

State of California  
Air Resources Board

Final Statement of Reasons for Rulemaking Including  
Summary of Comments and Agency Response

PUBLIC HEARING TO CONSIDER TECHNICAL STATUS AND PROPOSED  
REVISIONS TO MALFUNCTION AND DIAGNOSTIC SYSTEM REQUIREMENTS FOR  
1994 MODEL-YEAR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-  
DUTY VEHICLES AND ENGINES (OBD II)

Considered: December 8, 1994  
Agenda Item No: 94-12-2

I. GENERAL

The "Staff Report: Initial Statement of Reasons for the Proposed Rulemaking: ("Staff Report"), released October 21, 1994, is incorporated herein by reference.

In this rulemaking, the staff proposed a number of modifications to its regulations establishing on-board diagnostic system requirements for 1994 and later model year passenger vehicles, light-duty trucks, and medium-duty vehicles and engines (OBD II), Title 13, California Code of Regulations (CCR), Section 1968.1. These amendments address manufacturer concerns related to the implementation of OBD II systems. These amendments include near-term relief from both the catalyst monitoring requirements for low-emission vehicles, and the requirements for enhanced misfire detection. Regarding the latter requirements, the amendments provide some additional leadtime for compliance and restrict the region of engine operation for which misfire detection is required. The amendments also provide manufacturers with additional leadtime for compliance with the OBD II requirements for alternative fuel vehicles and additional flexibility in certifying OBD II systems with one or more deficiencies.

The staff also proposed amendments intended to increase the effectiveness of OBD II systems. First, it proposed an amendment that would require the phase-in of evaporative system leak detection strategies capable of detecting leaks equivalent in magnitude to a 0.020 inch diameter hole. The proposed phase-in would extend from the 1998 model year to the 2000 model year. Second, it proposed to strengthen the tamper resistance requirements to better ensure that the integrity of OBD II systems is maintained in-use.

Finally, the amendments provide manufacturers with additional leadtime to develop fully compliant OBD II systems for vehicles using alternate fuels. For purpose of consistency, the ARB also amended Title 13, CCR, Sections 2030 and 2031 and the

certification procedures for alternate fuel retrofit systems which are incorporated by reference therein. The amendments provide manufacturers with similar leadtime to comply with the OBD performance requirements.

Following a public hearing on December 8, 1994, in which extensive testimony from manufacturers and other interested parties was considered, the Air Resources Board (ARB or Board), by Resolution 94-67, approved the amendments, with modifications, for adoption. The modifications to the amendments were made available to the public between January 19, 1995, and February 3, 1995 as part of a "Notice of Availability of Modified Text" (Notice), a copy of which is incorporated by reference herein and enclosed as part of the rulemaking record that has been submitted. The ARB mailed a copy of the Notice to each person described in subsection (a) through (d), inclusive of Section 44, Title 1, California Code of Regulations, on January 19, 1995. As set forth in the Notice the ARB modified:

Section (b)(1.2.2) was modified to reduce the 1998 and 1999 model year phase-in percentages for the low emission vehicle catalyst monitoring requirements. The staff had originally proposed that manufacturers be required to certify 40 percent of its low emission vehicle applications to the 1.5 times the standard emission threshold for the 1998 model year, 60 percent for the 1999 model year, and 100 percent in the 2000 model year. In response to comments from industry, the ARB modified the phase-in percentages for the 1998 and 1999 model years to 30 and 60 percent respectively.

Section (b)(4.2.2) was modified to delay implementation for the phase-in of evaporative system leak detection strategies capable of detecting leaks as small as the equivalent of a 0.020 inch diameter hole. As proposed by the ARB staff, the more stringent requirement was to be phased-in beginning with the 1998 model year. As modified, section (b)(4.2.2) delays initial introduction of such systems from the 1998 model year to the 2000 model year. The projected sales volume phase-in percentages would be 50 percent with the 2000 model year, 75 percent for 2001, and 100 percent for the 2002 model year. Small volume manufacturers would not be required to meet the 2000 and 2001 model year phase-in percentages.

Section (b)(10) was modified to require illumination of the Malfunction Indicator Light (MIL) only for affected components and systems that are capable of causing emissions to increase by more than 15 percent of the FTP standard. Section (b)(10.4) was modified to eliminate the need for manufacturers, in most instances, to illuminate the MIL for those components not capable of causing such an emissions increase. For such components, manufacturers would only be required to store a fault code. However, if such an electronic component or system is used as part of the diagnostic strategy to satisfy another monitoring requirement, manufacturers would still be required to have the MIL illuminated. This exception would ensure that vehicle operators are alerted to malfunctions that may potentially impair the functioning of the OBD II system.

Section (a)(2.2) was modified to require that the readiness code be cleared (i.e., all

bits set to "test not complete") while the power take-off (PTO) unit is active, but that, once the PTO unit is de-activated, the readiness code can be restored to the state that existed prior to activation.

Section (b)(1.1.2) was modified to allow manufacturers of spark-ignited lean-burn engines to request Executive Officer approval for exemption from the OBD II catalyst monitoring requirements if the manufacturer can demonstrate that technology is not available that would allow for reliable monitoring of the catalyst system.

Section (b)(1.2.1) was modified to clarify that in instances when the malfunction criteria are based on the applicable emission standards, the certification reactivity adjustment factor would be applied to hydrocarbon emissions on low emission vehicle applications.

Section (b)(3.2)(B) was modified to remove an unnecessary restriction on the establishment of the malfunction criteria for misfire monitoring. With the modification, manufacturers would be permitted, but not required, to use the data from a single durability demonstration vehicle for all engines that have the same number of cylinders as the demonstration vehicle.

The title for section (g), and section (g)(1.0) itself were to further clarify that the demonstration requirements do not apply solely to engine families for which a Durability Demonstration Vehicle (DDV) is available. Similarly, in section (g)(4.5) the term "DDV" was replaced by "vehicle."

Section (g)(2.6.1) was modified to clarify the catalyst monitoring demonstration requirements for non-low emission vehicles. Consistent with the monitoring requirements for such vehicles, the modification makes clear that the baseline emission test is to be conducted with a representative 4000 mile catalyst system.

Section (g)(3.0) was modified to further clarify that for successful completion of OBD II demonstrations, manufacturers shall not require the demonstration vehicle to be cold soaked prior to running preconditioning cycles.

Section (m)(5.1) was modified to clarify that the implementation requirements specified in the section apply to alternate fuel engines as well as vehicles.

The ARB issued a second Notice of Availability of Modified Text and Supporting Documents and Information on April 3, 1995 and was available for public comment through April 18, 1995. In the second notice, the ARB notified the public about additional documents and information that the ARB relied upon in adopting the subject amendments. The second notice also modified section 1968.1(k)(5.0) of the regulations to correct an inadvertent reference to Draft SAE Practice J1939, "Serial Control and Communications Vehicle Network," January 1994.

Pursuant to Government Code section 11346.9, the ARB has determined that this regulatory action does not impose a mandate on local agencies or school districts.

Title 13, CCR, section 1968.1 incorporates by reference several Society of Automotive Engineer (SAE) and International Standards Organization (ISO) recommended practices and documents. Most of these documents were included in the regulations as they existed prior to this rulemaking and several have been updated by these amendments. The SAE and ISO documents that are incorporated by reference in the regulations include:

SAE Recommended Practice J1930, "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms," June 1993;  
SAE J1939 Committee Draft "Recommended Practice for a Serial Controlled Communications Vehicle Network," January 1994;  
SAE Recommended Practice J1962, "Diagnostic Connector," June 1992;  
SAE Recommended Practice J1978, "OBD II Scan Tool," June 1994;  
SAE Recommended Practice J1979, "E/E Diagnostic Test Modes," June 1994;  
SAE Recommended Practice J1850, "Class B Data Communications Network Interface," May 1994;  
SAE Recommended Practice J2012, "Diagnostic Trouble Code Definitions," January 1994;  
ISO 9141-2, "Road Vehicles - Diagnostic Systems - CARB Requirements for Interchange of Digital Information," February 1994.

Existing administrative practice of the ARB has been to have technical recommended practices, such as the SAE documents, and test procedures of the type found in Title 13, CCR, section 2030-2031 incorporated by reference rather than printed in the CCR. These procedures are highly complex and technical documents. They include "nuts and bolts" engineering protocols and have a very limited audience. Because the ARB has never printed SAE documents or test procedures in the CCR, the affected public is accustomed to the incorporation format utilized in sections 1968.1 and 2030-2031. SAE, ISO, and ARB test procedures are extensive and complex procedures with a limited audience. Moreover, printing portions of the documents in the CCR when the bulk of the procedures are incorporated by reference would be unnecessarily confusing to the affected public.

In the Notice of Proposed Rulemaking, Mail-out #94-38, pursuant to former Government Code section 11346.53 (now section 11346.5), the ARB declared that the proposed regulations may have an adverse economic impact on California businesses engaged in the manufacture of aftermarket parts. Accordingly, it solicited proposed alternatives from interested parties that would lessen any adverse economic impact upon such businesses. To date, the industry has suggested no alternatives other than deleting the tamper resistance requirements that have been proposed. As discussed in the summary of comments and Agency Responses below, the ARB has not found that suggestion to have merit. The ARB continues to believe that the OBD II systems are a vital part of the State's plan to achieve significant emission reductions from on-road motor vehicles and that the potential for

tampering is great, with the consequence that the OBD II program would be undermined. Thus, the ARB has not found the suggested alternative to be more effective in carrying out the purposes for which the regulations were proposed or which would be as effective and less burdensome to affected private persons or to small business than the adopted regulations and procedures and procedures.

## II. SUMMARY OF COMMENTS AND AGENCY RESPONSES

Prior to the public hearing on December 8, 1994, written comments were received from: American Automobile Manufacturers Association (AAMA), Automotive Parts and Accessories Association, Inc. (APAA), California Natural Gas Vehicle Coalition, Chrysler Corporation (Chrysler), Engine Manufacturers Association (EMA), Fiat Auto R&D U.S.A (Fiat), Ford Motor Company (Ford), The Gas Company, General Motors (GM), IMPCO Technologies, Inc. (IMPCO), Nissan Research and Development, Inc. (Nissan), and Specialty Equipment Manufacturers Association (SEMA).

Jack Heyler of the Automotive Services Council (ASC) commented in response to the 15 day "Notice of Availability of Modified Text."

At the Board hearing, AAMA, Ford, GM, Chrysler, Cummins Engine Company (Cummins), Lamborghini, (SEMA), Motor & Equipment Manufacturers Association (MEMA), APAA, ASC, and Chris Weaver testified.

Vehicle manufacturers generally supported the amendments that provide clarification of the requirements and address OBD II implementation concerns. However, concerns were expressed with respect to certain requirements, most prominently, the staff's proposed requirement for the detection of smaller evaporative system leaks. Aftermarket manufacturer representatives opposed the proposed enhancements to the tamper resistance requirements specified in the regulation. A summary of these comments and the agency responses are set forth below.

### Catalyst Monitoring

**1. Comment:** Manufacturers would be able to comply in a much more cost effective manner with the more stringent malfunction criteria that is to be phased-in between the 1998 and 2000 model years if the phase-in percentages were modified from 40, 70 and 100 percent to 30, 60 and 100 percent. (AAMA) (Ford) (GM)

**Agency Response:** The staff has modified the phase-in percentages according to industry's suggestion.

**2. Comment:** The ARB should hold a workshop in calendar year 1996 to assess manufacturers' progress in meeting the revised catalyst monitoring requirements for low-

emission vehicles. (AAMA) (Ford) (Nissan)

**Agency Response:** The staff stated in the Staff Report that it intends to conduct such a workshop, and the Board in its resolution has directed the staff to report back to the Board should modifications to the adopted requirements be necessary.

**3. Comment:** For Low Emission Vehicles (LEVs) and Ultra Low Emission Vehicles (ULEVs), the requirement for catalysts to be detected as malfunctioning before hydrocarbon emissions exceed 1.5 times the standard should be delayed until feasibility has been demonstrated. Making necessary catalyst system design changes may be extremely expensive. Further, it has not been demonstrated that vehicles can be designed to meet the LEV and ULEV emission standards, including new off-cycle requirements (known as Bag 4 requirements), and the OBD II catalyst monitoring requirements. Once this has been demonstrated to be feasible, the requirement must be phased-in over a period of many years to avoid prohibitive expense. (GM)

**Agency Response:** In formulating the proposed amendments to the catalyst monitoring requirements, the staff conducted testing on a prototype ultra low-emission vehicle (ULEV) at the ARB's facilities. The data, which are presented in the Staff Report, show that a significant decrease in front catalyst efficiency can occur without vehicle emissions exceeding 1.5 times the standard. Based on such data, and discussions with other manufacturers, the staff believes the feasibility of the proposed amendments has been demonstrated.

As part of its comment, GM states that modifications to existing catalyst configuration plans may have to be changed. The staff has acknowledged that such changes may be necessary. For this reason, the staff proposed to phase-in the requirements through the 1999 model year to allow for such changes to be made consistent with other planned powertrain modifications. In this manner, the cost of making whatever catalyst system design changes are needed should be significantly reduced. In fact, the Board reduced the 1998 and 1999 model-year phase-in percentages at the request of industry to further minimize such costs (see Comment 1).

The commentor lastly states that it may not be possible to design vehicles to meet new and existing emission standards as well as the OBD II catalyst monitoring requirements. The staff's testing, however, revealed that monitoring systems meeting the OBD II standards can be successfully designed for ULEVs (the most stringent emission category). Currently, off-cycle emission standards (or Bag 4 standards), have not been adopted; therefore, it is difficult to comment with any great certainty on the challenge of designing a vehicle that can meet off-cycle requirements and the catalyst monitoring requirements simultaneously. However, in discussions related to the development of off-cycle standards, it appears that manufacturers will not have to make significant catalyst system design changes as a result of the requirements currently under consideration by the staff. The staff believes that fuel system calibrations (rather than the design of the catalyst system) will be most impacted by

such standards.

Nevertheless, as mentioned previously, the staff will continue to follow manufacturers' progress regarding these requirements. Should it appear after further development that feasibility issues do exist with respect to existing or future emission requirements, the staff would propose appropriate amendments for the Board's consideration.

**4. Comment:** The exemption from the catalyst monitoring requirements that has been given for diesel vehicles should also be given to lean-burn natural gas engines because the same technological barriers exist for compliance. (Chris Weaver)

**Agency Response:** Based on this comment, section (b)(1.1.2) has been modified to allow manufacturers of spark-ignited lean-burn engines to request Executive Officer approval for exemption from the OBD II catalyst monitoring requirements if the manufacturer can demonstrate that technology is not available that would allow for reliable monitoring of the catalyst system.

#### Evaporative System Leak Detection

**5. Comment:** Major monitoring system design changes may be needed to detect smaller (i.e., 0.020 inch diameter) evaporative system leaks when using vacuum-based monitoring strategies. Should this prove to be true after further development, it will be necessary for the requirement to detect such leaks to be postponed from the 1998 model year to at least the 2001 model year. (AAMA) (Ford) (GM) (Nissan)

**Agency Response:** At the Board's direction, the staff modified the regulation to delay the phase-in of the requirement for detection of 0.020 inch diameter leaks from the 1998 model year to the 2000 model year. Nevertheless, the staff will continue to follow manufacturers' progress towards meeting the more stringent malfunction criteria, and will propose modifications to the adopted requirements, which could include additional leadtime, should that be necessary.

**6. Comment:** Prior to requiring the detection of evaporative leaks as small as 0.020 inches in diameter, the ARB should better quantify the number of small system leaks in the field and their emission impact. Also, feasibility and cost effectiveness need to be better addressed. (GM)

**Agency Response:** As presented in the Staff Report, the staff analyzed extensive data from in-use vehicles which estimate that a very significant number of older vehicles on the road have small evaporative system leaks that would likely not be detected without the enhanced evaporative system leak detection requirement. Nearly 2000 vehicles were included in this analysis.

Regarding feasibility and cost effectiveness, the staff conducted tests on four ARB

vehicles, ranging from a small passenger vehicle to a full size pick-up truck. This testing indicates that the detection of small evaporative leaks (down to a 0.020 inch hole) appears feasible using the monitoring technology currently being implemented to detect larger leaks. As such, it appears that only software modifications to the monitoring strategy are necessary to meet the enhanced requirement. Software costs, when the cost is spread out over a manufacturer's product line over several model years, generally do not result in any significant increase in vehicle cost. Further, manufacturers have five model years of leadtime to implement this requirement (the phase-in does not start until the 2000 model year). Should costs or feasibility issues exist that have not been fully addressed, the ARB staff would address such concerns in front of the Board.

**7. Comment:** It is critical for this monitoring requirement that the average run length restriction to be increased from six to ten, so as to allow for optimization of the exponentially weighted moving average (EWMA) protocol. (AAMA)

**Agency Response:** Manufacturers have requested permission to use special statistical algorithms in determining when a malfunction is to be indicated. The adopted amendments permit the use of such algorithms, provided the manufacturer can demonstrate that a malfunction will be detected on average in six trips or less (Section (a)(1.8)). The commentor is requesting that the maximum number of trips be increased from 6 to 10 to improve the reliability of monitoring strategies designed to detect leaks as small as a 0.020 inch hole. The staff is generally opposed to statistical algorithms taking more than 6 trips on average to detect a malfunction (see Agency Response to Comment 35)

Nevertheless, as mentioned previously, the staff plans to follow manufacturers' progress toward developing strategies to detect small evaporative system leaks. Should it be determined that modifications are necessary for the requirement to be successfully met, the staff would propose appropriate amendments to the Board. These amendments could include a special provision for the use of the requested slower statistical algorithms to detect evaporative system leaks.

**8. Comment:** The ARB has greatly overestimated the emission impact of small evaporative system leaks by relying on data from 1990 vintage vehicles. These vehicles do not employ the latest evaporative system improvements that will be included on vehicles meeting the new evaporative system test procedures. (GM)

**Agency Response:** The staff has reviewed data from the commentor that is based on their latest prototypes. The data do indicate that evaporative emission increases resulting from system leaks may be significantly lower on future vehicles as compared to current technology vehicles. However, in discussing this issue with the commentor, it appears that such improvements are highly dependent on evaporative system design. Specifically, those systems that are designed to maintain low evaporative system pressures emit less evaporative emissions when a leak is present. It is not at all clear that all manufacturers will design their evaporative systems to operate at such low pressures. The requirements for evaporative



systems allow manufacturers to design systems that achieve pressures up to 10 inches of water. At such pressures, emission impact of leaks will be much greater than the commentor's data suggest.

Even if the emission impact is reduced on future vehicles, the data presented still indicate that excess emissions resulting from leaks will be significant, especially when compared to expected tailpipe emission levels from future vehicles. Should excess evaporative emissions be reduced to as low as 3 grams per test when a leak is present, the gram per mile equivalent, based on average driving patterns, would be in excess of 0.1 grams per mile. This emission rate is greater than the 0.075 gram per mile Low Emission Vehicle standard, and more than double the 0.04 gram per mile Ultra-Low Emission Vehicle standard.

Further, in terms of cost effectiveness, the requirement would still be reasonable should the emission impact of leaks be less than originally thought. This is especially true when considering that only software changes should be necessary to meet the enhanced requirements (see Agency Response to Comment 6). Significant additional costs should not be incurred to implement monitoring systems to detect small evaporative system leaks.

Nevertheless, the ARB staff will continue to follow developments regarding both evaporative system design, and the design of monitoring strategies for these systems. Should it become clear that excess evaporative emissions resulting from leaks will not be significant, or that the costs involved in detecting smaller leaks are excessive, the staff would consider amendments to these requirements.

**9. Comment:** Service technicians will not be able to find evaporative system leaks smaller than 0.04 inches in diameter should they occur. Therefore, there will be no significant emission benefit resulting from the detection of smaller leaks. (GM)

**Agency Response:** The ARB staff believes that the service industry will be able to find small evaporative system leaks detected by the OBD II system. Technicians for decades have been able to find very small leaks in vehicle air conditioning units even though the leaks are sometimes in locations that are very hard to access, such as under the instrument panel. Further, the ARB staff has had success in detecting such leaks using a commonly available hydrocarbon "sniffer" device.

#### Misfire Monitoring

**10. Comment:** The modifications proposed by the staff will significantly increase the probability of meeting this major technological challenge (i.e., meeting the misfire detection monitoring requirements). However, because concern still exists with respect to a few of the most difficult engines, a workshop is requested for calendar year 1996 to assess manufacturers' progress. (AAMA) (Ford) (GM)

**Agency Response:** In the Staff Report, the staff stated that a 1996 review of the modified requirements will take place should implementation concerns regarding the misfire detection requirements continue to exist. Further, Resolution 94-67 directs the staff, if necessary, to report back to the Board in 1996 with amendments to the adopted requirements.

**11. Comment:** The ARB should allow for additional delays in compliance with the misfire monitoring requirements, particularly for small volume manufacturers. Some small volume manufacturers lack the developmental resources necessary to ensure compliance with these requirements at the present time. This is especially true for companies like Lamborghini that have very limited sales and produce 10 and 12 cylinder engines which are more difficult to implement misfire monitoring on. (Lamborghini)

**Agency Response:** As part of the rulemaking, the Board adopted additional leadtime for compliance with the expanded misfire detection monitoring requirements, up to the 2000 model year for small volume manufacturers. With this additional leadtime, small volume manufacturers should be able to investigate and implement one of the several misfire detection technologies that have been identified by the ARB. Nevertheless, the ARB will continue to follow manufacturers progress towards meeting these requirements and will act should it appear that the requirements cannot be reasonably satisfied for larger engines.

For vehicles that are not required to meet the expanded misfire detection monitoring conditions, the regulation requires misfire monitoring only during conditions encountered during an FTP test. This requirement has been shown to be feasible for larger engines in that one manufacturer, also a small volume manufacturer, has already certified an OBD II equipped vehicle with a V12 engine for 1995 model year. Therefore, the staff does not believe that additional leadtime with respect to the current misfire detection requirements is necessary. Nevertheless, should a manufacturer find that it cannot meet these requirements for a particular model year, the regulation in sections (m)(6.1) and (m)6.2 allow for the certification of OBD II systems although one or more of the monitoring requirements is not fully met.

**12. Comment:** The ARB should permit manufacturers to present data showing the necessity of suspending misfire diagnosis under certain defined conditions, in order to prevent misdiagnosis. (Nissan)

**Agency Response:** Sections (b)(3.3.1) and (b)(3.3.3) provide for temporary disablement of misfire detection systems when conditions exist that could cause the system to be unreliable.

#### Diesel Misfire Monitoring

**13. Comment:** Although misfire detection may be possible using cyclic variation detection, this technology has not yet been proven feasible for reliably detecting misfire on diesel engines. Additional leadtime may be necessary in order to successfully meet the

requirement. Therefore, a 1996 workshop is requested to review manufacturers' progress. (AAMA)

**Agency Response:** Should additional leadtime prove necessary, the staff will propose a modification to the requirement at a 1996 Board Hearing.

**14. Comment:** In addition to the 1996 workshop, the diesel misfire detection requirements should be delayed from the 1998 to the 1999 model year. (GM)

**Agency Response:** The misfire detection requirements for diesels require much less sophisticated diagnostic strategies than those currently in production for gasoline vehicles. This is because diesel engines are not subject to many of the causes of misfire in spark-ignited engines (i.e., ignition system failures). As a result, the ARB staff believes that sufficient leadtime has been provided for diesel vehicles to meet these requirements. Should unique implementation problems arise in the future, the ARB could as part of its review, propose additional leadtime for this requirement.

#### Comprehensive Component Monitoring

**15. Comment:** The OBD II regulation requires monitoring of any electronic component that can affect emissions during any reasonable in-use driving condition. Manufacturers do not have the resources to perform the extensive testing and analysis work that would be necessary to meet this requirement as written. For practical reasons, testing and liability should be limited to defined test conditions and procedures associated with FTP cycle conditions, or driving cycles for which there is an emission standard. (AAMA) (GM)

**Agency Response:** The ARB believes that it is necessary that the OBD II monitoring systems be capable of detecting malfunctions that may increase off-cycle emissions as well as FTP emissions. It has become increasingly apparent that excessive vehicle emissions occur from off-cycle emissions as well as from FTP cycle emissions. In passing the California Clean Air Act of 1988 (CCAA), the Legislature found that despite significant reductions in vehicle emissions that had been achieved in recent years, continued growth in population and vehicles miles traveled throughout the state was preventing the state from attaining state standards and, in fact, worsening air quality. (Health and Safety Code section 43000.5(a).) Up until that time, state emission control standards had been directed toward certifying vehicles by measuring FTP cycle emissions. In addressing the serious problems identified above, the Legislature specifically directed the ARB to implement short- and long-term programs to achieve additional reductions in vehicle emissions. (Health and Safety Code sections 43000.5(d) and 43018(c).) The OBD II regulations arise in part from this vestment of authority. Similarly, the need for the ARB to adopt OBD II requirements for monitoring off-cycle emissions arise out from these same legislative findings and directives.

The proposed amendments to this section have been made only to clarify the regulation, and are not considered to constitute a new or modified requirement. In previous

rulemakings involving section 1968.1, the staff attempted to minimize concerns related to having to test every vehicle component for its impact on emissions by modifying the regulation to make clear that only electronic powertrain components are subject to the requirements of section (b)(10).

Manufacturers have been able to avoid burdensome testing in this area by meeting with the staff and reaching agreement on what components need to be monitored. In most cases, manufacturers have presented to the ARB staff a list of components that they believed required monitoring. Upon review of the list and consideration of the component's function, the ARB and manufacturers have been able to agree upon the potential of a component's malfunction to cause increased emissions. In other cases, the parties have been able to agree on a specific testing procedure to provide the data necessary to determine whether or not monitoring is appropriate. This testing is limited and the burden associated with it is not great. Even the limited costs associated with such testing is minimized because the components used in vehicle powertrains are not expected to change significantly from model year to model year.

Some manufacturers have expressed concern with respect to having increased recall liability should an unmonitored component be found to increase emissions in-use when malfunctioning. The ARB believes that manufacturers could avoid increased liability by discussing their monitoring plans with the ARB staff prior to certification. After reviewing a manufacturer's monitoring plans, the staff could assist the manufacturers by identifying what it believes to be an appropriate plan. If the parties could then agree on a specific monitoring plan, the ARB would not be inclined to pursue a recall if it is subsequently determined that additional components should have been monitored. Instead, on a case by case basis, the ARB would be willing to work with the manufacturers to assure implementation of alternative monitoring strategies for such components in future model years.

**16. Comment:** Section (b)(10.1) should be revised to apply only to electronic powertrain components that can cause exhaust emissions to increase by an amount greater than 25 percent of the applicable standard, under FTP test cycle conditions only. (AAMA) (GM)

**Agency Response:** See Comment 15 above for a discussion regarding the requirement to monitor components that can affect emission during non-FTP driving conditions. The remainder of this response will pertain to the comment that only components that can substantially increase emissions (by more than 25 percent) should be monitored.

The requirement to monitor components that can measurably affect emissions was part of the regulation prior to the December, 1994, rulemaking. In originally formulating the OBD II requirements, the staff considered requiring manufacturers to detect multiple component failures that would lead to excessive vehicle emissions. Manufacturers opposed such a requirement due to the burden associated with trying to determine which of many potential malfunction combinations could cause high emissions. As an alternative, the ARB

included in the OBD II regulation separate monitoring requirements for each component that can measurably affect emissions. Thus, manufacturers are not required to detect emission increases due to the deterioration of multiple components so long as a malfunction is indicated when any component that can affect emissions no longer functions properly. Monitoring of all electronic powertrain components that can affect emissions is necessary to protect against excessive vehicle emissions resulting from the combined failure of multiple components.

Nonetheless, after considering this comment, the Board modified the requirements of section (b)(10) such that illumination of the MIL is required only for affected components and systems that can potentially cause emissions to increase by more than 15 percent of the FTP standard.

**17. Comment:** In some cases, when a component malfunctions that is used as part of another monitoring strategy, the OBD II monitoring strategy will ignore the information provided by the component and will continue to operate using default information. The ARB should not require monitoring of such components because they will not adversely affect OBD II system performance or emissions.

**Agency Response:** Section (b)(10.1) requires monitoring of components that are used as part of another monitoring strategy. This is to ensure that the driver is alerted to any malfunctions that would cause other portions of the OBD II system to be permanently disabled, or unreliable. Should manufacturers, as the commentor suggests, stop using the component as part of other diagnostic strategies when it fails, illumination of the MIL or the storage of a fault code would not be required when the failure occurs. However, such components must still be monitored by the on-board computer to ensure that OBD II monitoring strategies do not use information from faulty components or systems.

**18. Comment:** The Comprehensive Component Monitoring Requirements should be as strong as possible so that technicians will have diagnostic information necessary to fix vehicles with high emissions wherein the excess emissions are the result of the deterioration of several more minor malfunctions. (ASC)

**Agency Response:** The requirements should be sufficiently strong in that any component that can affect emissions will be monitored. In cases where the emission impact is small, the MIL may not illuminate when a failure occurs; however, a fault code will be stored to help technicians repair vehicles with excess emissions as a result of a number of minor malfunctions, which would satisfy the commentor..

#### Tamper Resistance Requirements

**19. Comment:** The proposed enhancements to the tamper resistance requirements could require vehicle manufacturers to make major investments in order to comply. (AAMA)

**Agency Response:** The tamper resistance requirements, as amended, require manufacturers to implement security measures including the use of data encryption, and a centralized computer that would track reprogramming activity. The purpose of these requirements is to prevent illegal alteration of OBD II system performance or even complete disablement of these systems on in-use vehicles. The staff recognizes that investments would be necessary to develop reprogramming systems that use such strategies to deter tampering. For this reason, the regulation provided the vehicle manufacturers with several years leadtime in order to allow for such strategies to be developed efficiently. Further, the regulation allows for equally effective alternatives, giving the manufacturers the opportunity to suggest methods that cost less.

**20. Comment:** The ARB should defer revised tamper resistance requirements to a future rulemaking, following the EPA's final rule on service information and after more evidence has been obtained to indicate that tampering will occur. (AAMA) (GM) (SEMA)

**21. Comment:** The ARB should delay adoption of the anti-tampering amendments until after workshops between the aftermarket industry and vehicle manufacturers are concluded so that better anti-tampering language can be proposed. (MEMA)

**Agency Response:** Given the number of known incidents of fraud that have been committed in the Inspection and Maintenance (I/M) program and the high incidence of computer tampering, in general, it is reasonable to anticipate that a significant amount of tampering with OBD II systems will occur in-use absent effective tamper resistance requirements. The staff is especially concerned that a high incentive to tamper with OBD II system calibrations will exist should California implement an I/M program test based on the use of OBD II systems, given the high cost repair limits that are likely to be part of the program. As acknowledged by the service industry at the hearing, security of the OBD II systems is crucial or else the vehicle and the OBD II system cannot be repaired. (Testimony of Jack Heyler, Transcript, page 185.)

The staff recognizes that manufacturers need to have adequate leadtime to implement tamper resistance requirements. Should the ARB simply defer the issue until tampering is evident in the field, and this in and of itself may be difficult to detect, years of leadtime would have to be provided from that point. By the time improved tamper resistance strategies would go into production, a great number of OBD II equipped vehicles would be on the road with inadequate on-board computer security, potentially reducing the effectiveness of the OBD II program, and jeopardizing the use of OBD II systems for a more efficient I/M program. Therefore, the staff believes it is necessary to require that reasonable tamper resistance measures be implemented with this rulemaking. The ARB staff will continue to meet with both the vehicle manufacturers and the aftermarket industry to monitor progress, including costs, in developing the tamper resistance measures.

**22. Comment:** Should the ARB determine that enhanced tamper resistance requirements are needed with this rulemaking, they should be modified to require either

electronic access to an off-site computer or the use of encryption, but not both. (AAMA) (GM)

**Agency Response:** In formulating the OBD II tamper resistance requirements, the staff has determined that both of the above security measures are needed to adequately protect against tampering. The use of an off-site computer is specified to allow the manufacturer to monitor reprogramming activity and to detect unusual reprogramming patterns that could indicate illegal tampering. With information generated from the central computer, such unusual reprogramming patterns could be further investigated. Knowing that the computer will generate such information, the computer will help deter unlawful tampering. The use of data encryption will deter individuals from monitoring reprogramming data using a recording device for the purpose of illegally modifying the data and installing the altered calibration into the on-board computer. As such, these strategies are not redundant, but are supportive of each other. If only one or the other is implemented, deterrence will not be as effective. Nonetheless, as mentioned previously, the regulation does allow alternative, equally protective methods of deterrence. If manufacturers can demonstrate that either method is equally effective as both measures taken together or if they can identify other equally effective strategies, the ARB will likely accept them.

**23. Comment:** Security of the OBD II system is not guaranteed by restricting reprogramming. (ASC)

The staff acknowledges that it is virtually impossible to make computers tamper proof. Even the most sophisticated systems are sometimes broken into. The intent of the tamper resistance requirements are to deter tampering to a reasonable extent. It has been demonstrated in other industries that computer security measures can be implemented that adequately guard against unauthorized access or alteration. A good example is the use of automated teller machines in the banking industry. Such systems are on occasion violated; however, as a whole, the security measures taken are adequate as evidenced by the fact that virtually every bank utilizes these systems. In the same manner, it cannot be guaranteed that OBD II systems will not be tampered with in the field; however, the tamper resistance requirements should be effective in minimizing such occurrences.

**24. Comment:** The ARB does not have authority to promulgate these anti-tampering provisions based on section 202(m) of the federal Clean Air Act (CAA) which states that access to the emission control diagnostics system shall be unrestricted and shall not require any access code or device available only from a vehicle manufacturer. (APAA) (SEMA)

**Agency Response:** The legislative history of the 1990 amendments to the CAA indicates that section 202(m) was amended by then Senator Gore to protect consumer freedom of choice in servicing OBD systems and competition in the vehicle service, diagnostic and repair industry. In reviewing the language of the amendments and the legislative history, the ARB believes the term "access" as used in section 202(m)(4)(b) refers to the diagnostic information generated by the OBD system (i.e., fault codes and vehicle

operation parameters) for use in repairing malfunctions that have been detected by the system. Previously, some manufacturers have permitted only franchised dealers to access such information, forcing independent repair establishments to use conventional tools such as voltmeters and vacuum gauges to diagnose malfunctions, which can be less efficient. Therefore, such dealers would have a market advantage. The commentors interpret access with respect to modifying the function of the OBD system for the purposes of making aftermarket parts OBD compatible. The ARB does not believe that such is the intent of the section.

The California Legislature has been equally concerned that independent service and repair facilities be given equal access to information necessary for proper diagnosis and repair of OBD systems as is given to vehicle manufacturer franchised dealers. (See Health and Safety Code Section 44036.2.)

**25. Comment:** The ARB has not complied with the CAA in that the CAA does not delegate to California the authority to require anti-tampering restrictions. (SEMA)

**Agency Response:** Section 209(b) of the CAA specifically allows California to request waivers from the general preemption of section 209(a) which prohibits individual states from adopting emission standards and other requirements for motor vehicles. The ARB has requested that the Administrator of the U.S. EPA grant California a waiver for the OBD II regulations. That request which is presently pending will be amended to include the most recent amendments to the anti-tampering sections of the regulations. The ARB believes that the Administrator will approve California's request for a waiver. Although the requirements of section 202(m) of the CAA are not expressly considered as part of the waiver determination, the ARB believes that the anti-tampering provisions in the OBD II regulations are consistent with the intent and purpose of the CAA.

**26. Comment:** The ARB has not complied with the requirements of the California Administrative Procedures Act calling for necessity, non-duplication and authority in promulgating the anti-tampering regulations. (SEMA)

**Agency Response:** Regarding necessity, the commenter states that there is nothing in the record indicating that the anti-tampering provisions are mandated by California or federal statute or that they are necessary to carry out the purposes of the OBD II regulations. As the commenter noted in Comment 23, the CAA specifically requires the U.S. EPA to adopt OBD regulations by the 1994 model year. (See 202(m).) Although section 202(m) of the CAA does not specifically direct California to adopt OBD regulations, section 43018(c) of the California Clean Air Act mandates the ARB to adopt standards and regulations that will result in the most-cost effective combination of control measures on all classes of motor vehicles and such measures shall include, but not be limited to, reductions in motor vehicle exhaust and evaporative systems and reductions in in-use emissions from motor vehicles through improvements in emission system durability and performance. The ARB's authority



to adopt the OBD II regulations arise from this specific delegation. The anti-tampering provisions have been an integral part of the adopted regulations from their initial inception and are consistent with the general delegation of Health and Safety Code section 39600, which requires the ARB to do such acts as may be necessary for the proper execution of the powers granted to and imposed upon the ARB. The provisions are also consistent with the more specific delegation granted to the ARB by section 43018. As to the latter section, the anti-tampering provisions help insure the integrity of the OBD systems so that the systems will remain useful over the life of the vehicle.

The ARB identified the need for the anti-tampering amendments in the Staff Report and in Response to Comments 19-21 above. As the regulations have developed since 1989, and industry progress with on-board computers has developed, the need for greater security to protect the reliability and integrity of the OBD system has become more apparent. Specifically, the ARB is concerned with the increasing popularity of vehicles using electronically erasable programmable read only memory (EEPROM). These computer chips can be recalibrated without physically modifying or replacing any on-board computer components and the concern is that these chips will be reprogrammed illegally to enhance vehicle performance and to escape detection.

At the ARB hearing to consider these regulatory amendments, the ARB staff provided additional detailed testimony of the need for the anti-tampering provisions. As stated by Mr. Bob Cross, Assistant Division Chief of the Mobile Source Division:

[T]he problem is that the amount of information that goes on those chips now is basically the complete calibration of the engine and the complete calibration of the diagnostic system. And so, the chip basically has all the parameters that control emissions on it and all of the codes which decide whether or not a component is broken or not on it; in other words, all the fault codes' [sic] decisions. [¶] And so, when you're talking about programming access to these computers, you're really basically talking about the issue of completely redoing the calibration of the vehicle or completely...turn off[f] OBD...and have it give a smog check station code that there was nothing wrong with the car. (Transcript of the Meeting Before the California Air Resources Board, December 8, 1994, to consider amendments to the OBD II regulations, at pages 194-195.)

Regarding unnecessary duplication, the commenter states that both California and federal statutes and regulations currently prohibit tampering with vehicles in a manner that would defeat or render inoperative vehicle emission control systems. As stated by Mr. Cross above, the concern is that present regulations approach tampering by imposing penalties if and when tampering can be detected. The concern of staff is that with reprogrammable EEPROMs tampering can be difficult, if not impossible, to detect. Thus, present statutes and regulations do not sufficiently protect the enhanced computer monitoring systems required by the OBD II regulations.

Finally, regarding authorization, the commenter states that the California Legislature has not addressed the need for tampering prevention regulations in connection with the OBD II program. As stated above, the California Legislature has delegated to the ARB authority to establish the OBD II regulations and to make such regulations enforceable and effective. The anti-tampering provisions is an integral part of the such regulations.

**27. Comment:** Sufficient anti-tampering provisions already exist in federal and state statutes and regulations. (MEMA)

**28. Comment:** Alteration of software programs can be detected at the time of inspection under the I/M programs. (MEMA)

**Agency Response:** The ARB disagrees with the commenter. Present statutes and regulations although prohibiting tampering and providing for the assessment of penalties are inadequate. Because of modern technology and skilled reprogramming, tamperers could reprogram OBD II systems to shut-off, causing malfunctions to escape detection during I/M or other testing. As mentioned in the Agency Response to Comment 25, such action, once it has taken place would presently be very difficult to detect. Thus, there is a need for the adopted amendments that will deter tampering before it takes place. To not have the new amendments would risk the reliability of the OBD II systems with the consequence of increased vehicular emissions.

Regarding the second comment, it may be possible, as the commentor suggests, to verify that vehicles are properly programmed as part of an I/M test. The staff will continue to discuss this issue with the automotive industry as a potential alternative to the current requirements, as amended. The amendments to the OBD II regulation provide the ARB with this latitude. However, methods to verify computer programming in a practical manner during an I/M test are not currently available, and the effectiveness of such a strategy in deterring tampering has not been fully evaluated.

**29. Comment:** In view of the ARB's stated interest in minimizing unnecessary conflicts with federal OBD regulations, it is noteworthy that the U.S. EPA recently withdrew its anti-tampering provisions from the federal OBD regulations. (SEMA)

**Agency Response:** The ARB acknowledges that the U.S. EPA vacated its regulations regarding anti-tampering as part of a settlement agreement with the aftermarket industry of a challenge in the federal appellate courts. The ARB understands that the U.S. EPA is redrafting the regulations and is planning to issue a notice of proposed rulemaking on the revised regulations in the coming months. As stated above, the ARB believes that the OBD II regulations are consistent with the OBD provisions of section 202(m) of the CAA and will be consistent with the regulations being developed by the U.S. EPA.

**30. Comment:** Restricted access to the OBD system will prevent independent service providers from being able to reprogram vehicles, and will also hinder the

development of replacement parts and specialty (modified) parts by aftermarket companies. Therefore, car owners which will face higher repair costs in having to obtain service and parts from franchised dealers. (APAA) (ASC) (SEMA)

**Agency Response:** The ARB does not believe that the antitampering restrictions will result in vehicle owners having to obtain service from only franchised dealers. The first part of the comment appears to be with respect to the installation of revised vehicle programming. For vehicles using electronically erasable memory devices (EEPROMs), manufacturers often provide dealerships with software changes (referred to as "field fixes") that the dealerships then install on vehicles to fix driveability or other problems. Currently, when independent service providers have a vehicle which needs updated software, they have to take it to a franchised dealer, which can result in increased cost and inconvenience compared with taking the vehicle to a franchised dealer in the first place. The staff understands franchised dealers have somewhat of an advantage in this sense; however, this problem exists with respect to non-OBD II vehicles currently in production and was not created by the tamper resistance requirements, or other OBD II requirements. Vehicle manufacturers on their own initiative restrict software and reprogramming equipment to franchised dealers. This issue is currently being addressed by the U. S. Environmental Protection Agency which is considering regulations that would require vehicle manufacturers to provide independent service companies with the equipment necessary to install manufacturer developed software modifications. Further, the California Legislature is currently considering a similar requirement as part of Assembly Bill 1457. The OBD II tamper resistance requirements would not impact such a requirement.

Regarding the development of replacement parts, the staff does not believe that access to the OBD II software is necessary in most cases. As long as replacement parts perform comparably to stock components, they should not be falsely detected as malfunctioning by the OBD II system. For aftermarket companies that produce replacement components that function differently than original equipment components, and for companies that produce specialty parts to enhance or otherwise modify vehicle performance, it may be necessary for the vehicle software to be modified to ensure that the product is compatible with the OBD II system and does not increase vehicle emissions. These companies will most likely have to work with vehicle manufacturers or intermediaries to develop necessary software modifications. This type of working relationship is already required to some extent because, as mentioned above, manufacturers on their own initiative restrict access to information necessary to implement such changes to vehicle programming. However, as manufacturers implement improved security measures, these businesses may have to rely increasingly on the manufacturers for help in developing and implementing vehicle software revisions.

Cognizant of this, the ARB acknowledged in the Staff Report that the amended antitampering requirements may have an adverse economic impact on some members of the aftermarket parts industry because of this increased difficulty in developing and certifying parts for the marketplace. However, determining exact economic impact on these members is difficult given the diversity of products manufactured. The ARB believes that any adverse

impact may be mitigated by the affected aftermarket and vehicle manufacturing industries developing ongoing business relationships that will allow the aftermarket parts manufacturers to acquire information necessary to design compatible parts. At this time, it is impossible to determine the additional cost to manufacturers that will result from establishment of these relationships, and how such additional costs will directly affect individual manufacturers.

While some aftermarket parts makers may be adversely affected by the OBD II anti-tampering requirements, other aftermarket parts companies may benefit economically as a result of the OBD II regulations. OBD II systems will provide for more timely detection of deteriorated and/or malfunctioning components, with the consequence that there will likely be a greater demand for replacement parts. Realizing that some manufacturers may benefit and others may be disadvantaged, the staff concluded that on balance the impact on employment and business growth in California would be minor at worst.

As stated in the agency's response to Comments 19-21 and 25, the amendments to the antitampering requirement were necessitated because of increasing likelihood of tampering because of EEPROMs and other advanced technology. To assure the reliability and integrity of the OBD system, and to achieve the maximum emission reductions possible, the ARB balanced its needs for greater security of the OBD system against the needs of the aftermarket industry to obtain information necessary for proper design of replacement and performance parts. To this end, the ARB determined that the most reasonable course of action would be to tighten security measures and concurrently to endeavor to facilitate the development of ongoing business relationships between the aftermarket and motor vehicle manufacturing industries. The ARB staff believed that this would ultimately result in the aftermarket industry being able to implement modifications necessary for the manufacture and certification of parts.

The ARB determined that it was necessary to impose the additional antitampering measures at this time because of the leadtime that would be required in developing secure systems and the realization that if technology forcing regulations were not adopted, the research and development of necessary technology would not likely be invested. To achieve maximum emission reductions from OBD II systems it is envisioned at this time that such systems will become an integral part of the I/M program. Tampering of the OBD systems, much of which could go undetected, could undermine the benefits of the I/M programs and delay use of the OBD II systems as part of those programs. This would have an adverse impact on emission reductions and would impede California's efforts to achieve state and federal attainment standards.

As stated, in adopting the amendments, the ARB fully realized that initially some burdens could be imposed on aftermarket part manufacturers. To this end, the ARB scheduled the first of possibly a series of workshops to address the problems facing the industry and to attempt to facilitate dialogue between the vehicle manufacturing and aftermarket parts industries. Ultimately it is hoped that this will foster development of business relationships that will assure that aftermarket parts makers will have the ability to

make their products compatible with OBD II systems and emission requirements. The first workshop was held on February 7, 1995. The ARB plans to hold other workshops as it continues to develop revisions to the aftermarket certification test procedures that will specifically address the issue of aftermarket parts and OBD II systems. The ARB believes that the successful development of business relationships will assure the continued viability of the aftermarket industry.

**31. Comment:** An amendment should be added that requires manufacturers to provide the same information and equipment provided to franchised dealers to independent repair facilities on a contractual basis at a reasonable cost. (ASC)

**32. Comment:** A standardized system (methodology) for reprogramming must be made accessible to independent service repair facilities. (APAA) (ASC)

**Agency Response:** The OBD II regulation addresses service information availability relative to the use of OBD II systems in diagnosing and repairing emission related malfunctions. The regulation contains requirements for standardizing diagnostic information so that independent service technicians will be able to access this information with commonly available diagnostic equipment (section (k)). Further, this section requires publication of service procedures that reference the use of this type of equipment. However, the ARB believes requirements for information and equipment not directly related to the use of OBD II systems, such as information and equipment relating to reprogramming of vehicles, would be inappropriate within the context of the OBD II regulations.

Service information concerns are currently being addressed by the U.S. EPA and the California Legislature. As mentioned in the ARB's response to Comment 29 above, both are considering requirements for access to reprogramming equipment. Further, the California Legislature recently enacted section 44036.2, which requires manufacturers to make the service procedures they provide to franchised dealers available at reasonable cost to independent service facilities.

With respect to standardization of reprogramming methodologies, neither the EPA or the California Legislature is considering such a requirement to the best of the ARB staff's knowledge. The ARB believes such standardization could be beneficial to the independent service industry; however, reprogramming methodologies are complex and can differ significantly between manufacturers. A significant amount of additional discussion and development is necessary before such a requirement would be reasonable. Nevertheless, the ARB staff plans to continue to investigate the feasibility of standardized reprogramming equipment, and the potential benefit of such equipment to reduce vehicle emissions in-use.

**33. Comment:** There is a need to standardize and facilitate access to service information databases by requiring the on-board system to electronically identify the vehicle, its current calibration status, and any approved modifications which have been introduced. (ASC) (MEMA)

**Agency Response:** The commenters are referring to the development of a service information database that could be linked directly to a vehicle's on-board computer. The on-board computer would transmit the vehicle identification number (VIN) to the database along with an identification number for the software version contained in the on-board computer. The database would then use this information to automatically access the relevant service procedures for the vehicle, and would indicate if the vehicle contains the most recent software version available. The development of such a database is currently being considered by the Society of Automotive Engineers' E/E Diagnostic Standards Committee.

The ARB believes that the use of technology to improve access to emission related service information will help the service industry to better diagnose and repair vehicles with excess emissions, and the ARB is interested in doing what it can to further such efforts. However, as mentioned in the Agency Response to Comments 30 and 31, it is not the ARB's intent to address all service information concerns as part of the OBD II regulation. The regulation only requires manufacturers to implement diagnostic systems to detect vehicle malfunctions, and to generate related diagnostic information as a tool to help in repairing such problems.

#### Statistical MIL Illumination Protocols

**35. Comment:** The current regulatory language limits the average run length for alternative MIL illumination protocols to six trips on average. The maximum average run length should be increased to ten to allow for optimization of strategies such as the Exponentially Weighted Moving Average (EWMA). (AAMA) (GM)

**Agency Response:** The ARB staff has studied statistical algorithms such as EWMA and believes that they can be used effectively as an alternate MIL illumination protocol. For this reason, the regulation contains a provision for their use, and allows up to six trips on average for malfunction detections to occur (three times longer than generally specified in the regulation). The staff believes it is necessary to limit the "run-length" of these algorithms to six on average in order to ensure the detection of malfunctions in a timely manner. Even with a limit of six on average, some malfunctions will not be detected until 10 or more trips due to the variation associated with the algorithm. Should the limit be extended to 10 on average, the variation would also increase, causing malfunction detections to be delayed until 20 trips or more in some cases, which is not reasonably timely.

#### In-use Recall Protocol

**36. Comment:** The in-use recall provisions are too broad and could lead to the recall of a vehicle without its emissions having exceeded the standards. Further, because manufacturers are still gaining experience with OBD II systems, there should be a moratorium on OBD II system recalls for model years 1994 through 1996. At a minimum, the current two times the standard recall threshold for model years 1994 and 1995 should be extended to model year 1996. (AAMA) (GM)

**Agency Response:** As discussed previously (see Comment 14) the OBD II regulation requires monitoring of individual components that have an impact on emissions, but would not cause vehicle emissions to exceed 1.5 times the standard. The purpose of this requirement is to prevent excessive vehicle emissions that could result from a combination of such malfunctions. To this extent, it is necessary for the ARB to ensure that these monitoring systems be able to detect malfunctions occurring in-use. Without the ability to recall vehicles that do not properly detect such problems, the ARB could have no recourse should vehicles operate on the road with high in-use emissions and no indication of a malfunction because manufacturers are not required to detect combinational failures. However, as stated in the response to Comment 14, the ARB staff is willing to work with individual manufacturers on a case by case basis to help identify components that need to be monitored and which would subject the vehicle to recall.

A moratorium on in-use recall through the 1996 model year would prevent the ARB from seeking corrective action should OBD II systems fail to perform reasonably in-use. It is not the staff's intent to vigorously pursue in-use recalls of OBD II systems in the early years of production, as is evidenced by the higher emission thresholds for in-use recall through the 1995 model year for non-low emission vehicles, and through the 2000 model year for low emission vehicles. However, without retaining some authority to recall vehicles, there is no assurance that manufacturers will take adequate measures to ensure reasonable in-use operation of these systems.

Finally, regarding the commenter's request for an extension of the higher emission thresholds for in-use recall on non-low emission vehicles from the 1994 and 1995 model years through the 1996 model year, the staff believes that the two years of relief that has already been provided should be sufficient for these vehicles. These vehicles are certified to higher emission standards, with the consequence that a higher in-use recall emission margin is to some extent inherent. Further, by the 1996 model year, manufacturers will have had sufficient leadtime to ensure proper in-use performance of these systems.

#### Other Comments

**37. Comment:** The provision by which retrofit conversion system manufacturers can request Executive Officer approval to disable certain monitoring strategies should be extended to at least the 1999 model year so that the provision is consistent with that for vehicle manufacturers. (IMPCO)

**Agency Response:** As amended the regulations allow manufacturers of original equipment vehicles certified to run on alternative fuels to request that the Executive Officer waive specific monitoring requirements until the 1999 model year. The waiver would apply through the 1998 model year and the manufacturer would be expected to fully comply in the 1999 model year. Similarly the present rulemaking amended Title 13, California Code of Regulations sections 2030-2031 and the test procedures incorporated therein. These amendments allow retrofit manufacturers to request from the Executive Officer that OBD II

monitoring requirements not apply up through the 1998 model year. Thus, the regulations as they apply to original equipment manufacturers and retrofit manufacturers are consistent. The ARB believes these provisions provide vehicle and retrofit manufacturers with adequate leadtime to ensure that all OBD II monitoring strategies are compatible with alternate fuels.

**38. Comment:** The ARB has not gotten an EPA waiver for the OBD II regulation, making it without force or effect. (SEMA)

**Agency Response:** To the extent that this question is referring to California's authority to enforce these regulations without a waiver, the comment is outside the scope of this rulemaking. California has adopted the regulations and these amendments under authority granted to it by the California Legislature. To comply with the requirements of section 209(b) of the Federal Clean Air Act, the ARB has formally submitted a request for a waiver to the U.S. Environmental Protection Agency (U.S. EPA). However, knowing that it would be proposing these amendments in response to concerns raised from industry, the ARB requested that the U.S. EPA delay consideration of the waiver request until these amendments were formally adopted. The ARB will be requesting in the near future that the waiver request be reactivated.

**39. Comment:** The incorporation of SAE J1979 and J1939 may potentially represent a further unlawful delegation of authority. The proposed regulation does not clarify whether later changes to these SAE standards will have no effect on the regulation or if such later changes will be deemed incorporated. (SEMA)

**Agency Response:** As with these amendments, the ARB will follow its practice of formally amending the OBD II regulations if it decides to adopt and apply a later version of the incorporated SAE documents. (See section k(2.0) in which the regulations were amended to incorporate the latest version of SAE J1979.)

**40. Comment:** The regulation should allow for reactivity adjustment factors to be applied to hydrocarbon emissions in determining malfunction criteria. (Chris Weaver)

**Agency Response:** A footnote was added to the regulation to make clear that reactivity adjustment factors can be used in this manner.

**41. Comment:** The regulation should give the Executive Officer the discretion to provide leniency with respect to complying with the OBD II requirements in instances where the introduction of new technology has make compliance difficult to achieve. (Fiat)

**Agency Response:** An amendment to the regulation was adopted that allows manufacturers to certify OBD II systems with identified monitoring system deficiencies through the 2000 model year. The provision permits the certification of OBD II equipped vehicles with two deficiencies without penalty through the 1996 model year, and one



deficiency for model years 1997 through 2000. Fines in the amount of 25 or 50 dollars per deficiency would apply should additional deficiencies be identified. The staff believes this provision provides manufacturers with adequate leniency to address most implementation concerns. Should it be determined that manufacturers will not be able to meet the OBD II requirements without additional leniency, the ARB staff would propose additional amendments to the Board.