Why Are Diesel Emissions a Concern?

- Toxic Air Contaminant
- SIP Attainment
  - Diesel NOx and ROG contribute to ozone and secondary PM formation
  - Diesel PM
Health Impacts of Diesels in California

• Annual health impacts
  – 2,900 premature deaths
  – 3,600 hospital admissions
  – 240,000 asthma attacks/respiratory symptoms
  – 600,000 lost days of work

• By comparison
  – 3,700 deaths from car accidents
  – 2,000 homicides

Statewide Average Potential Ambient Cancer Risks for 2000

- Diesel Exhaust PM10 (70%)
- 1,3 Butadiene (10%)
- Benzene (8%)
- Carbon Tetrachloride (4%)
- Formaldehyde (3%)
- Hexavalent Chromium (2%)
- All Others (3%)
Diesel On- & Off-Road Emissions are Significant

Why Reduce In-use Diesel Emissions?

• Diesel Engines are Long Lived
• New Engine Standards Offer Long Term Reductions
• In-use Emission Rules Provide Near-Term Reductions
• Control Technology is Available
Diesel Risk Reduction Plan

• Adopted in 2000
• Goal is to Reduce Diesel PM By 75% by 2010 & 85% by 2020
• Measures
  – New Diesel Engine Standards
  – In-Use Controls on Existing Engines
  – Cleaner Low Sulfur Diesel Fuel

Diesel Risk Reduction Plan - In-Use Engine Measures

• On-Road Engines
  ✔ Solid Waste Collection Vehicles
    – Public HDV Fleets
    – Private HDV Fleets
• Off-Road Engines
• Stationary Engines
• Original Focus was on Retrofitting
Diesel Emission Control Strategy Verification Procedure

- Required PM Reduction - 25% Minimum
- Optional NOx Reduction - 15% Minimum
- Emission Testing
- Durability Demonstration
- Emission Control Group/Applicability
- Warranty
- In-Use Compliance Testing
  – Consistent with U.S. EPA Requirements
Diesel Emission Control Strategy Verification Levels

• Level 1
  – 25% or greater PM Reduction
• Level 2
  – 50% or greater
• Level 3
  – 85% or greater or \( \leq 0.01 \) g/bhp-hr
• Optional NOx Reduction, 15% min.

Current Level 3 Verifications*

• Level 3 PM only
  – CleanAir Systems (stationary only)
  – Clean Air Partners (dual-fuel only)
  – Lubrizol Purifilter
  – Donaldson DPM
• Level 3 with 25% NOx Reduction
  – Cleaire Flash & Catch
  – Cleaire Longview

*as of March 2004
Installed Diesel Particulate Filter

- Level 3, 85% PM Reduction
- Reduces HC & CO also
- Backpressure Monitor required
- Engine must meet filter manufacturer's exhaust temperature criteria for use

Current Verifications*

- Level 1 PM Only
  - Donaldson DOC + Spiracle
  - Donaldson DOC + Spiracle + ULSD
  - Donaldson DOC + ULSD
- Level 1 plus 25% NOx Reduction
  - Cleaire Flash and Match

*as of March 2004
Diesel Oxidation Catalyst

- Up to 90% CO & HC reductions
- Level 1 - 25% reductions
  PM may be expected
- Lower operating temperatures
- Can be used on older engines with poor oil control
- Requires no maintenance

Current Verifications

- No longer verified as of January 1, 2004
  - Engelhard DPX
  - Johnson Matthey CRT
- Manufacturers chose not to meet adopted rule’s warranty requirements
- Product sold before 1/1/2004 continue to be legal
Approaches for Regulations

- In-Use Diesel Vehicle Emission Reductions
  - NOx/PM Fleet Reduction
    - Transit Agency Rule
  - Best Available Control Technology (BACT)
    - Trash Truck Rule
    - Public Agencies Rule

Fleet Rule for Transit Agencies

- Adopted 2000; Amended 2002
- All transit agencies must reduce NOx and PM emissions
- Fleet emissions reduction method
- Stresses advanced technologies
In-Use Urban Bus Requirements

• Low Sulfur (<15 ppm) Diesel Fuel
  – as of July 1, 2002
• 4.8 g/bhp-hr NOx Fleet Average
  – as of October 1, 2002
• PM Reductions 2003 through 2008
  – Goal is 85% Reduction from Baseline

Proposed Amendments For Transit Agencies

Non-Urban Buses
Urban Buses
**Scope**
Fleet Rule for Transit Agencies

- Not Covered by the Current Rule:
  - Transit Agency “Non-Urban” Buses
  - Public Agency Buses
    - E.G., Airports, Universities
  - Other Buses: Non-transit
  - Private Buses
    - Charters, Tourism

---

**Transit Agencies**

Proposed Fall Board Hearing

- Add
  - Non-Urban Bus Definition
  - Non-Urban Bus NOx Fleet Requirements
  - Non-Urban Bus PM Fleet Requirements
  - Reporting Requirements
Who and What Will it Affect?

- Transit Agencies
  - Operating “Non-urban” Buses
- “Non-urban Buses”
  - Bus powered by a medium heavy-duty truck engine
  - Bus (medium or heavy heavy-duty engine) not used in transit services

Non-Urban Bus: Proposed NOx Requirements

- NOx Fleet Average Reduction
  - Two Step Reduction
    - 3.2 g/bhp-hr in 2007
    - 2.4 g/bhp-hr in 2010
  - Based on engine certification
    - Similar implementation as for Urban Buses
Non-Urban Bus: Proposed PM Requirements

- Total PM Reduction
  - Baseline January 1, 2005
  - Same method as for Urban Buses
- Implementation Schedule:
  - 25% reduction by 2007
  - 50% reduction by 2009
  - 80% reduction by 2011, or average of 0.01 g/bhp-hr PM

Non-Urban Bus: Proposed Reporting Requirements

- Reporting Requirements Mirror Existing Transit Fleet Rule
- Initial Report of Baseline Due 1/31/2006
- Annual Reports of Reductions Due Each 1/31 though 2016.
Examples of NOx and PM Calculations

- See Handout

FLEET RULE FOR TRANSIT AGENCIES
Non-urban bus and HD Vehicle Survey
Survey

• Better Data = Better Inventory
• Inventory Required to Understand Emission Reductions Gained
• Survey Response Low Thus Far
  – 50 out of 70 transit agencies
  – 22 out of 250 possible transit and paratransit agencies

We need your input!
Get the survey at:
http://www.arb.ca.gov/msprog/bus/reportingforms.htm
(Second bullet)
FUTURE FLEET RULES

Future Fleet Rules Schedule

• Public Agency On-road
  – 2004
• Public Agency Off-road Equipment
  – 2004 or 2005
• Private On-road Vehicles
  – 2005
• Private Off-road Vehicles
  – 2006
Contacts

Fleet Rule for Transit Agencies
www.arb.ca.gov/msprog/bus/bus.htm

Dr. Nancy Steele, Manager
Retrofit Implementation Section
Phone: (626) 350-6598
Email: nsteele@arb.ca.gov

Kathleen Mead, Lead Staff
Phone: (916) 324-9550
Email: kmead@arb.ca.gov