PANEL DISCUSSION:
PLANNING FOR SUSTAINABLE RESOURCE RECOVERY PROGRAMS

VWEA 2017 Education Seminar
Wednesday, May 11th 2017

Panel Moderators:
Paula Sanjines/CH2M
Stephanie Spalding/HDR
Our Panelists

- Mary Strawn – Arlington County WPCP
- Sharon Foley – Harrisonburg-Rockingam Regional Sewer Authority
- John J. Dano – Hampton Roads Sanitation District
- Mike McGrath – Fairfax County Noman M. Cole PCP
Arlington County Department of Environmental Services
Mary Strawn, Chief Engineer
System Overview

- Water Pollution Control Plant serves a majority of residents of Arlington, VA
- Population served: about 250,000
- Total flow treated: 25 MGD ADF
- Phosphorus removal with ferric; tertiary denitrification filters
- Biosolids quantity: 39,000 wet tons per year
- Class B lime stabilization
Water Pollution Control Plant

• Biosolids Project Drivers
  • Old equipment
  • Focus of last upgrades was liquid treatment processes
  • Commitment of County to energy efficiency

• Project Goals
  • Replace failing equipment with more efficient technologies
  • Recover resources and better serve the community
  • Improve ability to weather future regulatory change
Challenges Still Impeding Implementation

• The biggest challenges that we need to clear:
  • Stakeholder understanding of project objectives
  • Future risks—regulatory changes, land application costs, and natural gas fuel cost and credit value
  • Program financing
• In order to proceed, we’ll need:
  • Buy-in from stakeholders and County officials
  • To ensure affordability of the program for ratepayers
• Status: Master Plan finalization in progress
Harrisonburg-Rockingham Regional Sewer Authority (HRRSA)

Sharon Foley, Executive Director
System Overview

- HRRSA Members
  - City of Harrisonburg, Rockingham County and Towns of Bridgewater, Dayton and Mt. Crawford
- Population served: approx. 75,000
- North River WWTF
  - 22 mgd (design), 14 mgd (AADF)
  - ENR Plant (5-stage Bardenpho)
  - TN: 3.8 mg/L  TP: 0.28 mg/L
- Biosolids quantity
  - Class B cake: 16,000 wet tons/yr (15% solids)
  - Class B liquid: 1,000,000 gal/year (3.5% solids)
- Biosolids Treatment
  - Anaerobic Digestion (Class B)
  - Dewatering (Belt Filter Press)
  - Co-digestion of imported industrial sludge
- Reuse/Disposal: Land Application
North River WWTF
Enhanced Biosolids Reuse & Reduction (EBRR) Project

- **Project Goal/Objectives**
  - Enable more reuse/disposal options by producing Class A/EQ Biosolids

- **Biosolids Project Drivers**
  - Achieve 100 days of winter biosolids storage
  - Minimize disposal of liquid sludge
  - Lower Treatment and Disposal Costs
    - Reduce volume of dewatered biosolids by increasing % solids (Sludge Drying)
  - Recovery and reuse of digester gas
  - Potential for additional regulations further restricting land application of Class B biosolids
Project Hurdles

• Excess digester gas production limited thermal drying capacity to less than 40% of current dewatered biosolids production
• Existing dewatering operations (BFP) produce cake solids of approx. 15% increasing the amount of biogas required to achieve Class A/EQ biosolids (>90% solids)
• Cost of auxiliary fuels for thermal sludge drying detrimental to project economics
  • Lowest cost alternative (natural gas) not currently available at plant site
• Reuse/disposal options for Class A/EQ biosolids are limited in local agricultural area due to phosphorus-limited soils
Clearing the Hurdles

1. Increase dryer capacity by utilizing dryer waste heat for digester heating
2. Increase intake of highly concentrated industrial sludge to boost digester gas production
3. Upgrade dewatering equipment to achieve greater than 18% solids in cake feed

**Net Effect 1-3:** *Increases the % cake that can be dried from < 40% to 99% with no aux. fuel*

4. Conduct market assessment to evaluate reuse options for Class A/EQ biosolids in Shenandoah Valley Region and potential net revenue.
HRRSA EBRR Project

Current Assessment of Project Objectives

- 110 days of winter storage
- No liquid sludge hauling
- Thermal drying with digester gas (no auxiliary fuel)
- Final product is Class A/EQ biosolid
- Self-funding project through lower hauling and revenue from industrial solids

Current Status

- Engineering in progress
  - Design Team: RK&K (project lead), Buchart Horn (sludge dryer) and Material Matters (biosolids market assessment)
  - Engineering Complete by July 28, 2017
  - Funding: Virginia Clean Water Revolving Loan Fund
Hampton Roads Sanitation District

John J. Dano
Chief of Planning & Analysis
HRSD Overview

- SE Virginia
- Population served: 1.7 Million
- 9 major treatment plants
- Total flow treated: 125 mgd/250 mgd
Atlantic System Overview

- Virginia Beach & Chesapeake
- Average/Capacity: 28.5 mgd/54 mgd
- Secondary Treatment
  - 30/30 BOD/TSS
- Ocean Outfall
- Biosolids quantity: 38 dry tons/day
  - Permitted production 60 dry tons/day
- 2 stage digestion, centrifuge dewatering, cake storage, Class B land application
- Cake storage at capacity;
  - store 90-225 days/year
Atlantic Plant

• Biosolids Project Drivers
  • Land Application Program
    • Class A
  • Closure of CETP (2022)
  • Optimize AT Assets
    • Digester capacity
    • Storage Pad capacity (2009)
    • Optimize CHP (2013)

• Project Vision
  • “Produce a high-quality Class A biosolids product by processing solids through the Cambi Thermal Hydrolysis Process, provide for future increases in solids handling capability, and provide for a new fats, oils and grease (FOG) receiving station to feed the Cambi system. The system should be reliable, operator friendly, cost effective, and energy efficient, and should result in no offsite odors.”
Challenges to Implementation

- Impacts to entire Solids Handling process
- Cooling thermally hydrolyzed solids (THS)
- Integrating fats, oils and grease receiving facility
- Equipment shutdowns and emergency storage
- Start-up considerations to achieve Class A
## Existing Digester Capacity Expanded with THP

<table>
<thead>
<tr>
<th>Condition</th>
<th>Peaking Condition</th>
<th>ATP Solids Production (including FOG)</th>
<th>Delivered Biosolids (dtpd)</th>
<th>Total Solids to Cambi (dtpd)</th>
<th>Cambi B6-4 Trains Required (No.)*</th>
<th>Cambi Capacity (dtpd)</th>
<th>Unused Cambi Capacity (dtpd)</th>
<th>Digesters In Service (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.5 MGD</td>
<td>Peak 2-week</td>
<td>37.95</td>
<td>0</td>
<td>38</td>
<td>1</td>
<td>92</td>
<td>54</td>
<td>2</td>
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<tr>
<td>54 MGD</td>
<td>Peak 2-week</td>
<td>70.75</td>
<td>0</td>
<td>71</td>
<td>1</td>
<td>92</td>
<td>21</td>
<td>3</td>
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</tbody>
</table>
# Annual Average Solids Production at the Major HRSD Facilities

<table>
<thead>
<tr>
<th>Facility</th>
<th>2009 Flows (mgd)</th>
<th>2030 Flows (mgd)</th>
<th>2009 Raw Solids Production (dtpd)</th>
<th>2030 Raw Solids Production (dtpd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army Base (AB)</td>
<td>12.3</td>
<td>11.7</td>
<td>9.9</td>
<td>8.6</td>
</tr>
<tr>
<td>Atlantic (AT)</td>
<td>25.7</td>
<td>37</td>
<td>29.8</td>
<td>42.9</td>
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<tr>
<td>Boat Harbor (BH)</td>
<td>15.1</td>
<td>16.2</td>
<td>12.6</td>
<td>13.5</td>
</tr>
<tr>
<td>Chesapeake-Elizabeth (CE)</td>
<td>21.1</td>
<td>19</td>
<td>18.9</td>
<td>17</td>
</tr>
<tr>
<td>James River (JR)</td>
<td>13.7</td>
<td>13.7</td>
<td>12</td>
<td>10.3</td>
</tr>
<tr>
<td>Nansemond (NP)</td>
<td>18.3</td>
<td>26.1</td>
<td>19</td>
<td>29.4</td>
</tr>
<tr>
<td>VIP (VIP)</td>
<td>34.4</td>
<td>33.7</td>
<td>24.7</td>
<td>25.6</td>
</tr>
<tr>
<td>Williamsburg (WB)</td>
<td>10.1</td>
<td>18.5</td>
<td>20.8</td>
<td>20.5</td>
</tr>
<tr>
<td>York River (YR)</td>
<td>12.4</td>
<td>11.7</td>
<td>13.5</td>
<td>13.1</td>
</tr>
<tr>
<td><strong>System-wide totals</strong></td>
<td><strong>163.1</strong></td>
<td><strong>187.6</strong></td>
<td><strong>161.2</strong></td>
<td><strong>180.9</strong></td>
</tr>
<tr>
<td><strong>System-wide totals (without AT and CE)</strong></td>
<td><strong>116.3</strong></td>
<td><strong>131.6</strong></td>
<td><strong>112.5</strong></td>
<td><strong>121</strong></td>
</tr>
</tbody>
</table>
System Overview

- Fairfax County, Virginia
- Population served: 450,000
- Total flow treated: 40 mgd
- Prelim/Pri; BNR+MBBR; AWT
- Biosolids quantity: 45,000 wtpy
- GST+DAF, Cent Dewater, SSI
- Landfill gas used for afterburners
Noman M Cole PCP

- Biosolids Project Drivers
  - Aging Infrastructure
  - SSI MACT Regulations
  - Driver 3
- Project Goal/Objectives
  - Politically/Regulatory Sustainable
  - Economical
  - Regionally engaged
  - Climate change
Challenges We Overcame

• The biggest barriers that we needed to clear:
  • Capital Project Delivery
  • Regulatory Action
  • Changing Public Attitudes
  • Cost & Economics

• These factors enabled implementation:
  • Peer Review
  • Public Engagement w/ Elected Officials

• Description of current status
  • SSI MACT met
  • Phased construction underway
Q/A
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