Containers are not broken or leaking.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Sample collection date/times are provided.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Appropriate sample containers are used.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Sample bottles are completely filled.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Sample Preservation Verified.</td>
<td>True</td>
<td>Samples -1, -15, and -35 were received unpreserved. Nitric acid was added to adjust pH. Sample -1 is now &lt; 2 SU but samples -15 and-35 were unsuccessfully adjusted and remain at 7.</td>
</tr>
<tr>
<td>There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Containers requiring zero headspace have no headspace or bubble is (&lt;6\text{mm (1/4&quot;)}.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Multiphasic samples are not present.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Samples do not require splitting or compositing.</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td>Residual Chlorine Checked.</td>
<td>N/A</td>
<td></td>
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</table>
## Qualifiers

<table>
<thead>
<tr>
<th>Qualifier</th>
<th>Qualifier Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>The Sample MDC is greater than the requested RL.</td>
</tr>
<tr>
<td>U</td>
<td>Result is less than the sample detection limit.</td>
</tr>
<tr>
<td>*</td>
<td>LCS or LCSD is outside acceptance limits.</td>
</tr>
</tbody>
</table>

## Glossary

These commonly used abbreviations may or may not be present in this report.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>%R</td>
<td>Percent Recovery</td>
</tr>
<tr>
<td>CFL</td>
<td>Contains Free Liquid</td>
</tr>
<tr>
<td>CNF</td>
<td>Contains no Free Liquid</td>
</tr>
<tr>
<td>DER</td>
<td>Duplicate error ratio (normalized absolute difference)</td>
</tr>
<tr>
<td>Dil Fac</td>
<td>Dilution Factor</td>
</tr>
<tr>
<td>DL, RA, RE, IN</td>
<td>Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample</td>
</tr>
<tr>
<td>DLC</td>
<td>Decision level concentration</td>
</tr>
<tr>
<td>MDA</td>
<td>Minimum detectable activity</td>
</tr>
<tr>
<td>EDL</td>
<td>Estimated Detection Limit</td>
</tr>
<tr>
<td>MDC</td>
<td>Minimum detectable concentration</td>
</tr>
<tr>
<td>MDL</td>
<td>Method Detection Limit</td>
</tr>
<tr>
<td>ML</td>
<td>Minimum Level (Dioxin)</td>
</tr>
<tr>
<td>NC</td>
<td>Not Calculated</td>
</tr>
<tr>
<td>ND</td>
<td>Not detected at the reporting limit (or MDL or EDL if shown)</td>
</tr>
<tr>
<td>PQL</td>
<td>Practical Quantitation Limit</td>
</tr>
<tr>
<td>QC</td>
<td>Quality Control</td>
</tr>
<tr>
<td>RER</td>
<td>Relative error ratio</td>
</tr>
<tr>
<td>RL</td>
<td>Reporting Limit or Requested Limit (Radiochemistry)</td>
</tr>
<tr>
<td>RPD</td>
<td>Relative Percent Difference, a measure of the relative difference between two points</td>
</tr>
<tr>
<td>TEF</td>
<td>Toxicity Equivalent Factor (Dioxin)</td>
</tr>
<tr>
<td>TEQ</td>
<td>Toxicity Equivalent Quotient (Dioxin)</td>
</tr>
</tbody>
</table>
## Method Summary

Client: Commonwealth of Kentucky  
Project/Site: Blue Ridge Landfill

<table>
<thead>
<tr>
<th>Method</th>
<th>Method Description</th>
<th>Protocol</th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>900.0</td>
<td>Gross Alpha and Gross Beta Radioactivity</td>
<td>EPA</td>
<td>TAL SL</td>
</tr>
<tr>
<td>901.1</td>
<td>Radium-226 &amp; Other Gamma Emitters (GS)</td>
<td>EPA</td>
<td>TAL SL</td>
</tr>
<tr>
<td>903.0</td>
<td>Radium-226 (GFPC)</td>
<td>EPA</td>
<td>TAL SL</td>
</tr>
<tr>
<td>904.0</td>
<td>Radium-228 (GFPC)</td>
<td>EPA</td>
<td>TAL SL</td>
</tr>
</tbody>
</table>

**Protocol References:**  
EPA = US Environmental Protection Agency

**Laboratory References:**  
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566
### Sample Summary

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill

<table>
<thead>
<tr>
<th>Lab Sample ID</th>
<th>Client Sample ID</th>
<th>Matrix</th>
<th>Collected</th>
<th>Received</th>
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<tbody>
<tr>
<td>160-17284-1</td>
<td>MW-17R-AKGWA 8003-8393</td>
<td>Water</td>
<td>05/03/16 10:45</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-2</td>
<td>MW-10-AKGWA 8001-0201</td>
<td>Water</td>
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<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-3</td>
<td>MW-13-AKGWA 8001-2025</td>
<td>Water</td>
<td>05/03/16 14:46</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-4</td>
<td>MW-15R-AKGWA 8003-3579</td>
<td>Water</td>
<td>05/03/16 15:45</td>
<td>05/06/16 09:10</td>
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<td>160-17284-5</td>
<td>MW-7-AKGWA 8001-0205</td>
<td>Water</td>
<td>05/03/16 16:55</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-6</td>
<td>#1 UV EFFLUENT CHANNEL 37 DEGREES 42.086'</td>
<td>Water</td>
<td>05/03/16 11:05</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-7</td>
<td>#2 UV EFFLUENT CHANNEL 358.917</td>
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<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-8</td>
<td>#3 WWTP INFLUENT</td>
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<td>05/06/16 09:10</td>
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<td>05/06/16 09:10</td>
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<tr>
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<td>#5 FILTER CAKE</td>
<td>Solid</td>
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<td>05/06/16 09:10</td>
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<td>#6 FILTER CAKE</td>
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<td>05/06/16 09:10</td>
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<td>#7 FILTER CAKE</td>
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<td>05/06/16 09:10</td>
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<tr>
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<td>Water</td>
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<td>05/06/16 09:10</td>
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<tr>
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<td>Water</td>
<td>05/03/16 17:25</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-15</td>
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<td>Water</td>
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<tr>
<td>160-17284-18</td>
<td>POND 3</td>
<td>Water</td>
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<td>05/06/16 09:10</td>
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<tr>
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<td>Water</td>
<td>05/03/16 16:50</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-20</td>
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<td>Solid</td>
<td>05/03/16 16:00</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-21</td>
<td>POND 3 DUP</td>
<td>Water</td>
<td>05/03/16 16:20</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-22</td>
<td>POND 3 SEDIMENT DUP</td>
<td>Solid</td>
<td>05/03/16 16:00</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-23</td>
<td>DRY BRANCH CREEK UPSTREAM</td>
<td>Water</td>
<td>05/03/16 17:53</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-24</td>
<td>DRY BRANCH CREEK UPSTREAM SED</td>
<td>Solid</td>
<td>05/03/16 17:58</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-25</td>
<td>DRY BRANCH CREEK DOWNSWEEP</td>
<td>Water</td>
<td>05/03/16 18:35</td>
<td>05/06/16 09:10</td>
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<td>05/06/16 09:10</td>
</tr>
<tr>
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<td>DRY BRANCH CREEK DOWNSWEEP SED DUP</td>
<td>Solid</td>
<td>05/03/16 18:55</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-28</td>
<td>OUTFALL 004</td>
<td>Water</td>
<td>05/03/16 11:15</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-29</td>
<td>POND 4</td>
<td>Water</td>
<td>05/03/16 11:30</td>
<td>05/06/16 09:10</td>
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<tr>
<td>160-17284-30</td>
<td>POND 4 SEDIMENT</td>
<td>Solid</td>
<td>05/03/16 12:10</td>
<td>05/06/16 09:10</td>
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<td>160-17284-31</td>
<td>POND 4 SED SILT FENCE</td>
<td>Solid</td>
<td>05/03/16 11:45</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-32</td>
<td>SED POND 1</td>
<td>Water</td>
<td>05/03/16 14:10</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-33</td>
<td>SED POND 1 SEDIMENT</td>
<td>Solid</td>
<td>05/03/16 14:30</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-34</td>
<td>OUTFALL 001</td>
<td>Water</td>
<td>05/03/16 14:45</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-35</td>
<td>LEACHATE EFFLEUNT</td>
<td>Water</td>
<td>05/03/16 15:00</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-36</td>
<td>POND 2</td>
<td>Water</td>
<td>05/03/16 15:40</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-37</td>
<td>POND 2 OUTFALL</td>
<td>Water</td>
<td>05/03/16 16:00</td>
<td>05/06/16 09:10</td>
</tr>
<tr>
<td>160-17284-38</td>
<td>POND 2 SEDIMENT</td>
<td>Solid</td>
<td>05/03/16 15:45</td>
<td>05/06/16 09:10</td>
</tr>
</tbody>
</table>
Client Sample Results

Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

Client Sample ID: MW-17R-AKGWA 8003-8393
Lab Sample ID: 160-17284-1
Date Collected: 05/03/16 10:45
Date Received: 05/06/16 09:10
Matrix: Water

**Method: 900.0 - Gross Alpha and Gross Beta Radioactivity**

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**Method: 903.0 - Radium-226 (GFPC)**

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**Method: 904.0 - Radium-228 (GFPC)**

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**Client Sample Results**

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill

**Client Sample ID:** MW-10-AKGWA 8001-0201  
Lab Sample ID: 160-17284-2  
**Date Collected:** 05/03/16 11:33  
**Date Received:** 05/06/16 09:10  
**Matrix:** Water

### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 903.0 - Radium-226 (GFPC)

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**Carrier**  
%Yield: 74.9  
Limits: 40 - 110

### Method: 904.0 - Radium-228 (GFPC)

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**Carrier**  
%Yield: 74.9  
Limits: 40 - 110

%Yield: 87.1  
Limits: 40 - 110
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**Method: 903.0 - Radium-226 (GFPC)**

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**Method: 904.0 - Radium-228 (GFPC)**

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**Carrier**

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# Client Sample Results

**Client: Commonwealth of Kentucky**  
**Project/Site: Blue Ridge Landfill**  
**TestAmerica Job ID: 160-17284-1**  
**Lab Sample ID: 160-17284-4**  
Matrix: Water

## Client Sample ID: MW-15R-AKGWA 8003-3579  
Date Collected: 05/03/16 15:45  
Date Received: 05/06/16 09:10

### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 903.0 - Radium-226 (GFPC)

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### Method: 904.0 - Radium-228 (GFPC)

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TestAmerica St. Louis
Client Sample Results

Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

Client Sample ID: MW-7-AKGWA 8001-0205
Lab Sample ID: 160-17284-5
Date Collected: 05/03/16 16:55
Date Received: 05/06/16 09:10

Matrix: Water

### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 903.0 - Radium-226 (GFPC)

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### Method: 904.0 - Radium-228 (GFPC)

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Client Sample ID: #1 UV EFFLUENT CHANNEL 37 DEGREES

42.086'

Date Collected: 05/03/16 11:05
Date Received: 05/06/16 09:10

Lab Sample ID: 160-17284-6
Matrix: Water

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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**Method: 903.0 - Radium-226 (GFPC)**

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**Method: 904.0 - Radium-228 (GFPC)**

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Client Sample Results

Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

Client Sample ID: #3 WWTP INFLUENT
Date Collected: 05/03/16 11:45
Date Received: 05/06/16 09:10

Lab Sample ID: 160-17284-8
Matrix: Water

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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<th>Unit</th>
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<th>Analyzed</th>
<th>Dil Fac</th>
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<tbody>
<tr>
<td>Gross Alpha</td>
<td>42.7 G</td>
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<td>14.5</td>
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<td>Gross Beta</td>
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<td>8.94</td>
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Client Sample ID: #4 WWTP INFLUENT

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<th>Unit</th>
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Method: 904.0 - Radium-228 (GFPC)

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## Client Sample Results

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill  
**TestAmerica Job ID:** 160-17284-1

### Client Sample ID: #5 FILTER CAKE

**Lab Sample ID:** 160-17284-10  
**Matrix:** Solid  
**Date Collected:** 05/03/16 12:10  
**Date Received:** 05/06/16 09:10

### Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

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<th>Dil Fac</th>
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<tr>
<td>Radium-226</td>
<td>0.885</td>
<td>0.221</td>
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## Client Sample Results

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill

### Client Sample ID: #6 FILTER CAKE
**Date Collected:** 05/03/16 12:10  
**Date Received:** 05/06/16 09:10

### Lab Sample ID: 160-17284-11  
**Matrix:** Solid

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**Method:** 901.1 - Radium-226 & Other Gamma Emitters (GS)

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<td>Radium-228</td>
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<td>0.495</td>
<td>0.499</td>
<td>0.663 pCi/g</td>
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Client Sample Results

TestAmerica Job ID: 160-17284-1
Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

Client Sample ID: #7 FILTER CAKE
Lab Sample ID: 160-17284-12
Date Collected: 05/03/16 12:10
Date Received: 05/06/16 09:10
Matrix: Solid

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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</table>

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Client Sample Results

TestAmerica Job ID: 160-17284-1
Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

Client Sample ID: DRY BRANCH CREEK DOWNSTREAM DUP
Lab Sample ID: 160-17284-13
Date Collected: 05/03/16 18:35
Date Received: 05/06/16 09:10

Matrix: Water

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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Method: 903.0 - Radium-226 (GFPC)

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Method: 904.0 - Radium-228 (GFPC)

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**Client Sample Results**

**TestAmerica Job ID:** 160-17284-1  
**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill

**Client Sample ID:** POND 3 ABOVE OUTFALL  
**Lab Sample ID:** 160-17284-14  
**Matrix:** Water

Date Collected: 05/03/16 17:25  
Date Received: 05/06/16 09:10

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### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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<td>Gross Beta</td>
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### Method: 903.0 - Radium-226 (GFPC)

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### Method: 904.0 - Radium-228 (GFPC)

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<tr>
<td>Radium-228</td>
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6/13/2016
**Client Sample Results**

Client: Commonwealth of Kentucky  
Project/Site: Blue Ridge Landfill

**Client Sample ID: ADS BRL-LT-LIQ**  
Lab Sample ID: 160-17284-15  
Date Collected: 05/03/16 11:10  
Date Received: 05/06/16 09:10  
Matrix: Water

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### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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<td>45.4/66.1</td>
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### Method: 903.0 - Radium-226 (GFPC)

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<tr>
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### Method: 904.0 - Radium-228 (GFPC)

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6/13/2016
### Client Sample Results

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill

**Client Sample ID:** ADS BRL-LT-SL  
**Lab Sample ID:** 160-17284-16  
**Matrix:** Solid

**Date Collected:** 05/03/16 11:20  
**Date Received:** 05/06/16 09:10

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**Method: 900.0 - Gross Alpha and Gross Beta Radioactivity**

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**Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)**

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## Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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## Method: 903.0 - Radium-226 (GFPC)

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## Method: 904.0 - Radium-228 (GFPC)

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**Client Sample Results**

**Client Sample ID: POND 3**

**Date Collected:** 05/03/16 16:20  
**Date Received:** 05/06/16 09:10

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**Method: 900.0 - Gross Alpha and Gross Beta Radioactivity**

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**Method: 903.0 - Radium-226 (GFPC)**

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**Method: 904.0 - Radium-228 (GFPC)**

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### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 903.0 - Radium-226 (GFPC)

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### Method: 904.0 - Radium-228 (GFPC)

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### Client Sample ID: POND 3 SEDIMENT

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**Date Collected:** 05/03/16 16:00  
**Date Received:** 05/06/16 09:10

#### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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#### Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

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Client: Commonwealth of Kentucky  
Project/Site: Blue Ridge Landfill

Client Sample ID: POND 3 DUP  
Lab Sample ID: 160-17284-21  
Matrix: Water

**Method: 900.0 - Gross Alpha and Gross Beta Radioactivity**

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**Method: 903.0 - Radium-226 (GFPC)**

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**Method: 904.0 - Radium-228 (GFPC)**

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Client Sample Results

TestAmerica Job ID: 160-17284-1

Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

Client Sample ID: POND 3 SEDIMENT DUP
Lab Sample ID: 160-17284-22
Date Collected: 05/03/16 16:00
Date Received: 05/06/16 09:10

Matrix: Solid

### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

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### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 903.0 - Radium-226 (GFPC)

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### Method: 904.0 - Radium-228 (GFPC)

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### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

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## Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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## Method: 903.0 - Radium-226 (GFPC)

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## Method: 904.0 - Radium-228 (GFPC)

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## Client Sample Results

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill

**Client Sample ID:** DRY BRANCH CREEK DOWNSTREAM SED  
**Lab Sample ID:** 160-17284-26  
**Matrix:** Solid

**Date Collected:** 05/03/16 18:55  
**Date Received:** 05/06/16 09:10

### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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<td>Gross Beta</td>
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### Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

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Client Sample Results

Client: Commonwealth of Kentucky  
Project/Site: Blue Ridge Landfill

Client Sample ID: DRY BRANCH CREEK DOWNSTREAM SED  
Lab Sample ID: 160-17284-27 Dup

Date Collected: 05/03/16 18:55  
Date Received: 05/06/16 09:10

Matrix: Solid

### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

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Client Sample Results

Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

**Client Sample ID: OUTFALL 004**

**Lab Sample ID: 160-17284-28**

Date Collected: 05/03/16 11:15
Date Received: 05/06/16 09:10

**Matrix: Water**

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### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 903.0 - Radium-226 (GFPC)

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### Method: 904.0 - Radium-228 (GFPC)

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### Client Sample Results

#### Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

#### Client Sample ID: POND 4
Date Collected: 05/03/16 11:30  
Date Received: 05/06/16 09:10

#### Lab Sample ID: 160-17284-29
Matrix: Water

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**Method: 900.0 - Gross Alpha and Gross Beta Radioactivity**

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**Method: 903.0 - Radium-226 (GFPC)**

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**Method: 904.0 - Radium-228 (GFPC)**

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### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

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<tr>
<td>Radium-226</td>
<td>0.422 pCi/g</td>
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Client Sample Results

Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

Client Sample ID: POND 4 SED SILT FENCE
Lab Sample ID: 160-17284-31
Date Collected: 05/03/16 11:45
Date Received: 05/06/16 09:10

Matrix: Solid

**Method: 900.0 - Gross Alpha and Gross Beta Radioactivity**

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**Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)**

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## Client Sample Results

**TestAmerica Job ID: 160-17284-1**  
**Client: Commonwealth of Kentucky**  
**Project/Site: Blue Ridge Landfill**

**Client Sample ID: SED POND 1**  
**Lab Sample ID: 160-17284-32**  
**Date Collected: 05/03/16 14:10**  
**Date Received: 05/06/16 09:10**  
**Matrix: Water**

### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 903.0 - Radium-226 (GFPC)

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<td>Radium-226</td>
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### Method: 904.0 - Radium-228 (GFPC)

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## Client Sample Results

TestAmerica Job ID: 160-17284-1

### Client Sample ID: SED POND 1 SEDIMENT

**Lab Sample ID:** 160-17284-33  
**Matrix:** Solid  
**Date Collected:** 05/03/16 14:30  
**Date Received:** 05/06/16 09:10

**Method: 900.0 - Gross Alpha and Gross Beta Radioactivity**

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**Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)**

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### Client Sample Results

**Client: Commonwealth of Kentucky**  
**Project/Site: Blue Ridge Landfill**  
**TestAmerica Job ID: 160-17284-1**  
**Lab Sample ID: 160-17284-34**  
**Matrix: Water**

**Client Sample ID: OUTFALL 001**  
**Date Collected: 05/03/16 14:45**  
**Date Received: 05/06/16 09:10**

#### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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#### Method: 903.0 - Radium-226 (GFPC)

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#### Method: 904.0 - Radium-228 (GFPC)

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### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 903.0 - Radium-226 (GFPC)

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<tr>
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### Method: 904.0 - Radium-228 (GFPC)

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<tr>
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**Client Sample Results**

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill

**Client Sample ID:** POND 2  
**Lab Sample ID:** 160-17284-36  
**Matrix:** Water

**Date Collected:** 05/03/16 15:40  
**Date Received:** 05/06/16 09:10

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### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

<table>
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<th>MDC</th>
<th>Unit</th>
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<th>Analyzed</th>
<th>Dil Fac</th>
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<td>3.00</td>
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<td>pCi/L</td>
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<td>4.00</td>
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### Method: 903.0 - Radium-226 (GFPC)

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### Method: 904.0 - Radium-228 (GFPC)

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6/13/2016
## Client Sample Results

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill  
**Client Sample ID:** POND 2 OUTFALL  
**Date Collected:** 05/03/16 16:00  
**Date Received:** 05/06/16 09:10

### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 903.0 - Radium-226 (GFPC)

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6/13/2016
Client Sample Results

Client: Commonwealth of Kentucky  
Project/Site: Blue Ridge Landfill

Client Sample ID: POND 2 SEDIMENT  
Lab Sample ID: 160-17284-38  
Matrix: Solid

Date Collected: 05/03/16 15:45  
Date Received: 05/06/16 09:10

### Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

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### Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

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Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

### Lab Sample ID: MB 160-251280/1-A
**Matrix:** Solid  
**Analysis Batch:** 251461

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<th>Total Uncert. $(2\sigma+/-)$</th>
<th>RL</th>
<th>MDC</th>
<th>Unit</th>
<th>Prepared</th>
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### Lab Sample ID: LCS 160-251280/2-A
**Matrix:** Solid  
**Analysis Batch:** 251461

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<th>Unit</th>
<th>%Rec</th>
<th>%Rec. Limits</th>
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### Lab Sample ID: MB 160-254724/1-A
**Matrix:** Water  
**Analysis Batch:** 255830

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### Lab Sample ID: LCS 160-254724/2-A
**Matrix:** Water  
**Analysis Batch:** 255830

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**Matrix:** Water  
**Analysis Batch:** 255830

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### Lab Sample ID: 160-17284-13 MS
**Matrix:** Water  
**Analysis Batch:** 255830

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## Method: 900.0 - Gross Alpha and Gross Beta Radioactivity (Continued)

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## Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

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| **Count**                        |                                                   |
| **Uncert.**                      |                                                   |
| **(2σ+/-)**                      |                                                   |
| **RL**                           |                                                   |
| **MDC**                          |                                                   |
| **Unit**                         |                                                   |
| **Prepared**                     |                                                   |
| **Analyzed**                     |                                                   |
| **Dil Fac**                      |                                                   |
| Radium-226                       | -0.04844                                         |
|                                  | U                                                |
|                                  | 0.0837                                           |
|                                  | 0.0839                                          |
|                                  | 1.00                                             |
|                                  | 0.361                                            |
|                                  | pCi/g                                            |
|                                  | 05/12/16 12:24                                   |
|                                  | 05/02/16 08:21                                   |
|                                  | 1                                                |
| Radium-228                       | 0.06554                                          |
|                                  | U                                                |
|                                  | 0.151                                            |
|                                  | 0.151                                            |
|                                  | 0.219                                            |
|                                  | pCi/g                                            |
|                                  | 05/12/16 12:24                                   |
|                                  | 05/02/16 08:21                                   |
|                                  | 1                                                |
**Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)**

**Lab Sample ID: LCS 160-250875/2-A**  
Matrix: Solid  
Analysis Batch: 254482

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**Lab Sample ID: 160-17284-16 DU**  
Matrix: Solid  
Analysis Batch: 254534

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**Method: 903.0 - Radium-226 (GFPC)**

**Lab Sample ID: MB 160-250356/1-A**  
Matrix: Water  
Analysis Batch: 254506

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**Lab Sample ID: LCS 160-250356/2-A**  
Matrix: Water  
Analysis Batch: 254506

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**Lab Sample ID: LCSD 160-250356/3-A**  
Matrix: Water  
Analysis Batch: 254506

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TestAmerica St. Louis
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Method: **903.0 - Radium-226 (GFPC)** (Continued)

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**Method: 904.0 - Radium-228 (GFPC)**

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TestAmerica St. Louis

Page 58 of 66 6/13/2016
### Method: 904.0 - Radium-228 (GFPC) (Continued)

#### Lab Sample ID: LCSD 160-250357/3-A
**Matrix:** Water  
**Analysis Batch:** 251458  

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**Carrier**  
- **Ba Carrier:** %Yield = 80.1, Qualifier = 40.0 - 110.0
- **Y Carrier:** %Yield = 92.3, Qualifier = 40.0 - 110.0

#### Lab Sample ID: MB 160-250391/1-A
**Matrix:** Water  
**Analysis Batch:** 251458  

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**Carrier**  
- **Ba Carrier:** %Yield = 86.3, Qualifier = 40.0 - 110.0
- **Y Carrier:** %Yield = 88.6, Qualifier = 40.0 - 110.0

#### Lab Sample ID: LCS 160-250391/2-A
**Matrix:** Water  
**Analysis Batch:** 251458  

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**Carrier**  
- **Ba Carrier:** %Yield = 86.3, Qualifier = 40.0 - 110.0
- **Y Carrier:** %Yield = 89.7, Qualifier = 40.0 - 110.0

#### Lab Sample ID: LCSD 160-250391/3-A
**Matrix:** Water  
**Analysis Batch:** 251458  

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**Carrier**  
- **Ba Carrier:** %Yield = 82.9, Qualifier = 40.0 - 110.0
- **Y Carrier:** %Yield = 89.0, Qualifier = 40.0 - 110.0

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TestAmerica St. Louis

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## QC Sample Results

TestAmerica Job ID: 160-17284-1
Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

### Method: 904.0 - Radium-228 (GFPC) (Continued)

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## QC Association Summary

### Rad

**Leach Batch: 250107**

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**Prep Batch: 250373**

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### QC Association Summary

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill

#### Rad (Continued)

**Prep Batch: 250373 (Continued)**

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## QC Association Summary

Client: Commonwealth of Kentucky
Project/Site: Blue Ridge Landfill

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## QC Association Summary

**Client:** Commonwealth of Kentucky  
**Project/Site:** Blue Ridge Landfill

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### Method: 903.0 - Radium-226 (GFPC)

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

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**Tracer/Carrier Legend**

Ba = Ba Carrier

### Method: 904.0 - Radium-228 (GFPC)

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

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## Tracer/Carrier Summary

**Method:** 904.0 - Radium-228 (GFPC) (Continued)

**Matrix:** Water

### Tracer/Carrier Legend
- **Ba** = Ba Carrier
- **Y** = Y Carrier

### Percent Yield (Acceptance Limits)

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