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

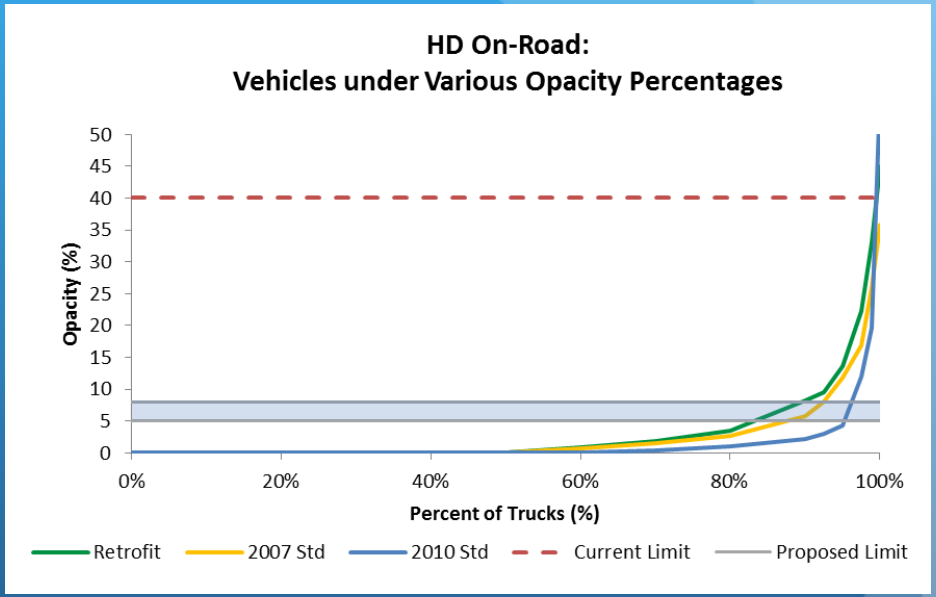
- 40% opacity limit for 1991 & newer diesel engines
  - 55% opacity limit for 1990 & older diesel engines
- Snap acceleration opacity test
- SAE J1667 compliant smoke meter

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



ARB roadside testing data: 2011-2014

- ~10% of the DPF equipped fleet accounts for about 70% of the excess emissions

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

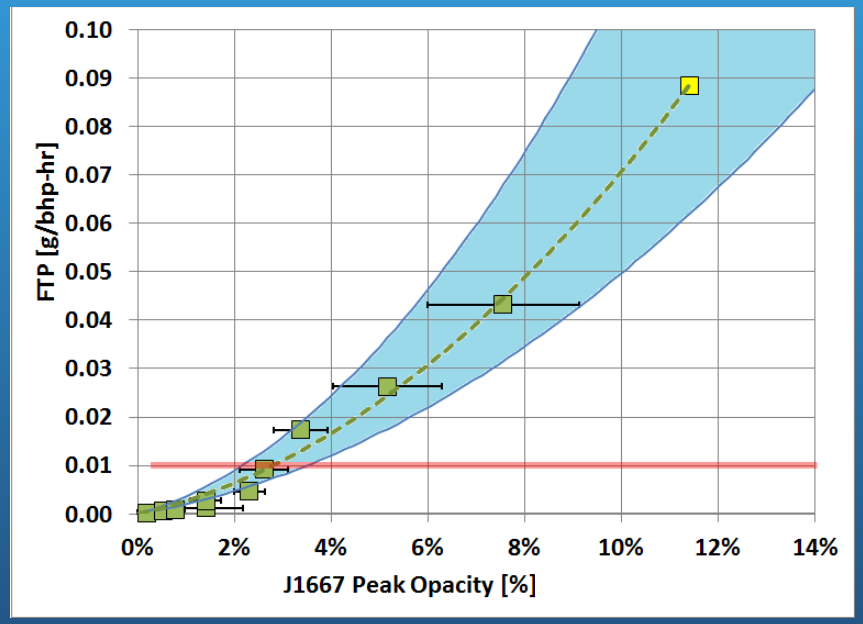
Potential Program Changes

- 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

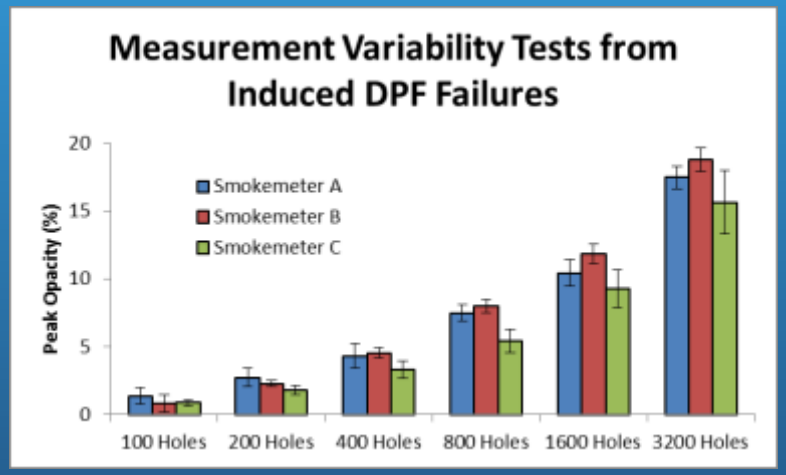


Research conducted at National Renewable Energy Laboratory (NREL)

- 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

Measurement Variability at Low Opacity Levels

ARB Research Contract 11-600



Research conducted at National Renewable Energy Laboratory (NREL)

- 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

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

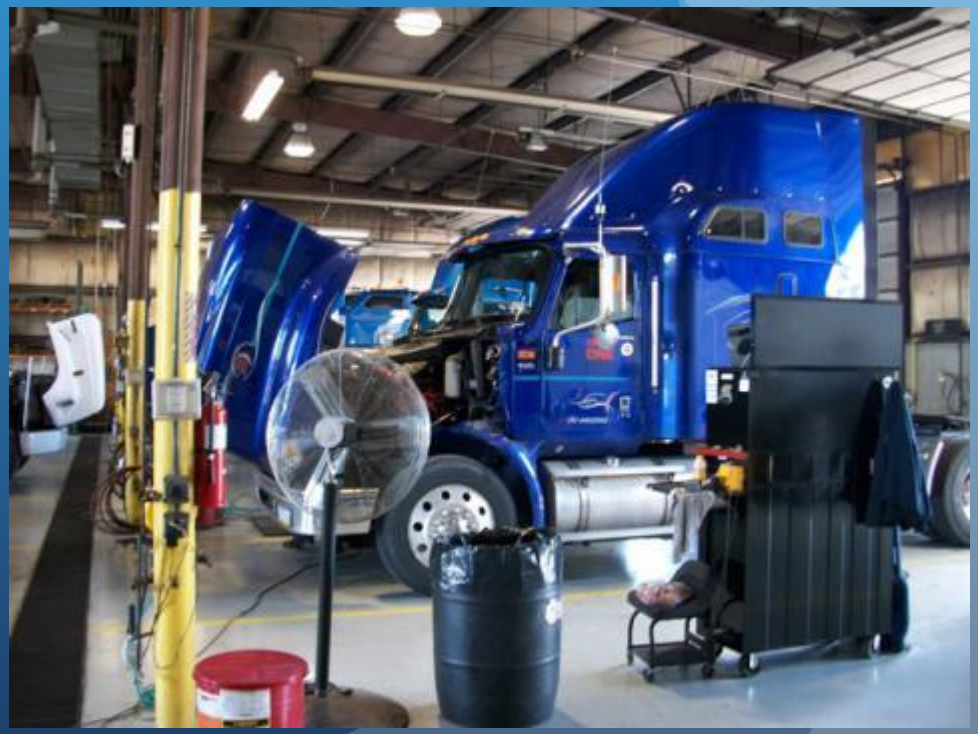
HD OBD Background

- 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
  - rhaste@arb.ca.gov
  - (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
  - Ron Haste, P.E., Manager
  - rhaste@arb.ca.gov
  - (626) 575-6676

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

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