Orange County Sanitation District
Technology Demonstration Project Update

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Environmental Supervisor
Orange County Sanitation District

AQMD Rule 1110.2 Biogas Technology Committee Meeting – October 29, 2014
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

**Plant No. 1 – Fountain Valley**
- 3 identical IC engines
- 3471 hp each; lean burn
- 2500 kW generator
- **Total nameplate capacity:** 7.5 MW

**Plant No. 2 – Huntington Beach**
- 5 identical IC engines
- 4166 hp each; lean burn
- 3000 kW generator
- 1 MW steam turbine
- **Total nameplate capacity:** 16 MW

Both plants combined: 1.4 billion cubic feet of digester gas produced in 2013
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
Catalytic Oxidizer/SCR System

- Urea Injection
- SCR Catalyst
- Catalytic Oxidizer
Technology Demonstration Project  
(April 1, 2010 – March 31, 2011)  
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.
### CEMS Comparison – October 28th 2014

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit 1</th>
<th>Unit 2</th>
<th>Unit 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICE % Load</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Natural Gas Flow (dscfm)</td>
<td>103.24</td>
<td>0.00</td>
<td>103.42</td>
</tr>
<tr>
<td>Digester Gas Flow (dscfm)</td>
<td>15.90</td>
<td>0.00</td>
<td>15.45</td>
</tr>
<tr>
<td>% Digester Gas</td>
<td>723.09</td>
<td>0.00</td>
<td>687.56</td>
</tr>
<tr>
<td>NOx @15%O2 (ppmvd), 15-Min Average</td>
<td>97.85</td>
<td>0.00</td>
<td>97.80</td>
</tr>
<tr>
<td>NOx @15%O2 (ppmvd), Real-time</td>
<td>7.79</td>
<td>0.00</td>
<td>35.40</td>
</tr>
<tr>
<td>CO @15%O2 (ppmvd), 15-Min Average</td>
<td>8.08</td>
<td>0.00</td>
<td>35.13</td>
</tr>
<tr>
<td>CO @15%O2 (ppmvd), Real-time</td>
<td>9.10</td>
<td>0.00</td>
<td>426.06</td>
</tr>
<tr>
<td>NOx Inlet @15%O2 (ppmvd), Real-time</td>
<td>8.87</td>
<td>0.00</td>
<td>419.95</td>
</tr>
<tr>
<td>NH3 Slip @15%O2 (ppmvd), Real-time</td>
<td>30.17</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Urea Flow (gph)</td>
<td>9.04</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>CEMS Cabinet Temp (Deg F)</td>
<td>0.74</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Plant Total NOx Lbs/Day, 30Day

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Total NOx Lbs/Day, 30Day</td>
<td>110.33</td>
</tr>
<tr>
<td>Plant Total CO Lbs/Day, 30Day</td>
<td>135.79</td>
</tr>
</tbody>
</table>
Recent CEMS Data

Nearly 30,000 operating hours later – still using original catalysts

May 2014 – October 2014:

- 8.2 ppm NO\textsubscript{X}
- 8.4 ppm CO
- 5.5 ppm NH\textsubscript{3} slip

11.5 ppm VOC (not CEMS)
Full Implementation: Project J-111

- Gas cleaning units in primary/polishing configuration
- Construction RFP issued Dec 27th 2013
- OCSD Board of Directors approved contract April 23rd 2014
- Notice to Proceed issued May 27, 2014
Current Construction
All Engines Will Not Meet Rule 1110.2 Deadline

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

• May 17, 2016
  – Substantial completion of all 8 engines
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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