OBD II Background

- Adopted in 1989
- On every 1996 and newer vehicle.
- Monitors virtually every emission related component
- Illuminates warning light and stores fault info for repair technicians
Status of OBD II

- On 100 million vehicles in the U.S.
- Over 3 trillion miles covered
- Feedback indicates program is working
Percentage of Cars With High Mileage

- >100k: 60% (1995), 44% (2001)
- >125k: 50% (1995), 27% (2001)
- >150k: 17% (1995), 41% (2001)

Odometer miles: >100k, >125k, >150k
LEVI II and OBD II Programs

• LEV II program targets near zero fleet emissions for useful life (120k miles)
• Certification and In-Use Compliance programs verify useful life standards
• OBD II program targets high mileage vehicles beyond useful life
Reasons for Proposed Changes

- Keep pace with technology
- Areas for improvement
- Proper OBD II performance is critical for I/M
- Stronger enforcement needed
Outline

- Technical requirements/revisions
- Revisions affecting I/M and repair technicians
- Malfunction thresholds
- Enforcement strengthening
NOx Catalyst Monitoring

- Currently, only HC conversion efficiency monitored
- LEV II program requires 75% NOx reduction from LEV I program
- NOx conversion efficiency now needs to be monitored
NOx Catalyst Monitoring Proposal

- Phase-in for LEV II vehicles
  - 2007 and subsequent model years
    - 1.75 x HC or NOx standard (2.5x for SULEVs)
  - 2005 and 2006 model years
    - 3.5 x NOx standard
- Will refine existing catalyst monitoring approach
“Cold Start Strategy” and Secondary Air System Monitoring

- Most emissions occur at cold start
- Many emission control components and strategies affect catalyst warm-up
- Propose monitoring during warm-up
- 2006-2008 phase-in
Additional Technical Revisions

- Diesel catalyst and particulate matter (PM) trap monitoring
- Misfire monitoring
- Variable valve timing (VVT)
- Most changes required for 2005 and newer vehicles.
Outline

• Technical requirements/revisions
• **Revisions affecting I/M and repair technicians**
• Malfunction thresholds
• Enforcement strengthening
Standardization changes

- OBD II standardization requirements
- Scan tool communication, connector, fault codes, etc.
- Necessary in I/M
- Help technicians make effective repairs
Changes to help I/M programs

- EPA requires OBD II system in state I/M programs
- Improvements include:
  - Electronic VIN
  - Readiness status
  - Connector location
Communication Protocol

- Scan tools talk to vehicles via standardized protocols
- Controller Area Network (CAN) protocol
  - allowed in 2003 and required in 2008
  - More data at faster rates
  - Phase-out of current protocols
- Heavy-duty/medium duty communication protocol (J1939)
Verification of Standardized Requirements

- Testing of production vehicles
- Verify compliance with standardized features necessary for I/M testing
- Required for 2005 and newer vehicles
Outline

• Technical requirements/revisions
• Revisions affecting I/M and repair technicians
• Malfunction thresholds
• Enforcement strengthening
Monitoring Thresholds

- Major OBD II monitors calibrated to $1.5 \times$ standard
- Industry wants higher levels for LEV II program vehicles
Monitoring Thresholds (cont.)

- LEV II/ULEV II standards do not necessitate less stringent thresholds
- Proposed thresholds necessary to achieve LEV II emission benefits
- Production vehicles already meet requirements
- Flexibility to revise thresholds if necessary
SULEV Monitoring Thresholds

- Proposed SULEV threshold of 2.5 x standard
- Accounts for current emission measurement technology
- Allows same levels of individual component deterioration as ULEV I
- Three manufacturers selling SULEVs meeting these thresholds
NMOG Threshold

- **Threshold x Standard**
  - **Standard**
  - **Staff Proposed Threshold**
  - **Industry Threshold**

- Emission Standards:
  - ULEV I
  - ULEV II
  - SULEV

- Threshold Values:
  - ULEV I: 1.5
  - ULEV II: 1.5
  - SULEV: 2.5, 8.3
NOx Threshold

<table>
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<tr>
<th>Emission Standard</th>
<th>Staff Proposed Threshold</th>
<th>Industry Threshold</th>
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<tr>
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Cost Effectiveness of Thresholds

- Proposed thresholds are cost-effective:
  - ~ $5 per pound for 120k-230k miles
  - Includes costs to consumers and the emission benefit
- Industry’s proposed thresholds:
  - $4.75 to $6.50 per pound
  - nearly 9 tons per day fewer emission reductions
Outline

- Technical requirements/revisions
- Revisions affecting I/M and repair technicians
- Malfunction thresholds
- **Enforcement strengthening**
OBD II-Specific Enforcement

- Enforcement testing since 1994 model year
- Enforced under OBD II and tailpipe procedures
- Existing procedures not adequate
OBD II Compliance and Enforcement
Three Major Improvements

• Increase in required testing
• Standardized method for measuring in-use performance
• OBD II-specific enforcement procedures
Production Vehicle Evaluation
-Monitoring Requirements

• Identify defects early
• Every diagnostic tested
• Testing early in production
Production Vehicle Evaluation - Standardization Requirements

• Ensure vehicles properly communicate OBD II information
• Development of “Gold Standard” test equipment
Monitoring Frequency

- Standardize method to measure frequency
- Software tracks how often monitoring occurs
- Minimum frequency equates to detection within two weeks
Enforcement Regulation

- Section 1968.5 is OBD II specific enforcement procedures
- Detailed enforcement procedures to be followed by staff
- Addresses shortcomings of using tailpipe procedures
- Applies to 2004 and subsequent model years
Enforcement Procedures/Criteria

- Establishes specific testing procedures
- Defines sampling and testing procedures
- Defines criteria for determining compliance
- Eliminates provision to offset OBD II non-compliance with “over-compliance” on tailpipe emissions
Enforcement - Remedial Action

- Criteria to determine appropriate remedial action
- Remedial action varies from nothing up to recall and fines
- Mandatory recall if a major monitor is non-functional
Summary

- LEV II program fleet has near zero emissions.
- Fleet must be maintained at near zero emissions for entire life
- Proposed changes are feasible and necessary
- Proposed enforcement regulation necessary for an effective OBD II program