Diesel Retrofit Program for Construction Equipment

The Central Artery/Tunnel Project
Boston, Massachusetts

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CA/T Program Purpose/Goals

• Reduce diesel impacts on abutters and construction workers.
• Help CA/T Project meet its environmental commitments.
• Reduce regional emissions.
• Good public relations.
Downtown Construction – Proximity to Abutters
Downtown Construction – Proximity to Pedestrians
CA/T Diesel Retrofit Program

- Originated in fall 1998 in collaboration with the Massachusetts DEP and NESCAUM.
- Only off-road equipment retrofitted.
- Focus on equipment near:
  - residential communities,
  - hospitals,
  - building fresh air intakes.
Oxidation Catalysts Instead of Diesel Particulate Filters

- Reduce CO, HC, Odors.
- Ease of installation and maintenance.
- Lower unit cost ($2,000).
- Proven technology.
Retrofit Program Phase 1

- 8 pieces of equipment retrofitted.
- 3 contractors participated.
- Oxidation catalysts provided by MECA.
- Contractors contributed installation costs.
- Equipment manufacturers provided written assurance on engine warranty.
Retrofit Program Phase 2

- Retrofitted 60 additional pieces of equipment.
- CA/T & contractors split cost of oxidation catalysts.
- Contractors contributed installation costs.
Equipment Retrofitted

• 50 – 300 HP range engines, including:
  – small cranes,
  – lifts,
  – excavators,
  – bulldozers,
  – generators, and
  – compressors.
Retrofit Program Costs & Operational Issues

- Oxidation Catalysts cost $1,000 to $3,000 per unit ($2,500 average).
- Installation time < 2 hours.
- No adverse effects on equipment performance.
- Warranty concerns (resolved in Phase 1).
Program Advertisement and Public Relations

THIS MACHINE IS EQUIPPED WITH AN AIR POLLUTION CONTROL DEVICE
Emission Reduction Potential

Estimated % reduction according to EPA certification list:

- CO = 40%.
- HC = 50%.
- PM = 20%.
Benefits of Retrofit Program

- Very cost effective way to reduce construction equipment emissions.
- Low cost (≈ 1-2 % of equipment cost).
- Can achieve 20-50 % emission reduction.
- Can help reduce diesel odor problem.
- Community was very appreciative.
Additional Retrofit Program

- Incorporated retrofit program into CA/T odor control specification 721.562.
- Required all off-road diesel equipment contain oxidation catalyst.
Lessons Learned

• Develop contract specification
  – identify the type of diesel equipment to be included,
  – specify which type of diesel emission control equipment can be used,
  – have contractor submit plan for approval before work begins.