Proposed Amendments to and New Requirements for On-Board Diagnostics II (OBD II)

September 25, 2015

Today's Presentation

- Background
- Proposed Amendments and New Requirements
- Summary

Background

- On-Board Diagnostic (OBD) systems
  - Detect emission-control system problems
  - Reduce in-use emissions through faster identification/repair of problems
- How do they work?
  - Mostly software in engine computer
  - Illuminates ‘check engine light’ when fault is detected
  - Standardized information for repair technician to help fix vehicle

Benefits of OBD to Consumers

- Identifies emission-related components covered under warranty
  - Eliminates unnecessary repairs
  - Fault codes and other scan tool data give information about area of malfunction or a specific component
- Consumer protection
  - Durability incentivized by cost of warranty repairs / customer satisfaction
- Early Detection of Malfunctions
  - Prevent secondary malfunctions (e.g., detect misfire before catalyst damaged)

OBD: Where We Are Today

- OBD on vehicles since 1996
- 150+ million OBD II vehicles on the road in the US
- OBD II systems are used as basis for emission inspection programs throughout U.S.
- OBD-based Smog Check has been shown to be more effective and less expensive than traditional tailpipe testing or other inspection methods

Reason for Changes

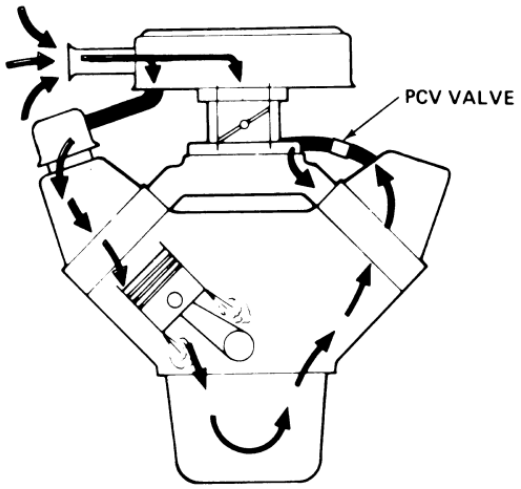
- Amendments needed to address LEV III emission standards
  - OBD helps ensure emission reductions from LEV III program
- Program updates occur regularly
  - Technology forcing regulation
  - Periodic reviews to check progress
- Changes affect light- and medium-duty vehicles

LEV III Emission Malfunction Thresholds

- LEV III differs from LEV II
  - Combined NMOG and NOx tailpipe standards
  - New lower vehicle emission categories (ULEV70, ULEV50, SULEV20)
  - Lower PM tailpipe standards
- Proposal
  - Thresholds for combined NMOG+NOx standards
  - Thresholds for new lower emission categories

More Stringent Requirements

- Proposed changes to crankcase ventilation (CV) system monitoring requirements
  - Improved monitoring of hose failures in CV system from 2023MY for gasoline and 2025MY for diesel
- Proposed addition of evaporative system leak monitor testing
  - Align with U.S. EPA's Tier 3 requirements for certification and in-use programs



Changes to Streamline OBD

- Address OBD implementation in light of Advanced Clean Car program
  - Vehicle design and emission controls more complex -emission control more heavily integrated with powertrain
  - Better defining limits of OBD requirement applicability improves clean vehicle implementation process
- Amendments proposed to exempt components with little or no emission benefit and to assist in OBD certification

Standardized Data

- Standardized data has always been integral to OBD
  - Ensures access to repair emission-related faults
- Current data also supports other ARB needs:
  - Smog Check inspections
  - OBD certification and compliance testing
  - Tailpipe certification and emission compliance testing
- Today's proposal contains added data for these purposes
  - Would also include GHG data for the first time

Data for Real-World Emissions Evaluations

- Investigation of differences between real-world and test-cycle performance
  - Verify emission benefits achieved in-use
- National Academy of Sciences highlighted importance of understanding real-world GHG emissions in 2015 report
  - Critical to determine actual benefits and for consideration when establishing future standards

Proposal Specific to Plug-in Hybrids

- Data to quantify real world usage
  - Report total gasoline and electricity used and miles traveled
- Verify current and future regulations properly account for emissions

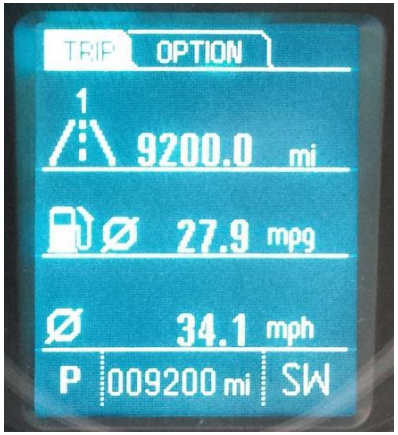
Proposal for “Off-cycle” Technologies

- Current GHG standards grant credits for technologies with additional benefits in-use
- Data would help quantify and validate these benefits
  - Report cumulative time technology is activated and/or how often it achieves the desired result

Proposal for All Vehicles

Data to evaluate real-world GHG/fuel economy

Proposed Data Parameter	Example Data
Total distance traveled	25,388 miles
Total fuel consumed	738.3 gallons
Total vehicle / engine run time	887.7 / 842.4 hours
Total vehicle / engine idle time	148.1 / 112.4 hours
Total city / highway drive time	485.1 / 254.5 hours
Total Positive Kinetic Energy (PKE)	9,278,842.8 m/sec^2
Total Engine Torque (work)	3,409,091.4 Newton-meters



Addressing Concerns

- Concern #1: Data identifies driver habits

  Response:
  - Content minimized and stored in aggregate only
  - Purposefully structured to only quantify vehicle (not driver) GHG performance
  - No location or personally identifiable information

Addressing Concerns (cont.)

- Concern #2: Data transmitted or obtained without permission

  Response:

  – Access to data requires physical connection and vehicle owner permission
  – ARB will only collect data from voluntary participants

Addressing Concerns (cont.)

- Concern #3: Data can be stolen or misused

  Response:

  – No new access point to vehicle created

  – Proposed data often already on cars (fuel economy displays)

  – Data collected by ARB will be stored without specific vehicle VIN

Costs

- Minimal impacts to cost
  - $5.11/vehicle to vehicle manufacturer
  - $5.43/vehicle to consumer (<0.02% of retail price)
- Preserves benefits of LEV III program

Summary

- Proposed changes necessary to ensure successful OBD II and LEV III program
  - Balance of changes to streamline certification and strengthen the program
- Staff recommends adoption of amendments with 15-day changes
  - Technical clarifications, do not affect stringency