TAO Advisory Group Retreat

Stationary – OCSD Biogas Engine Emission Reduction Project

February 2, 2011

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South Coast Air Quality Management District

Background

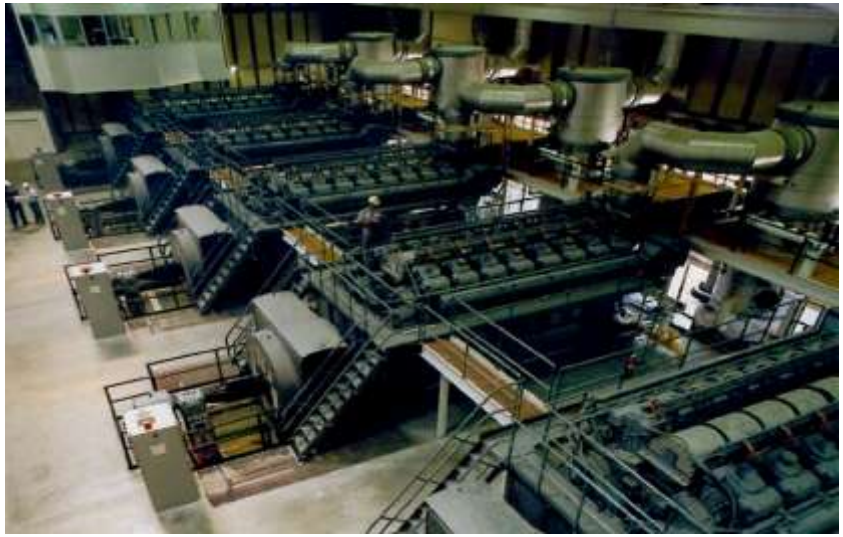
- Most large landfills and water treatment plants in SCAQMD convert the landfill or digester gas (biogas) to electricity
  - Income for municipalities and encouraged by state programs,
  - 54 I.C. engines, 2200 avg. hp, 84 MW total capacity.

Background (Cont.)

- Biogas engines have been allowed higher NOx than natural gas engines because NOx reduction catalysts could not be applied
  - contaminants in biogas rapidly fouled catalysts.

Rule 1110.2 Amendment – 2008

- Biogas engines must reduce NOx to 11 ppm by 7/1/2012
- Down from NOx levels as high as 50 ppm.
  - *subject to a technology assessment finding that adequate technology exists.*



Orange County Sanitation District Project

- October 2009 Governing Board approved funding
- Demonstration of retrofit technology on digester gas engine at OCSD's Fountain Valley plant

Funding

Partners	Funding	Percent
OCSD	$2,212,000	91
AQMD	$200,000	9

Project Overview

- Retrofit a 3,471 hp, 2500 kW digester gas engine with:
  - Digester gas carbon adsorption cleaning system
  - Urea tank & injection system
  - SCR catalyst system
  - Catalytic oxidizer
- Project Team
  - OCSD, Malcolm Pirnie, Inc. and Johnson Matthey

Biogas Cleaning System

SCR and Oxidation Catalyst System

Status and Results to Date

- Construction/Startup March/April 2010
- Biogas Cleaning System Siloxane Removal

  Inlet 3.7-8.7 ppm Outlet < 0.1 ppm
- CEMS data (ppm @ 15% O2):

	Measured	Proposed Rule Limit
NOx	6 – 9	11
CO	6 – 8	250
VOC	< 0.1	30

- Formaldehyde reduction (co-benefit)

  Inlet 21 ppm Outlet < 1 ppm
- Final report expected June 2011.


UNIT 1
UNIT 2
UNIT 3
ON-LINE
ON-LINE
ON-LINE
ICE % Load
79.36 V
82.28 V
101.25 V
Natural Gas Flow (dscfm)
14.74 V
12.88 V
213.21 V
Digester Gas Flow (dscfm)
589.71 V
622.80 V
404.78 V
% Digester Gas
97.56 V
97.97 V
65.50 V
NOx @15%O2 (ppmvd), 15-Min Average
5.29 V
27.88 V
41.13 V
NOx @15%O2 (ppmvd), Real-time
3.73 V
26.05 V
35.37 V
CO @15%O2 (ppmvd), 15-Min Average
8.07 V
428.13 V
358.63 V
CO @15%O2 (ppmvd), Real-time
8.56 V
453.01 V
446.20 V
NOx Inlet @15%O2 (ppmvd), Real-time
28.27 V
0.00 V
0.00 V
NH3 Slip @15%O2 (ppmvd), Real-time
0.00 V
0.00
0.00
Urea Flow (gph)
0.39 V
0.00 V
0.00 V
CEMS Cabinet Temp (Deg F)
71.60 V
69.01 V
73.47 V
Plant Total NOx Lbs/Day, 30Day
75.82 V
Plant Total CO Lbs/Day, 30Day
739.71 V
MAIN MENU
start
DELL