

# **New ARB OBD II Changes that affect I/M**

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# Background


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- Changes were adopted to ARB OBD II requirements in April 2002
- First revisions since pilot OBD I/M testing began
- Feedback from these programs led to a significant number of the changes

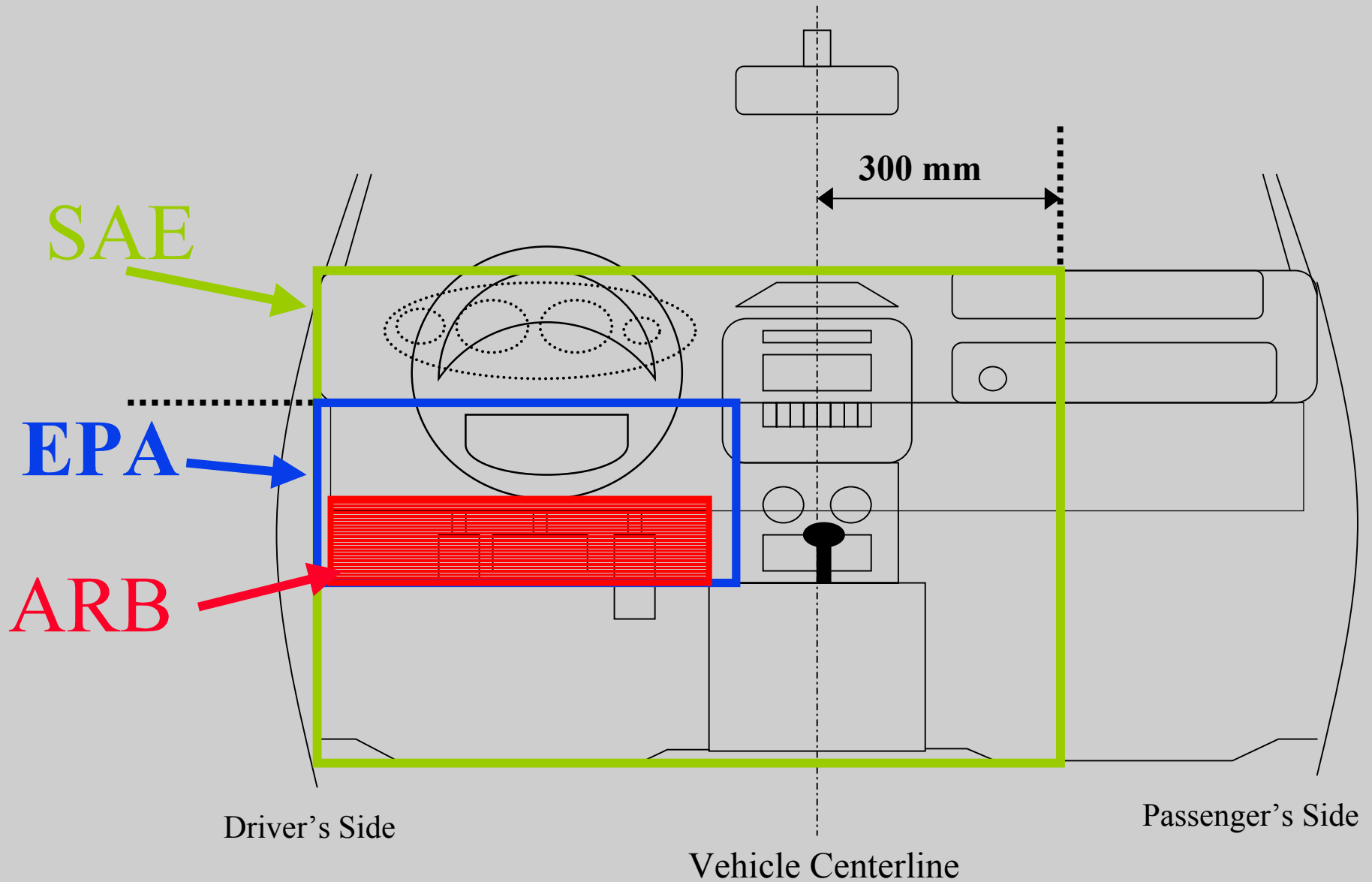
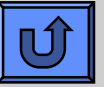
# Outline

- Inspection process
- Readiness status consistency
- Communication protocol
- Production vehicle testing
- Monitoring frequency
- More repair information
- Monitor “sensitivity”
- Stronger enforcement capability

# Inspection Process

- Connector Location
  - Smaller allowable area for connector 
  - Labels for any covers must say “OBD”
- Bulb Check
  - Minimum of 15-20 seconds for MIL on
  - Must read MIL commanded “off” during check
- Access to VIN through Scan Tool
  - Required on all 2005 and newer vehicles

# Connector Location



# Readiness Status

- Improved consistency in setting/clearing
  - Set to “complete/ready” sooner if no malfunction present
  - Clearer specification for “continuous” monitors
- Voluntary indication of status via MIL
  - After KOEO bulb check, MIL will flash if one or more “not ready”
- Consistent language for I/M equipment
  - Changes from readiness “codes” to “status”
  - Try to eliminate confusion between monitors “supported”, “continuous”, “complete”, “yes”, and “ready”

# Readiness Status (cont)

- More data to determine if battery recently disconnected/ fault codes cleared
  - Distance traveled since memory erased
  - Number of warm-up cycles since memory erased
  - Phased-in on 2005-2008 vehicles
  - Can be used to better decide when to reject vehicles
- More data to set readiness status after repair
  - “Live” data lets techs know on each drive cycle if monitors will run
  - Combined with service info to better prepare a vehicle for re-inspection

# Communication Protocol

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- Four protocols currently allowed
- Single protocol (CAN) required by 2008
  - Minimizes protocol mistakes
  - Necessary for newer technology cars
  - More powerful for repair technicians
- New production vehicle evaluation (PVE) testing

# PVE Testing Part 1

## Standardized Requirements

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- Simulates an OBD I/M test and verifies:
  - Proper communication
  - Car outputs valid data
- Uses “Gold Standard” engineering equipment to ensure compatibility with I/M test equipment
- Required each year on every make and model beginning in 2005

# PVE Testing Part 2

## Monitor Verification

- Thorough testing required on 2-6 vehicles per manufacturer per year from 2004 on
- Every single diagnostic tested (~150)
- Faults implanted to make sure every diagnostic correctly identifies faults
- Catches problems early and quickly

# Monitoring Frequency

## “Rate-based”

- Standardized method to measure frequency
- On-board software tracks how often monitoring occurs and how often car is driven
- Manufacturers must meet a minimum frequency on in-use vehicles
  - Frequency measured as a “ratio” of monitoring to driving
- Minimum frequency equates to detection within two weeks for most drivers
- Targets “hard to run” monitors

# PVE Testing Part 3

## Monitor Performance

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- Testing of 15 vehicles per year per representative make/model (15-300 vehicles per manufacturer)
- Must collect data showing how often monitors are operating on in-use vehicles
- Data reported back to ARB
- Helps identify problematic monitors early

# More data for repair techs

- Doubled data available through a scan tool
  - Added 15 new parameters such as fuel level, baro, catalyst temp, purge valve duty cycle, EGR duty cycle
  - More data to use for repair and to set readiness codes
- Scan tool data update rate 10-50 times faster
  - Current max speed of 1 parameter per 100 msec
  - New max speed of 6 parameters per 10-50 msec
  - Helps technicians identify problems/glitches

# More data for repair techs (cont)

- Fault code specifics
  - More restrictions on using manufacturer-specific “P1xxx” codes instead of generic “P0xxx” codes
  - More detailed fault codes to better separate faults for techs--better pinpointing of detected problem
- Pending fault codes
  - Required for all failures
  - Must be stored/erased in consistent manner from manufacturer to manufacturer
  - Allows techs to better confirm repairs

# More data for repair techs (cont 2)

- Better standardized test results
  - Allows tech to see/interpret results of the “major” monitors the last time they ran
  - Helps confirm proper repairs
- Data to more easily set readiness codes following repairs
  - For each monitor in the readiness status, gives instant feedback to tech on this drive cycle
  - Identifies if each monitor is enabled/disabled/done testing this trip

# Monitor “Sensitivity”

- OBD II has always been “technology-forcing”
- Requires continual review to make adjustments where necessary
- ARB has made changes in the past...
  - Phase-ins have often been extended
  - Misfire monitor was “desensitized” in 1996
  - Catalyst monitor threshold was changed from 1.5 to 1.75 x standard in 1996

# Monitor “Sensitivity” (cont)

- Latest changes continue that trend
  - Thresholds for SULEV vehicles increased from 1.5 to 2.5 x std
  - Three cars already meet these levels (one actually at 1.5 x std, two at 2.5 x std)
  - Comparison of component fault criteria from ULEV and SULEV (how “bad” does an oxygen sensor have to be before it turns on the MIL?)
  - 2.5 x std does not require manufacturers to “tighten” the fault criteria (component still has to deteriorate just as much on a SULEV as it does on a ULEV)

# Monitor “Sensitivity” (cont 2)

- ARB will continue to watch the program closely...
  - Required to report back every two years to the Board for updates/revisions found to be necessary
  - Feedback from I/M, technicians, and manufacturers an important part of the process

# Enforcement Regulation

- Adopted separate OBD II enforcement regulation
- Applies to 2004 and subsequent model years
- Provides ARB with significantly improved enforcement authority to pursue correction of cars
  - Clarifies OBD II is a stand-alone ARB requirement
  - Makes sure enforcement decisions are made based solely on OBD II system performance

# Enforcement Regulation

- Details test procedures, pass/fail criteria, and guidelines for remedial action (e.g., recall)
  - Even requires mandatory recall in limited cases where the problem is very serious
  - Example-- if problem causes the vehicle to be unable to be tested properly in OBD-based I/M
- Provides increased incentive to manufacturers to do the job right

# Summary

- A substantial number of the latest ARB revisions are directly targeted at making it more easier to use in I/M
- Changes increase vehicle manufacturer responsibility for doing the job right
- Changes give I/M test personnel more data to use
- Changes help repair techs better find and fix the problem (and prepare the vehicle for re-inspection)