Orange County Sanitation District
Technology Demonstration Project Update

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Orange County Sanitation District
Objectives

Rule 1110.2 Technology Implementation

- Where we have been
- Where we are now
- Where we are going next
OCSD Service Area

471 square miles
207 million gallons per day
2.5 million population
21 cities, 3 special districts
15 pumping facilities
2 treatment plants
## Central Power Generation Facilities

<table>
<thead>
<tr>
<th>Plant No. 1 – Fountain Valley</th>
<th>Plant No. 2 – Huntington Beach</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 identical IC engines</td>
<td>5 identical IC engines</td>
</tr>
<tr>
<td>3471 hp each</td>
<td>4166 hp each</td>
</tr>
<tr>
<td>Lean burn</td>
<td>Lean burn</td>
</tr>
<tr>
<td>2500 kW generator</td>
<td>3000 kW generator</td>
</tr>
<tr>
<td>Total nameplate capacity:</td>
<td>1 MW steam turbine</td>
</tr>
<tr>
<td>7.5 MW</td>
<td>16 MW</td>
</tr>
</tbody>
</table>

*Both plants combined: 1.4 billion cubic feet of digester gas produced in 2013*
Rule 1110.2 Impacts OCSD Resource Recovery Operations Significantly

- 55 biogas engines in South Coast basin
- 27 are digester gas fueled
- OCSD operates 8 of those 27
Catalytic Oxidizer/SCR System

- Urea Injection
- SCR Catalyst
- Catalytic Oxidizer
SCR Urea Injection Control Panel and Urea Tank
One-Year Technology Demonstration

- Demonstration monitoring conducted from April 1, 2010 to March 31, 2011
- Over 21,000 data points recorded (more than 5000 engine operating hours)
- Final report submitted to SCAQMD in July 2011
## Technology Demonstration Project
### Emissions Levels Achieved

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Engine Exhaust w/o Catalysts (ppmv)</th>
<th>Engine Exhaust With Catalysts (ppmv)</th>
<th>Rule 1110.2 limit (ppmv)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>31</td>
<td>7.2 (0.8 to 21.8)</td>
<td>11</td>
</tr>
<tr>
<td>CO</td>
<td>452</td>
<td>7.5 (4.0 to 42.2)</td>
<td>250</td>
</tr>
<tr>
<td>VOC</td>
<td>97</td>
<td>3.6 (0.73 to 5.42)</td>
<td>30</td>
</tr>
</tbody>
</table>

15-minute averages. Validated data only. Excludes exceedances during engine start-up (30 minutes) and due to operational issues/systems adjustments.
Recent CEMS Data

November - May 2014:
- 8.3 ppm NO\textsubscript{x}
- 7.5 ppm CO
- 11.5 ppm VOC (not CEMS)
- 7.4 ppm NH\textsubscript{3} slip (calculated)
- 2.1 ppm NH\textsubscript{3} slip (measured)
Our Learning Continues

More than 27,000 operating hours later – still using original catalysts

Catalyst performance degradation in February 2012
✓ catalyst cleaned and put back into service

Continuous siloxane monitoring investigated
✓ expensive, maintenance requirements unknown

What is a good indicator of contaminant breakthrough in gas cleaning unit that we can readily test for?
✓ ongoing
Full Implementation: Project J-111

• Project includes gas cleaning units with primary/polishing configuration and Cat Ox/SCR systems for all eight of OCSD’s co-generation engines.

• RFP for construction went out Dec 27th 2013

• Construction contract approved by OCSD Board of Directors on April 23rd 2014

• Notice to Proceed was May 27, 2014 (yesterday)
All Engines Will Not Meet Deadline

• 1/8/2016
  – One engine complete at Plant 1
  – Two engines complete at Plant 2

• 5/17/2016
  – Substantial completion of all 8 engines
Rule 1110.2 (d)(1)(H)(ii)

interval averaging time for the first 4 months of the retrofitted engine’s operation and up to a 24 hour fixed interval averaging time thereafter. For purposes of determining compliance using a longer averaging time:

(i) An operator shall not average data during one-minute periods in which the underlying equipment is not operated or when the CEMS is undergoing zero or calibration checks, cylinder gas audits, or routine maintenance in accordance with the provisions in Rules 218 and 218.1.

(ii) Notwithstanding the requirements of Rules 218 and 218.1, for one-minute time periods where NOx and/or CO CEMS data are greater than 95 percent of the Rule 218.1 Full Scale Range while the underlying equipment is operating, an operator shall use substitute data. A concentration equivalent to 3 times the NOx and/or CO emission limits in Table III-B (each corrected to 15% O2) shall be used as substitute data.
Thank You

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