Co-Digestion at LACSD: Contamination

Frank R. Caponi
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To protect public health and the environment through innovative and cost-effective wastewater and solid waste management and, in doing so, convert wastes into resources such as recycled water, energy, and recycled materials.
DISTRICTS’ ROAD TO ORGANICS MANAGEMENT

- Fulfill our Mission Statement
- Recognize our changing solid waste management role in L.A. County and fully support our member cities in a changing regulatory environment
- Recognize our wastewater facilities will play an important role
DISTRICTS’ ROAD TO ORGANICS MANAGEMENT

- Remain sensitive to significant regional air quality issues (AD vs. Composting vs. Landfilling)
- Build public/private partnerships
- Look for regional/local solutions
  - Avoids transportation issues
Districts’ Wastewater Facilities

- 10 water reclamation plants
- Approximately 1,445 miles of main trunk sewer lines
- 49 active pumping plants
- JWPCP
  - 280 mgd treated

Joint Water Pollution Control Plant

STARTED: FEBRUARY 1928 CAPACITY: 400 MGD
Sanitation Districts of Los Angeles County

Wastewater Treatment Facilities

Lancaster
Palmdale
Santa Clarita Valley
Saugus
L.A. Glendale
D.C. Tillman
La Canada
Whittier Narrows
JWPCP
Terminal Island
Long Beach
Los Coyotes
Pomona
San Jose Creek
So. Bay Cities
Joint Outfall System

Sanitation Districts of Los Angeles County

Trunk Sewers
Pumping Plants
JWPCP (24) Digesters

- 3.7 million gallons capacity each
- 4.4 million gallons of biosolids are added to digesters each day
- Digest 18-19 days
- 5,000 scfm of biogas generated
- 20 MW Co-Generation Facility
- Digested solids are dewatered and trucked off-site for composting and land application
Digesters have significant excess capacity!!
Food Waste Bench Scale Testing: Biogas Production Boost!

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

Food Waste Slurry characteristics: Total Solids ~ 14% by wt., Volatile Solids ~ 92% by wt., COD ~ 222,000 mg/L
# Food Waste Co-Digestion Demonstration Plan

(up to 70 tpd food waste)

<table>
<thead>
<tr>
<th></th>
<th>Test Digester</th>
<th>Control Digesters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WW/Sludge/TWAS Feed</strong></td>
<td>gal/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>205,000</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><strong>Food waste slurry feed</strong></td>
<td>gal/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20,000</td>
<td></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><strong>% Food Waste</strong></td>
<td>liquid basis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>solids basis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td><strong>Digester total</strong></td>
<td>gal/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>225,000</td>
<td>205,000</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>

**Control Digester**

**Test Digester**
Next Phase:
Demonstration Project

Beginning of Public/Private partnership
Food Waste Pre-Processing

Important: Effective Pre-Processing is Critical
WM’s CORe® Solution in Orange to Remove Contaminants

- FW Sources: restaurants, food processing plants, cafeterias and grocery stores (tipped material is inspected first)
- Pre-processing removes physical contamination (e.g., utensils, cans, packaging, heavies) using WM’s patented CORe®
- Processed FW is blended into Engineered BioSlurry (EBS™)
- EBS™ is loaded into tanker trucks for delivery to JWPCP
JWPCP Food Waste
Receiving/Feeding Station
Major issue: Contaminants

- Glass and grit are not caught in pre-processing
- Research is underway to improve capture and removal of inerts
- Grit and glass are biologically inert materials that cannot improve gas production
Major issue: Contaminants

- Cleaning cost roughly 2x that of control digester
- Glass may damage key infrastructure like pumps, valves and piping
- Cleaning frequency could double
- Grit and glass accumulation may adversely affect digester performance
New Plan: Expand Food Waste Co-Digestion Program at JWPCP

- Phase I – From 70 to approx. 140 tpd food waste – Biogas to transportation fuel
- Phase II – Additional 360 tpd food waste – Biogas to ?? pipeline injection ??
- Expand food waste sources:
  - Current WM
  - New: Republic, Insinkerator AND LACSD’s Puente Hills Material Recovery Facility
  - others?
New Plan: Expand Food Waste Receiving and Co-Digestion at JWPCP

Using five digesters

New receiving stations
New Plan: Food Waste Processing at Puente Hills MRF
DODA CLOSEUP
Clogged Pump
DODA
LOADING AND
PROCESSING
Mixer tank 1

- On
- Auto
- Frequency speed set: 50 Hz
- Time mixer work: 015 min
- Time mixer pause: 010 min
- Work time: 015:00
- Pause time: 005:53
- Percentage: 61.9%

Mixer tank 2

- On
- Auto
- Frequency speed set: 50 Hz
- Time mixer work: 015 min
- Time mixer pause: 010 min
- Work time: 015:00
- Pause time: 005:53
- Percentage: 61.5%

Mixer tank 3

- On
- Auto
- Frequency speed set: 50 Hz
- Time mixer work: 015 min
- Time mixer pause: 010 min
- Work time: 015:00
- Pause time: 005:53
- Percentage: 61.5%

Slurry tank 1

- Time mixer work: 015 min
- Time mixer pause: 010 min

Slurry tank 2

- Time mixer work: 015 min
- Time mixer pause: 010 min

Slurry tank 3

- Time mixer work: 015 min
- Time mixer pause: 010 min

Water tank

- Minimum level of work mixers tanks 1-2-3: 48%
MINIMUM STANDARDS
Interim Dumping
Manhole
Minimum Standards

- Food Waste – Pre-consumer sources
  - Residential only with permission
- Must obtain customer agreements
  - Prohibit contamination (e.g. glass, metals, hazardous materials)
- Particle size screened through, at least, 15mm screen
Minimum Standards

- Food Waste Slurry Quality Standards
  - (e.g., pH, Total Solids, Volatile Solids, Heavy metals, etc.)
  - Film Plastic-Glass-Inerts less than 0.5% by dry weight measured by Method TMECC* 0306

* Test Method for the Examination of Composting and Compost – US Composting Council
Minimum Standards

- Sampling and Analysis Requirement
  - Pre-testing before first load acceptance
  - Each load sampled
    - LACSD random test of samples
  - Contractor two random loads per week for TS and VS
  - Notification of material changes to feedstocks or sources
FUTURE STANDARDS: New Waste Receiving Facility
Future Standards

- To be developed
- Minimum standards will be tightened
Please contact me with any questions

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