LACSD Experience with SOP’s for Anaerobic Digestion of Food Waste Joint Water Pollution Control Plant

California Association of Sanitation Agencies SOP Training Workshop
Carlsbad, California

Mark McDannel
Los Angeles County Sanitation Districts

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Presentation

- Overview of LACSD Food Waste Project
- Review of SOP
Policy Drivers

- AB 341 establishes a statewide solid waste recycling goal of 75% in 2020

- Legislation and/or regulation requiring increased diversion of organics from landfills is coming. AB1826 passed both houses in Aug 2014

- Where can the organics go?
  - Anaerobic digestion
  - Composting
  - Other conversion technologies
Digesting Organic Waste Streams at WWTPs

● Advantages:
  – Digester already exists
  – Energy recovery equipment may already exist

● Concerns and challenges:
  – Limited capacity statewide – a niche, not a solution
  – Can accept only relatively clean feedstock
  – Impact of additional residuals on biosolids
  – WWTPs have an important public health mission
Adding Food Waste to Digesters Increases Biogas Production

Food Waste Slurry characteristics: Total Solids ~ 14% by wt., Volatile Solids ~ 92% by wt., COD ~ 222,400 mg/L

Adding 10-12% (v/v) food waste slurry to sludge could double biogas production

CH₄ Increase 112%
Demonstration Program Summary

- The Districts and Waste Management entered into a 2-year demonstration program agreement.

- WM will process 84 tons (20,000 gallons) per day of food waste slurry at off-site location and deliver to JWPCP.

- At JWPCP, the slurry will be injected into one digester for co-digestion at 9% food waste slurry on a liquids basis and 30% food waste on a solids basis.

- WM and JWPCP’s Research team will monitor the program to evaluate the impacts and performance of food waste when co-digested at a WWTP.

- Results will be used to determine the feasibility of a full-scale food waste AD program at Districts WWTPs.
Joint Water Pollution Control Plant

- 24 active digesters each with capacity of 3.7 million gallons
- 4.4 million gallons of biosolids added to digesters each day
- Biosolids breakdown (digest) for 18-19 days before exiting digester
- 5,000 scfm (or ~ 20 MW) of biogas is created
- Non-digestible solids are dewatered and trucked off for use in composting and for land application
FW Receiving/Feed-In Station

Food waste is pumped from WM tanker trucks into closed, sealed storage tanks, controlling odors.

Two identical receiving/feed-in stations for redundancy.
## Food Waste Co-Digestion Plan

<table>
<thead>
<tr>
<th></th>
<th>Test Digester #16</th>
<th>Control Digester #15</th>
</tr>
</thead>
<tbody>
<tr>
<td>WW/Sludge/TWAS Feed</td>
<td>gal/day</td>
<td>205,000</td>
</tr>
<tr>
<td>% solids</td>
<td>3.20%</td>
<td>3.20%</td>
</tr>
<tr>
<td>tons per day solids</td>
<td>27.3</td>
<td>27.3</td>
</tr>
<tr>
<td>Food waste slurry feed</td>
<td>gal/day</td>
<td>20,000</td>
</tr>
<tr>
<td>% Solids</td>
<td>14%</td>
<td>...</td>
</tr>
<tr>
<td>tons per day solids</td>
<td>11.7</td>
<td>...</td>
</tr>
<tr>
<td>% Food Waste</td>
<td>liquid basis</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>solids basis</td>
<td>30%</td>
</tr>
<tr>
<td>Digester total</td>
<td>gal/day</td>
<td>225,000</td>
</tr>
<tr>
<td>% Solids</td>
<td>4.2%</td>
<td>3.20%</td>
</tr>
<tr>
<td>HRT, days</td>
<td>16.4</td>
<td>18.0</td>
</tr>
</tbody>
</table>
Project Results to Date

- The food waste handling and storage system has generally worked as designed.
- Ramp up period delayed to resolve operational issues in slurry unloading from trucks, and to allow WM to line up food waste collection contracts.
- No major impact on treatment plant operation seen to date.
- An increase in biogas production has been seen.
SOP Process

- Receipt of letter from SWRCB
- Development of SOPs
- Submittal and review
State Water Resources Control Board

September 25, 2013

To Whom It May Concern:

PUBLICLY OWNED TREATMENT WORKS RECEIVING HAULED-IN ANAEROBICALLY DIGESTIBLE WASTE FOR CO-DIGESTION

The State Water Resources Control Board (State Water Board) has been working with the California Department of Resources Recycling and Recovery (CalRecycle), the California Department of Food and Agriculture (CDFA), and the California Association of Sanitation Agencies (CASA) to delineate jurisdictional authority for the receipt of hauled-in anaerobically digestible material (ADM) at Publicly Owned Treatment Works (POTWs) for co-digestion.
"If the Discharger proposes to receive hauled-in anaerobically digestible material for injection into an anaerobic digester, the Discharger shall notify the appropriate Regional Water Quality Control Board and develop and implement standard operating procedures (SOPs) for this activity. If hauled-in waste for digestion is already ongoing, the SOPs shall be developed within 90 days. Otherwise, the SOPs shall be developed prior to initiation of the hauling. The SOPs shall address material handling, including unloading, screening, or other processing prior to anaerobic digestion; transportation; spill prevention; and spill response. In addition, the SOPs shall address avoidance of the introduction of materials that could cause interference, pass-through, or upset of the treatment processes; avoidance of prohibited material, vector control, odor control, operation and maintenance, and the disposition of any solid waste segregated from introduction to the digester. The Discharger shall provide training to its staff on the SOPs and shall maintain records for a minimum of three years for each load received,"
Multi department response

- Monitoring Section
  - Front line with SWRCB
- Wastewater Operations
  - Operating the project
- Solid Waste Energy Recovery Section
  - Managing the project
## Approach: Do What the Letter Says to Do

<table>
<thead>
<tr>
<th>SWRCB Requirement</th>
<th>SOP Section(s)</th>
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<tbody>
<tr>
<td>Material handling</td>
<td>4.2</td>
</tr>
<tr>
<td>* Unloading</td>
<td>4.2.d-h</td>
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<tr>
<td>* Screening</td>
<td>4.1.c, 4.4</td>
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<tr>
<td>* Other processing</td>
<td>4.2.i-j, 4.4</td>
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<tr>
<td>Transportation</td>
<td>4.1</td>
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<td>Spill prevention and response</td>
<td>4.3</td>
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<tr>
<td>Avoidance of materials that could affect the treatment process</td>
<td>4.2.o, 4.4, Attachment D</td>
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<td>Prohibited material</td>
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<tr>
<td>Vector control</td>
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<tr>
<td>Odor control</td>
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<tr>
<td>Operation and maintenance</td>
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<td>Training</td>
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<tr>
<td>Recordkeeping</td>
<td>4.2.a, 4.6, Attachment A</td>
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</tbody>
</table>
SOP Contents

- Five pages long, with 350 pages of attachments
- 1.0 Purpose
- 2.0 Application
- 3.0 Introduction
- 4.0 Procedures
Section 4-Procedures

- This is the meat of the documents
- 4.1 Transportation and Delivery
- 4.2 Plant Operations
- 4.3 Spill Prevention and Response
- 4.4 Material Quality Control
- 4.5 Training
- 4.6 Record Keeping
Attachments

- Reference documents with full details
- Attachment A - Waste Management Truck Driver Instructions
  - One page with 11 steps and contact info
- Attachment B - Bill of Lading
  - One page, blank Bill of Lading
Attachments, cont’d

- Attachment C-JWPCP Operators Training Manual
  - Very detailed, prepared in same format and to same detail as other plant operation manual sections
- Attachment D-Feed Equipment Operation
  - Includes procedures, equipment manuals
- Attachment E-Demonstration Program Test Plan
Thank you. Questions?

Mark McDannel
562-908-4288 2442
mmcdannel@lacsd.org

Acknowledgements
• Dave Czerniak, Districts Project Manager
• Glenn Acosta, Planning Section
• Lisa Scales, SW Monitoring and Research Section
• Steve Krai and JWPCP Operations Personnel

“So, this Humpty Dumpty guy falls off the wall and I think, Dang, ain’t lettin’ this go to the food waste bin.”