Mobile Cargo Handling Equipment Workgroup
Meeting

ARB Enforcement of 2011 CHE Regulatory Amendments
August 27, 2015
Oakland, California

California Environmental Protection Agency
Air Resources Board

Overview

- Background
- U.S. EPA Authorization to Enforce
- Opacity Monitoring
- Tier 4 Alt PM Engine Retrofit Requirements
- Enforcement
- Next Steps
- Questions/Comments
Background

CHE Regulation Background

- Adopted by ARB December 2005
- Implementation began January 2007
- Amendments adopted by ARB September 2011
- Implementation of amendments began November 2012
Need for EPA Authorization

- Clean Air Act (CAA) prohibits states from enacting emission standards for motor vehicles
- Allows California to request an authorization to enforce its own non-road standards
- CAA Section 209(e)(2) allows EPA to grant authorization to California if:
  - Standards are not arbitrary or capricious
  - Standards required to meet compelling conditions
  - Standards and enforcement consistent with CAA
U.S. EPA Authorization to Enforce CHE Regulation

- U.S. EPA authorized enforcement of initial CHE regulation November 2011
- U.S. EPA authorized enforcement of 2011 amendments to CHE regulation April 2015

Requested U.S. EPA Authorization for Two Amendments

- Opacity monitoring - for both yard truck and non-yard truck CHE
- Retrofit of Tier 4 Alt PM engines
  - Tier 4 Alt PM emissions standards essentially Tier 3
  - Retrofit with highest level VDECS required within 1 year
- U.S. EPA authorized enforcement - April 29, 2015
U.S. EPA Authorization to Enforce

U.S. EPA Confirmed Other Amendments Within Scope of Existing Authorization

- Modification of retrofit requirements
  - Examples: provide additional extension time and add safety as a criterion
- Modification of operational practices
  - Examples: add low-use compliance extension and allow non-yard truck transfers between facilities under common control
- Allow demonstration of emissions equivalency for alternative technologies
- Modification of compliance requirements
  - Examples: allow fleets to bring older engines in to compliance first and add a rural low-throughput ports exemption

Opacity Monitoring
Opacity Monitoring

- Similar to ARB’s heavy-duty diesel vehicle smoke inspection program
- New CHE exempt for first four years
  - Example: 2015 MY engine exempt until January 1, 2019
- Alternative method of compliance available
  - Must be approved by ARB
  - Must demonstrate opacity test not feasible
  - Must detect increased soot

### Compliance Phase-in Schedule

<table>
<thead>
<tr>
<th>Percentage of Fleet Opacity Tested</th>
<th>Compliance Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>October 26, 2015</td>
</tr>
<tr>
<td>50%</td>
<td>January 24, 2016</td>
</tr>
<tr>
<td>75%</td>
<td>April 28, 2016</td>
</tr>
<tr>
<td>100%</td>
<td>July 27, 2016</td>
</tr>
</tbody>
</table>
Opacity Monitoring

Maximum Allowable Opacity Based on Engine PM Certification Standard

<table>
<thead>
<tr>
<th>PM Standard or Emissions Limit</th>
<th>g/kw-hr</th>
<th>g/bhp-hr</th>
<th>Maximum Opacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 0.54 or uncerfied</td>
<td>Greater than 0.40</td>
<td></td>
<td>55 percent</td>
</tr>
<tr>
<td>0.42 ( \leq x \leq 0.54 )</td>
<td>0.31 ( \leq x \leq 0.40 )</td>
<td></td>
<td>45 percent</td>
</tr>
<tr>
<td>0.28 ( \leq x \leq 0.40 )</td>
<td>0.21 ( \leq x \leq 0.30 )</td>
<td></td>
<td>35 percent</td>
</tr>
<tr>
<td>0.15 ( \leq x \leq 0.27 )</td>
<td>0.11 ( \leq x \leq 0.20 )</td>
<td></td>
<td>25 percent</td>
</tr>
<tr>
<td>0.07 ( \leq x \leq 0.13 )</td>
<td>0.05 ( \leq x \leq 0.10 )</td>
<td></td>
<td>15 percent</td>
</tr>
<tr>
<td>Less than 0.07</td>
<td>Less than 0.05</td>
<td></td>
<td>5 percent</td>
</tr>
</tbody>
</table>

Engines Must Be Tested in Certified Configuration

♦ Retrofitted engines
   - Test with VDECS removed or sampling port upstream of VDECS
   - May schedule when VDECS removed for cleaning or inspection
   - Opacity limit more stringent of:
     - Limit based on engine PM certification standard
     - Opacity limit for VDECS

♦ Engine with OEM aftertreatment
   - Such as Tier 4 or on-road 2007 or later
   - Test at exhaust of OEM aftertreatment
Opacity Monitoring

Opacity Testing - Overview

- Step 1: Determine the engine family name
- Step 2: Locate ARB certification Executive Order (EO) for the engine family name
  
  http://www.arb.ca.gov/msprog/offroad/cert/cert.php

- Step 3: Determine engine PM certification standard
- Step 4: Determine opacity limit based on PM certification standard
- Step 5: Compare measured opacity to opacity limit

Step 1 – Engine Family Name

![Isuzu Engine Information Label]
### Step 2 – Executive Order

![Image](image1.png)

### Step 3 – PM Certification Standard

<table>
<thead>
<tr>
<th>RATED POWER CLASS</th>
<th>EMISSION STANDARD CATEGORY</th>
<th>EXHAUST (g/kWh-hr)</th>
<th>OPACITY (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 ≤ kW &lt; 150</td>
<td>Tier 2</td>
<td>NC</td>
<td>PM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOx</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STD</td>
<td>N/A</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>FEL</td>
<td>N/A</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>CERT</td>
<td>5.3</td>
<td>0.18</td>
</tr>
</tbody>
</table>

![Image](image2.png)
Opacity Monitoring

Steps 4 & 5 – Determine Opacity Limit and Compare to Measured Level

<table>
<thead>
<tr>
<th>U.S. EPA PM Emissions Limits (g/dpm-hr)</th>
<th>Percent Opacity Not to Be Exceeded</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 0.4</td>
<td>55</td>
</tr>
<tr>
<td>0.31 ≤ x ≤ 0.4</td>
<td>45</td>
</tr>
<tr>
<td>0.21 ≤ x ≤ 0.3</td>
<td>35</td>
</tr>
<tr>
<td>0.11 ≤ x ≤ 0.2</td>
<td>25</td>
</tr>
<tr>
<td>0.05 ≤ x ≤ 0.1</td>
<td>15</td>
</tr>
<tr>
<td>&lt; 0.05</td>
<td>5</td>
</tr>
</tbody>
</table>

What If Measured Opacity Above Limit?

- Take engine out of service and perform required repair or maintenance
- Repeat opacity test after repair/maintenance
- Post-repair/maintenance opacity must be no more than 5% above opacity limit
- Equipment must remain out of service until measured opacity is no more than 5% above the opacity limit
U.S. EPA Tier 4 Alt PM Engine Retrofit Requirement

- Family Emissions Limit (FEL) Tier 4 Alt PM engines
  - PM certification standard essentially Tier 3
  - May be up to 20 percent of OEM’s U.S. production
- Highest level VDECS must be installed within one year of purchase or lease
- Retrofit not required for engines certified to primary Tier 4 PM emissions standards
Tier 4 Alt PM Engine EO

### CHE regulation section (p) requires written disclosure if engine is certified to Tier 4 Alt PM standards

- Must provide following disclosure on the bill of sale, lease agreement, or rental agreement:

  "When operated at a California port or intermodal rail yard, this engine is subject to the retrofit requirements of either subsection (e)(1)(B)3., (e)(3)(B)1.b., (e)(3)(B)2.b., or (e)(3)(B)3.b. of the California Air Resources Board’s Regulation for Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards."
Enforcement

Opacity Recordkeeping Requirements

- No reporting requirements
- Recordkeeping requirements:
  - To be kept with engine-specific maintenance records for 2 years
  - Records to be available to ARB staff upon request:
    - Maintenance records
    - Opacity test records
    - Repair records
Opacity Test Records Required

- Brand name and model of opacity meter
- Dates of last opacity meter and chart recorder calibrations
- Name of opacity test operator
- Name and address of facility contracted to conduct tests (if applicable)
- Engine make, model, model year, serial number, and opacity test date
- Opacity standard for tested CHE
- Measured opacity (three successive readings)
- Opacity test result: pass or fail

Post-Test Failure Repair Records Required

- Name of mechanic
- Date of repair
- Statement identifying nature of repair
- Itemized parts list
- Post-repair opacity test date
- Post-repair measured opacity (three successive readings)
- Post-repair opacity test result: pass or fail
Tier 4 Alt PM Engine Retrofit
Recordkeeping Requirements

- Recordkeeping same as for Tier 2 and 3 retrofit requirements
  - VDECS
    - VDECS type, manufacturer, model, serial number
    - Installation date
    - Level of control (1, 2, or 3); if not 3, include justification
    - Maintenance records
  - If no VDECS available – require documentation supporting non-availability
Next Steps

- ARB staff available for implementation and enforcement questions
- Enforcement begins October 26, 2015

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