Diesel On-Road Private Fleets
Control Measure
Public Workshop

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Jackie Johnson
In-Use Control Measures Section
Heavy-Duty Diesel In Use Strategies Branch

California Environmental Protection Agency
Air Resources Board

Overview
- Diesel Risk Reduction Program
- ARB Diesel PM Control Measures (Adopted and Future)
- Diesel PM Emission Reduction Strategies
- On-Road Private Fleets
- Next Steps

Health Effects of Diesel PM in California
- Increases cancer risk, hospital admissions & premature deaths
- In California in year 2000, diesel PM responsible for:
  - 2000-2500 premature deaths
  - ~3,600 hospital admissions
- 70% of known statewide air toxics risk is from diesel PM
California Diesel Risk Reduction Plan

- Established Goals
  - Reduce PM emissions from all diesel-fueled engines in California
  - 75% reduction by 2010
  - 85% reduction by 2020

- Four-pronged approach
  - New engine standards
  - Cleaner diesel fuel - <15 ppm S
  - Retrofit of existing engines
  - Ensure in-use emissions maintained

ARB Diesel PM Control Measures

- Transit agency fleet rule (2000)
- School bus idling (2002)
- Portable engines (2004)
- Transport refrigeration units (2004)
- Commercial vehicle idling (2004)
Adopted ARB Diesel PM Measures
(continued)

- Transit fleet vehicles (2005)
- Public agency/utility on-road fleets (2005)
- Port/rail cargo handling equipment (2005)
- Ship auxiliary engine fuel (2005)

Future ARB Diesel Measures

- 2006/07
  - Off-Road Mobile Equipment
  - On-Road Private Fleets
  - Harbor Craft
  - Stationary Agricultural Engines
  - Off-Road Agricultural Engines

Diesel PM Emission Reduction Strategies
New Engines for Heavy-Duty Diesel Trucks Much Cleaner

Cleaner Diesel Fuels
- ARB requires 15 ppm sulfur diesel fuel for on-road engines, off-road equipment, and stationary engines effective mid 2006
  - California diesel fuel continues to limit aromatics content to reduce NOx
- National on-road EPA low sulfur diesel being phased-in in late 2006

Reducing Emissions from Existing Engines
- In-use controls - ensure engines operate as cleanly as possible
- Fleet rules - modernize fleets through accelerated replacement, repower, and retrofit
In-Use Controls for Heavy-Duty Vehicles

- Maintaining emission levels in-use:
  - Roadside Smoke Inspection Program
  - Software upgrade (chip reflash)
  - On-board diagnostic program
    - Applies to 2010 model year vehicles
  - In-use compliance test program
- Operational controls:
  - Idling limits (adopted 2004)

PM Reduction From Existing Vehicles

<table>
<thead>
<tr>
<th>Control Strategy</th>
<th>PM Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust Filter</td>
<td>85%</td>
</tr>
<tr>
<td>Exhaust Catalysts</td>
<td>25%</td>
</tr>
<tr>
<td>Re-power with newer engine</td>
<td>20% to 90%</td>
</tr>
<tr>
<td>New vehicle</td>
<td>90%</td>
</tr>
<tr>
<td>Other (typical)</td>
<td>10% to 50%</td>
</tr>
</tbody>
</table>
  - Engine modifications
  - Fuel additives
  - Alternative diesel fuel derivatives

Compliance Flexibility

- Additional time to repower engine if verified retrofit controls are not available
- Special provisions for smaller fleets
- Special provisions for very low usage fleets
- Early compliance credit
Diesel Retrofit Emission Control Technologies

**Exhaust Gas Aftertreatment**
- Diesel Oxidation Catalyst
- Diesel Particulate Filter – Passive
- Diesel Particulate Filter - Active
- Lean NOx Catalyst
- Selective Catalytic Reduction
- NOx Adsorbers
- Flow-Through Filters
- Exhaust Gas Recirculation

**Fuel Based Technologies**
- Alternative Diesel Fuels - Emulsions
- Alternative Diesel Fuels - Biodiesel
- Alternative Diesel Fuels - Gas to Liquids
- Fuel Additives

Verified PM Retrofit Technologies

- ARB verifies effectiveness of emissions control technology
- Currently 25 PM diesel emission control systems verified
  - Level 1 (25% reduction) - 9 systems
  - Level 2 (50% reduction) - 4 systems
  - Level 3 (>85% reduction) - 12 systems
- Memorandum of Agreement with U.S. EPA for emission testing and verification levels

Carl Moyer and Other Incentive Programs

- Grants to fund incremental cost to install cleaner engines or retrofit devices early
  - For early or extra emission reductions
- $154 million spent over 6 years
  - 7000 engines cleaned up; 136 trucks (first 4 years)
  - Cost effective - $3000/ton NOx
- New on-going funding beginning 2005
  - $140 million/year
  - PM retrofits and fleet modernization now eligible
- Other Incentive Programs (Gateway Cities and SECAT)
  - 650 trucks funded
Heavy-Duty Diesel Private Fleets

2005 Vehicle Age Distribution
(Vehicles > 14,000 lbs*)
(Total Population ~ 270,000**)

- MY 1965-1987: 54%
- MY 1988-1990: 13%
- MY 1991-1993: 13%
- MY 1994-2005: 16%

*Based on EMFAC2002 (Year 2005), excludes non-registered vehicles and vehicles covered under the public fleets, transit, urban bus, and trash truck rules.

Heavy-Duty Diesel Private Fleets
2005 Diesel PM Emissions
(Vehicles > 14,000 lbs)
(Total Diesel PM Emissions ~ 9 tons per day*)

- MY 1965-1987: 20%
- MY 1988-1990: 13%
- MY 1991-1993: 13%
- MY 1994-2005: 62%

*Based on EMFAC2002 (Year 2005), excludes non-registered vehicles and vehicles covered under the public fleets, transit, urban bus, and trash truck rules.
### On-Road Private Fleets

#### Business Type

<table>
<thead>
<tr>
<th>Business Type</th>
<th>Percent of Fleet</th>
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</thead>
<tbody>
<tr>
<td>For Hire Transportation or Warehousing</td>
<td>36%</td>
</tr>
<tr>
<td>Construction</td>
<td>14%</td>
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<tr>
<td>Wholesale Trade</td>
<td>10%</td>
</tr>
<tr>
<td>Agriculture, Forestry, Fishing, or Hunting</td>
<td>9%</td>
</tr>
<tr>
<td>Vehicle Leasing or Rental</td>
<td>8%</td>
</tr>
<tr>
<td>Waste Management, Landscaping</td>
<td>6%</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>6%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>5%</td>
</tr>
<tr>
<td>Accommodation or Food Services</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
</tr>
</tbody>
</table>


### Heavy-Duty Diesel On-Road Fleets

#### Diesel PM Emissions (tons per day)

<table>
<thead>
<tr>
<th>Year</th>
<th>Private Fleets</th>
<th>Trash Trucks</th>
<th>Public Fleets</th>
<th>Out of state trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
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<tr>
<td>2010</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
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<tr>
<td>2015</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
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<tr>
<td>2020</td>
<td>2.00</td>
<td>2.00</td>
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### Heavy-Duty Diesel Private Fleets

#### Control Measure

- Reduce diesel PM from on-road (in-use) diesel-fueled private fleets.
- Diesel-powered vehicles with a gross vehicle weight rating (GVWR) of 14,000 lbs or greater.
- Includes but not limited to: private fleet heavy-duty trucks, private fleet buses, and motor homes.
- Does not apply to heavy-duty vehicles covered by ARB’s Solid Waste Collection, On-Road Heavy-Duty Municipality and Utility Owned Truck control measures and Fleet Rules for Transit Agencies.
Rulemaking Process
- Work with public and affected stakeholders
  - First workshops to discuss general concepts
  - Informal workgroup meetings and additional workshops as appropriate
- Staff evaluation and public review
  - Fleet and emissions inventory
  - Control technology feasibility/availability
  - Economic costs and environmental benefits
  - Consider need for compliance flexibility
  - Propose concepts
- Formal public comment period before Board consideration
- Public hearing and consideration by Board

On-Road Private Fleets
Tentative Schedule
- First public workshop series
  - Sacramento, April 5; El Monte, April 12; and Fresno, April 13
- Workgroup meetings
  - Late spring/early summer 2006
- Second public workshop
  - Discuss regulatory concepts (late summer)
- Additional workgroup meetings (Fall)
- Third public workshop
  - Regulatory proposal in winter 2006/2007
- Formal Board consideration in mid 2007

Contacts
- Tony Brasil, P.E., Manager, In-Use Control Section
tbrasil@arb.ca.gov
(916)323-2927
- Jackie Johnson (staff)jjohnson@arb.ca.gov
(916)323-2750
- Annette Hebert, Chief, Heavy-duty Diesel In-use Strategies Branchahebert@arb.ca.gov
(626)575-6973
- Ron Nunes (staff)rnunes@arb.ca.gov
(916)327-0376

Website: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm