Potential Changes to ARB’s Truck Inspection Programs

Public Workshop
El Monte, CA
August 25, 2016

California Environmental Protection Agency
Air Resources Board
Outline

• Background
• Potential Changes to Smoke Inspection Programs
• OBD Check Pilot Program
• Potential Future Inspection and Maintenance Program
• Next Steps
• Contacts
Schedule

- **Potential Changes: Heavy-Duty Vehicle Inspection Program (HDVIP)/Periodic Smoke Inspection Program (PSIP)**
  - Current Workshops: Aug/Sept 2016
  - Future Workshops: Planned Jan 2017
  - Board date: Planned Sept 2017
  - Implementation: 2018

- **Longer-term: Development of Potential heavy-Duty (HD) Inspection and Maintenance (I/M) Program**
  - Board date: Planned 2020
  - Implementation: Post-2020
Background
Heavy-Duty Truck Emissions

- Statewide HD truck (GVWR > 8,500 lbs) emissions
  - 33% of Statewide NOx
  - 26% of Statewide Diesel PM
Significant Steps Made to Reduce Emissions from HD Sector

• Engine Standards
  • 2007 standard: 0.01 g/bhp-hr PM with diesel particulate filters (DPFs)

• Truck and Bus Rule
  • Requires retrofit of DPFs on 2006 and older trucks
  • Turnover to 2010+ engines by 2023

These rely on properly functioning aftertreatment to significantly reduce HD truck emissions
Current On-Road HD In-Use Programs

- **HDVIP**
  - Random roadside inspections by ARB enforcement personnel for excessive smoke, tampering, and engine certification label compliance

- **PSIP**
  - Annual self-testing for California fleets of 2 or more
Current Smoke Inspection Requirements in the HDVIP and PSIP

- 40% opacity limit for 1991 & newer diesel engines
- 55% opacity limit for 1990 & older diesel engines
- Snap acceleration opacity test
- SAE J1667 compliant smoke meter
Opacity Limit Update Needed

• Improvements in engine design and the use of aftertreatment result in modern engines with lower opacity and PM emissions

• HD vehicles with properly functioning diesel particulate filters (DPFs) measure at near-zero opacity levels
Small Portion of Fleet Causes Excess In-Use PM Emissions

- Most trucks have 0% opacity
- Small portion of the fleet account for a vast majority of excess in-use emissions
- ~10% of the DPF equipped fleet accounts for about 70% of the excess emissions

ARB roadside testing data: 2011-2014
Planning Commitments

- Sustainable Freight Plan and Mobile Source Strategy
  - Near term: Address excess PM emissions by reducing the exhaust opacity limit.
    - Board Date: 2017, Implementation: 2018
  - Long-Term: Develop a “smog check” program for HD trucks
    - Implementation: post 2020

- State Implementation Plan (SIP) Commitments
  - No associated tons quantified for these proposed regulations
Potential Changes to HDVIP and PSIP
Potential Program Changes

• Program structure remains the same
  • Snap acceleration opacity test
  • SAE J1667 compliant smoke meter
  • Annual self testing for fleets of 2 or more

• Potential amendments to HDVIP/PSIP
  • Reduced opacity limit for DPF-equipped fleet
  • Training and certification of smoke testers
Lowering the Allowable Opacity Limit
Data Supports a Lower Opacity Level

ARB Research Contract 11-600

- SAE J1667 opacity tests were compared to engine dynamometer FTP cycles
- DPF was progressively damaged by drilling out holes in the cap to simulate broken DPFs from minor leaks to gross failures
- Properly functioning DPFs emit negligible PM emissions and no opacity
- Data suggests vehicles measuring at or above 5% opacity are emitting excess emissions beyond that of a properly functioning vehicle

Research conducted at National Renewable Energy Laboratory (NREL)
Measurement Variability at Low Opacity Levels

ARB Research Contract 11-600

- Three SAE J1667 certified smoke meters tested for comparison
- More than 10 Snap Acceleration tests performed per instrument at each level
- Smoke meters compare favorably with each other at low opacity levels (≈±1%)
- Data supports that current smoke meters are adequate to measure opacity levels in the 5%-8% range

Research conducted at National Renewable Energy Laboratory (NREL)
Potential Opacity Limit

- Majority of DPF-equipped vehicles have 0% opacity
- Small proportion of fleet constitutes significant portion of excess emissions
- A reduced opacity limit between 5%-8% is the current recommendation
- Staff estimates that 90-95% of the current HD on-road fleet would pass the recommended opacity limits

Staff requesting thoughts and feedback on recommendation for reduced opacity limit
Smoke Tester Training and Certification
Current Mechanic/Vehicle Testing Licensure Requirements

- **Light-Duty**
  - Repair shops and smog check facilities must apply for registration and obtain license to practice
  - Technicians must pass examination to determine minimum competency and qualifications are met

- **Heavy-Duty**
  - There are currently no state requirements that must be met before HD technicians can start practicing
ARB Staff Considering Required Certification for Smoke Testers

- Ensure HD smoke testers have sufficient training
  - Proper knowledge of the SAE J1667 testing procedures
  - Understanding of modern aftertreatment systems
Possible Methods of Certification

• Development of online course administered through ARB

• In person one-day course on HDVIP/PSIP protocols administered by California Council on Diesel Education and Technology (CCDET)

• Other options?

Staff requesting comments on potential development of certification and training courses
OBD Check Pilot Program for 2013+ Engines
HD OBD Background

• HD On Board Diagnostics (OBD) phased in beginning with 2010 engine model
  • Monitors vehicle components that can affect emission performance
  • Assists repair technicians in diagnosing and fixing problems
  • Only one engine family required to have OBD in 2010; others have Engine Manufacturer Diagnostic system (EMD)
  • Full OBD required for 2013 and newer model HD diesel engines
OBD Check Pilot Program

- Staff is seeking voluntary fleet participation for an OBD check pilot program
  - Fleets would work with ARB staff to:
    - Evaluate OBD data collection methods
    - Get preliminary information on fault codes and MIL light frequency
    - Consider how to best integrate OBD into a future program
  
- Collected data to be used to inform direction of future HD I/M program and potential inclusion of OBD checks in HDVIP/PSIP
Future HD Inspection and Maintenance Program
Long-Term: HD I/M Program Development

• HDVIP/PSIP amendments are first step toward a comprehensive HD I/M program

• Potential concepts that may be considered for comprehensive HD I/M program:
  • Focus on OBD for 2013 and newer model engines
    • Consider remote OBD/telematics
  • Vehicle testing for 2012 and older model engines
  • Require HD repair shop licensing/mechanic competency beyond that proposed for the HDVIP/PSIP amendments
HD I/M Supporting Research Efforts

- UC Riverside HD I/M Research Project
  - 24 month study, began Summer 2016
  - Evaluate potential test methods
  - Pilot demonstration program
  - Economic/environmental analysis

- Internal ARB Repair Durability Study
  - Measure emissions of high emitters pre- and post-repair
  - Recapture vehicles in 6 months to a year and retest

Staff searching for volunteer vehicles emitting excess PM and/or NOx emissions that need engine and aftertreatment repairs; ARB would pay for required repairs
Next Steps
Feedback Request: HDVIP/PSIP Amendments

- Staff is requesting comments related to the potential HDVIP/PSIP regulatory amendments
  - Comments on recommended opacity limit for DPF-equipped trucks
  - Should the opacity limit be lowered for non-DPF-equipped trucks?
  - Thoughts on potential approaches for smoke tester certification
  - Comments on OBD check pilot program to help inform future HD I/M program
Data Request and External Work Group Formation

• ARB is requesting additional data on:
  • Repair costs
  • Fuel economy benefits due to the repair of malmaintained vehicles
  • Reduction in vehicle downtime due to improved maintenance

• ARB staff to establish an external work group to discuss the above topics and other relevant HD I/M issues
Recap on Requests for Voluntary Fleet/Truck Participation

- **OBD Check Pilot Program**
  - Evaluate OBD collection methodology and share fault code/MIL light data
  - Provide input on direction of future programs

- **Staff Contact**
  - Ron Haste, P.E., Manager
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  - (626) 575-6676
Voluntary Fleet Participation

• Repair Durability Study
  • Procure vehicles with excess PM and/or NOx emissions
  • ARB will pay for repair costs
  • Vehicles would be required to be retested in 6 months to a year to assess repair durability

• Staff Contact
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ARB Contact Information

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Further Information

Webpage on opacity and HD I/M program regulatory development:
http://www.arb.ca.gov/msprog/hdim/hdim.htm

Join our list serve:
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(Choose mobile source related, Heavy-Duty Vehicle Inspection and Maintenance)