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OFFICE OF
AIR AND RADIATION

Memorandum

Subject: Improving I/M Performance and OBD Monitor Readiness

From: Leila Cook, Manager
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To: Air Program Managers
Regions I-X

This memorandum transmits an updated list of vehicles that exhibit issues related to OBD monitor readiness (formerly known as Appendix D[1]) and makes suggestions for how Inspection/Maintenance (I/M) programs can improve operational performance by addressing monitor readiness. I suggest this list be sent to all states in your Region that have I/M programs. This list will also be published on OTAQ's website and the OBD Clearinghouse. The OBD Clearinghouse has all of the referenced technical service bulletins.

Over the past few years, the Office of Transportation and Air Quality has worked with states and its contractor, ERG, to gather data on OBD inspections and investigate OBD monitor readiness problems. We have analyzed tens of millions of data records, identified potential problems, and worked with vehicle manufacturers to address these problems. The result is that we have prepared an updated list of vehicles that have OBD monitor readiness issues.

We now have well over 10 years of experience conducting OBD inspections and it is worthwhile to consider best practices to use in conducting these tests. In 2001, when we published guidance for states on conducting OBD tests, we recommended that states test older vehicles (model years 1996-2000) even if one or two monitors were not ready, and test newer vehicles (model years 2001 and newer) if one monitor was not ready (see § 51.357(a)(5) of the CFR). In light of our experience over the past decade, we would now suggest a more refined approach to monitor readiness. We are concerned about this because allowing vehicles to be tested without the monitors ready means there is some loss in emission reduction benefit for the program since some unready monitors may mask emission related problems with the vehicle. With this in mind, we have the following recommendations for I/M programs to consider when it comes to the general population of vehicles (i.e., not those listed on the attached readiness exception list):

[1] Appendix D was part of the June 2001 guidance document, "Performing Onboard Diagnostic System Checks as Part of a Vehicle Inspection and Maintenance Program" (EPA420-R-01-015) available online at http://www.epa.gov/otaq/regs/im/obd/r01015.pdf

1. Allow only an evaporative system monitor to be not ready.
   The evaporative system monitor is the most difficult one to set because it often requires the vehicle to be operated within a specific temperature regime. Since the weather doesn't always cooperate with this requirement, getting this monitor to set can be time consuming. Thus, we recommend that states require all monitors to be set except for the evaporative system monitor.
2. Never allow the catalyst or O_2 sensor monitors to be not ready.
   Rather than a blanket exemption allowing any monitor (or two for older vehicles) to be not ready, limit the monitors that are allowed to be not ready. For example, the catalyst and the oxygen sensor monitors should always be required to be ready.
3. Never allow monitors previously ready or those that have exhibited a MIL on to be not ready on retest.
   All of the monitors that were ready on the initial test should be capable of setting and required to be ready upon retest. An exception might be for the evaporative monitor, as discussed above, assuming there was no evaporative system related failure indicated.
4. Consider providing motorists with data loggers that indicate when monitors are ready.
   When a motorist presents for an inspection with monitors unready, an inexpensive data logger could be installed in the OBD port that would provide the motorist with a visual indicator of when the monitors are all ready and the vehicle can be returned to the station for a retest. This, combined with any information available on appropriate driving cycles to exercise the monitors, will reduce the need for multiple trips. This option can be used in conjunction with any of the options described above.

We recommend that states employ these options to improve the emission reduction benefits of the I/M program. Use of these more restrictive requirements would, at least in the short run, increase rejection rates because of unreadiness. In time, however, that problem should lessen as repair technicians and motorists adjust to the change. A phased approach might make sense to prevent high volumes of rejection initially (e.g., start with the newest model year vehicles). We would be happy to answer any questions or provide any needed assistance to states interested in these recommendations. We are not planning, however, to make any changes in I/M regulations to require these options.

Please note that the attached list is designed around the existing guidance on monitor readiness. If a state wishes to employ one or more of the suggestions in this memo, a revised approach on problem vehicles would be necessary. We would be happy to work with any state that wishes to customize a list for a more restrictive monitor readiness approach.

Should you have any question please contact me or have your staff contact Gene Tierney at (202) 343-9267 or Tierney.Gene@epa.gov.

Attachment

OBD ReadinessTestability Issues[1]				
Make	**Model Year**	**Model**	**Problem**	**Action**
Acura	1997	2.5 TL	Trouble communicating with some scan tools	Attempt communication with a different scan tool. See OBD clearinghouse for more information.
Audi and Volkswagen	1996-2002	All models with non-OEM stereos	If OEM stereo has been replaced with an aftermarket unit, the OBD system may not communicate with and may damage the scan tool	Ensure scan tool has complete current/voltage override protection. For more information, see VW Technical service bulletin 02-03 dated June 10, 2002.
Chrysler	1996 built prior to 11/21/95	Cirrus, Sebring, Sebring Convertible, Concord, LHS	All monitors reset to incomplete upon every ignition key-off.	Recall campaign #678 applies to California certified vehicles in California. TSB #18-005-01 applies to all other vehicles with a lifetime warranty.
Chrysler	2010 built prior to 2/20/10	300 with 3.5L engine and 5-speed automatic transmission	Evaporative Leak Detection Monitor may not set to ready	TSB# 18-008-10 Revision A
Dodge	1996 built prior to 11/21/95	Stratus, Intrepid, Neon, Avenger	All monitors reset to incomplete upon every ignition key-off	Recall campaign #678 applies to California certified vehicles in California. TSB #18-005-01 applies to all other vehicles with a lifetime warranty.
Dodge	1996	Stealth	All monitors reset to incomplete upon every ignition key-off	These vehicles are not reflashable and should be tested without regard to monitor readiness
Dodge	2003	Dakota, Durango and Ram Trucks with 4.7L engine and California or 50 state certified.	Catalyst monitor readiness status may indicate not supported	TSB#18-032-10 with lifetime warranty
Dodge	2003	Ram Truck with Cummins 5.9L diesel engine and California certified	MIL may illuminate erroneously. Comprehensive component monitor status may not set to ready	Recall Campaign #K01
Dodge	2004-5	Ram Truck with Cummins 5.9L diesel engine and California certified	Comprehensive component monitor status may not set to ready	TSB#18-030-10 with lifetime warranty
Dodge	2006-7	Ram Truck with Cummins 5.9L diesel engine.	Fuel system monitor and comprehensive component monitor status may not set to ready	Recall campaign #K01 applies to California certified vehicles. TSB#18-017-10 with lifetime warranty applied to federal certified vehicles.

[1] *Formerly known as Appendix D, this table lists specific vehicle makes and models with OBD readiness issues along with resolutions for I/M programs to use at their discretion to overcome those issues.*

OBD ReadinessTestability Issues[1]				
Make	**Model Year**	**Model**	**Problem**	**Action**
Dodge	2007 built prior to 01/06/07	Ram Chassis Cab with Cummins 6.7L diesel engine	Trucks are not equipped with oxygen sensors but oxygen sensor and oxygen sensor heater monitors may report as not ready. Comprehensive component monitor status may not be set to ready	Recall campaign #K01 applies to California certified vehicles. TSB#18-017-10 with lifetime warranty applied to federal certified vehicles.
Dodge	2010 built prior to 2/20/10	Charger, Challenger with 3.5L engine and 5-speed automatic transmission	Evaporative leak detection monitor may not set to ready	TSB# 18-008-10 Revision A
Eagle	1996 built prior to 11/21/95	Vision, Non-turbo Talon	All monitors reset to incomplete upon every ignition key-off	TSB #18-005-01 applies with a lifetime warranty
Eagle	1996	Summit, Summit Wagon	All monitors reset to incomplete upon every ignition key-off	These vehicles are not reflashable and should be tested without regard to monitor readiness.
Eagle	1996-8	Talon with 2.0L Turbo	All monitors reset to incomplete upon every ignition key-off	These vehicles are not reflashable and should be tested without regard to monitor readiness.
Ford	2000-2002	All	Evap monitors may be difficult to complete	Follow recommended drive cycles. See OBD clearinghouse. Otherwise test as normal.
Ford	2003	Focus	Monitors may be difficult to complete	Powertrain control module needs to be updated. See TSB 06-7-5. Otherwise test as normal.
Hyundai	2002	Sonata	Monitors are difficult to complete; perform drive cycle 2 times	Follow drive cycle in TSB #02-36-030 applies. Otherwise test as normal.
Hyundai	2003	Tiburon	Will not communicate with generic OBD test equipment	A manufacturer recall is in effect; recall campaign #057 and Hyundai TSB #03-01-003-01. Otherwise test as normal.
Infiniti	1996	All models	Catalyst and evaporative system monitors are difficult to complete	Follow drive cycle in TSB #NTB98-018, February 18, 1998. Otherwise test as normal.
Jeep	2005-6	Wrangler	Oxygen sensor heater readiness status bit remains incomplete.	TSB #25-001-07
Jeep	2010-11 built before 09/02/10	Wrangler with 3.8L engine	Downstream oxygen sensor monitor may not set to ready	TSB #18-027-10
Maserati	2005+	All models	VIN may not display properly on hand held scan tools	See TSB# MTB 148A Writing
Mitsubishi	1996-1998	All models	Catalyst monitor is difficult to complete	The OBD readiness criteria for this vehicle allow two monitors to be incomplete. Test as normal.

OBD ReadinessTestability Issues[1]				
Make	**Model Year**	**Model**	**Problem**	**Action**
Mitsubishi	1998-2001	Montero, Montero Sport, Diamante, 3000GT, Mirage, Galant, Expo/Expo LRV, and Eclipse models (except 2.0L non--turbo 420A engine models)	Some monitors are difficult to complete	Follow recommended drive cycles in Mitsubishi service manual. Otherwise, test as normal.
Nissan	1996-1997	All models	Catalyst and evaporative system monitors are difficult to complete	Follow recommended drive cycles. See Nissan TSB #NTB98-018, January 3, 2002. Otherwise, test as normal.
Nissan	1999-2006	All models	Monitors can be difficult to complete	Follow owner's manual drive cycle to achieve readiness. Otherwise, test as normal.
Plymouth	1996 built prior to 11/21/95	Breeze, Neon	All monitors reset to incomplete upon every ignition key-off	Recall campaign #678 applies to California certified vehicles in California. TSB #18-005-01 applies to all other vehicles with a lifetime warranty.
Saab	1996-1998	900 (B234i with Motronic 4.1)	Monitors are difficult to complete	Saab Service Instruction No. 248 describes the correct drive cycle for completion of the monitors. Otherwise, test as normal.
Saab	1996-1998	All models	Catalyst and evaporative system monitors are difficult to complete	The OBD readiness criteria for this vehicle allow two monitors to be incomplete. Test as normal.
Subaru	1996	All models	Readiness cleared at key-off	Scan vehicle for MIL illumination without regard to readiness.
Suzuki	2001	Aerio	Monitors can be difficult to complete	Follow drive cycle. See OBD Clearinghouse or Suzuki service information.
Suzuki	2004	Forenza	Monitors can be difficult to complete	Follow drive cycle. See OBD Clearinghouse or Suzuki service information.
Toyota/Lexus	1996-2006	All models	Monitors can be difficult to complete	Follow drive cycles in Toyota service information.
Toyota	1996-1997	Tercel, Paseo	Evaporative system monitor will never complete or is unsupported	The OBD readiness criteria for these model years allow two monitors to be incomplete. Test as normal.
Volvo	1996-1998	All models excluding the 850 Turbo	Catalyst and evaporative system monitors are difficult to complete	Follow recommended drive cycles in Service Bulletin 2-23-0056. Otherwise test as normal.
Volvo	1996	850 Turbo	Vehicle clears readiness at key-off	Scan for MIL illumination without regard to readiness status. See Volvo SB-2-23-0056.
Volvo	2004-2006	S40, V50	Air conditioning monitor mistakenly set to supported instead of unsupported	Ignore A/C monitor status and otherwise test as normal.
Volvo	2005-2007	XC90	Air conditioning monitor mistakenly set to supported instead of unsupported	Ignore A/C monitor status and otherwise test as normal.

Flex Fuel Vehicle Testability Issues[2]					
Model Year	**Model**	**Engine**	**Engine Family and VIN**	**Problem**	**Action**
Chrysler					
1998	Chrysler Caravan and Town and Country / Dodge Caravan / Plymouth Voyager	3.3L V-6 (E85)	WCRXT03.32BP (VIN 8th digit: G)	All monitors disabled for operation >E30 and ethanol fuel content learning. Desensitized system monitors: • fuel system rail check only for >E30; • fuel system rich for >E50; • fuel system lean and misfire for E0-E10 and coolant temp >230 deg. F; • purge flow check.	Test without regard to monitor readiness
1999	Chrysler Town and Country / Dodge Caravan / Plymouth Voyager	3.3L V-6 (E85)	XCRXT03.32BP (VIN 8th digit: G)		
2000	Chrysler Caravan, Voyager, and Town and Country / Dodge Caravan / Plymouth Voyager	3.3L V-6 (E85)	YCRXT03.32BP (VIN 8th digit: G)		
Ford					
2002	Ford Ranger 2-wheel drive	3.0L V-6 (E85)	2FMXT03.02F6 (50 State) (VIN 8th digit: V)	Monitors Disabled for operation >E10 blends: catalyst. Desensitized evaporative leak/purge check monitor to detect gross leak for operation >E75 blends (monitor fully compliant up to E75 blends).	Test without regard to monitor readiness
General Motors					
2000	Chevrolet S-10/GMC Sonoma 2-wheel drive	2.2 L I-4 (E85)	YGMXT02.2121 YGMXT02.2122 (VIN 8th digit: 5)	System monitors disabled for operation ≥E15 blends: O2 sensor heater, secondary air, catalyst. System monitors disabled for operation ≥E10 blends: evaporative leak check. Desensitized O2 sensor monitor implemented; only reports faults during operation ≤E15 blends.	Test without regard to monitor readiness
2001	Chevrolet S-10/GMC Sonoma 2-wheel drive	2.2 L I-4 (E85)	1GMXT02.2122 (VIN 8th digit: 5)	System monitors disabled for operation ≥E15 blends: O2 sensor heater, secondary air, catalyst. System monitors disabled for operation ≥E10 blends: evaporative leak check. Desensitized O2 sensor monitor implemented; only reports faults during operation ≤E15 blends.	Test without regard to monitor readiness

[2] *This table identifies Flexible Fuel Vehicles (FFV) that have a U.S. EPA exception from performing some OBD functions while under operation with an alternative fuel. Although some OBD functionally may not be present, the OBD inspection shall be performed for the operative monitors.*

Flex Fuel Vehicle Testability Issues[2]					
Model Year	**Model**	**Engine**	**Engine Family and VIN**	**Problem**	**Action**
2002	Chevrolet S-10/GMC Sonoma 2-wheel drive	2.2 L I-4 (E85)	2GMXT02.2122 (VIN 8th digit: 5)	System monitors disabled for operation ≥E15 blends: O2 sensor heater, secondary air, catalyst. System monitors disabled for operation ≥E10 blends: evaporative leak check. Desensitized O2 sensor monitor implemented; only reports faults during operation ≤E15 blends.	
Isuzu					
2000	Hombre 2-wheel drive	2.2 L I-4 / (E85)	YGMXT02.2121 YGMXT02.2122 (VIN 8th digit: 5)	This model shares a platform with the Chevrolet S-10 and GMC Sonoma. ***For guidance on these models, please refer to General Motors section.***	Test without regard to monitor readiness
2001	Hombre 2-wheel drive	2.2 L I-4 / (E85)	YGMXT02.2121 YGMXT02.2122 (VIN 8th digit: 5)		
Mazda					
2002	B3000 2-wheel drive	3.0 L V-6 (E85)	2FMXT03.02F6 (VIN 8th digit: V)	This model shares a platform with the Ford Ranger. ***For guidance on these models, please refer to Ford section.***	Test without regard to monitor readiness
2003	B3000 2-wheel drive	3.0 L V-6 (E85)	3FMXT03.02F6 (VIN 8th digit: V)		