CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS

PROPOSED AMENDMENTS TO THE VERIFICATION PROCEDURE FOR IN-USE STRATEGIES TO CONTROL EMISSIONS FROM DIESEL ENGINES

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TABLE OF CONTENTS

EXECUTIVE SUMMARY **5**

1 INTRODUCTION **8**

2 BACKGROUND **8**

3 SUMMARY OF PROPOSED AMENDMENTS **9**

3.1 WARRANTY REQUIREMENTS 9
3.2 NO_2 LIMIT 10
3.3 PROPOSED VERIFICATION TESTING PROTOCOL 10
3.4 HARMONIZATION OF DURABILITY REQUIREMENTS 10
3.5 ADDITIONAL PROPOSED AMENDMENTS 11

4 DISCUSSION **11**

4.1 WARRANTY REQUIREMENTS 11
4.1.1 Experience with Failures/Damage in the Field 12
4.1.2 Coverage in Related Warranties 14
4.1.3 Staff's Proposal 14
4.2 NO_2 LIMIT 15
4.2.1 Variability of Engine-out and DPF-out NO_2 Emissions 16
4.2.2 Engines With NO_2 in Excess of 20% of NOx 16
4.2.3 Lead Time for Product Development 18
4.2.4 Atmospheric Modeling Uncertainties 18
4.2.5 Staff's Proposal 19
4.3 PROPOSED VERIFICATION TESTING PROTOCOL 20
4.4 HARMONIZATION OF DURABILITY REQUIREMENTS 22
4.5 ADDITIONAL PROPOSED AMENDMENTS 22

5 INTERACTION WITH OTHER ARB DIESEL PROGRAMS **23**

6 ISSUES OF CONTROVERSY **24**

6.1 WARRANTY 24
6.2 NO_2 LIMIT 25

7 REGULATORY ALTERNATIVES **25**

7.1 NO CHANGE TO WARRANTY 25
7.2 NO CHANGE TO EFFECTIVE DATE OF NO_2 LIMIT 26

8 ECONOMIC IMPACTS **26**

8.1 LEGAL REQUIREMENT 26
8.2 AFFECTED BUSINESSES 26
8.3 POTENTIAL IMPACT ON CALIFORNIA BUSINESSES 27

8.4 POTENTIAL IMPACT ON EMPLOYMENT 27
8.5 POTENTIAL IMPACT OF BUSINESS CREATION, ELIMINATION OR EXPANSION 27
8.6 POTENTIAL IMPACT ON BUSINESS COMPETITIVENESS 27
8.7 POTENTIAL IMPACT TO CALIFORNIA STATE OR LOCAL AGENCIES 27
8.8 ESTIMATED COSTS 28

9 ENVIRONMENTAL IMPACTS 28

10 COST-EFFECTIVENESS 28

11 CONCLUSION 28

12 REFERENCES 29

APPENDIX A. PROPOSED REGULATION ORDER

FIGURES

Figure 1 DPF NO_2 Fractions by Test Cycle 17

Figure 2 DPF NO_2 Fractions by Engine Series..... 17

EXECUTIVE SUMMARY

In 1998, the Air Resources Board (ARB or "Board") identified diesel particulate matter (PM) as a toxic air contaminant. Because of the amount of diesel PM emitted into California's air, it is now by far the number one contributor to the total health risk posed by toxic substances in the ambient air. To address this large-scale health concern, the ARB adopted the Diesel Risk Reduction Plan in 2000. A significant component of the Diesel Risk Reduction Plan involves proposals to apply emission control strategies to in-use diesel vehicles and equipment. To ensure that any technology used toward that end would achieve real and durable emission reductions, staff developed the Diesel Emission Control Strategy Verification Procedure (the "Procedure"), which was adopted by the Board in May 2002.

Since the adoption of the Procedure, staff has identified four primary areas that require amendments:

(1) Warranty requirements: In developing the warranty requirements for verification, staff tried to strike a balance between the interests of the end-users and the manufacturers of emission control systems. Sometimes, the views of the two groups can seem to be almost diametrically opposed. Nevertheless, staff recognizes that it is imperative that Californians' exposure to diesel particulate matter be reduced to the greatest extent possible, and that a viable warranty is necessary to achieve this goal. Achieving this goal is in jeopardy because the manufacturers of diesel emissions control strategies perceive that the current warranty requirement presents them with too great a liability to participate in the verification process, and end-users perceive it as providing insufficient consumer protection.

Subsequent to the adoption of the Procedure by the Board, manufacturers of diesel emission control strategies began voicing significant concerns to staff regarding the Procedure's warranty requirements. Although manufacturers' concerns over the warranty were lessened by various clarifications made by staff, they were not completely resolved. Full resolution will require that the Board consider amendments to the Procedure. The mandatory warranty for verified diesel emission control systems currently includes coverage of damage to the engine and vehicle or equipment that is proximately caused by the control system. It is primarily the inclusion of the vehicle or equipment in the warranty coverage that has prevented manufacturers of emission control systems from agreeing to participate in the verification process. Their primary concern is the potential for end-users to make spurious claims with the goal of obtaining new vehicles or equipment.

The California Trucking Association (CTA), representing end-users, has repeatedly stated that the duration of warranty coverage is insufficient. Even if coverage of vehicle/equipment damage is removed, staff points out that the warranty affords far more protection than that required under the United States Environmental

Protection Agency's (U.S. EPA) Urban Bus Retrofit/Rebuild program, which was another mandatory emission control effort directed at in-use fleets. As with warranties offered by engine manufacturers, the U.S. EPA's required warranty did not include coverage of vehicle/equipment damage. In addition, it has been staff's experience that the potential for a verified emission control strategy to cause non-engine related damage is minimal. In the unlikely event that such damage should occur, however, all the standard avenues for relief from secondary damages remain intact. Therefore, even without coverage of vehicle/equipment damage, staff does not believe that end-users would be left in an unreasonable situation.

In an effort to achieve the goals of the Diesel Risk Reduction Plan while still maintaining reasonable consumer protection, staff therefore proposes that mandatory warranty coverage extend only to the engine, and not to the vehicle or equipment with which the control system is used.

(2) Nitrogen dioxide (NO_2) emission limit: The Procedure states that post-control NO_2 emissions must not exceed 20 percent of the total baseline (pre-control) NOx emissions. That NO_2 limit becomes effective on January 1, 2004. Staff proposes that the effective date be changed to January 1, 2007, to provide time to re-evaluate the limit and to allow implementation of effective emission controls to continue in the near-term. Re-evaluation of the limit is advised, as questions have arisen concerning the appropriateness of the limit given new information on the expected fleet penetration of high-NO_2 systems and the nature of NO_2 emissions in general. The delay ends before staff expects large-scale implementation of emission control systems, and therefore prevents negative regional health effects.

(3) Proposed verification testing protocol: An early step in the verification process that applicants must take is the preparation of the Proposed Verification Testing Protocol. One of the subsections of the proposed protocol requires that the applicant describe its system's principles of operation. Staff must develop a good understanding of the system for several reasons, principal among them being the need to determine whether additional analyses for other harmful pollutants are necessary. Staff proposes adding language to that subsection which clarifies how staff is to handle those control systems that appear to rely on principles not generally understood or accepted by the scientific world. The proposed language gives the applicant two opportunities to demonstrate that its product relies on sound principles of science and engineering to achieve emission reductions. After review of the second submittal, the Executive Officer may determine to either continue the verification process or to suspend the application or revoke an existing verification.

(4) Harmonization of Durability Requirements: The fourth major proposed amendment is born of an on-going effort to harmonize the Procedure with the U.S. EPA's verification protocol. The Procedure requires that emission reduction testing for a diesel emission control strategy be performed before and after the service accumulation period. As an alternative to testing a single unit in that fashion, staff proposes that the applicant be allowed to request that staff consider the testing of

two identical units, one that has been pre-conditioned and another that has completed the service accumulation period. That testing option is consistent with the requirements in the U.S. EPA's verification protocol.

Additional proposed amendments of a more minor nature include: (1) definitional changes and additions for consistency with the proposed Airborne Toxic Control Measure to Reduce Diesel Particulate Matter Emissions from Stationary Diesel-Fueled Compression Ignition Engines, (2) clarification of test cycle selection for off-road and stationary engine testing, (3) clarification that the Executive Officer will consider test procedures specified in airborne toxic control measures when evaluating a request to use an alternative test cycle or method, and (4) correction of the procedure for measuring NO_2.

Because no direct emissions benefits are associated with the staff proposal, no traditional cost effectiveness can be calculated. When staff proposes rules to implement in-use controls for the various categories of diesel engines, it will provide more detailed estimates, taking into account the specific issues associated with each category. Staff's proposed amendments do not change the voluntary nature of the Procedure. Accordingly, there will be economic impacts only with those individuals that choose to follow the Procedure to verify their products.

The proposed amendments to the Procedure retain the sound guidelines for evaluation and the flexibility of the original Procedure that are needed to reduce the burden on applicants and allow speedy implementation of the Diesel Risk Reduction Plan. The ARB staff recommends that the Board adopt the proposed amendments to sections of 2700 to 2710, Title 13, California Code of Regulations, set forth in the proposed Regulation Order in Appendix A.

1 INTRODUCTION

This report, written by the staff of the Air Resources Board (ARB or "Board"), describes proposed amendments to the Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines (the "Procedure"), which is in the California Code of Regulations, Title 13, Sections 2700-2710. The primary purpose of the Procedure is to support California's Diesel Risk Reduction Plan (see Section 2), which aims to dramatically reduce Californians' exposure to diesel particulate matter (PM). Verification under the Procedure is the key to gaining recognition of emissions benefits and thus to participating in the diesel emission control market created by the Diesel Risk Reduction Plan. The Procedure contains emission testing requirements that manufacturers of emission control technologies must fulfill in order for their products to be verified, as well as warranty and in-use compliance testing requirements. Since the Procedure was adopted by the Board in May 2002, staff has determined that changes could be made to improve the Procedure and better enable ARB to meet the goals of the Diesel Risk Reduction Plan. This report describes those changes and the rationale behind them.

Section 2 of the report provides context and historical background on the Procedure. The amendments staff is proposing are briefly summarized in Section 3, and Section 4 discusses the rationale used by staff in arriving at those proposals. Staff discusses how the proposal affects interaction of the Procedure with other ARB diesel programs in Section 5, and describes potential issues of controversy in Section 6. A number of regulatory alternatives to what staff proposes are covered in Section 7. Staff discusses the economic impacts of the proposed amendments on the public and private sectors in Section 8, and environmental impacts in Section 9. After briefly addressing cost-effectiveness in Section 10, staff concludes the report with Section 11.

2 BACKGROUND

In 1998, the ARB identified diesel PM as a toxic air contaminant following a ten-year review process. A toxic air contaminant is an air pollutant that contributes to mortality or serious illness, or poses other potential hazards to human health. Most toxic air contaminants are volatile and are found primarily in the atmosphere as gases, but some are atmospheric particles or liquid droplets. Diesel PM is of particular concern because it can be distributed over large regions, thus creating widespread public exposure.

Because of the amount of diesel PM emitted into California's air, it is by far the number one toxic air contaminant. To address this large-scale health concern, the ARB adopted the Diesel Risk Reduction Plan in 2000 (ARB, 2000). One of the primary goals of the Diesel Risk Reduction Plan is to reduce emissions of diesel PM from the long-lived in-use fleet. The Plan outlines measures that include the use of diesel emission control strategies with existing diesel vehicles and equipment in on-road, off-road, and stationary applications. To be able to implement those measures, ARB must first verify that candidate emission control technologies are effective in reducing emissions.

In response to that requirement, ARB staff developed a procedure to verify strategies that provide real and durable reductions in diesel PM emissions. The Board adopted the Procedure at the public hearing held on May 16, 2002. Although the primary function of the Procedure is to support the Diesel Risk Reduction Plan, it also quantifies NOx reductions in light of California's persistent ozone problem. The Procedure encompasses on-road, off-road, and stationary applications and is designed to evaluate a broad range of technologies, including aftertreatment systems, alternative diesel fuels, and fuel additives. The Procedure represents a cooperative inter-divisional effort that drew upon the expertise of staff in different areas as needed. Staff also worked with and continues to work with the U.S. EPA on harmonizing the verification procedures between the two agencies.

The requirements for verification under the Procedure extend beyond conducting emissions testing to quantify emissions reductions. The Procedure classifies technologies based on their PM reductions as Level 1 (25 percent minimum reduction), Level 2 (50 percent minimum reduction), or Level 3 (85 percent minimum reduction or maximum emission rate of 0.01 grams per brakehorsepower-hour). A technology must achieve at least a Level 1 PM reduction to be verified. To ensure that a product's emission reductions are durable, verification requires that applicants conduct emissions testing after the product has accumulated a specified amount of service in the field or in a laboratory. Applicants must also offer a specified minimum warranty to protect consumers against defects. Last, applicants must both conduct and successfully pass in-use compliance testing for their products to retain their verified status. Thus, the Procedure aims to ensure real and durable emission reductions, acknowledges consumers' interests, and requires that systems sold in the marketplace perform as well as those used for verification testing.

Staff has maintained a dialogue with stakeholders before, during, and after workshops and periods of public comment. As a result of this on-going dialogue, staff determined that changes could be made to improve the Procedure and better enable ARB to meet the Diesel Risk Reduction Plan's goal to dramatically reduce public exposure to diesel particulate matter. The proposed changes are briefly summarized in the next section and discussed in more detail in Section 4.

3 SUMMARY OF PROPOSED AMENDMENTS

The following is a concise summary of staff's proposed amendments to the Diesel Emission Control Strategy Verification Procedure. Section 4 discusses the proposals and explains the rationale behind them.

3.1 Warranty Requirements

The mandatory warranty for verified diesel emission control systems currently includes coverage of damage to the engine and vehicle or equipment proximately caused by the

control system. Staff proposes that warranty coverage only extend to the engine, and not the vehicle or equipment with which the control system is used.

3.2 NO_2 Limit

The Procedure states that post-control NO_2 emissions must not exceed 20 percent of the total baseline (pre-control) NOx emissions on a mass basis. That NO_2 limit becomes effective on January 1, 2004. Staff proposes that the effective date be changed to January 1, 2007.

3.3 Proposed Verification Testing Protocol

Section 2702(b) of the Procedure describes the requirements for the Proposed Verification Testing Protocol that the applicant must prepare. One of the subsections of the proposed protocol requires that the applicant describe its system's principles of operation. Staff proposes adding language to that subsection which relates to those control systems that appear to rely on principles not generally understood or accepted by the scientific world. The proposed language states that it is the responsibility on the applicant to demonstrate that its product relies on sound principles of science and engineering to achieve emission reductions. If, after reviewing the proposed protocol, the Executive Officer determines that the applicant has not made a satisfactory demonstration, staff proposes that the applicant be given a second opportunity (60 days) to submit additional material and clarifications that explain the principles of operation. After review of the second submittal, the Executive Officer may determine to either continue the verification process or to suspend the application. If an application has been suspended, it may only be reactivated at the discretion of the Executive Officer. Staff also proposes that if at any point in the verification process the Executive Officer has reason to doubt the scientific or engineering soundness of a product, the Executive Officer can require the applicant to provide further substantiation or risk suspension of the application or revocation of an existing verification.

In addition to the above, staff proposes adding another section to the proposed protocol in which the applicant simply states that the applicant agrees to provide a warranty pursuant to the requirements in the Procedure.

3.4 Harmonization of Durability Requirements

The Procedure requires that emission reduction testing for a diesel emission control strategy be performed before and after the service accumulation period. As an alternative to testing a single unit in that fashion, staff proposes that the applicant be allowed to request that staff consider the testing of two identical units, one that has been pre-conditioned and another that has completed the service accumulation period. The testing of two such units is consistent with U.S. EPA's verification procedure. In reviewing the request, staff may consider all relevant information, such as:

- The effect of the system on engine operation over time. Systems that cause changes in engine operation are likely not to qualify for this testing option.
- The quality of the evidence the applicant can provide to support that the two units are identical.

- Previous experience with similar or related technologies.
- Whether the applicant is participating in the U.S. EPA verification process and has made an agreement with U.S. EPA to test two units.

3.5 Additional Proposed Amendments

Definitions: Staff added the definitions for the terms “Emergency Use “ and “ALSF-1 and ALSF-2” and modified the definitions of the terms “Emergency Standby Engine,” “Portable Diesel Engine,” and “Stationary Diesel Engine.”

Off-road and Stationary Engine Test Requirements: Staff clarified that the off-road diesel engine regulations referred to in subsections 2703(e)(2) and (3) require the use of a specific test cycle, but that applicants may nevertheless request the Executive Officer to consider alternatives.

Alternative Test Cycles and Methods: Section 2703(f) lists examples of items that the Executive Officer may consider when evaluating an applicant’s request to use an alternative test cycle or method. To that list, staff added test procedures specified in airborne toxic control measures (ATCMs) adopted by the ARB.

Procedure for Measuring NO_2: Section 2706(a)(3) indicates that part of the NO_2 calculation involves subtracting NO from NOx on a second-by-second basis. Staff corrected that procedure by indicating that NO_2 is to be determined by subtracting the average rather than second-by-second values.

Limits on Other Pollutants: Section 2706(b) specifies that verified diesel emission control strategies must not increase the emissions of carbon monoxide (CO) greater than the current CO emission standards for new diesel engines. Staff amended this requirement for stationary engine applications. For stationary applications, the diesel emission control strategy must not result in an increase in the emissions of CO by more than 10 percent above baseline levels.

4 DISCUSSION

This section of the report includes a more detailed discussion of the proposed amendments and the reasoning staff used in their development.

4.1 Warranty Requirements

In developing the warranty requirements for verification, staff has had to strike a balance between the needs of end-users and manufacturers of emission control systems. As can be expected, the views of the two groups are almost diametrically opposed. Nevertheless, staff recognizes that it is imperative that Californians’ exposure to diesel particulate matter be reduced to the greatest extent possible. Achievement of that goal is currently in jeopardy because manufacturers perceive the warranty presents them with too great a liability to participate, and end-users perceive it as providing insufficient consumer protection.

Subsequent to the adoption of the Procedure in May 2002, diesel emission control strategy manufacturers began strongly voicing concerns with the warranty requirements, in particular with the extent of liability. Staff commenced working with manufacturers to clarify the requirements within the scope permitted to 15-day changes. The resulting modifications were released with other modified text in the Notice of Public Availability of Modified Text on January 29, 2003. Although the manufacturers looked favorably upon the clarifications staff was able to make, they continued to express dissatisfaction with the requirement that liability include damages to the vehicle or equipment itself, and not simply the engine. Their primary concern is the potential for end-users to make spurious claims with the goal of obtaining new vehicles or equipment. The perceived financial risk has been significant enough to prevent some manufacturers from accepting the required warranty, and thus from attaining verification. Consequently, the range of verified emission control options available to end-users has been reduced.

The manufacturers' concerns have prompted staff to re-evaluate the merit of including vehicle/equipment damage in the warranty. Staff has therefore sought to (1) get a sense for the likelihood of such damage by reviewing field experience with diesel emission control strategies, and (2) determine the nature of the coverage afforded by other related warranties.

4.1.1 Experience with Failures/Damage in the Field

Staff has been involved with both demonstrations and commercial installations of diesel emission control systems on a variety of vehicles including school buses, solid waste collection vehicles, transit buses, long-haul trucks, and construction equipment. The majority of that experience has been with passive diesel particulate filters (DPFs) used in both verified and unverified applications. Although failures of verified systems in verified applications have been minimal, staff will not acknowledge the successes here. Instead, staff now emphasizes instances of failure and damage for verified as well as unverified systems:

- In January 2003, staff visited personnel of the City of Los Angeles in the Fleet Services division to get an update on their experiences with the over 300 solid waste collection vehicles that had been retrofitted with DPFs. They reported no engine or vehicle damage caused by the verified DPFs. Their own shop performed a couple of welds to repair cracks in two filter housings, but the overall experience has been positive. Los Angeles City Bureau of Sanitation staff has expressed satisfaction with current trends and the use of retrofits on their equipment. The sanitation trucks have logged 965,715 miles on DPF units with only a few minor problems. City of Los Angeles Bureau of Sanitation Services management said they will purchase more when funds are available.

  In an experimental demonstration project, four sanitation trucks were retrofitted with unverified systems that included an exhaust gas recirculation (EGR) system and a DPF. Two of the engines sustained damage and had to be replaced. One engine

sustained heat damage because the EGR system was incorrectly calibrated. The manufacturer of the unverified system paid for a replacement engine. The second engine was damaged because the wrong filter type was installed. The filter came loose and vibrations caused it to deteriorate. It shed small fragments of substrate which were directed back into the engine via the EGR component. That engine was also replaced by the system manufacturer. Those two instances are the worst retrofit-caused damage that staff has encountered to date. Had either of the two situations occurred with verified systems, the engine damage would have been completely covered by the warranty. The proposed amendment does not remove coverage of engine damage. It is noted in passing that when correctly calibrated and installed, that same EGR/DPF system has proven to be safe and effective in numerous transit bus applications.

- In the latter half of 2002, a private trucking fleet retrofitted over 100 of its long-haul trucks with verified DPFs. The company updated staff in early October 2003 on its experiences to date. The main problems encountered have been as follows: brackets did not fit properly and required reworking, backpressure sensor lines failed and required replacement, a number of DPF can components experienced failures due to a design flaw, and there has been difficulty in obtaining spare parts. The company is currently in the process of determining the exact extent of these issues. It reported no filter damage, and no engine or vehicle damage.

- Part of the South Coast Air Quality Management District's school bus demonstration program included the retrofit of buses powered by 1978 two-stroke engines (an unverified application) with DPFs. The worst failure that occurred was when one of the buses stalled because the filter plugged up and had to be towed. Nevertheless, there was subsequently no indication of engine or vehicle damage.

- One of the Los Angeles Metropolitan Transit Authority buses equipped with a DPF experienced a complete failure attributed to a bracket that came loose. The filter apparently rattled back and forth causing the substrate to gradually erode. By the time the problem was discovered, the substrate had been reduced to the size of a softball. Staff investigating the failure did not observe any engine or vehicle damage based on a visual examination of the bus and a review of data from subsequent emissions testing.

- ARB has been participating in an experimental demonstration program with the Construction Industry Air Quality Coalition (CIAQC) in which off-road construction equipment was retrofitted with DPFs (another unverified application). The program seeks to develop experience with retrofits in off-road applications, which are often extremely demanding physically. On-going reports from the field by the company Booz Allen Hamilton have described all failures and problems in detail. One of the most demanding pieces of equipment retrofitted with a DPF was a treaded bulldozer. Its extreme vibrations and lack of convenient location for installation of the DPF created problems for the DPF and the exhaust piping leading to it. In addition to the filter substrate itself sustaining damage, a tear developed in the exhaust piping just

downstream from the weld to the main exhaust manifold. Aside from that tear, no damage to the equipment was reported. Also, there has been no indication of any engine damage. Had the bulldozer installation been intended to support a verification, that DPF would not have been verified for that application.

The control strategies thus far encountered appear to have an extremely low probability for causing damage to vehicles and equipment. The Manufacturers of Emission Controls Association (MECA) strongly agrees with that observation. They tend to be more intimately involved with the engine and its operation than with other vehicle/equipment parts. Therefore, if some potential exists for damage to a significant component, it would most likely be the engine. Even so, the probability of a verified control strategy causing engine damage when used in an appropriate fashion is extremely low. Staff has not yet encountered any such cases. All instances of failure and damage mentioned above for verified systems would be covered by the proposed warranty.

4.1.2 Coverage in Related Warranties

The most similar program to ARB's in-use diesel emission control program is the U.S. EPA Urban Bus Retrofit/Rebuild Program, which was another mandatory emission control effort directed at in-use fleets. The program required a 100,000-mile defect warranty and 150,000-mile performance warranty (ARB requires 150,000 for both). However, manufacturers were not required to offer warranties that cover damages to the engine or vehicle caused by emission control systems. In addition, no durability demonstration was required by U.S. EPA. In the program's development phase, the warranty was a point of contention, as it is presently, but there were never any requirements written into the rule for secondary damages.

Besides investigating the U.S. EPA program's requirements, staff also reviewed warranty statements from various engine manufacturers and spoke directly with representatives from several of the larger companies. Engine warranties do not state that they cover damage to other vehicle components. They cover only the engines themselves.

Given staff's findings, it appears that explicit inclusion of damage to the engine and vehicle/equipment in a warranty is unprecedented.

4.1.3 Staff's Proposal

Although the potential for damage to vehicles/equipment does not appear to be significant, and related warranties do not afford the same level of consumer protection against secondary damages, owners may naturally be concerned should coverage of vehicle/equipment damage be removed from the warranty. First, it should be noted that the warranty required by ARB is the minimum required by law. Manufacturers may wish to offer enhanced warranties to make their products more attractive to potential customers. Some have already expressed that is their intent. More importantly, staff does not believe that removal of such coverage would place owners in an unreasonable situation. In the unlikely event that an owner's vehicle or equipment sustains damage

as a result of the malfunction of a verified diesel emission control strategy, the standard avenues of relief are available. Legal theories of negligence and product liability would provide the owner potential relief. The comprehensive coverage in the owner's vehicle insurance policy would be available to cover damage. Furthermore, business losses attributable to the damage may be covered under the vehicle owner's business interruption insurance.

Active participation of manufacturers is critical to achieving the health benefits called for by the DRRP. Because the potential for a verified control strategy to cause non-engine related damage is minimal, no related warranties afford the same level of coverage of secondary damages, and owners have all of the standard avenues to pursue for relief should such damage occur, staff proposes that the warranty required by ARB not include liability for damage caused to the vehicle or equipment with which a strategy is used.

4.2 NO_2 Limit

Another proposed amendment relates to the nitrogen dioxide (NO_2) emission limit. The Procedure currently requires that the emissions of NO_2 from an engine employing a diesel emission control strategy not exceed 20 percent of the baseline (engine-out) NOx emissions beginning on January 1, 2004. As of that date, no application for verification will be approved if the strategy does not meet the limit. In addition, previously verified strategies that do not meet the limit will no longer be considered verified for the purposes of new applications or new installations. Existing installations of such verified strategies, however, do not need to be removed and will continue to be recognized as verified by ARB. The diesel emission control strategies most directly affected by the NO_2 emission limit are those that oxidize nitric oxide (NO) in the exhaust to NO_2 which assists with the oxidation of PM (e.g., some passive diesel particulate filters). Such strategies have been shown to emit oxides of nitrogen (NOx) that have a significantly higher fraction of NO_2 than was originally present in the engine's exhaust.

As described in the Procedure's Initial Statement of Reasons (ISOR) released on March 29, 2002, ARB conducted atmospheric modeling for the year 2010 with various NO_2 fractions to investigate the effects of large-scale implementation of high-NO_2 strategies (ARB, 2002). The two basic assumptions that went into the modeling were that (1) 90 percent of all diesels were equipped with high-NO_2 diesel particulate filters, and (2) baseline NO_2 emissions were equivalent to 10 percent of the total NOx emissions. After reviewing the results of the modeling and presenting them before the International Diesel Retrofit Advisory Committee (February 6, 2002), staff determined that an NO_2 emission limit of 20 percent of the total baseline NOx emissions (by mass) would both minimize potential negative side effects (such as increases in ozone exposure) and potentially leave the door open for effective strategies that rely on the NO_2 oxidation mechanism. To give manufacturers time to redesign their control strategies to meet the limit, the Board approved an effective date of January 1, 2004.

Subsequent to the adoption of the Procedure, staff received several comments from manufacturers which, for the most part, did not support the NO_2 limit. Each comment is discussed in turn, below.

4.2.1 Variability of Engine-out and DPF-out NO_2 Emissions

One issue raised by manufacturers is that the variability of engine-out NO_2 will reduce the ability of verifications to cover a range of engine families, thus dramatically increasing the cost of verification.

That comment has merit for the following reasons. Systems are verified on the basis of groups of engines and applications that are defined by parameters relevant to the system being verified (emission control groups). If a passive DPF is shown to work on a truck with an engine certified to a particular PM emission standard, it can be verified for similar engines that meet the same standard. If testing shows that a DPF meets the NO_2 limit on a particular engine, staff has no certification standard or database of NO_2 emission data for reference to assist in determining other engines for which the DPF can be verified.

Without taking NO_2 into account, the emission control group for which passive DPFs are currently verified is large and well-defined (nearly all 1994-2002 on-road engines). The same cannot be said when NO_2 enters the picture. All of the vehicles in the EC-Diesel Technology Validation Program were in that same emission control group (LeTavec, 2000). Figures 1 and 2 show NO_2 fractions[1] for vehicles in the program equipped with one of the verified DPFs. The data is sorted by test cycle in Figure 1 and by engine series in Figure 2. In each case, a wide spectrum of NO_2 fractions is observed, often ranging 30 to 40 percentage points for each subgroup. Such a spread is large given that the limit is set at 20 percent. The data suggests that both test cycle and engine-type can have a significant impact on the NO_2 fraction. That observation is especially significant given that (1) all of the engines tested were from the same emission control group, and (2) baseline testing of other vehicles in the same fleets with the same engines showed a low engine-out NO_2 fraction with little absolute variation (5.0±0.8 percent[2]). The implication is that the 1994-2002 on-road group may need to be further subdivided in some fashion, but there is no clear indication as to what parameters should be used to do so. Such a subdivision could make verification much more burdensome for the applicant as it attempts to determine with which groups of engines its product will meet the NO_2 limit.

4.2.2 Engines With NO_2 in Excess of 20% of NOx

Another comment received by staff stated that there are engines in California with engine-out NO_2 levels in excess of 20 percent. Although most of the limited data collected by staff indicates that 5 percent NO_2 is more typical, there are data that support the comment. One manufacturer has submitted data indicating that a 1999

[1] NO_2 fractions were calculated by staff using NO and NOx emissions data from the ECD Technology Validation Program's Master Spreadsheet (Vertin, 2002).

[2] Based on data from (Vertin, 2002), as above. This result is for a 95 percent confidence interval and excludes three instances where staff found negative NO_2 fractions.

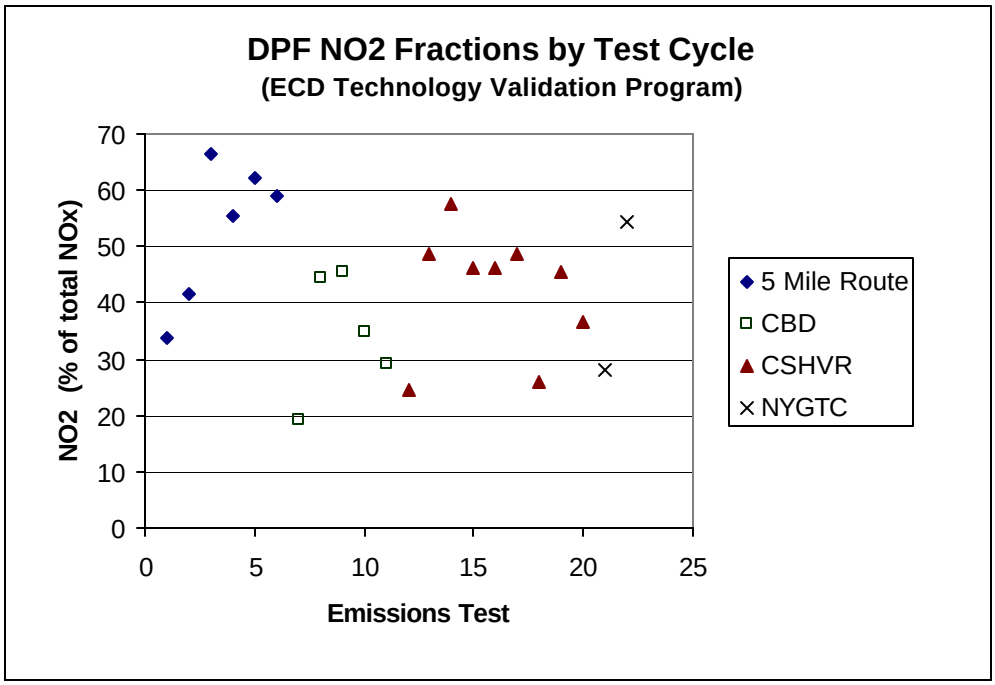

Figure 1. Note that CBD = Central Business District, CSHVR = City Suburban Heavy Vehicle Route, and NYGTC = New York Garbage Truck Cycle.

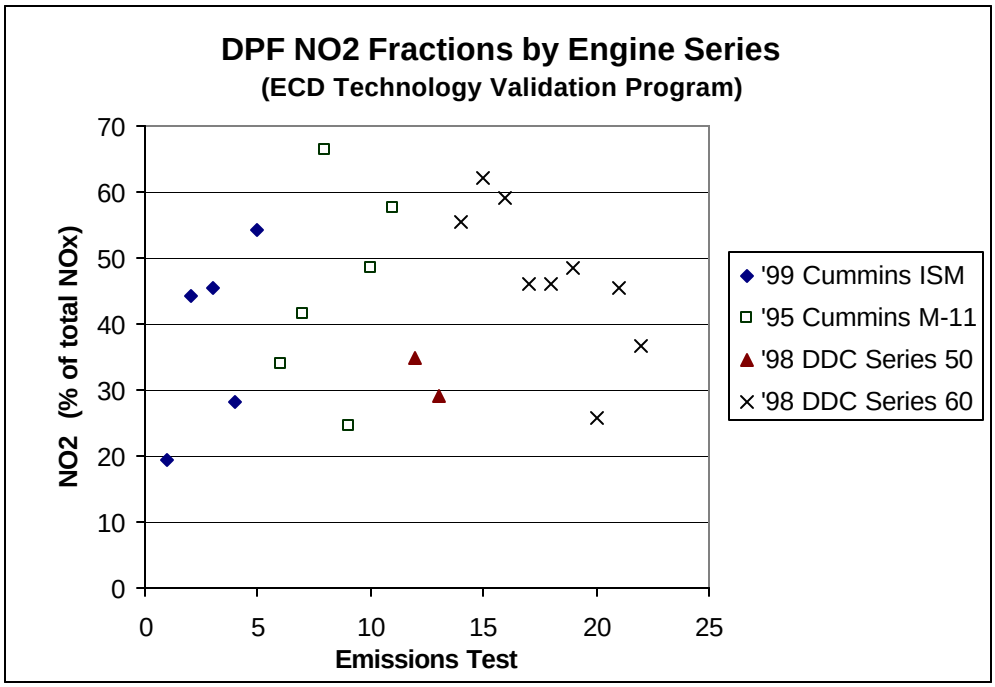

Figure 2.

Navistar 7.3-liter engine has a baseline NO_2 fraction of about 21 percent as measured over the heavy-duty transient Federal Test Procedure (FTP). Another manufacturer submitted data for a 1990 Navistar DT-466 using the same test procedure which indicate an 18 percent NO_2 fraction. Such engines would allow little to no increase in NO_2 emissions. Following the letter of the Procedure would prohibit retrofit of some high-NO_2 engines unless a control strategy actually reduced the engine-out NO_2 fraction.

4.2.3 Lead Time for Product Development

Several companies opposed the January 1, 2004, effective date on the grounds that it will not provide adequate time for development of compliant products. Although not yet verified, there are a number of commercially-available passive DPFs that comply with the NO_2 limit, but they use less active catalysts. As a result, they have significantly higher exhaust temperature requirements and therefore are compatible with a more restricted range of applications. Staff is aware of some progress being made with lowering NO_2 emissions from passive filters with a greater range of applicability, but to date, there are no verified Level 3 diesel emission control strategies that meet the NO_2 limit. Therefore, unless new compliant systems are verified soon, California stands to lose valuable early field experience and PM reductions that can be gained prior to the implementation of fleet rules.

4.2.4 Atmospheric Modeling Uncertainties

At the present time, diesel engine NO_2 emissions have not been adequately characterized. Historically, NO_2 has never been measured during diesel engine emissions testing. ARB's atmospheric modeling assumed an average engine-out NO_2 fraction of 10 percent, which is the conventional fraction used when modeling NOx emissions from combustion sources in general. The accuracy of that assumption for diesel engines specifically is not well established. As already discussed, the limited data staff has collected indicate that the NO_2 fraction may vary substantially from one engine to another. The extent to which that variability is due to different test cycles or test conditions is not known at this time.

In addition to the uncertainty surrounding baseline NO_2 emissions, there are also questions concerning the modeling assumption that 90 percent of all diesels will be equipped with high-NO_2 diesel particulate filters by 2010. To date, passive DPFs are only verified for 1994-2002 on-road engines that meet certain exhaust temperature requirements. Exhaust temperature data from various solid waste collection vehicles indicates that only about one third of such vehicles with 1994-2002 engines would meet the temperature requirements of the currently-verified passive DPFs (ARB, 2003). Because passive DPFs are limited in their application to engines that are not too dirty or too cold, 90 percent penetration into the entire diesel fleet appears to be unrealistic.

In order to determine the significance of a more realistic fleet penetration scenario, ARB has initiated another atmospheric modeling effort using a new scenario. The new scenario acknowledges the limited application of passive DPFs and introduces a mix of retrofit technologies as well as the option of repowering with cleaner engines. The goal

of the new modeling effort is to determine what an appropriate NO_2 limit might be in light of the more realistic scenario. At the present time, staff has not yet completed this study.

4.2.5 Staff's Proposal

In order to more meaningfully and realistically evaluate diesel emission control strategies that increase NO_2 emissions, the questions raised above need to be resolved. Staff therefore proposes that the effective date for the NO_2 limit be delayed. The duration of the delay must be long enough to give staff the time it needs to gather additional data and develop a better understanding of the NO_2 issue, and yet not so long as to have significant penetration of high-NO_2 strategies into the fleet.

Based on a draft implementation schedule for fleet rules, staff estimates that only 2 percent of the diesel fleet (sum of on- and off-road) will be required to use Best Available Control Technology (BACT) by the end of 2006. By the end of 2007, staff estimates that percentage to increase to about 8 percent (22 percent of the on-road fleet) if, as staff expects, off-road implementation has not yet begun. Compared to the 90 percent penetration of high-NO_2 strategies used in the modeling, the 2 and 8 percent estimates do not seem significant, especially since BACT is certainly not limited to technologies with high NO_2 emissions [3]. Nevertheless, staff opts for a conservative stance and recommends that a proposed delay not extend beyond the end of 2006 (a three year delay). Staff's conservative position is reasonable because the early, voluntary retrofit activity taking place in California may result in more than 2 percent implementation by the end of 2006. The new modeling effort now underway, in fact, will examine the effects of the delay using a scenario with more widespread implementation.

Besides additional atmospheric modeling, the delay will afford staff more time to gather NO_2 emissions data that will be necessary to address the issues raised above. Staff will obtain data from ARB's Heavy-Duty Emissions Test Laboratory, applications submitted for verification, and from demonstration projects and studies around the world. The additional atmospheric modeling and emissions data will be necessary to determine if a different NO_2 limit is appropriate, and more generally if a simple limit is the appropriate way to address NO_2 concerns.

The proposed delay will be welcomed by many manufacturers of emission control systems. In response to a request for comments issued in September 2003 which asked for input on the NO_2 issue in general, the Manufacturers of Emission Controls Association (MECA) indicated that it supports delaying the effective date and looks forward to working with staff to resolve the complex issues posed by controlling NO_2 emissions. The delay will also give manufacturers more time for product development aimed at reducing NO_2 emissions. As mentioned earlier, staff is aware of some

[3] Active DPFs and repowering with 2007 engines, for example, are NO_2 –compliant alternatives that achieve Level 3 PM reductions. Although 2007 engines may have high NO_2 fractions, they will likely emit less NO_2 than older engines because of their much lower overall NOx emissions. Level 3 applies to strategies that reduce PM by 85 percent or more, or to less than 0.01 grams per brake-horsepower hour.

progress being made with lowering NO_2 emissions from passive filters. Continued development requires time and money. The delay will provide additional time as well as additional opportunities to generate the revenue needed for development from the sale of current designs.

In 2002, ARB considered and adopted a reasonable yet protective NO_2 standard. New information and unanswered questions indicate that there is potential for that to change. In order to balance concerns over the health effects of higher NO_2 emissions and unmitigated PM emissions, staff proposes that the effective date of the NO_2 emission limit be delayed by three years to January 1, 2007.

4.3 Proposed Verification Testing Protocol

The first step in the verification process that an applicant takes is preparation of the Proposed Verification Testing Protocol, described in Section 2702(b) of the Procedure. The purpose of requiring the proposed protocol is to give staff the opportunity to understand the nature of the product under consideration, to determine the need for additional analyses, and to ensure that the planned testing is in accordance with the requirements for verification.

There are several reasons why it is critical for staff to develop a good understanding of how an emission control system works. The Procedure is intended to be sufficiently flexible and comprehensive to evaluate all kinds of diesel emission control strategies, whether they use aftertreatment hardware, an alternative diesel fuel, or some other method of reducing emissions. In order to determine which parts of the Procedure apply to a given product, staff must understand the product. That is especially true when applicants request alternatives to required test methods. A key determination that staff must make is whether additional analyses for other harmful pollutants are necessary. That determination, and the public health protection which motivates it, utterly depend on staff developing a good comprehension of the product. Another task that staff must perform which hinges on a good understanding is the determination of the limits of a product's applicability. If staff knows how a product works, it can reasonably estimate the breadth of engines and applications for which verification is merited based on a given set of emissions test data. Without understanding the principles of operation, staff may need to see data for each and every engine for which the applicant seeks verification. That situation would make verification extremely cost prohibitive. It is therefore in the best interests of the applicants as well as the public that staff gains the understanding it needs.

For the reasons noted above, one of the subsections of the proposed protocol requires that the applicant describe its system's principles of operation. The existing language is sufficient for handling technologies, such as diesel particulate filters, that function via processes that are generally understood. If, however, an applicant describes principles of operation that do not appear to be generally understood or accepted by the scientific world, the existing language does not provide clear guidance on how staff is to proceed. Section 2700 indicates that the Procedure applies to in-use strategies that are able to control emissions through the use of sound principles of science and engineering, but

does not provide any process for handling cases that do not at first appear to meet that criterion.

To fill that need, staff proposes adding language to subsection 2702(b). The proposed language states that it is the responsibility of the applicant to demonstrate that its product relies on sound principles of science and engineering to achieve emission reductions. That statement will help to ensure that applicants realize it is not staff's responsibility to demonstrate the soundness of their products, but rather their own. The applicant must perform any research necessary to substantiate a novel or unique approach to reducing emissions.

If, after reviewing the proposed protocol, the Executive Officer determines that the applicant has not made a satisfactory demonstration of the soundness of its product, staff proposes that the applicant be given a second opportunity (60 days) to submit additional material and clarifications that explain the principles of operation. Based on past experience, applicants may need feedback from staff in order to understand what a satisfactory demonstration entails. Thus, a second opportunity for explanation is proposed. Staff includes a time limit of 60 days to prevent an endless exchange of informal questions and answers via telephone and email with applicants that are not actually prepared for verification.

After review of the second submittal, the Executive Officer may determine to either continue the verification process or to suspend the application. Because of limited staff resources, staff proposes that applicants be limited to two formal attempts to explain their products. If an application has been suspended, it may only be reactivated at the discretion of the Executive Officer. In that manner, applicants with suspended applications may still have an opportunity to have their products verified, but ARB is not obligated to expend additional resources reviewing those applications.

Staff also proposes that if at any point in the verification process the Executive Officer has reason to doubt the scientific or engineering soundness of a product, the Executive Officer can require the applicant to provide further substantiation or risk suspension of the application. It is possible that a product may at first appear sound based on review of the proposed verification testing protocol, but that subsequent information could suggest otherwise. If, for instance, staff conducts its own emission testing using an applicant's product and finds inconsistent results, staff may require that the applicant explain the situation and potentially modify the product to correct a problem.

In addition to the above, staff proposes adding another section to the proposed protocol in which the applicant simply states that the applicant agrees to provide a warranty pursuant to the requirements in the Procedure. Based on past experience, staff finds that it is important for the applicant to be aware of the warranty requirements and the potential costs thereof early on in the verification process.

4.4 Harmonization of Durability Requirements

The final major proposed amendment relates to durability requirements and is born of an effort to harmonize with U.S. EPA's verification protocol. The Procedure currently requires that emission reduction testing for a diesel emission control strategy be performed before and after the service accumulation period. Although it does not explicitly state that the testing must be performed on the same unit before and after, that was the intention. The verification protocol used to support U.S. EPA's Voluntary Diesel Retrofit Program, however, calls for testing of both a pre-conditioned (or "de-greened") unit and an aged unit at the same point in time, with testing of a single unit at two different times (before and after service accumulation) left as an option.

Although ARB and U.S. EPA's diesel programs are different, staff nevertheless recognizes the value of harmonizing the verification requirements to the greatest extent possible. Staff therefore proposes amending the Procedure to explicitly allow applicants to request that the Executive Officer consider having the durability testing requirement fulfilled via testing two identical units at the same time, one pre-conditioned and one aged. This testing option is limited to those control strategies that have no significant effect on the engine over time. If there is reason to suspect that a strategy may have engine effects, testing before and after the service accumulation on the same engine with a single unit would likely be required. Because of the importance of establishing a system's performance when pre-conditioned, staff will pay close attention to an applicant's request to use the two-unit option. In particular, staff will examine the quality of the evidence that the applicant provides to support that the two units are identical. If the applicant is in the U.S. EPA verification process and has reached an agreement with U.S. EPA to use two units, staff will also take that into consideration.

Both the U.S. EPA and ARB are engaged in an on-going effort to harmonize their respective verification requirements. The proposed modification is one more step in that direction.

4.5 Additional Proposed Amendments

Definitions: Staff added the definitions for the terms "Emergency Use " and "ALSF-1 and ALSF-2" and modified the definitions of the terms "Emergency Standby Engine," "Portable Diesel Engine," and "Stationary Diesel Engine" to make them consistent with the corresponding definitions for those terms in the proposed Airborne Toxic Control Measure to Reduce Diesel Particulate Matter Emissions from Stationary Diesel-Fueled Compression Ignition Engines (stationary ATCM). While the proposed stationary ATCM does not require the use of verified systems, ARB staff anticipates that in some cases owners of stationary diesel engines will use verified technology to comply with the emission limits defined in the proposed ATCM. To avoid potential uncertainty regarding the applicability of the verification emission test results in meeting the proposed stationary ATCM's emission limits, ARB staff believes it is important that the definitions in the Procedure be consistent with the definitions in the proposed ATCM.

Off-road and Stationary Engine Test Requirements: To verify a diesel emission control strategy for use with off-road and stationary engines, applicants must follow the test

procedure defined in ARB off-road diesel engine regulations. The original language in subsections 2703(e)(2) and (3) incorrectly implied that the off-road regulations had a number of different test cycles from which applicants could select the most appropriate one. Staff clarified that the regulations require the use of a specific test cycle, but that applicants may nevertheless request the Executive Officer to consider alternatives.

Alternative Test Cycles and Methods: Section 2703(f) lists examples of items that the Executive Officer may consider when evaluating an applicant's request to use an alternative test cycle or method. To that list, staff added test procedures specified in airborne toxic control measures (ATCMs) adopted by the ARB. With that modification, applicants are alerted to the fact that ATCMs may specify test procedures that differ from those in the Procedure, but that those test procedures may be used towards verification with approval from the Executive Officer.

Procedure for Measuring NO_2: Section 2706(a)(3) indicates that part of the NO_2 calculation involves subtracting NO from NOx on a second-by-second basis. While that method is useful for observing how NO_2 emissions vary over time and in different modes of operation within a test cycle, it is not the preferred method for determining the average NO_2 over the cycle. For cycle-average NO_2 , it is more accurate to simply subtract the cycle-average value of NO from that for NOx, as is done by all of the laboratories staff has dealt with. Staff therefore proposes that the Procedure be modified accordingly.

Limits on Other Pollutants: Section 2706(b) specifies that verified diesel emission control strategies must not increase the emissions of CO greater than the current CO emission standards for new diesel engines. Staff proposes amending this requirement for stationary engine applications to make it consistent with the requirements of the proposed ATCM for stationary diesel-fueled compression-ignition (CI) engines. The amended language requires diesel emission control strategies for stationary applications to not increase the emissions of CO by more than 10 percent above baseline levels. Staff believes this is appropriate for stationary engine applications because many of the existing stationary engines currently operating in California are not certified to off-road CI engine standards. As such, staff believes requiring verified diesel emission control technologies to reduce CO emission rates to that of a new off-road certified engine may be overly burdensome and beyond the primary goal of the verification process, which is to verify reductions in diesel PM and NOx.

5 INTERACTION WITH OTHER ARB DIESEL PROGRAMS

The proposed amendments do not affect the basic interaction of the Procedure with other ARB diesel programs. Two items are worth noting, however. First, some of the proposed amendments help to align the Procedure with ATCMs. Staff proposes including consistent definitions and listing ATCM test procedures for consideration as alternative test methods to help the Procedure achieve smoother integration with ATCMs. Second, the proposed delay of the NO_2 limit's effective date extends the

amount of time that various verified diesel emission controls will be eligible to participate with various retrofit programs. Thus, PM reductions may continue to be realized even before most of the fleet rules are implemented.

6 ISSUES OF CONTROVERSY

6.1 Warranty

Staff expects most of the controversy to center around the proposed amendment to the warranty requirements. At the May 16, 2002 public hearing, the California Trucking Association (CTA) commented that the warranty periods were too short and therefore did not protect the consumer. CTA raised warranty issues again at the September 25, 2003 public hearing to consider the fleet rule for solid waste collection vehicles. In response to the September 2003 request for comments, CTA voiced its opposition to the proposed warranty change. Similarly, the California Independent Oil Marketers Association indicated that it insists there be full warranty protection for engines and vehicles. Obviously, any change to the warranty which appears to reduce consumer protection is of great concern to the eventual end-users of the emissions control strategies.

As discussed earlier in Section 4.1, staff's experience with systems in the field indicates that the potential for a verified control strategy to cause non-engine related damage is minimal. Despite this, the potential for even a single "deep-pockets" pay-out has the manufacturers of various proven emissions control systems contemplating withdrawing from active involvement in the Diesel Risk Reduction Plan. Staff believes modification of the warranty is necessary to ensure that their involvement will continue.

It should be pointed out that in the unlikely event that an owner's vehicle or equipment sustains damage as a result of the malfunction of a verified diesel emission control strategy, the standard avenues of relief are available. These include the legal theories of negligence and products liability as well as coverage by vehicular and business interruption insurance policies. Staff does not believe, therefore, that the proposed amendment would place owners in an unreasonable situation.

When the warranty ARB requires is compared against other relevant warranties, even with the proposed change, one finds that the coverage affords greater consumer protection. The warranty required in the U.S. EPA Urban Bus Retrofit/Rebuild Program consisted of a 100,000-mile defect warranty and 150,000-mile performance warranty (ARB requires 150,000 for both). However, manufacturers were not required to offer warranties that cover damages to the engine or vehicle caused by emission control systems. Engine warranties do not state that they cover damage to other vehicle components either. They cover only the engines themselves. For these reasons, staff again states that the end-user would not be placed in an unreasonable situation as a result of removing coverage of vehicle/equipment damage from the warranty.

Motivated by discussions at ARB's public hearing in September, staff has surveyed major diesel emission control system manufacturers to inquire about the availability of extended warranties. The survey revealed that none are currently offering extended warranties on their emission control systems, although one indicated it definitely will do so in the near future. The main reason for the unavailability of extended warranties is the uncertainty surrounding the current warranty required by the Procedure. The uncertainty stems from the fact that the manufacturers have recently been verified or are in the verification process, and so the ramifications of the required warranty are not yet known. Most companies want to reevaluate the situation once the verification program has matured further so that they can determine whether the required warranty is sufficient or if extended warranties should be made available. One company has indicated that it may offer extended warranties for large fleets in the future. The company that indicated it definitely will offer extended warranties said it plans to offer a variety of warranties to solid waste collection vehicle fleets in the near-term, as well as full maintenance leases and preventative maintenance contracts.

6.2 NO_2 Limit

Although many manufacturers of emission control systems support delaying the effective date of the NO_2 limit, other parties, including some manufacturers, have submitted comments indicating their support for not changing the date. While it is encouraging that some manufacturers have confidence in their ability to provide NO_2 – compliant products, those manufacturers' products have not yet been verified. None of the currently-verified Level 3 emission control systems can meet the NO_2 limit.

The imminent effective date of the NO_2 limit, unless changed, stands to eliminate a significant amount of near-term PM emission reductions and invaluable early field experience with retrofits. In addition, as described in Section 4.2, there are significant questions that staff must address concerning how to meaningfully and realistically evaluate emission control strategies that increase NO_2 emissions. Staff therefore holds to its proposal to delay the effective date by three years to allow for more time to resolve those issues.

7 REGULATORY ALTERNATIVES

While developing the proposal, staff considered a number of regulatory alternatives described below.

7.1 No Change to Warranty

If staff elected to retain the coverage of damage to the vehicle or equipment in the warranty, it is likely that many manufacturers of diesel emission control systems would reduce or cease their participation in California's retrofit market. Large and small manufacturers alike have expressed that inclusion of such damages makes the liability too large to risk participation. If manufacturers turn their attention only towards other states and to the original equipment market, California stands to lose enormous benefits associated with reduced diesel PM emissions from the in-use fleet. Therefore, while not

changing the warranty would likely be supported by fleet owners, it is not in the best interest of Californians in general.

7.2 No Change to Effective Date of NO_2 Limit

Retaining the January 1, 2004, effective date for the NO_2 limit is the most conservative way to address concerns over elevated NO_2 emissions from certain emission control systems. Unfortunately, doing so would significantly reduce near-term diesel PM emission reductions that are being achieved by numerous publicly-funded retrofit programs. It would also greatly diminish the invaluable field experience that these technologies are gaining. That experience will play a vital role in the success of future fleet rules. As discussed in Section 4.2, there are significant questions concerning the appropriateness of the current form of the limit and the assumptions that led to its determination. Finally, the proposed delay does not afford high-NO_2 systems enough time to achieve large-scale penetration, and thus prevents negative regional health effects.

8 ECONOMIC IMPACTS

The proposed amendments to the Procedure modify a protocol for evaluation of in-use diesel emission control technologies. Participation in the Diesel Emission Control Strategy Verification program is purely voluntary and a business would presumably use the Procedure only if it believed doing so was financially advantageous. The proposed amendments in no way change the voluntary nature of the Procedure. They do, however, further harmonize the Procedure with that of the U.S. EPA and potentially reduce the financial burden on applicants.

8.1 Legal Requirement

Section 11346.3 of the Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulation. The assessment shall include a consideration of the impact of the proposed regulation on California jobs, business expansion, elimination or creation, and the ability of California business to compete with business in other states.

State agencies are also required to estimate the cost or savings to any State or local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate shall include any non-discretionary cost or saving to the local agencies and the cost or saving in federal funding to the State.

8.2 Affected Businesses

Participation in California's diesel emission control program is not mandatory. However, any business or individual that chooses to participate in the program will have to satisfy the requirements of the Procedure. Businesses that choose to participate and thus follow the Procedure include manufacturers and marketers of diesel emission control

technologies. Also, some businesses may be indirectly affected, such as suppliers of raw materials or equipment to participants.

8.3 Potential Impact on California Businesses

The requirements for verification under the Procedure apply to any business that wishes to sell its products in California, regardless of its location. The proposed amendments do not alter that universality. Should any manufacturer or marketer elect to participate in the verification program, it would need to provide detailed information and data on the product in accordance with the Procedure. The testing required by the Procedure may require significant expenditures of capital on the part of a company. The proposed amendments to the Procedure will either cause no change in the cost of testing or potentially reduce the cost if an applicant is approved to use the proposed two-unit durability testing option.

Should a business choose not to participate in the verification program, there are other avenues by which its products may be sold in California. A business having a Vehicle Code 27156 exemption can legally sell the product in California, but can claim no emissions reductions. The product would not be a verified diesel emission control strategy, and would not satisfy the requirements of the fleet rules.

8.4 Potential Impact on Employment

The proposed amendments to the Procedure are not expected to cause a noticeable change in California employment and payroll. Participation in the program is voluntary and presumably only businesses able to afford the program will participate.

8.5 Potential Impact of Business Creation, Elimination or Expansion

The proposed amendments to the Procedure will not impact the status of California business in a noticeably different way from the original version of the Procedure, aside from extending the period of time that products with NO_2 fractions above the limit can be sold.

8.6 Potential Impact on Business Competitiveness

The proposed amendments to the Procedure would have no significant impact on the ability of California's businesses to compete with businesses in other states. Staff's proposals do not change the voluntary nature of the Procedure or its applicability to all businesses that manufacture or market diesel emission control technologies regardless of their location.

8.7 Potential Impact to California State or Local Agencies

The proposed amendments to the Procedure will not create costs or savings, as defined in Government Code section 11346.5 (a)(6), to any State agency or in federal funding to the State, costs or mandate to any local agency or school district whether or not reimbursable by the State pursuant to Part 7 (commencing with section 17500, Division 4, Title 2 of the Government Code), or other non-discretionary savings to local agencies.

8.8 Estimated Costs

As noted previously, the proposed amendments do not change the voluntary nature of the Procedure. Those manufacturers that wish to market diesel emission control strategy devices in California may wish to obtain verification using the Procedure. The Procedure includes emissions and durability testing requirements. The proposed amendments to the Procedure will either cause no change in the cost of testing or potentially reduce the cost if an applicant is approved to use the proposed two-unit durability testing option.

9 ENVIRONMENTAL IMPACTS

No direct environmental impacts can be associated with the staff proposal, as the proposal would simply modify an existing methodology and protocol for evaluating diesel emission control strategies. While the proposed amendments would extend the amount of time that a strategy which does not meet the NO_2 limit would be verified, that period of time falls far short of when significant implementation of strategies is planned. Thus, as discussed in Section 4.2, no significant environmental impacts are expected. Emissions benefits due to use of the strategies evaluated through this Procedure will be estimated as part of the development of regulations or other programs to implement the strategies.

10 COST-EFFECTIVENESS

Because no direct emissions benefits are associated with the staff proposal, no traditional cost effectiveness can be calculated. When staff proposes rules to implement in-use controls for the various categories of diesel engines, it will provide more detailed estimates, taking into account the specific issues associated with each category.

11 CONCLUSION

The proposed amendments to the Procedure, as described herein, would help ARB in its efforts to implement the Diesel Risk Reduction Plan and better protect public health. ARB staff recommends that the Board adopt the proposed amendments to sections 2700 to 2710, Title 13, of the California Code of Regulations, as set forth in the proposed Regulation Order in Appendix A.

12 REFERENCES

Air Resources Board. Staff Report: Technical Support Document – Proposed Control Measure for Diesel Particulate Matter From On-Road Heavy-Duty Diesel-Fueled Residential and Commercial Solid Waste Collection Vehicle Diesel Engines. June 6, 2003.

Air Resources Board. Staff Report: Initial Statement of Reasons – Proposed Regulation for the Verification Procedure for In-Use Strategies to Control Emissions from Diesel Engines. March 29, 2002.

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Vertin, K. EC-Diesel Technology Validation Program Master Spreadsheet, Round 2. National Renewable Energy Laboratory. Updated August 21, 2002. Requests for the spreadsheet should be sent to: teresa_alleman@nrel.gov