

# On-Board Diagnostics Regulatory Update



California Air Resources Board  
Mobile Source Control Division

May 28, 2009  
Sacramento, California

# Today's Presentation

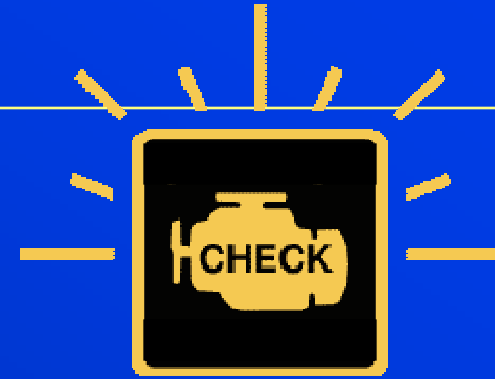
- Background
- Proposed Amendments
- Enforcement Regulation
- Cost Effectiveness

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# Background

- On-Board Diagnostic (OBD) systems
  - Mostly software in engine computer
  - Illuminates 'check engine light'
- OBD II
  - On passenger cars, trucks, SUVs since 1996
- Heavy-Duty (HD OBD)
  - Starts on 2010 and newer HD engines



# Where we are today

- 130+ million OBD II equipped cars in the U.S.
  - More than 50% of the in-use fleet
- 25 states in the U.S. using OBD II for I/M, including CA
  - Over 18,000 OBD II inspections a day just in CA
- First HD OBD engines to be launched next year

# Reasons for Changes

- Keep pace with technology
- SmogCheck and technician feedback and experience
- Certification staff experience
- Review previous round of adopted requirements
  - First review of HD OBD since adoption in 2005

# Regulatory Development

- Regulatory update work started in 2007
- Numerous meetings with industry
  - HD engine manufacturers, associations (e.g., EMA), suppliers
- Draft regulation released for Oct. 2008 workshop
- Draft enforcement regulation released Dec. 2008
- Primary stakeholders affected by regulations:
  - EMA, AAM, AIAM
  - Vehicle owners, repair technicians

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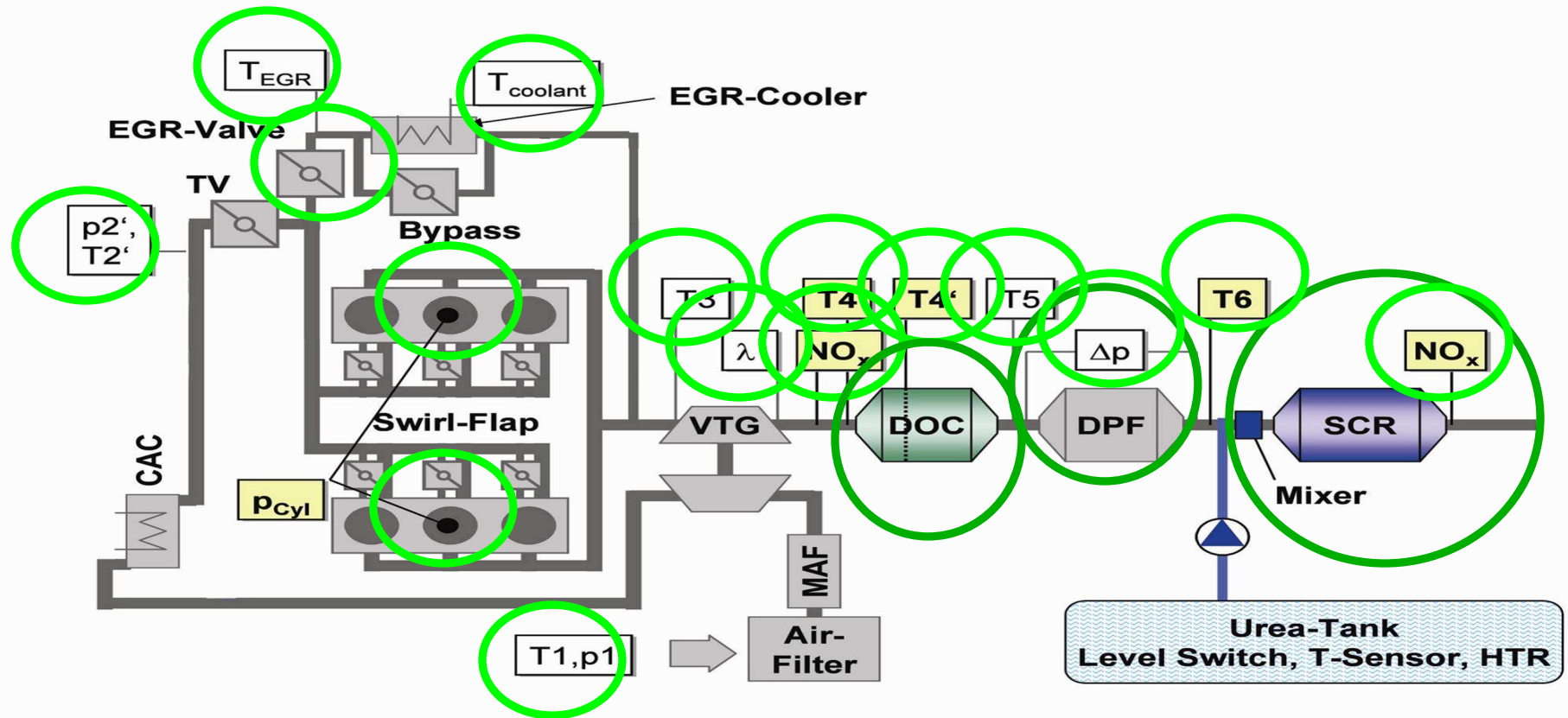
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# Typical Diesel Emission Controls

- have become increasingly complex
- need to work for ~1,000,000 miles





# HD OBD

## Diesel Amendments Summary

- Laundry list of smaller amendments
  - Clarifications, delays of specific requirements
- Reduced monitoring stringency
  - Relax 2010-2012MY thresholds for:
    - PM filter, NOx catalyst (e.g., SCR), and NOx sensors
  - Modified to reflect current state of technology

# HD OBD

## Diesel Amendments Summary

- Added requirements:
  - New emission controls or additional failure conditions
  - Leadtime provided as necessary
- Items include:
  - Any form of emission control strategies
  - Cold start emission controls
  - Improved cooling system monitoring
  - Additional standardized data for scan tools

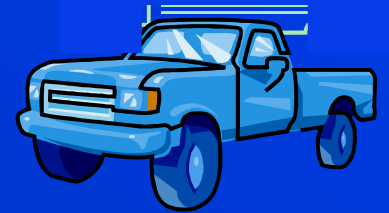
# Other Changes

- Number of requested changes rejected
  - E.g., relaxation of NMHC catalyst threshold
    - Most manufacturers on track to meet current requirement so no adjustment for technical feasibility
- Some changes reflect partial compromise
  - Requirement to account for adjustment factors kept
    - But less rigorous calculation procedure allowed and additional guidance to be provided in a mail-out



# OBD Harmonization

- Currently, two different OBD regulations
  - OBD II for light- and medium-duty vehicles
  - HD OBD for heavy-duty vehicles
- Some products span medium- and heavy-duty classes
- Proposed amendments modify both regulations to harmonize as much as possible



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# Enforcement Regulation Overview

- Ensures OBD system works correctly in-use
  - Stand-alone enforcement regulation
  - Very similar to existing light-duty regulation
- Details enforcement procedures
  - Vehicle/engine sampling
  - Pass/fail criteria
    - Relaxed in early years
  - Remedial action up to fines and recalls
  - Mandatory recall for most egregious cases

# Enforcement Regulation

## Manufacturer self-testing

- Requires emission testing
  - Engine-based (not vehicle) testing
- Requires manufacturers to do the testing
  - Procure and test limited number of engines
    - 1-3 engines per year (1 for most)
    - Additional 'like' engines tested if 1<sup>st</sup> one fails
  - Report results to ARB
- Basis for enforcement action if OBD system doesn't work

# Enforcement Regulation

## Industry Comments

- Imposes significant added cost and workload
- Recall jeopardy for self-testing inappropriate
  - Question legal authority
- Staff Response:
  - Testing necessary based on light-duty experience
    - Cost calculated at < \$2/engine sold
    - Small fraction of certified engine families tested
  - Recall is appropriate for serious non-compliances
    - Jeopardy limited in early years
    - Within ARB authority to ensure compliance
      - 4+ existing regulations require self-testing



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# Cost Effectiveness of Proposed Requirements

- Minimal change to original cost calculations
  - Updated total cost for HD OBD = \$134/engine
    - < 2% retail price of engine
    - Includes cost for new enforcement testing
- Emission benefits:
  - ~3 tpd ROG, 38 tpd NOx, 0.4 tpd PM in 2020
- Cost-effectiveness very good:
  - \$0.15/lb of ROG+NOx and \$22.50/lb of PM
  - Cost includes repair costs

# Summary

- Proposed amendments necessary to ensure emissions remain low for entire life
- Proposed enforcement regulation essential for an effective HD OBD program
- Staff recommends adoption of amendments and enforcement regulation
  - With 15-day changes