Status Update
Public Transit Bus Fleet Rule

San Diego
March 21, 2002

Outline

- Background
- Outreach to Transit Agencies
- NOx Fleet Average Update
- Alternative NOx Strategy Update
- Implementation Update
- Transit Agencies Voluntary Activities
- Outstanding Issues
- Recommendations
Background

Select Fuel Path by January 31, 2001

New Engine Standards
- 2002: 0.1 g/bhp-hr PM
- 2004-2006: 0.5 g/bhp-hr NOx
- 2007 and beyond: 0.2 g/bhp-hr NOx

Alternative NOx Strategy Exemption
- 4.8 g/bhp-hr NOx Fleet Average
  Effective October 1, 2002
**Background**

- Annual Reports Due Each January 31
- Low Sulfur Fuel (15 ppm or less) Starting July 1, 2002
- PM Retrofits Starting January 1, 2003
- Zero-Emission Bus Demo Starting 2003
- Zero-Emission Bus Purchases in 2008

**September 2001 Update**

- 4.8 g/bhp-hr NOx Fleet Average
  - 14 transit agencies supplied incorrect or insufficient information
- Alternative NOx Strategy
  - 15 applications
  - 1 complete plan; 3 incomplete plans
  - No NOx demonstrations
Resolution 01-31 (September 2001)

- Assist Transit Agencies to Comply with NOx Fleet Average
- Assist Transit Agencies with Alternative NOx Strategy Applications
  - Submit complete plan by 12/31/01
  - Commit resources for NOx demo by 12/31/01
  - Implement demo by 12/31/02

Outreach to Transit Agencies
Outreach to Transit Agencies

- Multiple Meetings & Teleconferences
- Presentation at California Transit Association Conference
- Issuance of Two Advisories
- Engine Manufacturers Association Meeting
- Communication through Letters, Phone Calls, and E-mails

NOx Fleet Average Update
**NOx Fleet Average Update**

- Fleet Average Effective October 1, 2002
- Compliance through Retirement, Repowering, or New Purchases of Buses
- Four Transit Agencies Projected to be in Non-Compliance in October 1, 2002

<table>
<thead>
<tr>
<th>Transit Agency</th>
<th>Fleet Path</th>
<th>Fleet Size</th>
<th>Date</th>
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<tbody>
<tr>
<td>Arcata/MAD River Transit System</td>
<td>Diesel</td>
<td>4</td>
<td>11/02</td>
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<tr>
<td>Fairfield/Suisun Transit</td>
<td>Diesel</td>
<td>41</td>
<td>12/02</td>
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<tr>
<td>San Luis Obispo Regional Transit</td>
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<tr>
<td>South County Area Transit</td>
<td>Diesel</td>
<td>4</td>
<td>12/03</td>
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</table>
Alternative NOx Strategy Update

- No Complying Engines Available 2004-2006
- Exemption Requirements
  - Apply by 6/30/01
  - Achieve greater NOx emission benefits
  - Demonstrate advanced NOx aftertreatment technology at 70-90% reduction
- Board Allowed Until 12/31/01 to Complete Plan & Commit Resources
## Approved Strategy Plans

<table>
<thead>
<tr>
<th>Transit Agency</th>
<th>Fuel Path</th>
<th>Air District</th>
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<tbody>
<tr>
<td>AC Transit District</td>
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<tr>
<td>Eastern Contra Costa Transit</td>
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<td>Bay Area</td>
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<tr>
<td>Golden Gate Transit</td>
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<td>Bay Area</td>
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<tr>
<td>Santa Clara VTA</td>
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<td>Bay Area</td>
</tr>
<tr>
<td>El Dorado County Transit</td>
<td>D</td>
<td>El Dorado County</td>
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<td>Merced County Transit</td>
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<tr>
<td>Visalia City Coach</td>
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## Withdrawn or Incomplete Applications

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<th>Transit Agency</th>
<th>Fuel Path</th>
<th>Air District</th>
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<tr>
<td>Livermore-Amador Valley Transit</td>
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<tr>
<td>San Francisco MUNI</td>
<td>D</td>
<td>Bay Area</td>
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<tr>
<td>Monterey-Salinas Transit</td>
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<td>Monterey Bay</td>
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<tr>
<td>San Joaquin Regional Transit</td>
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<tr>
<td>Long Beach Transit</td>
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<td>South Coast</td>
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<tr>
<td>Montebello Bus Lines</td>
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<tr>
<td>City of Norwalk</td>
<td>D</td>
<td>South Coast</td>
</tr>
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Aftertreatment Demonstration Status

- One Joint Demonstration with All Seven Transit Agencies
- San Mateo County Transit & Central Contra Costa Transit Authority will also Participate
- Potential to Achieve 70% Reduction
- Torrance Transit will Perform Separate Demonstration (Not Required)

Implementation Update
Annual Reports

- Reported on Time: 49
- Reported Late By 03/01/02: 14
- Reported Late By 03/15/02: 2
- Outstanding Reports: 5
- Total: 70

Past Due Annual Reports

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<tr>
<th>Transit Agency</th>
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<th>Air District</th>
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<td>City of Commerce</td>
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<tr>
<td>City of Norwalk</td>
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<td>South Coast</td>
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<tr>
<td>Fairfield/Suisun Transit</td>
<td>D</td>
<td>Bay Area</td>
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<td>City of LA – Dept of Transportation</td>
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<td>South Coast</td>
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<tr>
<td>Yolobus</td>
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<td>Yolo-Solano</td>
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Ultra Low Sulfur Diesel Fuel Availability

Fuel Contracts (45 Responded)
- 14 have contracts in place
- 31 do not have contracts yet or purchase on open market

Price Difference
- 67% are paying $.02 - $.07 more
- 23% are paying $.08 - $.15 more
Transit Agency Voluntary Activities

- Aggressively Repowering Buses with Two-Stroke Engines
- Using Low Sulfur (<15 ppm) Fuel Earlier than 7/1/02 Deadline
- Installing Particulate Filters Earlier than Required
- Testing Engines with Lower NOx and PM than Current Certified Engines
Outstanding Issues

- Unavailability of 85% PM Reduction Strategies for Older Engines
- In-Use Performance of Retrofits
- Development of Hybrid-Electric Bus Test Procedures
Fleet Composition 2001

Two and Four Stroke Engines (2001)

Fleet Composition 2002

Two and Four Stroke Engines (2002)
**PM Retrofit Requirements**

- Requirement Effective 1/1/03
  - 100% of pre-91 MY diesel engines
  - Certain % of 91-95 MY diesel engines

- Applicable exemptions:
  - Pre-91 MY engines retrofitted with 0.1 g/bhp-hr PM ARB certified retrofit device
  - Alternative fuel path: 91-95 MY buses within two years of retirement
  - Diesel path: 91-95 MY buses within one year of retirement

**2002 Fleet Plans**

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<tr>
<th></th>
<th>Pre-1991 MY</th>
<th>1991-1995 MY</th>
<th>Total</th>
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<tr>
<td></td>
<td>2 stroke</td>
<td>4 stroke</td>
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<tr>
<td>Retire</td>
<td>825</td>
<td>96</td>
<td>303</td>
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<tr>
<td>Repower</td>
<td>0</td>
<td>0</td>
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<td>Retrofits</td>
<td>430</td>
<td>16</td>
<td>674</td>
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<tr>
<td>Exempt</td>
<td>537</td>
<td>5</td>
<td>13</td>
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<tr>
<td>Totals</td>
<td>1792</td>
<td>117</td>
<td>1073</td>
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**PM Retrofit Update**

- Two Devices Verified for Four-Stroke Engines (MY 94-02) at 85%
- No Retrofit Devices Verified for Engines Older than 1994 MY or Two-Stroke Engines
- No 85% Technology Expected for Pre-1994 Engines to Meet 1/1/03 Deadline

**In-Use Performance of Retrofits**

- New York City Transit
  - 900 buses, few problems
- Long Beach Transit
  - 60 buses, 2 failures
- Philadelphia
  - 30 buses, no problems
In-Use Performance of Retrofits

- Los Angeles MTA
  - 2 buses, no problem
- San Francisco MUNI
  - 2 buses, 1 problem
- Santa Clara VTA
  - 1 bus, 1 failure

Hybrid-Electric Bus Developments

- Continue to Work with Hybrid Bus Manufacturers, Hybrid Drive Train Developers & Transit Bus Fleet Managers
- Heavy-Duty Hybrid-Electric Vehicle Test Procedures Planned for Board Consideration in September 2002
Summary

- **NOx Fleet Average**
  - Nearly all project compliance
  - NOVs to be issued to 4 projected not to comply

- **Alternative NOx Strategy Exemption**
  - All plans submitted on time approved
  - Others chose not to purchase diesel engines 2004-2006
  - One joint demonstration planned
Summary

- Annual Report Due 1/31/02
  - 5 are past due
- Low Sulfur (<15 ppm) Diesel Fuel
  - Generally available
  - Staff will assist transit agencies
- Retrofit Field Experience
  - 1994 MY and newer - few problems
- Retrofits Not Verified For pre-94 MY

Recommendations
Recommendations

- Propose Revised Retrofit Implementation Schedule in September 2002
- Continue to Work with Transit Agencies
  - NOx Fleet Average
  - Advanced NOx Aftertreatment Demo
  - Low Sulfur Diesel Fuel
  - Retrofits

Recommendations

- Assist Rural and Small Transit Agencies
- Propose Adoption of Hybrid Test Procedures in September 2002