Emissions Controls for Stationary Engines Introduction

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Control Technology Performance

Based on:

- Regulatory Requirements
- On-going Maintenance of Control Systems
- Adequate Emissions Monitoring
- Audits and Enforcement

Importance of Regulatory Requirements

Regulatory Requirements Drive Control Performance

- Stringent Standards Promote Improved Control Performance
  - New and Innovative Designs
  - Materials – alloys, coatings, etc.
  - Computer Flow Modeling – emissions, flow, and temperature distribution
  - Catalyst Structure and New Formulations
  - Redundant Systems
- Better Reliability
  - Automated Controls Optimize Reductions
  - Increased Design Experience

Example Regulation Driving Technology Improvements

Emissions Reduction Market System

- Chicago Area – Ozone Nonattainment Designation
- Program Structure
  - Ozone Season Cap-n-Trade Program (May 1st – Sept. 30th)
  - 170 Sources Affected
  - Establish Baseline Emissions
  - Allocations at 12 Percent Below Baseline
- 2006 Results
  - Emitted 61.5 percent less VOC than baselines emissions
- For more, go to:
  - www.epa.state.il.us/air/erms/apr/2006/aprr-2006-full.pdf

Importance of Ongoing Maintenance of Control Systems

Ongoing Attention to Control System Performance Needed

- Verifying Initial Performance Just Beginning
- Assures Long Term Optimal Performance
- Avoids the Affects of Deterioration that Comes from Neglect
- Like this…….

Importance of
Audits and Enforcement

Importance of
Adequate Emissions Monitoring

Emissions Monitoring Ensures Regulatory Accountability

- Example: California's South Coast Air Quality Management District
- Problem Identified: Stationary engines subject to Rule 1110.2 met scheduled annual emission source tests but failed to meet unannounced spot emission tests
- Result: Excess emissions and AQMP (air quality management plan) not being met
- Remedy: Improve monitoring, recordkeeping and reporting. Institute tighter emission limits. Affects all rich burn and lean burn stationary non-emergency engines (gas and diesel) in the Los Angeles area (SCAQMD)
- Requires Best Available Retrofit Control Technology
- Permitted sources ~ 1,000

South Coast AQMD
Stationary Engine Compliance Statistics

	Rich Burn Engines	Lean Burn Engines
No. of ICE's tested	180	11
% Non-compliance	51%	27%
% NO_x Violations	40%	27%
% CO Violations	28%	0%

Source: South Coast AQMD, 12 January 2007

South Coast AQMD
Emission Exceedences for Stationary Engines

	NOx	CO
Current Rule 1110.2 Limits, ppm*	36-45	2000
Typical BACT Limits, ppm*	11	70
Maximum Test Concentration, ppm*	850	12,500
Average Violation Concentration, ppm*	137	2,520
Maximum % Over Limit	7,430%	18,400%
Average % Over Limit	912%	1,830%
Tested Excess Emissions, Tons/Year	385	4,894
Estimated Total Inventory Excess Emissions, Tons/Year	**1,870**	**23,800**

Source: South Coast AQMD, 12 January 2007

*** @ 15% O_2**

South Coast AQMD
Revised Stationary Engine Rule (1110.2)

- NO_x and CO CEMs on ≥ 1000 Hp engines
- Emission limits drop to BACT (11 ppm NOx, 30 ppm VOC and 70 ppm CO)
- All new non-emergency generators must meet CARB 2007 DG standards (1.6-4.0 ppm NOx, 1.3-3.2 ppm VOC and 3.7-9.3 ppm CO)
- More stringent source tests on non-CEMs engines
- Inspection & maintenance program for non-CEMs engines

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