

FINAL STATEMENT OF REASONS

**ADOPTION OF EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2001
AND LATER OFF-ROAD LARGE SPARK-IGNITION ENGINES**

TABLE OF CONTENTS

I. INTRODUCTION AND BACKGROUND 2

II. SUMMARY OF COMMENTS AND AGENCY RESPONSE 5

 A. Regulatory Development 5

 B. Standards 6

 C. Lead Time 9

 D. Durability Testing 11

 E. Warranty 12

 F. Useful Life 14

 G. New Engine Compliance and Production Line Testing 15

 H. Engine Family Classification 16

 I. Test Cycle 17

 J. In-use Testing 18

 K. Recall 22

 L. Labeling 24

 M. Technology Review 27

 N. Small Volume Manufacturers 31

 O. Preemption 32

 P. All-terrain Vehicles (ATV) 34

 Q. Miscellaneous 36

III. MODIFICATIONS TO THE ORIGINAL PROPOSAL - FIRST NOTICE OF
MODIFIED TEXT 43

IV. SUMMARY OF COMMENTS AND AGENCY RESPONSE - FIRST NOTICE OF
MODIFIED TEXT 52

 A. Definitions 53

 B. Labeling 54

 C. Warranty 55

 D. In-Use Testing 56

 E. Recall 58

 F. Miscellaneous 60

V. MODIFICATIONS TO THE ORIGINAL PROPOSAL - SECOND NOTICE OF
MODIFIED TEXT 63

VI. SUMMARY OF COMMENTS AND AGENCY RESPONSE - SECOND NOTICE
OF MODIFIED TEXT 66

 A. Terms 66

 B. Miscellaneous 68

State of California
AIR RESOURCES BOARD

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

PUBLIC HEARING TO CONSIDER ADOPTION OF EMISSION STANDARDS AND
TEST PROCEDURES FOR NEW 2001 AND LATER OFF-ROAD LARGE SPARK-
IGNITION ENGINES

Public Hearing Date: October 22, 1998
Agenda Item No.: 98-11-3

I. INTRODUCTION AND BACKGROUND

This rulemaking was initiated by the publication on September 3, 1998 of a notice of public hearing to consider the adoption of regulations governing Large Off-Road Spark-Ignition Engines. Concurrently the Staff Report entitled *Public Hearing to Consider Adoption of Emission Standards and Test Procedures for New 2001 and Later Off-Road Large Spark-Ignition Engines* (Initial Statement of Reasons for Proposed Rulemaking, hereafter "Staff Report"), including the express terms of the regulations as initially proposed by the staff and a statement of the rationale for the proposal, was made available upon public request from ARB as required by Government Code § 11346.2.

The proposed action consisted of the addition of Sections 2430 through 2439, and the incorporated "California Exhaust Emission Standards and Test Procedures for 2001 and Later Off-Road Large Spark-Ignition Engines" to the California Code of Regulations (CCR), Title 13, Article 4.5, along with amendments to sections 2410 through 2414, Article 3, Title 13, of the CCR. The principal purpose of the proposed regulations was to implement emission standards for large (greater than 1.0 L) and small (less than or equal to 1.0 L) off-road large spark-ignition (LSI) engines. The proposed regulations includes a certification and compliance program, an in-use emissions compliance testing program for the large LSI, a three year phase-in period (Tier 1) to provide manufacturers with added flexibility in achieving the new standards for large LSI, and special provisions for small-volume manufacturers, including exclusion from the Tier 1 requirements.

At a public hearing held October 22, 1998, the Air Resources Board (the "Board") considered the proposed regulations and received written and oral comments on the proposal. Staff also proposed several modifications to the regulations included in the Staff Report at the Hearing, most notably, the less stringent standards for engines with a displacement of one liter or less, and in response to public comment, a technology review to take place in 2000 and 2002.

At the conclusion of the hearing, the Board approved the originally proposed regulations with the modifications described. In accordance with section 11346.8 of the Government Code, the Board, in Resolution 98-51, directed the Executive Officer to make

the text of the modified regulatory text available to the public for a supplemental written comment period of 15 days. The Executive Officer was then directed either to adopt the amendments with such additional modifications as may be appropriate in light of the comments received, or to present the regulations to the Board for further consideration if warranted in light of the comments.

The text of the Board-approved modifications with the modified text clearly indicated, was made available for a supplemental 15-day comment period in a "Notice of Public Availability of Modified Text" issued July 27, 1999.

Written comments were received during the 15-day comment period. After considering the comments, a second "Notice of Public Availability of Modified Text" was issued on August 16, 1999. After considering the comments received on this second Notice, the Executive Officer issued Executive Order G-99-063, adopting the amendments.

A complete description of the proposed regulatory action and its rationale is contained in the Staff Report and the information made available in the two supplemental 15-day Notices. These documents and the September 3, 1998 Notice are incorporated by reference herein. This Final Statement of Reasons updates the Staff Report by identifying and explaining the modifications made to the text of the originally proposed regulations. This Final Statement of Reasons also contains a summary of the comments the Board received on the proposed regulatory action during the formal rulemaking process and ARB's responses to those comments.

Incorporation of Test Procedures and Federal Regulations. The amended test procedures are incorporated by reference in Title 13, CCR, § 2432. The amended test procedures, in turn, incorporate test procedures adopted by the U.S. Environmental Protection Agency and contained in Title 40 Code of Federal Regulations (CFR) Part 86.

The ARB documents are readily available from the ARB upon request and were made available during the subject rulemaking in the manner specified in Government Code Section 11346.7(a). The CFR is published by the Office of the Federal Register, National Archives and Records Administration, and is therefore reasonably available to the affected public from a commonly known source.

The test procedures are incorporated by reference because it would be impractical to print them in the CCR. Existing ARB administrative practice has been to have the test procedures incorporated by reference rather than printed in the CCR because these procedures are highly technical and complex. They include the "nuts and bolts" engineering protocols required for certification of large spark-ignition engines and have a very limited audience. Because the ARB has never printed complete test procedures in the CCR, the affected public is accustomed to the incorporation format utilized therein. The ARB's test procedures as a whole are extensive and it would be both cumbersome and expensive to print these lengthy, technically complex procedures with a limited audience in the CCR. Printing portions of the ARB's test procedures that are incorporated by reference would be unnecessarily confusing to the affected public.

Economic and Fiscal Impacts. In developing the regulatory proposal, the ARB staff evaluated the potential economic impacts on private persons and businesses as required by GC § 11346.3. The following businesses have the potential to be affected by the adopted regulations: any business involved in the production or use of LSI engines, manufacturers that supply components for LSI engines and equipment, and distributors and retailers that sell components for LSI engines and equipment.

Manufacturers of LSI engines will be affected directly. There are about 16 LSI manufacturers selling engines into California, eight of which are considered major. None of these manufacturers are located in California, however some have small operations in California. ARB staff believes that manufacturers of LSI engines will use closed-loop, electronic fuel-injection systems, and three-way catalysts to meet the standards. This added technology will result in a per engine increase of about \$1000. However, staff believes that the manufacturers will pass the bulk of these added costs onto equipment operators. Therefore, there will be no noticeable adverse impact on affected manufacturers.

Distributors and dealers of components for LSI engines and equipment could be affected in two ways. First, an increase in the price of manufacturing an engine could result in reduced sale of the engines and equipment by dealers. ARB staff believes this will not occur however, because all competing equipment will increase in price as a result of the regulations. Also, these new machines will most likely be more fuel efficient and durable and thus, more desirable to operators. Second, adequate supplies of new engines may not be available to distributors and dealers in a timely manner. However, because EPA should adopt standards similar to those adopted by the ARB, the supplies of all new engine models are likely to stabilize.

Equipment operators are likely to incur the cost passed on by the engine manufacturers. ARB staff estimates this cost to be \$1000 per engine. However, new engines are likely to be more fuel efficient and have a longer life. Therefore, the lifetime cost impact on equipment operators as a result of the regulations is expected to be negligible.

Engine manufacturers and engine and equipment distributors and dealers are expected to pass the increase in per engine cost on to equipment operators. The impact on equipment operators will be offset by the improvement in engine technology. Therefore, the cost impact on California business and individuals due to the regulations is expected to be negligible.

Finally, the Board has determined that this regulatory action does not impose a mandate on local agencies or school districts.

GC 11346.7(b)(5) requires ARB staff to include, if possible, proposed alternatives that would lessen the adverse economic impact on small businesses. Although staff believes that the cost impact to small businesses will be negligible for the same reasons as listed above, in developing the regulatory proposal, staff included special provisions for small-volume manufacturers in order to ease the potential burden of compliance. The small-volume category represents approximately 4 percent of the total engines (1994-1996 annual average nationwide sales) in the LSI engine category. To ensure continued product availability the ARB allowed a delay in compliance for small-volume manufacturers until 2004, when 100 percent of small-

volume manufactured production would need to comply with the Tier 2 standards. The Board also approved the provisions for small-volume manufacturers during Tier 2, allowing them to use an assigned deterioration factor, and reducing their in-use testing requirements.

Consideration of Alternatives. The purpose of the regulations is to achieve the maximum possible emission reductions from this source category, considering technology and cost factors. As required by GC § 11346.9, paragraphs (a)(4) and (a)(5), the Board has further determined that as a consequence of the regulatory process on this item, no alternative considered by the agency would be more effective in carrying out this purpose or would be as effective and less burdensome to affected private persons than the action taken by the Board.

As mentioned above, special provisions were given to small-volume manufacturers. Among these were reduced testing requirements and the exclusion of small-volume manufacturers from the Tier 1 requirements.

II. SUMMARY OF COMMENTS AND AGENCY RESPONSE

At the October 22, 1998 hearing, oral testimony was received from representatives from: the Engine Manufacturers Association (EMA), Arctic Cat Incorporated, Polaris, the Manufacturers of Emission Controls Association (MECA), the Outdoor Power Equipment Institute(OPEI), the Industrial Truck Association (ITA), and IMPCO Technologies, Incorporated (IMPCO). Of the entities providing oral testimony, six submitted written comments as well. Additional written comments were received by the hearing date by Westerbeke, NACCO Materials Handling Group (NACCO), Incorporated, J.C. DeLaney Consulting, the California Motorcycle Dealers Association (CMDA), and Toyota Industrial Equipment (Toyota).

Set forth below is a summary of each objection or recommendation made regarding the specific regulatory actions proposed, together with an explanation of how the proposed action was changed to accommodate each objection or recommendation, or the reasons for making no change. The comments have been grouped by topic whenever possible. Comments not involving objections or recommendations specifically directed toward the rulemaking or to the procedures followed by the ARB in this rulemaking are not summarized below. Comments in support of the regulations are not summarized below.

A. Regulatory Development

1. **Comment:** We would have preferred a more deliberative approach to developing this proposal--in a nutshell, more data and less “engineering judgement.” We would have preferred, for example, to see the Southwest Research Institute complete its work on a prototype, as was originally intended, and to have had an opportunity to analyze the system, its test results, and their relevance to our products. We would have preferred to complete more of the important industry testing of the durability of automotive systems when subjected to the non-road work cycle, because we are concerned that the preliminary test results reveal the useful-life emissions limits to be unrealistic. And although we appreciate staff’s very

recent agreement to modify the proposal based on discussions with EMA, we would have preferred a process that permitted more participation and time for analysis. (ITA)

Agency Response: All public comment periods for public comment met applicable statutory and regulatory minimums. A strong effort was made to develop this regulation, and every attempt was made to interact with industry regarding the regulation. The State Implementation Plan, approved in November 1994, included implementation of standards for LSI engines in 2000. Therefore, manufacturers were made aware of the upcoming implementation of standards. Beyond minimum requirements, the development process of this regulation included a workshop, group meetings, and many individual meetings with members of industry.

To meet the standards, staff believes manufacturers will be able to rely on existing technologies. Specifically, on-road technology such as three-way catalysts and closed-loop emission control will be able to be transferred to off-road engines to bring these engines into compliance. Southwest Research Institute conducted research which confirms staff's belief, in which these on-road technologies were used on off-road engines, resulting in emissions below the standards. It should also be noted that staff continues to encourage industry to provide more data to ARB, in response to the Board's directive to schedule technology reviews in 2000 and 2002.

B. Standards

2. **Comment:** CARB staff should adopt a proposed exhaust emission standard of 3.9 g/hp-hr HC+NO_x, consistent with the current Federal and California medium duty truck standard, recognizing that 3.9 g/hp-hr equates to measured results at 300 hours for the tested state of the art automotive engine when tested on the comparatively heavier ISO C2 cycle, and that further development will be necessary to maintain this level for longer useful life. (NACCO)

Agency Response: The medium-duty vehicle comparison is inappropriate because these engines/vehicles are different from LSI engines, having, among other things, different duty cycles, test procedures, and emission requirements. The LSI emission standards and other requirements are appropriate for these engines because the LSI engine manufacturers are not subject to in-use compliance until the 2004 model year (MY), thus providing them five additional years to perform demonstrations and testing of 2001 MY engine designs to ensure in-use compliance. Also, technology reviews scheduled for 2000 and 2002 will provide opportunities to reassess the standards.

3. **Comment:** The emissions limit for HC+NO_x moving from 2.25 g/bhp-hr to 3.0 g/bhp-hr will still require a three-way converter and closed loop fuel system. (Toyota)

Agency Response: The regulations do not require a manufacturer to use specific emission reduction systems to meet the emission standards. However, staff anticipates that manufacturers will elect to use three-way catalysts and closed-loop emission controls in order to meet the large LSI engine emission standards because this technology is available and has

been proved effective in on-road applications. Staff believes however, that given the lead time and phase-in schedule this is technologically feasible (see response to comment #1 above).

4. Comment: This is a technology-forcing proposal. It's true that closed-loop three-way catalyst technology is not new and that a few such systems have been designed for forklift trucks. ITA stood up very early in this process to say that it was appropriate to develop standards based on this technology. But there are questions, and they're serious ones, about what emissions performance can be expected of those systems given the operating and environmental conditions in which our products perform. The questions are perhaps most acute for LPG systems, which represent 70-80% of our spark-ignited products, because there is no highway counterpart to those systems. But there are ample challenges on the gasoline side as well.

And this is not a "one-size-fits-all" situation. Varying performance needs, use environments, and long-recognized product differentiation require uniquely developed systems for different grouping of products. So to go from the isolated, voluntary use of closed-loop three-way catalyst systems that face no emissions-performance requirements whatsoever--indeed, whose emissions performance isn't even known--to mandated certified systems across an entire product line, is a daunting challenge carrying significant risks of failure.

ITA members accept the challenge and will do their utmost to reach the goal. We are engaged in vigorous efforts to begin developing the new generation of products that will be needed. But we are making these efforts, as the Staff Report acknowledges, amid considerable uncertainty. (ITA)

Agency Response: Staff recognizes ITA's concern regarding maintaining emissions during the operational and environmental conditions within which the regulated engines will be in use. ITA members have used advance controls on both gasoline and LPG engines to ensure compliance with workers' safety requirements such as Occupational Health and Safety Act (OSHA). Staff believes that three-way catalysts and closed-loop controls provide excellent emission reduction capability (see response to comment #1 above) and that in-use experience will confirm that those reductions can be maintained over the useful life of LSI engine applications. The regulations provide for manufacturer flexibility to introduce the control systems gradually between 2001 and 2003 (Tier 1). The experience gained by observing and testing engine-catalyst based control systems in the field during Tier 1, during which there are no in-use requirements, will provide the manufacturers with valuable knowledge on the deterioration and performance of their designs. Manufacturers will be able to then use the knowledge obtained to validate their designs and encourage redesign for 2004 model year compliance.

5. Comment: The emission standards should be revised to 4.0 g/bhp-hr HC+NO_x for large LSI engines. This standard will be technically challenging, will force closed loop and catalyst technology, will achieve significant emission reductions, and will be less disruptive to the marketplace. (EMA)

Agency Response: In response to industry concern, staff revised its original proposal such that the regulations for large LSI include a 4.0 g/bhp-hr HC+NO_x and a 50g/bhp-hr CO in-use

standard for the first 3 years of Tier 2 (i.e. 2004-2006). This modification will allow industry added flexibility to comply with the Tier 2 requirements.

6. **Comment:** For small LSI engines the regulations and test procedures should be the same as Class II under 25 horsepower engines with a 9.0 g/bhp-hr HC+NO_x and 410 g/bhp-hr CO emission standard. However for the small LSI engine the minimum useful life periods should be set at the maximum EPA period. (EMA)

Agency Response: At the Board hearing, and included within the first notice of modified text, staff revised its original proposal such that small LSI engines are required to meet the same standards as the Class II, under 25 horsepower, spark-ignited engines. The modified standards for the small LSI engines are 9.0 g/bhp-hr HC+NO_x and 410 g/bhp-hr CO beginning in 2002 with a useful life period of 1000 hours.

7. **Comment:** We do have some concerns with the staff's most recent recommendation for relaxing the standards for those engines under one liter. We also recognize that the Board considers a lot of factors in making these decisions, but from a purely technological point of view we do not believe that the relaxation is necessary. This is a, I think, a rulemaking as you heard from other folks who have testified, and we would certainly concur and perhaps go a little bit further in saying that this is one instance where the technology is clearly available, catalyst technology has been used on this category of engines, large spark-ignited engines, for over 30 years. In fact, it was really where the catalytic convertor first was introduced and paved the way for automotive catalysts. (MECA)

Agency Response: Staff's initial proposal included stricter standards for small LSI engines. Staff's proposed revisions at the hearing were based on meetings with industry. Industry expressed concern with the standards and were uncomfortable with the use of catalysts on this equipment. These small LSI engines are not based on automotive engine technology (note that the larger LSI engines are, which have proven durability and a history of emission control using catalysts and electronic controls). The smaller LSI engines are more comparable to lawn and garden engines under 25 horsepower, which are typically air-cooled engine designs. Because of the mode of operation for these engines, catalyst durability may be compromised and the more stringent standards may be tough to meet. The less stringent standards that the Board approved would not necessarily require use of a catalyst. Because the volume of small LSI engines (1.0 liter and under) is low, a change to less stringent standards would result in only a loss of a couple of tenths of a ton of HC+NO_x reduced per day, at the current level of equipment and emissions.

8. **Comment:** We would encourage the Board at a subsequent rulemaking to look at the possibility of adopting reduced emission hydrocarbon plus NO_x standards for both categories, not only for the smaller spark-ignition engines, but also those over one liter. And we would also recommend that the Board direct the staff to study the issue and come back with some recommendations on ways in which to encourage the manufacturer sale and use of engines that are below the mandated standard and also standards of engines that meet the standards ahead of schedule. If there's an opportunity and a program that promotes the availability of equipment that is below the levels mandated, we continue to believe that there is a market out there, that people are interested in buying clean engines. (MECA)

9. **Comment:** It is MECA's recommendation that the Board directs the staff to report, with recommendations, to the Board no later than June 1999 on possible strategies to promote the manufacture, sale and use of equipment with engines meeting the reduced-emission NMHC+NOx standards. (MECA)

10. **Comment:** Adopt optional reduced-emission NMHC+NOx standards for both categories of large SI engines (<1.0 liter and 1.0 liter and greater). (MECA)

11. **Comment:** It is MECA's recommendation that, "The Board direct the staff to report, with recommendations, to the Board no later than December 2001 on: 1) progress in reducing emissions from large off-road SI engines through the program of early introduction of low emitting engines; 2) the technological feasibility of cost effectively achieving greater emission reduction than will be achieved under the staff's October 22, 1998 proposed standards; and 3) the air quality benefits that could be derived from greater reductions in NMHC+NOx beyond those that will be achieved under the staff's October 22, 1998 proposal. (MECA)

12. **Comment:** I would much prefer to address on the merits of Bruce's concept [optional reduced emission standards] and see what we could do with it, and eventually come back, have the staff come back to the Board with an actual proposal, rather than try and address it in a 15-day notice where it's a new concept. (EMA)

Agency Response: The Board directed staff to investigate the possibilities of optional standards within the scope of the 15-day Notice of Modified Text. However, the Board noted that if no consensus could be reached between industry during that time, the issue would not be included in the 15-day notice, but in a subsequent process. Based on discussions with industry and other interested parties, staff determined that the optional standards program is too difficult to incorporate as a 15-day change and a consensus could not be reached in a timely manner. Therefore, staff is currently working on an optional reduced emission standards program which will include LSI engines and other off-road engines .

C. Lead Time

13. **Comment:** We continue to have serious concerns about the basic technological feasibility of these requirements in the lead time provided. We recognize that the Tier 1 regulation will be phased in, so that some of the forklift engines over 50 horsepower will have additional time beyond 2001 to come into compliance. However, it should also be recognized that the phase-in will have uneven benefits at best, because non-certified engine families simply may be unavailable for our members's important models--we cannot expect to see certified and uncertified versions of every engine, because engine availability will be a function of where the greatest demand lies. This may cause some forklift manufacturers to have to design new engines into their forklifts across their entire product line in the first year. So the phase-in feature does not substitute for the preemption agreement. (ITA)

14. **Comment:** ARB's proposed two year leadtime is an insufficient period with which to design engine control devices and to integrate the new design with various equipment applications. Adequate leadtime is needed for equipment manufacturers to work with engine suppliers in order to integrate certified engines with catalysts, electronic fuel injection (EFI) or exhaust gas recirculation (EGR) technology. We recommend that the implementation date for CARB Tier 1 be moved from 2001 to 2002 with a reflective change of the phase-in schedule to : 30% in 2002, 70 % in 2003, 100% in 2004. (Many equipment manufacturers do not have direct ties to engine suppliers and use multiple engine brands. In such cases the phase-in may not provide relief to the equipment manufacturer.) (NACCO, EMA)

Agency Response: The ARB applied its expertise acquired over several decades regulating other mobile source industries to analyze the feasibility of the technology-forcing likely to occur from the proposed regulations. The Staff concluded that given the advanced state of current technologies available and the several years available to apply them, lead time was more than sufficient. The Staff Report acknowledged that some development would be needed in order to meet the emission standards (see p. 47 of the Staff Report). To account for this development period staff incorporated into the regulation a phase-in period. In addition, Staff proposed at the October Board hearing, and the Board approved, a modified program in which the implementation date for small LSI engines was postponed until 2002 (see response to Comment #5).

No reasonable justification however, has been provided to postpone implementation of large LSI engines until 2002, especially given that the current phase-in schedule extends over three years. A delay in the Tier 1 implementation beyond the current phase-in would decrease needed emission reductions and result in a SIP shortfall.

Prior to the release of the Staff Report, during industry meetings, staff had proposed a more stringent Tier 1 phase-in schedule beginning in 2001 of 60/80/100 percent, such that 60 percent of a manufacturers' certified engines would need to comply with the emission standards in 2001, 80 percent in 2002, and 100 percent in 2003. The proposal included in the Staff Report was a phase-in schedule of 40/60/80 percent to provide more flexibility to manufacturers due to the inclusion of forklifts greater than 50 horsepower into the category. As a result of industry's concerns still present after the release of the Staff Report, staff proposed to the Board, and the Board approved, a modified less stringent Tier 1 phase-in schedule of 25/50/75. The phase-in schedule provides the opportunity for manufacturers to bring in the technology and new engine lines over time. This recommended modification was supported by EMA in testimony at the hearing. Furthermore, small volume manufacturers have added flexibility by way of exemption from certifying during Tier 1.

Staff recognizes that, compared to engine manufacturers, many of the equipment manufacturers are less familiar with the emission control technologies that will be used to comply with the standards. The Board directed staff to hold a technology review in 2000 (to review the Tier 1 standards) and in 2002 (to review the Tier 2 standards). During the technology review process, if it is determined necessary, staff may recommend regulatory changes.

D. Durability Testing

15. **Comment:** Manufacturers should be allowed to determine their own Durability Factors (DFs) without costly mandatory durability demonstrations. It is unnecessary and excessively expensive to have a manufacturer demonstrate a durability standard AND be subject to an in-use testing program. (EMA)

16. **Comment:** Since manufacturers will be determining their own DFs, Part 1, 12(d) of the Test Procedures is no longer applicable and should be deleted.” (EMA)

17. **Comment:** This entire section of the Test Procedures regarding durability data engines should be deleted and replaced with:

(d)(1) “The engine manufacturer shall use good engineering practice to determine engine and emission durability.”

(d)(2) “The engine manufacturer must supply the Executive Officer with a written summary of the method used to determine engine and emission durability.” (EMA, ITA)

18. **Comment:** Additionally, this section should specify that durability requirements do not apply to Tier 1 engines. (ITA)

Agency Response: As proposed at the hearing and specified within the 15-day notice of modified text, staff modified the regulation to allow manufacturers to determine their own DFs without requiring mandatory durability demonstrations. The new language also includes the requirement that manufacturers must provide the Executive Officer with a written plan for determining durability for approval. Thus, staff made the requested changes to the test procedures.

19. **Comment:** Regarding maintenance requirements specified in the Test Procedures; ARB’s view of the technology necessary is based on the automotive industry. Because of diverse applications, many LSI engine manufacturers do not have control over variables such as vibration, debris, environmental exposure and interface to original equipment manufacturer (OEM) equipment that the automotive industry does. In addition, off-road engines are run, on average, at a much higher load level relative to the engine’s capacity than automotive engines. These factors make the technology used in emissions control more susceptible to failure than in the automotive field. Because of additional vibrations, temperatures and engine loading in some installations, the electronic components used from the automotive industry may not survive for 4,500 hours. The Executive Officer should have the authority to approve tighter maintenance requirements upon the manufacturer’s application. (EMA, ITA)

Agency Response: As stated in the Staff Report (see p. 30) catalysts have long been used to reduce emissions from large spark-ignition engines in special operating environments such as mines and indoor warehousing applications. In addition, as stated in the Staff Report (see p. 33), data exist showing that catalytic converters have remained operational on forklifts up to and over 10,000 hours of operation. The Technical Support Document (included as Attachment E of the Staff Report) addressed industry’s concern (see p. E-16), discussing the recent progress made by catalyst manufacturers in catalyst development. Considering the current state of catalyst technology, the lead time given, the 2001 through 2003 phase-in

schedule, and the relaxed useful life requirements and in-use standards during 2004 through 2006, staff is confident that manufacturers will be able to comply with the durability requirements in regulations.

20. **Comment:** Looking towards the proposed Tier II emission regulation for 2004, we are not aware of an accurate method to convert the known 100,000 mile durability of our fuel systems in the on-road category into the off-road category. Particularly given the differing uses and duty cycles found in the off-road category. We appreciate and support the CARB staff position that testing needs to occur to validate useful life hours and develop durability data as related to engines and emission systems used in the off-road category. We will and are doing our part to obtain this data. We encourage the Board to keep that in the back of your thoughts that, come 2004, these technology reviews we're talking about are very critical. (IMPCO)

Agency Response: ARB appreciates and encourages manufacturers to develop data and complete the essential testing needed to facilitate future technology reviews. A technology review will be held in 2002 at which time industry is encouraged to present any new information with regard to off-road engine emission control system durability.

E. Warranty

21. **Comment:** ARB discusses a 2 year warranty requirement for Tier 1 in the Staff Report but does not mention it in the regulations. Section 2435 of the regulation needs to be re-written to properly distinguish between Tier 1 and Tier 2 warranty requirements.

Also, in addition to the two year requirement, the Tier 1 warranty for the large LSI category should provide for a 1200 hour alternative. (EMA)

22. **Comment:** ITA have previously raised the need to clearly distinguish the Tier 1 warranty from the Tier 2 warranty. As to the specifications for the Tier 1 warranty, some forklifts are used for multiple shifts per day, so that a flat two-year warranty without any hour limitation is completely unreasonable. (ITA)

Agency Response: The notice of modified text includes a two year warranty requirement for Tier 1. Staff also included an alternative option which is dependant upon hours of operation. Current mechanical parts warranties offered by manufacturers for this category of engines are usually for between 1500 and 2000 hours. Staff included a 1500 hour alternative to the Tier 1, two year warranty requirement for large LSI engines.

23. **Comment:** Section 2435(b)(2) of the regulations increases the in-use warranty requirement by one year for those engines that do not have hour meters. EMA sees no rationale for extending the warranty period by one additional year for engines not equipped with hour meters. The base warranty requires a specified number of years or hours accumulated, whichever occurs first. EMA objects to further warranty liability and reference to such a requirement should be deleted. (EMA, ITA)

24. **Comment:** ITA agrees with EMA's sentiment, even though forklift engines do have hour meters. (ITA)

Agency Response: This requirement was modified within the notice of modified text, and EMA's and ITA's concerns were addressed. Please refer to the response to comments 25 and 26.

25. **Comment:** Warranty periods should not exceed 50% of useful life. Thus, for large LSI engines the warranty period would be 3 years or 1750 hours for Tier 2, and 2 years or 1200 hours for Tier 1. For small LSI the warranty period would be 2 years or 500 hours. (EMA)

26. **Comment:** Reduce Tier 2 warranty to 1750 hrs/3 years. (NACCO)

Agency Response: As industry recommended, at the hearing staff proposed and the Board approved a modified warranty period of 50% of useful life for all emission related parts, with a 70% of useful life warranty applicable to high cost parts only (about \$400 or more, 1998 dollars). High cost parts were required to have longer warranty periods because these are typically the major parts of the emission control system, and a failure of these parts would result in the largest emissions increase and the responsibility of the cost of a failure of these parts should not fall upon the consumer. For large LSI engines this results in 3 years or 2500 hours warranty period for all emissions related parts, and 5 years or 3500 hours for high cost parts, for Tier 2. Note that although the warranty period was modified to 50% of useful life, the time periods do not match those specified in comments #25 and #26 above. This is because the time periods stated by industry were based on industry recommended less stringent useful life requirements. Staff made no modification to the useful life requirement for the large LSI engines (see Section F - Useful Life). With regards to the warranty period for large LSI engines during Tier 1, see the agency's response to comments 21 and 22.

For Small LSI engines a warranty period of 2 years was maintained, identical to the warranty period for the small off-road engines less than 25 horsepower (see response to comment #4).

27. **Comment:** Manufacturers should have the right to deny warranty coverage for non-OEM parts if the failure can be attributed to a replacement part and the replacement part is determined to be non-equivalent to an OEM part. ARB should specify this allowance in the regulation. (EMA, ITA)

Agency Response: No change to the staff's proposal was necessary because the regulations address the use of poor quality replacement parts. The definition of "replacement part" includes the term "equivalent part". If the manufacturer can prove that the failure is due to the replaced part that is not an "equivalent part", section 2435(c)(10) of the regulation allows the manufacturer to deny warranty coverage.

28. **Comment:** Staff requires the manufacturer to supply a copy of the warranty booklet in the application for certification. This is unnecessary. A copy of the emissions warranty statement should suffice. (EMA, ITA)

Agency Response: The language presented in this section is consistent with all other ARB

engine regulations. ARB review of manufacturers' documents is required in order to insure that the proper and complete information is being provided to customers regarding their warranty rights and obligations.

29. **Comment:** The use of the current model year in the Warranty Statement is infeasible, since this would require that manuals be revised and reprinted each year. ARB should provide the flexibility to use a range of years, over the effective dates of the regulation, to avoid unnecessary costs. (EMA, ITA)

Agency Response: The first notice of modified text includes language that allows manufacturers to display a range of years instead of only the current model year on warranty statements. Therefore, manufacturers will not necessarily be required to print new warranty statements each year.

F. Useful Life

30. **Comment:** NACCO recommends that CARB adopt a useful life requirement of 3000 hours or 5 years. (A useful life of 5000 hours exceeds the 100,000 mile automotive requirement, which in our view equates more closely to 3000 hours of use. (NACCO)

31. **Comment:** Durability cycles in the large LSI category are much more demanding than durability cycles for passenger cars and light-duty trucks. ARB has no data which demonstrate that automotive type technology can achieve even greater durability when transferred to off-road applications. The appropriate useful life periods of 3,500 hours or 5 years for large LSI, and 1000 hours for small LSI should be used. (EMA)

32. **Comment:** Principally, EMA is concerned with the useful life projections. For many equipment applications, the useful life values used by the staff exceed what industry believes to be reasonable. Given this overestimation, and based on our prior comments, we do not believe the emission inventory results contained in the model are accurate. (EMA)

Agency Response: The 15-day Notice of Proposed Modified Text reflects modifications to useful life that staff presented, and the Board approved at the October 22, 1998 hearing. Small LSI engines are required to certify for a useful life of 2 years/1000 hours. Flexibility was also provided to manufacturers during the years 2004 through 2006. During these years manufacturers are required to certify large LSI engines to a useful life of 5 years/3500 hours. The 2007 model year engines must certify to a 7 year/5000 hour useful life as was proposed in the original Staff Report.

Staff relied upon Power Systems Research (PSR) data to determine the engine useful life periods proposed in the Staff Report. PSR has affirmed that staff used these data correctly. Based upon this information staff believes the proposed useful life period for large LSI engines, 5000 hours or seven years, is appropriate. However, staff will continue to encourage industry to provide useful life data to ARB as it is developed. The scheduled technology reviews in 2000 and 2002 will consider such new data.

G. New Engine Compliance and Production Line Testing

33. **Comment:** Since compliance testing and confirmatory testing will be done at the expense of the manufacturer, annual dollar limits must be provided on the cost associated with such testing. (EMA)

34. **Comment:** ITA supports the sentiment expressed by EMA and would work to develop a workable approach to this admittedly complicated area. (ITA)

Agency Response: The regulations allow ARB to require manufacturers to perform confirmatory testing on certified test engines only when test results are very close to the standards or other data exist that show good engineering practices were not followed. Likewise, new engine compliance testing would be required to verify certification or production line test results only when there appears to be a problem with production engines. Therefore, it is not practical to provide annual dollar limits for such place testing. In addition, a dollar limit could hamper ARB's enforcement efforts and provide a competitive advantage to manufacturer with poorer quality control of their engines.

35. **Comment:** The regulation section regarding new engine compliance testing should state that compliance testing is required for all engines model year 2004 and later. (EMA, ITA)

Agency Response: As stated in the Staff Report, the new engine compliance testing will commence with the beginning of the regulatory program in 2001. The 15-day notice of modified text corrected the inconsistency between the Staff Report and the regulations.

36. **Comment:** How did ARB arrive at the \$52 figure used to define "adequately inaccessible or sealed" parameter as stated in Part I, 9(d)(2)(I) of the Test Procedures. (EMA, ITA)

Agency Response: This amount was carried over from similar on-road regulations with a Consumer Price Index (CPI) adjustment to 1998 dollars. The \$52 figure is also appropriate for LSI engines because this cost is neither application nor category specific, and applies to the time to make modifications and adjustments on any engine.

37. **Comment:** With regards to Part I, 16(b)(1)(ii) of the Test Procedures, "The meaning of this section is unclear." (EMA, ITA)

Agency Response: Staff modified the regulations to make this section more clear. The section now states that an emission-data test engine selected shall represent all engines containing that emission control system and having similar peak horsepower.

38. **Comment:** Once the manufacturer provides notice of additions or changes [to a certified engine] made concurrent with implementation, what is the time period in which the Executive Officer must announce any additional testing requirements? (EMA)

39. **Comment:** Additionally, ITA notes that the Test Procedures do not specify the time period in which the Executive Officer may require additional testing for engines added after certification. (ITA)

Agency Response: This comment was responded to by staff in a written e-mail to EMA on October 21, 1998. Staff explained that the word “immediately” is used in the regulation language and is sufficiently specific. This is believed to no longer be an issue with EMA and ITA.

H. Engine Family Classification

40. **Comment:** ARB needs to provide language which would allow those engines sharing similar design characteristics, but of different fuels, to be certified as one engine family (using the fuel which would provide the worst case scenario). (EMA)

41. **Comment:** Specifying that simply because two engines are configured with different fuel systems, e.g., gasoline and LPG, does not preclude inclusion in the same engine family group, would be consistent with paragraph 11(a)(3)(vi) of the Test Procedures. (ITA)

Agency Response: Staff generally agreed and it was not our intent to restrict engines using differing fuels from certifying within the same family. The notice of modified text includes language that specifically states that engines that use differing fuels may be certified as one engine family.

42. **Comment:** The air intake system could be a family discriminator and ARB needs to allow for that. (EMA, ITA)

Agency Response: Staff did not make any change to the regulations, because staff believes no change was necessary to address industry's recommendation. Section 11 of the Test Procedures lists the engine characteristics that define an engine family and engine family group. The "discriminators" listed allow the manufacturer to group engines together in an engine family or engine family group that exhibit similar emission characteristics. This allows the manufacturer to use emission test data from one engine in the group to represent all engines in the group. Section 11 already includes the method of air aspiration as a discriminator. The language does not prohibit manufacturers from further using the air intake system also as a family discriminator if they so choose.

43. **Comment:** The Test Procedures state that “the engine that features the highest horsepower...will usually be selected,” as the emission-data engine for a particular exhaust emission control system combination. This is inconsistent with the selection criteria provided in ARB Mail-Out MAC 92-06.” (EMA)

Agency Response: Staff uses the term “usually”. It is the responsibility of the manufacturer to ultimately provide ARB with the engine resulting in the worst case emissions scenario and the reasoning behind selection of that engine.

I. Test Cycle

44. **Comment:** With regards to Part II of the Test Procedures, ARB should appropriately recognize the potential differences that exist between International Organization for Standardization (ISO) 8178 and the existing Society of Automotive Engineers (SAE) procedures. (EMA, ITA)

Agency Response: Staff attempts to harmonize internationally using the ISO procedure where applicable. Applicable SAE procedures will be used when ISO procedures are not appropriate technically or do not exist, and this is specified in section 14 of the Test Procedures.

45. **Comment:** We recommend that staff re-evaluate the ISO 8178 C2 cycle as suitable for evaluation of emissions for forklift applications and that CARB adopt an emissions/durability test cycle that is more representative of forklift truck operation for more valid zero hour and durability emissions measurement results. (Note to readers: NACCO submitted to staff a multiple page proposal for a new SI test cycle and speed definition.) (NACCO)

Agency Response: Staff discussed NACCO's recommendation within the Staff Report (page 55). The C2 cycle was approved through ISO to represent operation of SI industrial engines, including forklifts. In 1993, ISO revised the C2 cycle to better model forklift operation. The revisions were supported by the EMA and ITA, the two industry associations representing the engine and equipment manufacturers. The cycle was determined to best represent a majority of variable speed engine operations. It is unclear whether the test cycle that NACCO is suggesting for use is representative only of NACCO's forklift operations, or whether it represents a broader class of engines. Under contract by ARB, the Southwest Research Institute assembled a technical advisory committee consisting of representatives from engine, equipment, fuel system, and catalyst manufacturers, and industry associations. The C2 test cycle adopted by the Board for incorporation into the test procedures was selected based upon input from the technical advisory committee.

46. **Comment:** We recommend that ARB adopt a new engine speed definition that accounts for governed engine speed and governor droop and is based on the engine load data developed in 1983 as discussed. Define Rated Speed as Governed Speed, and Intermediate Speed as 50 percent of Governed Speed. Basing intermediate speed on governed speed rather than on the speed at which rated power is produced provides a more equitable standard by eliminating the influence of governor performance. The 50 percent value aligns well with the Hyster Company test data. (NACCO)

Agency Response: A change in the definition based on manufacturers' selection of hardware, like that suggested by NACCO, would limit and encroach on other engine manufacturer's engine component choices. Currently, emission standard certification is based on the worst-case emission engine configuration within an engine family. Thus, an engine family that uses more than one type of governor need only be tested using the worst-case engine. The modification requested by NACCO would result in the requirement that each engine code be

tested to certify an engine family. This would result in a greater burden placed on engine manufacturers with no corresponding emissions benefits.

47. **Comment:** With regards to § 2437(b)(1)(a) of the regulations, in the last sentence “parameters must be set to. . . .” should read “parameters may be set to....” (EMA, ITA)

Agency Response: Staff agreed and made this clarifying change.

48. **Comment:** Section 2437(f)(1) of the regulations regarding suspension and revocation of an Executive Order should be removed. It is redundant with paragraph (f)(2) and does not correspond with paragraph (c)(5) which only pertains to the testing of a single engine. (EMA)

49. **Comment:** ITA agrees with EMA, that clarification is needed. Automatic suspension should apply, if at all, only to individual engines. (ITA)

Agency Response: In the notice of modified text staff deleted the word “family” from this section such that this section will correspond to § 2437(c)(5) and pertain to only the engine. The resulting paragraph is no longer redundant to paragraph (f)(2).

J. In-use Testing

50. **Comment:** We request that CARB remove the Tier 2 in-use testing requirement and defer to EPA. The cost of two in-use programs (CARB and EPA) would be an undue burden on manufacturers.” (NACCO)

51. **Comment:** The in-use program adopted by ARB must be harmonized with a nationwide program and thus the in-use program should be deferred for now and harmonized with EPA. (EMA)

52. **Comment:** The in-use field testing proposal especially concerns us because we see it as very cumbersome and likely to be impractical, expensive, and disruptive of our customer relationships. (ITA)

Agency Response: The in-use program adopted by the Board was developed cooperatively between ARB and EPA and is intended to be harmonized when EPA proposes its LSI program. Since ARB has allowed manufacturers to reduce much of the up-front certification demonstration in order to reduce the costs to manufacturers, in-use emission testing has become the most important method of ensuring emission compliance. Given the absence of a federal regulation of these engines and the unknown timing and uncertain context of the federal in-use program, it is especially appropriate for ARB's regulation to address in-use compliance now. Furthermore, as stated in the Staff Report (page 24), the ARB intends to work cooperatively with EPA when choosing engines for in-use testing, thereby minimizing manufacturers cost burden.

53. **Comment:** The regulation states that ARB has up to 12 months to identify the engines manufacturers will in-use test. This sometimes could result in the engines not being identified

until the end of the production period for an engine family. If ARB specifies the target engine families sooner, the manufacturer may be able to arrange agreements with the final owners of the engines, so procurement of these units will be easier. Since procurement of these engines will greatly inconvenience the owner and his business, up-front agreements would help the procurement of these units. EMA recommends that ARB identify engines for in-use testing at the time the certification approval is issued. (EMA)

54. **Comment:** ITA agrees with EMA's comment. Another possible approach is to state that ARB will specify alternative engine configurations if the engines of the configuration originally specified have already left the manufacturers control. In addition, the regulation should specifically permit manufacturer-owned engines to be used in the in-use field test program. (ITA)

Agency Response: It was staff's intent that engines picked for testing will be done so during the production period and thus manufacturers will know prior to sale which engines will need to be tracked down for testing. The language in the regulation was modified in the first 15-day Notice to make this clear.

55. **Comment:** The proposal allows ARB to select specific configurations within an engine family for in-use testing. The proposal contains provisions for reduced testing for low volume engine families, but not for low volume configurations. The low volume sections should be updated to include the low volume configurations. Also, the regulation should specify that if ARB selects a specific configuration instead of an engine family, and if a non-compliance is found, then only that configuration will be considered for remedial action. (EMA, ITA)

Agency Response: Staff does not agree with ITA that manufacturers should be given special provisions for testing of low volume configurations. Historically, ARB has only chosen to test certain configurations within an engine family when a specific concern regarding those configurations has been identified. Regardless, ARB provides reduced testing provisions primarily to increase flexibility to small businesses who may not have as many resources as the larger businesses. Small volume manufacturers typically fall into this category.

Furthermore, as stated in the Section 2439(b)(1), if the reason for non-compliance is determined to be limited to only a specific configuration then only that configuration will be considered for remedial action.

56. **Comment:** In-use testing of up to a maximum of ten engines per family tested is overly burdensome. (EMA, ITA)

Agency Response: Staff believes that the adopted in-use testing procedure is not overly burdensome to manufacturers. Manufacturers are required to test four engines per engine family (one engine if it's a carry-over family and it has been tested previously). Manufacturers are only required to test more engines if the engines are failing. Such additional testing may be necessary to ensure accurate results. Manufacturers may choose to test more to generate emissions credits.

57. **Comment:** EMA is concerned about finding vehicles that have the sufficiently high in-use hours in the time allotted for the manufacturer to complete in-use testing. In general, the engines selected for the in-use programs could be 12 to 36 months old. Depending on how long it takes to put an engine into service, some engines in the engine family could be in service only a few months. It may be difficult to find engines that have 75% to 100% of their useful life in hours at 15% to 60% of their useful time in service. In addition, considering the criteria that was used to set useful life (50% of the engine are out of service), approximately 50% of the engines may not even be functional at the hours required to test them. As a comparison, at the passenger car useful life (10 years), approximately 75% of the cars are still in service (according to the AAMA fact and figures report). At the point at which the agencies in-use test the passenger cars (less than 75,000 miles), more than 85% of the vehicles are still in service. Based on the lower feasibility of procuring the required engines for in-use testing at the extended useful life, EMA recommends that manufacturers be allowed to test these engines at 50% of the useful life hour. (EMA)

58. **Comment:** ITA agrees with EMA's comment, and further recommends that provision be made for special hardship in locating engines having the specified configuration and the specified accumulation of hours. (ITA)

Agency Response: Staff recognized that manufacturers needed additional flexibility in selecting test engines in a reasonable time period. The regulations were modified such that engines tested in-use must have accumulated a minimum of 50% of the family's certified useful life period. The regulation was also modified to allow up to 24 months for the completion of testing.

59. **Comment:** With regard to in-use test engines as set forth in Section 2438 (b)(1) of the regulations, there is no way to assure that the test engine has had a maintenance and use history representative of in-use conditions, other than to choose the engine from a manufacturer's fleet. (EMA)

60. **Comment:** ITA agrees with EMA's comment. Moreover, 'representative of in-use conditions' is an elusive term because in-use conditions vary widely. The requirements to obtain information and retain documents are also vague. (ITA)

Agency Response: Staff disagrees and made no modification to the language. The current regulation language specifies how to choose and determine the conditions of test engines. Section 2438 (b)(1)(A) states that a manufacturer must obtain information from the end users regarding the accumulated usage, maintenance, repairs, operating conditions, and storage of the test engines. The results of the information will assure the manufacturers that the engines were manufactured as required and used in equipment as designed. Section 2439 requires documents be maintained for at least seven years.

61. **Comment:** The proposed regulation requires the manufacturer to report the cause of failed tests within 15 days after the completion of the test. This requirement is new for in-use compliance testing, as it is not required for on-highway vehicle and engine programs. EMA has two concerns with the 15 day requirement:

1) 15 days is insufficient time for any report. Manufacturers are already required to submit all the data within three months after the completion of the engine family testing. What does ARB expect to gain by knowing earlier and what does one failed engine really indicate?

2) It is not always possible to determine the cause for the non-compliance. Even if the cause can be determined, most analysis will take more than 15 days. EMA believes that tracking down individual failures is a waste of resources which could be better spent on resolving reoccurring issues and improving the future product. (EMA)

62. **Comment:** ITA agrees with EMA's comment. Furthermore, the 'reasons for noncompliance' will typically be myriad, interrelated, and largely a matter of speculation. (ITA)

Agency Response: After discussion with industry, staff modified the regulations to allow additional reporting time for failed engines. A manufacturer must report an emissions test failure of a test engine within 72 hours after the completion of the test specifying only the emission results and identifying the pollutant which failed to comply with the emission standard. Early notification of a failure allows ARB the opportunity to observe further testing, if desired. The manufacturer must report any reasons for noncompliance that are identifiable within fifteen business days of an engine family failure. Staff clarified that manufacturers have 15 business days, not fifteen calendar days, to respond. Additional time beyond the initial fifteen days may be granted to the manufacturer to fully evaluate the noncompliance with prior approval from the Executive Officer.

63. **Comment:** With regards to large LSI, further compliance flexibility should be provided via an average, banking, and trading (ABT) program. (EMA)

Agency Response: Staff believes an ABT program is not necessary during Tier 1 because of the flexibility provided by the phase-in schedule. Furthermore, the Tier 2 standards have been determined to be technologically feasible using currently available technology. ABT programs are typically used to provide manufacturer flexibility when introducing new technology. However, staff will consider an ABT program during the technology review if EPA adopts an ABT program for their 2004 standards. Thus, this issue can be decided after the adoption of EPA regulations.

64. **Comment:** Section 2438(c)(1)(C) of the regulations requires that manufacturers submit the engine serial number when reporting in-use test results. The clause "if applicable" should be added to this statement. (EMA)

Agency Response: Staff made the necessary change such that alternate engine identification methods are acceptable when reporting emission testing results generated from the in-use testing program.

65. **Comment:** Section 2438(c)(1)(E) of the regulations requires that manufacturers submit the estimated hours of use when reporting in-use test results. The clause "if identifiable" should be added to this statement. (EMA)

Agency Response: The staff made no modifications to the regulations with regards to this comment. Staff believes that hours of use is “identifiable” since the regulations specifically require only an “estimate”. Alternatively, manufacturers may rely on readings from hour meters as most engines are so equipped.

66. **Comment:** Section 2438(c)(2) of the regulations requires that the final engine family report be provided electronically. ARB should provide manufacturers' with adequate time to develop the necessary systems to collect and transmit the data. (EMA, ITA)

Agency Response: Staff believes that there is little difficulty in providing the ARB with the required information electronically, as is currently done for many ARB programs using readily and publicly available software programs. Thus the time allotted is adequate.

K. Recall

67. **Comment:** Section 2439 of the regulations regarding ordered recall is inappropriate and should be removed. As a non-integrated industry, we are unable to recall our products in the same way auto makers can. Recall is too harsh a remedy for in-use failures. The threat of enjoinderment is sufficient, and recall should be voluntary, solely at the manufacturer’s discretion. (EMA)

68. **Comment:** ITA agrees with EMA’s comment. The provision should at least state that recall would be considered only as a last resort, which seems consistent with the spirit of the section. (ITA)

Agency Response: Ideally, manufacturers would never experience recall because the testing they perform prior to introduction would ensure complying engines for their useful lives. Realistically, when in-use compliance testing results in identifying engines that do not meet the standards, those engines are repaired to their certified configuration. Manufacturers have the ability to perform the repairs through a voluntary recall. This was noticed in the originally proposed regulations included with the Staff Report. Within the notice of proposed modified text, staff included more detail to the voluntary recall protocol. However, if manufacturers fail to voluntarily remedy the noncompliance, ordered recall is an important and necessary part of the enforcement of the regulations. It is needed to help ensure that the emission reduction goals of the regulation are met even when there are instances where an emission family has a substantial number of engines that fail to conform with the emission standards in-use.

69. **Comment:** Unlike automobiles, there is no standard registration of equipment, therefore engine manufacturers do not know who the end user (owner) is, and would be unable to determine names of engine owners for recall as required in Section 2439, paragraphs (d)(2)(C) and (d)(2)(H) of the regulation. (EMA)

70. **Comment:** ITA agrees with EMA’s comment. Additionally, the comment applies equally to equipment manufacturers. (ITA)

Agency Response: Staff believes that manufacturers have a reasonable opportunity to obtain

owner information before purchase or after, using such devices as warranty submissions. In addition, manufacturers have at least five years to implement a tracking system to locate owners. However, within the notice of modified text staff included language that if, after good faith efforts, the manufacturer cannot correct the percentage of equipment or engines specified in the manufacturer-submitted recall plan by the applicable deadlines and cannot take other measures to bring the engine family into compliance with the standards, the manufacturer shall propose mitigation measures to offset the emissions of the unrepaired equipment.

71. **Comment:** Section 2439(f)(2) of the regulations cites “motor equipment registration lists” as a means for identifying owners for the purposes of recall. This does not apply to all LSI engines and should therefore be revised accordingly. (EMA, ITA)

Agency Response: Staff clarified this requirement in the regulation by requiring the manufacturer to use motor equipment registration lists, as applicable, to obtain the names and addresses of equipment or engine owners.

72. **Comment:** Again, EMA does not support a recall provision. In the event that it is required, EMA recommends changing the minimum recall capture rate from 80% to a value calculated based on the average emissions reduction of the fix as specified in § 2125 (b)(6). This is consistent with what is allowed for on-highway vehicles. (EMA)

73. **Comment:** ITA agrees with EMA’s comment. It is unrealistic to specify an ironclad capture rate for all circumstances. (ITA)

Agency Response: Staff believes that an 80% capture rate for in-use recall is fair and reasonable, and consistent with other recall programs. Staff wishes to stress that current recall regulations for on-highway vehicles are being revised, and in fact, new on-highway regulations are going to require a recall capture rate of 100%. See also response to comment #69.

74. **Comment:** Section 2438(d)(2) of the regulations states that ARB will not allow the manufacturer to perform a voluntary recall once ARB has determined that a substantial number of engines fail to conform with the requirements. EMA sees no rationale for this provision, and it is inconsistent with on-road regulations. It should be removed from the regulation. (EMA)

75. **Comment:** ITA agrees with EMA’s comment. ITA also does not understand the reference to "paragraph (d) of this part." (ITA)

Agency Response: The commenters are not entirely correct. If upon completion of the in-use compliance engine testing, the average emissions of the engines exceeds the standards, the manufacturer does not concede failure, and the ARB determines the engine family has failed, the manufacturer will no longer have the option to remedy the noncompliance using the voluntary recall program. Thus, the manufacturer may opt into the voluntary recall program only through the testing period and if the manufacturer concedes the failure. If the manufacturer does not acknowledge the failure, the ARB would likely order the recall to

remedy the noncompliance and subject the manufacturer to the more stringent requirements associated with the ordered recall program.

In regard to the reference to “paragraph (d)”, the reference was corrected in the notice of modified text.

76. **Comment:** There are no procedural or reporting requirements specified for voluntary or influenced emissions recalls (Section 2439 only lists reporting requirements for ordered recalls). Although EMA does not support a recall provision, any such requirement should include voluntary and influenced recall procedures similar to those specified for on-highway vehicles in § 2113 through 2121. (EMA, ITA)

Agency Response: Staff modified the regulation to include detailed voluntary recall protocol, consistent with language from the on-road recall regulations.

77. **Comment:** By definition of an off-road engine in this proposed rule, marine generators will be regulated, and subject to recall and to in-use testing. In the marine industry it is almost impossible to conduct a recall of engines or to obtain engines from the field for emissions testing (other than outboards and personal watercraft). The typical cost of removing and reinstalling an engine from a boat starts at \$2000 for an easily accessible engine and this cost does not include other costs, such as shipping and testing. The ability to recall an engine from the field will not be economical and manufacturers will have a very difficult time tracking engines and locating customers who will be willing to allow their engines to be removed from their boats. Therefore, all marine generators and marine auxiliary engines should be exempt from recall and from in-use testing. (Westerbeke)

Agency Response: Within the adopted regulation there is a provision that the Executive Officer may provide for alternate means of showing compliance with those regulations if compelling circumstances associated with the structure of the industry and the uniqueness of engine applications makes it impossible to do in-use testing as outlined in the regulations (see Section 2438(b)(4) of the regulations). Therefore, marine generators generally remain subject recall and in-use testing, however the Executive Officer may provide exemption on a case-by-case basis.

L. Labeling

78. **Comment:** Section 2434(b) states that the label “must be welded, riveted or otherwise permanently attached to the engine block.” ARB should clarify that the use of laminated paper labels resistant to engine fluids, that would self-destruct when attempted to be removed, or plastic labels will suffice.

In addition, engine manufacturers should be allowed to place the engine label on another approved location as opposed to specifically requiring that it be positioned on the engine block. In many cases, there is either not enough space available on the engine block for an engine label, or the label would be obstructed from view. (EMA, ITA)

Agency Response: The second notice of modified text removed the requirement that labels be metal. The current language in this section gives the Executive Officer authority to make a judgement on a case by case basis to deal with label location or space constraints. Furthermore, staff believes that space limitations with regards to labels should no longer be a concern to manufacturers now that the smaller LSI engines with a displacement of 1.0 liter or less must comply with the simpler small off-road engine label requirements.

79. **Comment:** LSI engines are typically supplied without fuel tanks. The same engine design may be sold to various equipment manufacturers for various equipment usages, and the fuel tank location, relative to the engine, will be different in each case. Complying with the requirement to locate the label “immediately adjacent to each fuel tank filler inlet” will not be possible and this requirement should be removed” (EMA, ITA)

Agency Response: Section 2434(c)(6)(B) does require the location of the label to be placed “immediately adjacent to each fuel tank filler inlet”. However, the paragraph continues to state that, "... the Executive Officer must upon application from an engine manufacturer, approve other label locations that achieve the purpose of this paragraph. If the engine is manufactured separately from the equipment, the label must be affixed to the engine and located so that it is readily visible. Such labels must be in English and in block letters which must be of a color that contrasts with their background." Therefore, alternatives are available.

80. **Comment:** Section 2434(j) of the regulations states that the Executive Officer may approve alternative label locations or modify label content requirements. However, this section is too general and does not adequately address EMA’s concerns with respect to the many unnecessary requirements listed in § 2434(c). (EMA, ITA)

Agency Response: The items required on the label are necessary to identify the engine for any testing and/or enforcement activity. More importantly, it provides readily accessible operation, maintenance, and repair information for customers to ensure proper fuel use and engine adjustments. Providing the Executive Officer with authority to approve modified labels provides the manufacturer with additional flexibility to customize the label while providing the appropriate information.

81. **Comment:** Section 2434(c)(3) of the regulations requires that the engine serial number be stamped on the engine block or stamped on a metal label riveted to the engine block. Most LSI engine manufacturers have deleted stamping serial numbers and build dates on engines either because of space limitations or for cost reductions. Alternative tracking methods, such as model number, date code, etc. should be allowed.

In addition the location of the tracking number should not be limited to the engine block. (EMA, ITA)

82. **Comment:** Part I, 20(a) of the Test Procedures requires manufacturers to identify , by engine identification numbers, any engine covered by an Executive Order. Engine identification numbers are not used on many engines, so this section should be revised to include (as an option) the identification of engines by model and date code. (EMA, ITA)

Agency Response: This section of the test procedures is comparable to other ARB engine regulations. The manufacturer needs to have coding that will allow for recognition of each unique engine. Therefore, the use of model number and date code would not meet the required information. In order to allow for flexibility to manufacturers who might use tracking methods other than serial numbers, staff added the allowance of alternative tracking methods to this section. In addition, see response to comment #78 above.

83. **Comment:** With regards to labels, since it will be self evident as to what type of fuel a particular engine will use, it is not necessary to specify what fuel or fuels the engine was certified to as required in Section 2434(c)(5)(C) and (E). This section does not add any valuable or necessary information and should be removed. (EMA, ITA)

Agency Response: Staff disagrees with the commenter's statement. Currently, manufacturers offer single engine lines configured for use with gasoline, propane, and natural gas. Manufacturers may certify certain engines for use only with a specific fuel. Since this is the case, there needs to be a clear indicator on the engine, for users and enforcement purposes, as to what fuel(s) the particular engine is certified for.

84. **Comment:** Detailed maintenance specifications and adjustments should not be required on the engine label as required in Part I, 12(e) of the Test Procedures and Section 2434(c)(5)(E) of the regulations. Instead, the label should provide a reference to the owner's manual for maintenance information. (EMA, ITA)

85. **Comment:** ITA agrees with EMA's comment. A user would rarely if ever try to perform service and maintenance on an expensive capital item such as a forklift without reference to the manual. (ITA)

Agency Response: Detailed maintenance specifications and adjustments are not required on labels. Labels must reveal only basic tune up specifications (minor repair information) and adjustments to ensure proper maintenance of engines to ensure compliance with the standards. Manufacturers currently provide such information on engine labels. Manufacturers are also already given flexibility in that the current language allows for certain items to be excluded from the label upon approval by the Executive Officer. Staff believes that space limitations on labels should no longer be an issue with industry now that this requirement no longer applies to LSI engines less than or equal to 1.0 liter. (See also Agency response to comment #78)

86. **Comment:** Due to space constraints, the label requirements should be kept to a minimum. Required items should be limited to:

- Corporate name and trade mark
- Conformity statement: "This engine conforms to 2001-03 (2004 and later) California (and Federal) regulations for off-road LSI engines."
- Engine family identification

In addition, engine manufacturers should not be required to affix the engine tracking number (manufacture specific) to the engine block, but should be given the option of placing it elsewhere on the engine." (EMA, ITA)

Agency Response: Staff disagrees for the reasons given in response to comments #82 and #84 above.

87. **Comment:** The date of manufacture should not be mandated on the label, only on the engine. (EMA, ITA)

Agency Response: Staff made the modifications in the notice of modified text to provide manufacturers with the option of including this information on the engine or on the label. However, again, staff does not believe that space on labels should be a concern any longer. (See Agency response to comment #78)

88. **Comment:** Since there are no durability period choices available to manufacturers of LSI engines as there are in the small off-road engine regulations, there is no need to require the durability period on the label. This concept was introduced in the less than 25 HP rulemaking due to the various durability periods available for the same engine. This requirement should be removed.” (EMA, ITA)

Agency Response: Within the notice of modified text, staff made the necessary modifications to Section 2434(c)(5)(H) of the regulations, such that the durability period is no longer required on the label.

M. Technology Review

89. **Comment:** ARB should adopt a formal, meaningful technology review to reopen the Tier 2 rulemaking and determine whether the Tier 2 program is technically feasible. (EMA)

90. **Comment:** Because there are still many uncertainties concerning the feasibility of the Tier 2 program and the degree to which EPA ultimately will harmonize with ARB, it is also critically important that the Board conduct a technology review in 2001 that includes an opportunity for manufacturers, as well as staff, to express their views on the feasibility of the Tier 2 standards.

I do want to note that just this morning I heard for the first time that staff is now recommending the technology review occur in the year 2000. It was 2001 in the mail-out. And my understanding of that is because of this Board's prior directive that technology reviews where all of the non-road categories occur, I think, as I recollect, every two years, and the schedule probably puts that in 2000.

I want to express to you my concern that having this tech review for this category in 2000 is probably premature. The Tier 1 rule starts in 2001. Manufacturers will have the kind of meaningful data that you all will find important in the 2001 time frame. If because of the staff's legitimate concern they don't want to do tech reviews with the Board every year, I would ask you to consider having this particular category have a tech review perhaps in 2002, rather than pull it forward one year, to push it back one year. (EMA)

91. **Comment:** We are the manufacturers of industrial trucks, more commonly known as forklift trucks, and so we are significant users of the over one liter spark-ignited (LSI) engines... Because of the way we purchase, obtain and dress out spark-ignited engines, it appears that a number of our members who normally would just be equipment manufacturers may gain the status of engine manufacturer under the [regulation].

Because we may, in many cases, be the party that puts the engine in final form and makes changes to it that affect its emissions, and as we understand the regulations, that would place us in the status of engine manufacturer.

That in turn may require us in many cases to go out and procure the test equipment, to train personnel to understand the certification process, which can be a very detailed, complicated process... I guess what I'd really like to have one [technology review] in 2000 to see how we're doing in the certification process. (ITA)

92. **Comment:** Add regulatory language for technology review before Tier 2 implementation. (NACCO)

93. **Comment:** We are also very supportive of the technology review in 2002, because we believe very strongly that in 2002 the evidence will be overwhelming that significantly tighter standards could be applied to the smaller, less than one liter spark-ignited engines. (MECA)

Agency Response: The staff recognizes that although manufacturers are likely to have experience with certifying engines through participation in the on-road market, or in other off-road markets, they may still encounter unforeseen issues when developing complying engines. The Board also recognized this possibility. As a result of industry's comments, the Board directed staff to conduct technology reviews in both 2000 and 2002. In response to a comment made by Mr. Jed Mandel, on behalf of EMA, the Board directed staff to generally address issues specific to the Tier 1 standards, such as the certification process, during the 2000 technology review, and issues specific to the Tier 2 standards during the 2002 technology review. However, the Board also did not restrict or limit staff from acknowledging and addressing any new information that may become available during either technology review. the Board's directives appear no in the regulation, but in Resolution 98-51.

94. **Comment:** It has been a hectic several months for staff as well as industry and neither has the confidence that they would like to have that this standard is achievable in the lead time provided. The upshot is that a lot of faith is being put in the technology review to assess progress toward meeting the requirements. You'll understand that this puts industry in an uncomfortable position, because it might shift the burden to us to prove a negative; it elevates a somewhat speculative proposal to legal regulation status; and it induces reliance on emissions reductions that may prove unattainable in the prescribed time frame.

Compared to other ARB proceedings, the development time for this proposal has been quite short. But we also recognize that the staff has worked very hard, as industry has, and that the Board wishes to get a regulation for these engines on the books. We will do our best to meet the challenge. What we seek is some appreciation of the magnitude of that challenge and the

uncertainties that surround our ability to meet it--in other words, we ask for a technology review that is all-encompassing and open-minded. (ITA)

95. **Comment:** We don't feel complete confidence that sufficient data has been collected to say that particularly the Tier 1 in-use standards are going to be technologically feasible. There is work currently underway by Southwest Research and there's also some very important work that we have shared with the staff underway by some of our member companies that will go directly to whether the useful life requirement under Tier 2 is going to be feasible.

I raise that just to emphasize Jed's point that we really feel that there needs to be a very candid and wide-ranging technology review to see how that test data will affect us. (ITA)

Agency Response: Staff is confident that the approved standards are achievable in the lead time provided. The technology is already available, and is currently use with some LSI engines. The Staff Report, Technical Support Document, and certain manufacturer's comments support the Board's conclusion that the technology is available to achieve the Tier 1 emission levels in the time frame provided. Manufacturers have acknowledged uncertainty regarding maintaining the standards in-use. Thus, the Board directed staff to conduct a technology review one year prior to the implementation of each tier. Staff does not believe however that industry will be put in a position to "prove a negative" during the technology review. A technology review will enable the ARB staff and industry to determine how the application of technology is progressing by analyzing available data, identify any previously unforeseen challenges, and recommend regulatory changes if warranted. During such reviews staff will look at the available data and reassess the overall feasibility of the standards, including the stringency of the emission limits, the length of the useful life, and the degree of harmonization with U.S. EPA. Industry will also be provided with an opportunity to provide their own assessment of these issues to the Board. Staff wants to stress that this forum will be very open to all new data presented.

96. **Comment:** We understand that the technology review will encompass not only the core requirements of emissions limits, effective dates, and useful-life specifications, but all of the requirements. This understanding is critical to our support for the proposal. (ITA)

97. **Comment:** If there is a technology review in 2000, I think it would be appropriate for the staff to not only look at some of the certification issues, but to take a look at where the technology is, because frankly we think it's going to be very exciting and it will be an exciting story in 2000, doesn't necessarily mean at that point they'll change the regulations, but as long as there's a review, it would be a good idea to take a look at how much progress is being made with the technology. (MECA)

Agency Response: The technology review, as directed by the Board, is to assess new developments in available technology and how that affects the regulation, and to report on the status of the engines already meeting the standards. Staff expects that ITA's and MECA's concerns will be addressed during the technology review.

98. **Comment:** The technology review will dovetail with the EPA's development of federal regulations for the same LSI engines. Both ARB and EPA have consistently reaffirmed their

commitment to a harmonized approach for the long-term regulations of these engine and we emphasize again today that harmonization is critical to industry's ability to plan its product lines rationally-- differences in federal and state requirements inevitably multiply the engineering burdens we face. We are therefore counting on EPA's participation in ARB's technology review, in ARB's participation in the EPA regulatory development process, and the ultimate harmonization of the requirements. (ITA)

Agency Response: As stated in the Staff Report and at the hearing, staff intends to work with EPA to ensure that the federal and state programs are harmonized as much as possible in order to place no unnecessary burden on industry. Staff has worked closely with EPA during the construction of the LSI regulations to develop a harmonized program, and staff is committed to continue to work closely with EPA during future proceedings.

99. **Comment:** Because they are a relatively small part of the market, forklift manufacturers must create their own completed engines by purchasing engine blocks and then "dressing out" the engines with fuel-system and exhaust-system components obtained from third-party vendors (some of whom are ITA Associate Members). Unfortunately, and clearly contrary to staff's expectations when this regulatory proceeding began, we see no prospect that the engine manufacturers will have an interest in manufacturing certified engines for forklifts, at least on the scale necessary to meet our demand.

The problem, assuming we continue our current approach to developing completed engines, is that the forklift manufacturer will also become the "engine manufacturer" under the regulation's definition. This gives us the responsibility of certification, testing, reporting and so forth that equipment manufacturers typically rely upon their engine suppliers to handle. This, in turn, requires ITA members to purchase test equipment, train personnel, and devote significant scarce resources just to the compliance process.

But the problem remains, because staff's hope that engine suppliers would choose to satisfy the demand for certified spark-ignited engines has not proved well-founded. We ask that allowance be made in the technology review to recognize this unusual additional burden that we face. (ITA)

Agency Response: The process of technology review is designed such that challenges such as this, should they arise, can be addressed. Staff will be conducting two separate technology reviews; one in 2000 (to review the Tier 1 standards) and one in 2002 (to review the Tier 2 standards). Should this situation arise, staff will address it during the 2000 technology review.

N. Small Volume Manufacturers

100. **Comment:** Small volume manufacturers will be unable to cost effectively purchase the necessary components for its products to remain competitive. Fuel injectors, catalyts, oxygen sensors, and fuel pressure regulators are just a few of the items that must be purchased in high quantities, in the thousands not hundreds, in order to obtain costs that will keep the price of the final product competitive in the marketplace. (Westerbeke)

Agency Response: Staff recognizes Westerbeke's concerns. However, the worst-case cost increase per engine is expected to be no more than \$1105 (refer to page 48 of the Staff Report). Also, EPA is expected to adopt a similar regulation which would be implemented in 2004. Since small-volume manufacturers (which includes Westerbeke) are exempt from complying with ARB's Tier 1 standards, the rule to which they will eventually need to comply in 2004 should be a national rule also. Since this will require Westerbeke to comply with regulations nationally, it may allow Westerbeke the ability to buy in higher quantities, and thus keep the price of final products competitive in the marketplace. Finally, since the standards adjusted by the Board apply to 2004 and later engines, unless Westerbeke makes design changes to its engines they may continue to use the same technology indefinitely, thereby spreading the cost over many model year engines.

101. **Comment:** Westerbeke produces approximately 5000 engines a year, less than 275 of those engines are spark-ignited engines greater than 25 horsepower, of which less than 50 are sold in California. Small entities cannot afford to perform production line testing, due to the lack of financing, workforce, and equipment. For instance, at Westerbeke to perform an emissions test two operators, one test cell, and four work days are required. To prevent larger manufacturers from gaining an unfair advantage over their much smaller competitors, small volume producers should be exempt from all production line testing. At present time, the CumSum procedure would cause Westerbeke to test almost 100% of its California production. (Westerbeke)

Agency Response: To ease the compliance burden on small-volume manufacturers staff has made special provisions with regard to small-volume manufacturers including exemption from Tier 1 compliance. The CumSum production line testing procedure is designed to allow manufacturers to test as few as 2 engines per family if no engine fails the emissions test. However, the regulations, per the notice of modified text, provide an upper limit for small-volume manufactures of 1% of production at most to be tested. Therefore if Westerbeke produces less than 100 LSI engines for sale in California, then Westerbeke would be required to test at most one engine.

102. **Comment:** Something by way of a label or notice must be done to prevent large companies from using their requirement for 2001 certification against small volume manufacturers who are exempt. There must be some kind of indication on the engine that notifies customers that it is not illegal to purchase an engine from a small volume manufacturer for use in California even though the engine was not required to be certified. (Westerbeke)

Agency Response: Per section 2430, all engines covered by the regulations must receive an Executive Order to be sold in California. As with other phase-in and small volume manufacturer programs, all manufacturers of engines will need to contact the ARB to show compliance to the standards or the small volume allowance. The Executive Order may be used to show compliance with the regulations. In addition, at a small volume manufacturer's request, staff will work with the manufacturer to approve a label for the exempt engines.

103. **Comment:** "The newly proposed regulations are a serious threat to small business. The provisions for small volume manufacturers and small entities do not go far enough to protect

them from going out of business. Also, there is no means for protecting small volume manufacturers, who are exempt from certification during the first phase of this regulation, from being wrongly marketed against by their larger customers. The Board must allow more provisions for small volume manufacturers and small entities to prevent these companies from going out of business as a result of this regulation. (Westerbeke)

Agency Response: Staff believes that all concerns raised by small-volume manufacturers, including Westerbeke, have been addressed in a manner that should be acceptable. See responses to the previous comments in this section.

O. Preemption

104. **Comment:** In 1993, ARB staff and ITA reached agreement on the scope of federal preemption for forklifts and that agreement was confirmed in writing and submitted to EPA. The preempted category consisted of rough terrain forklifts, diesel forklifts, and spark-ignited forklifts over 50 horsepower.

Despite this long-standing agreement, we found out a few short weeks ago, almost incidentally during a telephone discussion I was having with staff on other issues, that staff planned to take the position that no spark-ignited forklifts were preempt.

If the preemption agreement is abrogated, the consequence is that forklift engine families over 50 horsepower, which would have had until 2004 to comply with the EPA regulation, must now comply three years earlier with the California regulation. This imposes a significant, unexpected burden on our members, which staff has acknowledged comes extremely late in the process. It deserves to be discussed further.

Although the cost to ITA members in the loss of preempt status for its engines over 50 horsepower significantly increases our near-term burden, we do not believe that honoring the preemption agreement would affect California's long-term air quality or SIP compliance, since all of the engines will become subject to EPA's useful-life regulation in 2004. If only because of the lateness of staff's decision and the fact that here has been virtually no discussion of it, the fair approach would seem to restore the preemption agreement for Phase I of the proposal. (ITA)

105. **Comment:** Our main concern with the latest proposal is its reference to nullifying the over 50 HP preemption for forklifts. This issue was not raised at either the CARB May workshop nor during our meeting with you in June. Loss of this preemption will compound Toyota's challenge immensely by introducing numerous additional engine family/forklift model combinations. We have not yet concluded our final position on the potential impact of this issue as it would include negotiations with outside engine suppliers. Worse case, it could jeopardize our ability to meet the Tier 1 timing of January 2001. (Toyota)

Agency Response: It is true that ARB staff, ITA, and other industry groups reached an agreement submitted to EPA by ARB on July 20, 1993 declaring preempt equipment, and that the preempt category included rough-terrain forklifts, diesel forklifts, and spark-ignition

forklifts over 50 horsepower. This agreement was based on data presented to the staff by ITA, which indicated that “a very significant quantity” of forklifts over 50 horsepower are used on construction or farm sites and thus are subject only to federal regulation. However, as discussed in the Staff Report (page 28), in the years since 1993 staff has obtained data showing that in actuality only a small percentage of spark-ignition engine forklifts greater than 50 HP are used in construction and farm activities; closer to 18% which is well under the 51% primary use determination. The data used to reach this conclusion were obtained from two sources; a 1996 report by the National Propane Gas Association on the role of propane in the forklift market, and the ARB large spark-ignition engine emissions inventory. Thus staff adjusted the preemption category list to account for this new, more accurate information and included spark-ignition engine forklifts greater than 50 HP in this LSI engine regulation.

Staff made publicly available the proposed regulation language and Staff Report, within the Initial Statement of Reasons (ISOR), on September 4, 1998. Within the ISOR was a list of non-preempt equipment for the LSI engine regulation (see Attachment C of the ISOR), including forklifts that are neither rough-terrain nor powered by diesel engines, and a discussion regarding the basis for inclusion of forklifts. The release of the ISOR met with the required release time period (45-day minimum) prior to the public hearing, in accordance with section 60005, Title 17, CCR. ITA was informed by staff of the change in status of forklifts, and the basis for the change in policy, in a phone conversation on August 3, 1998. Staff stated to ITA that staff would propose a return of forklifts into the preempt category if ITA supplied staff with data that backed such a move. ITA has yet to supply staff with such data.

Staff realized that by including forklifts down to 50 horsepower in the 2001 regulations the number of engines impacted by the regulations was increased. However, many of the engines used in forklifts are used in other applications and thus were already subject to the regulations. Staff also realized that forklift manufacturers would have to ensure that complying engines were available and incorporated into more of their models. The phase-in program of Tier 1 was designed to significantly ease this burden. In workshops and discussions with industry, staff proposed with the standards a Tier 1 phase in schedule in which 60 percent of the engines are required to comply in 2001, 80 percent in 2002, and 100 percent in 2003. However, because of the inclusion of forklifts into the non-preempt category, staff revised its phase-in, proposing a less stringent schedule of 40/60/80, to provide these manufacturers with additional flexibility and lead time to comply. As a result of additional industry concerns, staff proposed, and the Board approved, an even less stringent phase-in schedule of 25/50/75 at the hearing. In addition, expected EPA regulation will require 100% of production to comply with standards in 2004 coinciding with ARB’s program, therefore this will most likely also be a national requirement.

106. **Comment:** I don’t think it is going to be resolved today, but we would like to have an opportunity to discuss with the staff, as we did when the original preemption agreement was entered into, the basis for our belief that there are preempt spark-ignited forklift engines.

Like I say, it's been a question of not being able to really have the dialogue that we thought should be necessary to do that. It's an important issue to us because it translates directly into the number of engine families that we have to deal with in Tier 1. (ITA)

Agency Response: Staff is always willing to talk to members of the industry about any questions or comments they may have.

107. **Comment:** We at IMPCO believe that the reversal of the preemption status on forklift trucks will lead to positive social and environmental results by allowing for immediate reductions in emissions. (IMPCO)

Agency Response: Staff is pleased that IMPCO agrees with staff's removal of the preemption status on forklifts. Staff's reasoning for doing so is explained in responses to comments #104 through #106.

P. All-terrain Vehicles (ATV)

108. **Comment:** Polaris believes that ATVs over 275 kg and over 25 hp have been inappropriately placed under the proposed LSI rule. Even though some ATVs have utility usage, primary use for ATVs is recreational, so utility classification is inappropriate.

If the LSI rule is enacted as currently written, Polaris would have to remove our premium models from the California market (Sportsman 500, Magnum 500, Ranger, Big Boss 500 6 x 6, and some as of yet unannounced models). This will cause economic hardship for our dealers. In fact, we expect that dealers who only handle Polaris ATVs will no longer be viable.

The simple way to avoid this situation is twofold: One, merely remove the phrase "with an unladen dry weight of 600 pounds (275 kg) or less" from the current ATV definition in Title 13, CCR, § 2411. This would move all ATVs into the current OHRV rule, which is appropriate to those vehicles' design and use. Two, revise the LSI rules for the smallest engines in that group to be closer to the small off-road engine regulations. Specifically, 9 g/bhp-hr HC+NO_x and 410 g/bhp-hr CO would be appropriate. For useful life, we suggest a manufacturer selectable useful life like in the small off-road engine rule, with choices of 375, 500, and 625 hours. This would be more realistic for engines on the bottom of the LSI 25-175 hp spectrum. (Polaris)

109. **Comment:** Arctic Cat believes that all of the vehicles that it markets as ATV's would be appropriately classified as ATV's without regard to power or weight. We also believe that the proposed LSI regulation does not recognize the limitations of ATV engines, expectations of the consumers of ATV's, or the economics of marketing ATV's in California.

Our position with respect to the proposed regulation is very simple: we believe that the weight limit should be, and would appropriately be moved or removed from the ATV definition. (Arctic Cat)

110. **Comment:** Classifying these over 600 pound ATVs as utility vehicles for emissions certification purposes means that the manufacturers will have to comply

with two completely different certification procedures for their ATV product lines—one for small ATVs, and a separate, more stringent one for the larger ATVs that comprise a very small portion of their current model offerings. At the present time the total California population of 600 pound, over 25hp ATVs is well under 1000. Although I do not have any exact figures, after talking directly to the three manufacturers who currently make and sell the large ATVs, I estimate the current total population after several years of availability in the market, at between 500 and 700 units. This is a very small number of vehicles for manufacturers to have to test and certify separately from the rest of the ATVs, in the off-road recreational classification. Having a completely separate emission standard and certification procedures for this very small number of vehicles would not be practical, and would present an unrealistic administrative burden on the manufacturers - the cost of which would, of course, have to be passed along to the California consumer. Faced with the additional compliance efforts costs, and in view of the small sales volume, one or more of the manufacturers may even decide to withdraw these vehicles for the California market. Consolidating all ATVs into one emissions classification will require negligible, if even any, air quality compromises, and will ensure a supply of very clean, modern, acceptable ATVs for California consumers whose recreation activities demand a heavier machine. We suggest the ATV definition be slightly amended so that all ATVs, regardless of their weight, are classified as recreational vehicle not some as specialty or utility vehicles. (J.C. DeLaney Consulting)

111. **Comment:** As a result of the expected Board approval for much or all of the staff proposals for the specialty vehicle regulation, Title 13, CCR, Chapter 9 Off-Road Vehicle and Engines Pollution Control Devices is going to be amended anyway, we suggest that all ATVs, regardless of their weight, be classified as recreational vehicles, not some as specialty vehicles. (CMDA)

Agency Response: As a result of the proposed new standards for small LSI engines (refer to the responses provided in the Standards section) staff reevaluated, among other things, the feasibility, the emission reductions, and the costs of emission reductions if they were to reclassify the over 275 kg (600 pounds) ATVs to the Off-Highway Recreational Vehicle (OHRV) rule. Staff determined the emission reductions that these larger ATVs would achieve under the LSI regulation are essentially the same as the reductions they would achieve under the OHRV regulation. Based on manufacturers comments, the Board approved a modification to the OHRV rule proposed by the staff which removed the phrase: “with an unladen dry weight of 600 pounds (275 kg) or less” from the ATV definition found in the OHRV rule. Therefore, pending final ARB action, the over 600 pound ATVs will be included in the OHRV regulations, sections 2410 - 2414, title 13, CCR.

Q. Miscellaneous

112. **Comment:** The displacement discriminator between “small” and “large” should be changed from 1.0 liter to 1.2 liters. Forklifts and other industrial equipment are

greater than 1.2 liters, and most garden and turf care engines are less than 1.2 liters. (EMA)

Agency Response: The comment made by EMA was superseded by comments received subsequently and the comments presented at the hearing by Mr. Jed Mandel, representing EMA at the hearing. EMA supported staff's proposal to split the engines into "small" and "large" engines at 1.0 liter and to allow the "small" engines to comply with the SORE regulations. The modification was made in the notice of modified text.

113. **Comment:** Regulation implementation date is presented in Section 2430 as calendar year not model year. Is that the intent? (EMA)

Agency Response: The initial implementation date of the regulations is January 1, 2001. Therefore, the regulation is applicable to all engines produced on or after January 1, 2001. Engines produced prior to January 1, 2001 are not subject to the regulations. In other words, the regulations are implemented on January 1, 2001, and once implemented, pertain to the model years beginning with model year 2001, where model year is defined by the manufacturer, and is based on its production period within the definition of model year as stated in section 2431(a)(23).

114. **Comment:** Section 2433(e) of the regulations regarding replacement engines is confusing and needs to be reviewed. According to previous discussions with ARB, EMA's understanding is that replacement engines from 2001 to 2003 will not be subject to any regulations. Thereafter, starting in 2004, the method of allowing replacement engines will be as outlined in § 2433(e)(2). (EMA)

115. **Comment:** ITA agrees with EMA that the language is confusing. For consistency and clarity, the approach to replacement engines used in the compression-ignition regulation, as we thought was intended, would be appropriate. ITA also believes that the requirement to forecast replacement-engine sales is awkward and burdensome without adding value to the process. (ITA)

Agency Response: The approach to replacement engines used in the compression ignition regulation is more stringent than that within the LSI engine regulation. The replacement engine approach used within the LSI engine regulation was designed to provide flexibility to manufacturers. Although the manufacturer has the burden of proof as specified in section 2433(e)(2)(A), the manufacturer has the flexibility to sell replacement engines which are not certified to the emission standards. As recommended by industry in further conversations, staff modified Section 2433(e) in the first notice of modified text to be consistent with the small off-road engine (SORE) regulations. Restriction regarding replacement engines will begin in 2004, as EMA and ITA noted, and that language was also added in the first notice of modified text. Staff believes these modifications cleared up any existing confusion within section 2433(e).

116. **Comment:** Section 2435(e) of the regulations requires that manufacturers must provide, with each new engine, written maintenance instructions. Engine

manufacturers cannot be held liable if the OEMs do not include the engine manufacturer's literature package or supply their own. (EMA)

117. **Comment:** ITA agrees with EMA's statement, but we do not read the regulation as imposing liability on the engine manufacturer if the equipment manufacturer does not pass along the engine manufacturer's literature. ITA would support clarification of this point. (ITA)

Agency Response: Because these comments do not suggest a specific modification to the regulatory language, staff made none. The manufacturer's obligations to seek approval of and furnish with each engine written maintenance instructions are clear from the existing text. The comments appear to seek ARB's prejudgment of fact-specific enforcement matter, which regulatory staff typically do not address in this document.

In addition, staff believes that engine and equipment manufacturers must work together to make sure that California engines comply with the standards and other requirements. Staff believes that sufficient lead time has been provided to allow for such coordination between engine and equipment manufacturers and that engine and equipment manufacturers must make every effort to do so.

118. **Comment:** With regard to the in-use credits program, credits should not be discounted by 10%. There should be no discount. (EMA)

119. **Comment:** ITA agrees with EMA's comment. The reference to 'AF' should be removed from the formula for credit calculation. (ITA)

Agency Response: An engine family with a compliance level, as determined by in-use testing, below the emission standards would be able to generate emission credits for averaging, banking, and trading. The credits program was designed to assist manufacturers in meeting the emission requirements in-use for all their engines. The program allows the manufacturers to take advantage of their compliance margin, the difference between the engine's emission certification level and the standard, to remedy potential noncompliance. When an engine family is tested in-use and the engines' emissions results are below the standards, that engine family may generate emission credits. Those credits may be used to remedy another engine family whose in-use emissions exceed the standards. As with other averaging type programs, the ARB applies a discount factor of ten percent. That is, the manufacturer may use emission credits at the rate of 1.1 to 1 to remedy noncompliance. The discount factor is used to provide the "breathers" with the assurance that the engines will continue to operate at the emission levels tested and thus, no emission loss occurs.

The adjustment factor (AF) is included in the credit calculation as an adjustment for statistical certainty. The more engines that are tested the higher the certainty of the resulting compliance level values.

120. **Comment:** Test power is inappropriately defined in the in-use credit calculation. Credit calculation under the in-use program must use a definition for “power” reflecting the certification test power of the tested configuration. (EMA, ITA)

Agency Response: During the rulemaking process staff broadened the engine family category requirements allowing manufacturers to include more engine types and horsepower ratings to be categorized into one engine family, thereby lessening the burden of compliance on manufacturers. As a result of these modifications, using sales weighted power, rather than the test engine's horsepower, better represents the engine family as a whole. The engine tested is the worst case for emissions, but may not necessarily represent the majority of engines within the family sold in terms of horsepower.

121. **Comment:** Part I,6(a)(2)(i)(A) of the Test Procedures requires that all records, from the time when the engine is first built, be forwarded to ARB when the certification application is sent out. However, for on-highway certification, manufacturers are only required to send the records from the time when the engine/vehicle is first received by the certification activity. This is allowed because there are often time delays, (sometimes several months), from when the engine/vehicle is assembled and ultimately delivered to the certification activity for testing. Also, many of the vehicle/engines are not built up in-house, but rather are built by outside contractors. EMA recommends that individual record requirements for the non-road LSI engines be consistent with current on-highway requirements. (EMA)

122. **Comment:** It is unclear which records the engine manufacturer must forward to ARB with an application for certification, and which records the engine manufacturer must retain. In any event, the record requirements for non-road LSI should be consistent with, and no more stringent than, ARB’s current on-highway requirements. (ITA)

Agency Response: Subsection 6(a)(2)(i)(A) does not refer to records to be submitted to ARB, as the commenters suggest. This paragraph refers to documents that must be kept at the manufacturer's on-site location with regards to the engine used for certification. This comment was responded to by staff in a written e-mail to EMA on October 21, 1998. Staff received no further comments regarding this issue. Therefore, this is believed to no longer be an issue with EMA and ITA.

123. **Comment:** Part I, 6(a)(3) of the Test Procedures requires all records, other than routine emission tests, to be maintained for a period of 8 years after issuance of all Executive Orders to which they relate. Routine emission test records must be retained for 2 years. This is longer than in the small engine regulation which is 6 and 1 year respectively. What is ARB’s rationale? (EMA, ITA)

Agency Response: Staff developed this requirement pertaining to record keeping, to be comparable to that for heavy-duty off-road engines. This differs from the small engine regulation because small engines tend to be in-use for a comparatively shorter

period of time. The longer period is necessary in order to have records available in case ARB requires information from those records in circumstances such as recall.

124. **Comment:** Part I, 8(b)(1)(ii)(A)(6) of the Test Procedures regarding the application for certification requires a listing, with detailed descriptions, of special test devices used to conduct emission testing. This is too vague and should be removed or reworded. (EMA, ITA)

Agency Response: Staff believes the language is clear as to the requirements in this section. Examples of “special test devices” are given (e.g. adapter, simulator). The language requires that the Executive Officer have knowledge of the “special test device” which is used to conduct emission testing, in order to obtain information as to the affects such a device may have on emission results.

125. **Comment:** Part I, 8(b)(1)(ii)(C) of the Test Procedures is unclear and needs to be modified. (EMA, ITA)

Agency Response: Staff believes the subject language is now clear after a grammatical error was corrected in the first notice of modified text. The subject language requires that, during the application process for certification and upon request by the Executive Officer, manufacturers provide detailed drawings and descriptions of emission related components. Obtaining these drawings and descriptions may be necessary in order for the Executive Officer to determine which engine parameter will be subject to adjustment, and it's physically adjustable range, during certification and compliance testing.

126. **Comment:** The entire section on maintenance, within Part I, 12 of the Test Procedures, is extremely burdensome. (EMA)

127. **Comment:** ITA agrees with EMA’s comment. For example, the need for most maintenance is obvious and should not have to be further supported except at the Executive Officer’s request in individual cases. (ITA)

Agency Response: It is not staff's intent to overly burden manufacturers. The maintenance requirements incorporated in this regulation are consistent with other ARB regulations. They are necessary to assure that engines are maintained as they are tested, and that their emissions comply with the standards in-use.

128. **Comment:** Without a timer in the engine controls, which could be an expensive option, there is no way of monitoring engine hours. Even with the timer, because of the diverse applications, indicating to the operator that it is time for maintenance will be challenging. There are endless varieties of control panels for OEM applications.

Visible signals are inappropriate for the applications of small LSI engines and thus, small LSI engines should be specifically excluded from this requirement. (EMA)

129. **Comment:** ITA understands that hour meters are optional under the proposed procedures. Most, if not all, industrial trucks that use large spark-ignited engines are equipped with hour meters, but such meters are relatively rare for equipment that use 1.0 L engines and less. (ITA)

Agency Response: As a result of industry's concerns, staff proposed, and the Board approved, allowing small LSI engines to meet the same requirements as SORE. The modifications were made in the first notice of modified text.

130. **Comment:** Part I, 12(a)(3)(ii)(B) of the Test Procedures requires that survey data be used to demonstrate that, at an 80 percent confidence level, 80 percent of a manufacturer's engines are maintained according to the critical maintenance provisions proposed. Demonstrating this on 80 percent of a manufacturer's engines is too high of a requirement and not necessary. A more appropriate number would be 50 percent. (EMA, ITA)

Agency Response: Parts listed in section 12(a)(3) are critical emission related components, such as catalysts, fuel systems, and electronic control units. No maintenance is allowed these components because the impact on emissions is great. Flexibility on this requirement is provided to a manufacturer only in cases where maintenance has a, "reasonable likelihood of being performed in-use." The manufacturer has the option of demonstrating the likelihood of the maintenance being performed. One option is the use of survey data showing that 80 % of the engines already have the maintenance performed. The required 80% is preferable to 50% because the number of engines on which maintenance is performed must be high in order to ensure emissions compliance. If only 50% of the engines were properly maintained, the 50% would not have been maintained, and the emissions impact would be great. Also, the manufacturer may use one of the other five options to show a reasonable likelihood of the maintenance being performed in-use.

131. **Comment:** With regard to Part I, 12(e) of the Test Procedures, the regulations fail to specify: 1) the maximum hours limit for a certification engine to still be considered a "green" engine, and 2) the plus/minus hour spread for the test and maintenance intervals. (Note: +/- 8 hours is currently used for on-highway engines.) (EMA)

Agency Response: Staff is unclear as to what the issue is because of an apparent incorrect reference. This issue is believed to no longer be an issue with EMA and ITA. Staff directed manufacturers to Section 13 of the Test Procedures showing the limit of up to 50 hours to stabilize an engine for testing. Regarding the issue of emission testing spread, manufacturers should include their suggestions when submitting a plan, using good engineering practice for durability testing.

132. **Comment:** With regards to Part I, 16(a)(3) of the Test Procedures, it is unclear if Executive Orders will be issued for certified engine families or family groups. (EMA)

133. **Comment:** ITA understands that Executive Orders concerning certification will apply to engine family groups. Assuming this is correct, the regulatory purpose of ‘engine families’ is not clear to us. (ITA)

Agency Response: Staff modified the regulation in the notice of modified text to read that Executive Orders will be issued for each engine family, not engine family groups.

134. **Comment:** Part I, 21 of the Test Procedures requires any heavy-duty off-road large spark-ignition engine manufacturer obtaining certification shall notify the Executive Officer, on a yearly basis, of the number of engines of such engine family-engine displacement-exhaust emission control system-fuel system combination produced for sale in California during the preceding year. Engine manufacturers are unable to track California-only sales on a “true sales” basis, due to the structure of the industry. Estimates of California sales should be sufficient to fulfill this requirement.”

Also, the use of the words “heavy-duty” are in error and should be deleted. (EMA, ITA)

Agency Response: Staff deleted “heavy duty” from the language. The language specifies that manufacturers must supply the number of engines "produced for sale" in California, and not "true sales" as the commenter states. Staff believes that manufacturers should be able to supply such production information because manufacturers must obtain Executive Orders for any engines produced for sale or sold in California, and therefore staff believes this important information is information commonly kept on record by manufacturers.

135. **Comment:** Part I, 22(a)(2) of the Test Procedures regarding maintenance instructions requires documentation from the ultimate purchaser that maintenance was conducted. The requirement states that instructions shall contain a description of the documentation that the manufacturer will require from the ultimate purchaser as evidence of compliance with the instructions. What type of documentation would suffice? (EMA, ITA)

Agency Response: This requirement was purposefully left broad in order to give manufacturers the most flexibility in determining the necessary documentation. Examples of what ARB could accept are receipts and statements from the owners.

136. **Comment:** With regards to test fuel specifications, does Indolene meet California on-road fuel specifications? ARB needs to provide harmonization on certification test fuels or manufacturers will be burdened with additional tests. (EMA, ITA)

Agency Response: Staff proposed, and the Board accepted, to require test fuel to meet the California on-road fuel specifications. Indolene is accepted as an alternative fuel in these specifications.

137. **Comment:** There are a number of technical comments and corrections which we have submitted to the staff and we have provided to the Board's secretary as part of EMA's comments. We urge the Board to direct the staff to continue to work with us on these technical corrections which we believe have no impact on emissions, but significant impact on costs. (EMA)

Agency Response: The staff is always willing to talk with industry regarding proposed regulations. The Board directed staff to continue to work with industry on technical corrections. Many corrections included in the notices of modified text were based on industry discussions.

138. **Comment:** I noticed that in the later part of Attachment A, in the section titled *Proposed Amendments to Title 13...Chapter 9, Article 3* pertaining to Off-Highway Recreational Vehicles and Engines, staff has eliminated all reference to *Specialty Vehicles* from Section 2410 through Section 2414.

It appears that staff is proposing the elimination of these vehicles from the existing regulations, but I can find no reference to this in the Staff Report, nor can I find any reference to new standards for these small(<25 hp) vehicles/equipment.

My question is: What standards do staff intend the (as currently defined) *Specialty Vehicles under 25 horsepower* to be regulated to. (J.C. DeLaney Consulting)

Agency Response: The term "specialty vehicle" has essentially been deleted from the regulations. Engines used in "specialty vehicles" under 25 hp, once regulated under the OHRV rule, were incorporated with other spark-ignition equipment using engines under 25 hp in the small off-road engine (SORE) regulations at the March 1998 hearing. Engines used in "specialty vehicles" above 25 hp were incorporated under the LSI engine regulations and required to meet the standards and test procedures specified therein. "Specialty vehicles" were specifically discussed in the Staff Report on pages 1 and 56, and generally discussed throughout the Staff Report in the context of engines greater than 25 hp. The net result is that all engines previously regulated as "specialty vehicles" are now regulated under either these LSI engine regulations or the SORE regulations, depending on horsepower.

III. MODIFICATIONS TO THE ORIGINAL PROPOSAL - FIRST NOTICE OF MODIFIED TEXT

At the hearing, the Board approved the proposed sections 2430 through 2439, Title 13, CCR, and the associated test procedures, with some modifications to the originally proposed regulatory language. The following is a description of the modifications included in the first notice, by section number. Additional background and justification for these modifications is provided in the respective sections discussed in Part II, above.

REGULATIONS - LSI Engines

§2431 - Definitions

The definition of “compliance testing” was appropriately renamed "new engine compliance testing" and modified to provide manufacturers the ability to choose a qualified testing facility. This choice must be approved by the Executive Officer.

The definition of "emission durability period" was modified to more accurately define "emission durability period."

The definition of “small volume manufacturer” was added to clarify the use of small volume manufacturer within the regulation.

The definitions for "scheduled maintenance" and "unscheduled maintenance" were modified to match those provided in the test procedures language.

The definition of “useful life” was added to be consistent with the test procedures which already had the same definition for useful life.

§ 2433 - Exhaust Emission Standards and Test Procedures

Paragraph (b) was modified to reflect 2002 and subsequent model year (MY) standards of 9.0 g/bhp-hr (grams per horsepower-hour) HC plus NO_x and 410 g/bhp-hr CO with a durability demonstration of 1000 hours for LSI engines 1.0 liter and less. Text concerning engines over 1.0 liter was modified to reflect a 3.0 g/bhp-hr HC+NO_x and 37 g/bhp-hr CO emission standard with a durability demonstration of 3500 hours and a 4.0 g/bhp-hr HC+NO_x and 50 g/bhp-hr CO in-use compliance standard in 2004 through 2006. For the 2001, 2002, and 2003 model years, manufacturers may comply with the emission standards by phasing-in complying engines by the percentages 25/50/75, respectively. Provisions allowing small-volume manufacturers an exemption from the pre-2004 standards were also added to this section. The modified standards are shown in the table below.

Exhaust Emission Standards
(grams per brake horsepower-hour)
[grams per kilowatt-hour]⁽¹⁾

Model Year	Engine Displacement	Durability Period	Hydrocarbon plus Oxides of Nitrogen	Carbon Monoxide
2002 and subsequent	≤ 1.0 liter	1,000 hours or 2 years	9.0 [12.0]	410 [549]
2001 - 2003 ^{(2),(3)}	> 1.0 liter	N/A	3.0 [4.0]	37.0 [49.6]
2004 - 2006 ⁽⁴⁾	> 1.0 liter	3500 hours or 5 years	3.0 [4.0]	37.0 [49.6]
2007 and subsequent	> 1.0 liter	5000 hours or 7 years	3.0 [4.0]	37.0 [49.6]

- Note: (1) Standards in grams per kilowatt-hour are given only as a reference. Pollutant emissions reported to ARB by manufacturers must be in grams per brake horsepower-hour.
- (2) Small volume manufacturers are not required to comply with these emission standards.
- (3) Manufacturers must show that at least 25 percent of its California engine sales comply with the standards in 2001, 50 percent in 2002, and 75 percent in 2003.
- (4) The standards for in-use compliance for engine families certified to the standards in the row noted are 4.0 g/bhp-hr (5.4 g/kW-hr) hydrocarbon plus oxides of nitrogen and 50.0 g/bhp-hr (67.0 g/kW-hr) carbon monoxide, with a useful life of 5000 hours or 7 years. In-use averaging, banking, and trading credits may be generated for engines tested in compliance with these in-use compliance standards. If the in-use compliance level is above 3.0 but does not exceed 4.0 g/bhp-hr hydrocarbon plus oxides of nitrogen or is above 37.0 but does not exceed 50.0 g/bhp-hr carbon monoxide, and based on a review of information derived from a statistically valid and representative sample of engines, the Executive Officer determines that a substantial percentage of any class or category of such engines exhibits within the warranty periods noted in Section 2435, an identifiable, systematic defect in a component listed in that section, which causes a significant increase in emissions above those exhibited by engines free of such defects and of the same class or category and having the same period of use and hours, then the Executive Officer may invoke the enforcement authority under Section 2439, Title 13, California Code of regulations to require remedial action by the engine manufacturer. Such remedial action is limited to owner notification and repair or replacement of defective components, without regard to the requirements set forth in Section 2439(b)(5) or Section 2439(c)(5)(B)(vi). As used in the section, the term “defect” does not include failures that are the result of abuse, neglect, or improper maintenance.

Footnote 4 is lengthy, but it provides all necessary information regarding the emissions compliance for engines in the interim years only (2004 - 2006 model years). The Board approved an alternative in-use compliance program for LSI engines over 1.0 L similar to the existing on-road program. Thus, the language in footnote 4 is a copy of similar on-road language with changes appropriate to LSI engines. The

language provides manufacturers with reduced burden of compliance in the initial years of the in-use compliance program by allowing them to meet less stringent emission standards in-use. This is balanced by the provision that if defective emission related parts are identified during testing, the manufacturer is required to take remedial action, which is limited to owner notification and repair or replacement of defective components, without regard to the recall capture rate requirements set forth in Section 2439(b)(5) or Section 2439(c)(5)(B)(vi).

Paragraph (d) was modified such that engines 1.0 liter and less must meet the standards in paragraph (b) and the test procedures specified in the small off-road engine (SORE) regulations. This modification was made to ensure consistency with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing.

Paragraph (e), which allows the replacement engines, which are not certified to the emissions standards, to be produced to replace engines produced prior to 2004, was modified by the addition of an implementation date of 2004. This date was inadvertently left out of the originally proposed regulation language.

Paragraphs (e)(2)(B) and (C) were modified such that a description of the physical or performance characteristics of those models of non-certified replacement engines that indicate that a certified replacement is not available must be provided by the manufacturer of replacement engines at the conclusion of the model year, and not at the beginning. The same modification had been made in the SORE regulatory text. These modifications were made in response to industry concerns that the description of the characteristics could not be made prior to the beginning of the model year.

§2434 - Emission Control Labels

Paragraph (b) was modified to direct manufacturers to the California Code of Regulations, Title 13, Section 2404 for the applicable labeling specifications for 2002 and later model year off-road LSI engines with engine displacement less than or equal to 1.0 liter. This modification was made to ensure consistency with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing.

Paragraph (c)(3) was modified to allow for alternative identification methods or tracking numbers for engines and alternative means of attaching these methods of identification, and to require that the date an engine was manufactured be stamped on the engine block or a metal label riveted or permanently attached to the engine block. These modifications were made in response to industry concerns regarding the nature of tracking engines and to decrease the burden on industry.

Paragraphs (c)(5)(G) and (H) were modified such that the build date and durability period are no longer required on the engine tune-up label. Since this information is required to be on the engine, these modifications were made to decrease the burden on industry.

Paragraph (g) was modified by replacing “diesel fuel” with “gasoline”, which is more accurate within the context.

§2435 - Defects Warranty Requirements

Paragraph (a) was modified to direct manufacturers to the California Code of Regulations, Title 13, Section 2405 for the applicable warranty requirements for 2002 and later model year off-road LSI engines with engine displacement less than or equal to 1.0 liter. This modification was made to ensure consistency with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing.

Subsection (b) was modified to include changes in the required warranty period. For 2001 to 2003 MY, engines greater than 1.0 liter must be warranted for 2 years or 1500 hours. In 2004 and subsequent years, engines greater than 1.0 liter must be warranted for 3 years or 2500 hours, and high cost parts for these engines must be warranted for 5 years or 3500 hours. The regulation language and modifications are similar to the corresponding on-road text in Section 2037. These modifications were made in response to industry concerns regarding stringent warranty requirements and to decrease the burden on industry.

Paragraph (b)(4) was added such that in the absence of a device to measure hours of use, an engine must be warranted for a period of the years noted in paragraphs (b)(2) and (3). If a device to measure hours is used, the engine must be warranted for the number of hours or the number of years noted above in paragraphs (b)(2) and (3), whichever occurs first. This modification was made in response to industry concerns regarding equipment on which no hour meters are included.

Paragraphs (c)(1), (c)(2), and (c)(8) were modified to include a reference to paragraph (b)(3) of §2435 as a result of the changes made to §2435(b).

§2436 - Emission Control System Warranty Statement

Paragraph (a) was modified to specify that each manufacturer must furnish a copy of the warranty statement as set forth in the California Code of Regulations, Title 13, Section 2406(a) with each new off-road large spark-ignition engine with engine displacement less than or equal to 1.0 liter, using those portions of the statement applicable to the engine. This modification was made to ensure consistency with modifications to the original proposal which were present by staff, and approved by the Board, at the hearing. Paragraph (a) was also modified to allow manufacturers to display a range of years instead of only the current model year on warranty statements, therefore manufacturers may not need to print new warranty statements each year. This modification was made in response to industry concerns regarding the burden of generating new warranty statements with each model year and to decrease the burden on industry.

Paragraph (b) was modified to specify that commencing with the 2002 model year for large off-road large spark-ignition engines with engine displacement less than or equal to 1.0 liter, each manufacturer must furnish with each new engine a warranty statement as set forth in the California Code of Regulations, Title 13, Section 2406(b). This modification was made to ensure consistency with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing.

§2437 - New Engine Compliance and Production Line Testing (PLT)

The originally proposed regulation mailed out with the Staff Report inadvertently stated that new engine compliance testing started in 2004. The correct year for which new engine compliance testing begins, as was stated in the Staff Report, is 2001. Paragraph (a)(1) was modified to correct the typewritten error. The paragraph was also modified to specify that the applicable new engine compliance test procedures for 2002 and later model year large off-road spark-ignition engines with engine displacement less than or equal to 1.0 liter are set forth in the California Code of Regulations, Title 13, Section 2407. This modification was made to ensure consistency with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing.

Paragraphs (b) and (b)(1) were modified to correct an error in the year for which PLT is implemented. The year 2004 was corrected to 2001, as stated in the Staff Report. Paragraph (b)(1) was also modified to specify that the 2002 and subsequent model year off-road large spark-ignition engines with an engine displacement of less than or equal to 1.0 liter, that have been certified for sale in California, are subject to production line testing performed according to the requirements as set forth in the California Code of Regulations, Title 13, Section 2407. This modification was made to ensure consistency with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing.

Paragraph (b)(2)(A)(iii) was added to provide reduced PLT requirements beginning with the 2006 model year if a manufacturer can show that its PLT and in-use test results are consistent and comply with the emission standards. Manufacturers must annually request reduced testing. This modification was made to decrease a manufacturer's testing burden for engines which repeatedly comply with the emission standards.

Paragraph (b)(4)(K) was added to allow a one percent limit on PLT testing for small volume manufacturers. This modification was made to decrease a small volume manufacturer's testing burden.

Paragraph (f)(1) was modified by removing the word "family" such that this paragraph of the regulation will correctly correspond to §2437(c)(5).

§2438 - In-use testing program.

A new paragraph (a) was added to this section to make specific its applicability. As modified, the section will apply to new 2004 and later model year off-road large spark-ignition engines with engine displacement greater than 1.0 liter. This modification was made to ensure consistency with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing.

Paragraph (b), was modified, deleting inapplicable references to "production line" testing, and clarifying language.

Paragraph (b)(1) was modified to clarify that the ARB will identify during the production period which engine families will be subject to in-use testing.

Paragraphs (b)(3) and (b)(5) were modified to indicate that in-use engine procurement will occur between 0.50 and 1.0 of the certified engine's useful life period. The modification was made to broaden the range of engines available within the allowable time period. Also, the ARB will not require testing to begin within twelve months of notification, but instead will require only the submission of a plan by the manufacturer as to how engines will be procured for testing. These modifications were made to decrease a manufacturer's testing burden.

Paragraphs (b)(3)(A)-(C) were modified to correct all variations of "exceeds any standard", "fails any pollutant", and "fails any standard" such that they are identical and read, "fails any pollutant emission standard." Paragraph (b)(3)(B) was further modified to specify that the production numbers stated refer to national numbers.

For clarification, two paragraphs within subsection (b), regarding added testing and remedial action, were moved to the more appropriate subsections (c)(6) and (7).

Paragraph (b)(5) was modified to specify that testing shall be completed within 24 months from the date of the approval of the plan. This modification was made to allow manufacturers additional time to complete testing.

Paragraph (c)(2) was modified to allow repairs to be performed on in-use test engines with prior Executive Officer approval, thereby ensuring properly operating engines for testing.

Paragraph (c)(5) was modified to decrease a manufacturers testing burden by providing manufacturers with additional time to report failed engines. The manufacturer must report an emission test failure of a test engine within 72 hours after the completion of the test. The report must specify the emission results and identify the pollutant that failed to comply with the emission standard. The manufacturer must report all such reasons of noncompliance within fifteen business days of an engine family failure. Additional time beyond the initial fifteen days may only be granted if the manufacturer receives prior approval from the Executive Officer.

Paragraph (d)(1)(C) was modified to decrease a manufacturer's testing burden by allowing for alternate engine identification methods to be reported by the manufacturer when complying with the in-use testing program.

For clarity, what had been previously referred to as paragraph (d)(1) and (2), regarding the voluntary recall was moved to (c)(8) and (9).

For clarity, paragraph (e)(3)(G), the definition of "compliance level", was moved to (e)(3)(E).

Paragraph (e)(7) was modified to correct a typographical error. All references to a 1.2 liter cut point were changed to a 1.0 liter cut point. In accordance with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing, all references to the small LSI engines were also deleted.

§2439 - Procedures for In-Use Ordered Recalls

In accordance with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing, the title of this section was modified to specify that it include only those LSI engines with an engine displacement of greater than 1.0 liter and also to include voluntary recall protocol. The new title reads, "Procedures for In-Use Engine Recalls for Large Off-Road Spark-Ignition Engines with an Engine Displacement Greater Than 1.0 Liter."

Subsection (b) was added to clearly outline the voluntary recall protocol. It was fashioned after the existing on-road recall protocol and adjusted for LSI engines.

Subsection (c)(2)(A)-(C) was added to include language which clearly specifies methods by which a manufacturer may show that an emissions-related failure will not result in an exceedance of the emission standards.

Paragraph (c)(7)(B) was modified to clarify that the Executive Officer may require the manufacturer to use motor equipment registration lists, when available, to obtain the names and addresses of equipment or engine owners.

Paragraph (c)(13)(C) was modified to decrease a manufacturer's reporting burden, by providing manufacturers the option of submitting ordered recall progress reports in six quarterly reports, or two annual reports.

Paragraph (e) was added providing the Executive Officer the ability to waive any or all of the recall requirements if the Executive Officer determines that the requirement constitutes an unwarranted burden on the manufacturer without a

corresponding emission reduction. This modification aligns the recall protocol more closely with that of on-road.

REGULATIONS - Recreational Vehicles

The Board directed staff to modify the definition of all-terrain vehicle (ATV) within Title 13, Section 2411(a)(1) to remove the 600 pound unladen weight limit restriction. The result is that all ATV's, regardless of weight, are subject to the off-highway recreational vehicle (OHRV) regulation.

TEST PROCEDURES - LSI Engines

In addition to making the test procedures consistent with the above modifications of the regulatory language, staff has made other modifications to clarify and simplify the test procedures. The following is a description of the modifications, by Section number.

Part I, 2 - Definitions

The definitions for "alternate fuel", "ARB Enforcement Officer", "basic engine", "compliance testing", "deterioration factor", "emission durability period", "engine family", "off-road large spark-ignition engines", "scheduled maintenance", "Test Procedures", and "unscheduled maintenance" were added or modified to match those provided in the regulation language.

The definition of "useful life" was modified, making the useful life for engines equal to or less than 1.0 liter 2 years or 1000 hours, whichever occurs first. This modification was made to ensure consistency with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing.

Part I, 3 - Abbreviations

Missing subscripts and symbols were added to several abbreviations.

Part I, 7 - Emission Standards for 2001 and Later Model Year Off-Road Large Spark-Ignition Engines

Paragraph (a) was modified to be consistent with the changes made to Section 2433, Title 13, of the CCR.

Part I, 9 - Approval of Application for Certification; Test Fleet Selections; Determinations of Parameters Subject to Adjustment for Certification and New Engine Compliance Testing, Adequacy of Limits, and Physically Adjustable Ranges

Paragraph (d)(2)(D) was modified to clarify the existing language.

Part I, 11 - Test Engines

Paragraph (a)(5) was added to clarify that engines identical in all the respects under the definition of engine family given in paragraph (a)(2) of this section, but which use differing fuels, may be certified as one engine family, provided the engine family be certified using the fuel that would yield the worst-case emission scenario. This modification reduces a manufacturer's testing burden.

Paragraph (d) was modified and subsections were rearranged to revise the method for determining emission deterioration factors (DF). The revised paragraph allows manufacturers to provide their own DF's using good engineering practice. The manufacturers must submit a plan for determining DF's and have it approved, by the Executive Officer, prior to certification. The paragraph was also modified to allow an engine manufacturer the ability to request a reduction in the total amount of service accumulation hours for any durability/service accumulation engine to one half of the engine's defined useful life period. This modification reduces a manufacturer's testing burden.

Part I, 12 - Maintenance

Paragraph (d) was modified to clarify that maintenance performed on engines used to determine the deterioration factors must be consistent with the maintenance requirements, thereby ensuring emission results representative of in-use engines.

Part I, 13 - Service Accumulation; Emission Measurements

Paragraph (a)(2) was modified to clarify that a manufacturer shall determine, for each engine family or group of engine families, the number of hours that the engine-system is stabilized for emission-data testing.

Part I, 16 - Certification

Paragraph (a)(3) was modified to clarify that if the Executive Officer determines that a test engine meets the requirements of the certification procedures, then an Executive Order will be issued for each engine family within the group, not for engine family groups.

Paragraph (b)(1)(ii) was modified to clarify the specifications of an emission data test engine.

Part I, 18 - Changes to an Engine Covered by Certification

Paragraph (a) was modified to clarify that the correct references in the paragraph should be 11(a)(1) through 11(a)(4).

Part I, 20 - Submission of Engine Identification Numbers

Paragraph (a) was modified to decrease manufacturer burden by allowing manufacturers to report using alternative identification methods to engine identification numbers.

Part I, 21 - Production Engines

This paragraph was modified to remove the term “heavy-duty” which did not belong in the context.

Part II - International Standards Organization (ISO) 8178, RIC Engines - Exhaust emission measurement - Part 4: Test cycles for different engine applications

ISO 8178, 8.7 was modified to ensure consistency with modifications to the original proposal which were presented by staff, and approved by the Board, at the hearing.

TEST PROCEDURES - Recreational Vehicles

In the Test Procedures for OHRV the definition for "All-Terrain Vehicle" was modified to be consistent with the approved changes to section OHRV regulations 2411(a)(1), as noted above.

Staff made several other non-substantial modifications throughout the regulations and test procedures to correct grammatical and typographical errors, correct references and citations, and improve the clarity of the regulations and test procedures.

IV. SUMMARY OF COMMENTS AND AGENCY RESPONSE - FIRST NOTICE OF MODIFIED TEXT

Written comments on the first Notice of Modified Text were submitted by the Engine Manufacturers Association (EMA), and the Industrial Truck Association (ITA).

Set forth below is a summary of each objection or recommendation made regarding the specific regulatory actions proposed, together with an explanation of how the proposed action was changed to accommodate each objection or recommendation, or the reasons for making no change. The comments have been grouped by topic whenever possible. Comments not involving objections or recommendations specifically directed toward the modifications made or to the procedures followed by the ARB in this first Notice of Modified Text are not summarized below.

A. Definitions

139. **Comment:** In §2431(a)(32), the definition for "scheduled maintenance", the words "affecting emissions" should be placed after the words "equipment or engine components or systems" to properly reflect the limitations of this *emissions* regulation. A similar change should be made to §2431(a)(37), which defines "Unscheduled Maintenance." There may be other instances where this limitation is necessary. (ITA)

Agency Response: The definitions simply describe what is considered maintenance of a component on an engine or equipment. The two definitions distinguish between maintenance that occurs as a scheduled item, such as oil or spark plug change, and maintenance that occurs as an unscheduled item, such as when the engine or a component is not operating properly and requires some action. The Test Procedures use the definitions when describing the requirements for performing maintenance and documenting such maintenance for all components. The Test Procedures impose requirements on both emission and non-emission related components because maintenance on either could alter engine performance and emission characteristics.

140. **Comment:** With regards to §2431(a)(33) and the use of the word "manufacturer"; it is unclear whether the word "Manufacturer" in "Small Volume Manufacturer" refers to the "Engine Manufacturer" as defined in §2431(a)(16). In other words, could a company whose traditional business is manufacturing forklifts, and who is an "Equipment Manufacturer" for most of the engines it places in its forklifts, but who is also the "Engine Manufacturer" (because it holds the certification) for a small number of certified engines that it places in its California forklifts, qualify for treatment as a "Small Volume Manufacturer"? (ITA)

Agency Response: The small-volume provisions included in the regulation were intended to provide flexibility for small businesses. However, small volume is based on the number of engines for which the manufacturer will bear the responsibility of certification and compliance. Therefore, to use the example suggested by ITA, a manufacturer who is an equipment manufacturer, but is also an engine manufacturer certifying for sale less than 2000 engines annually in the United States, could be classified as, and therefore entitled to the provisions set forth in these regulations, a small-volume manufacturer. The definition of "small-volume manufacturer" was modified in the second notice of modified text to clarify this as a result of ITA's comment.

141. **Comment:** In general, CARB needs to examine each instance in which the regulation uses the word "manufacturer" to determine to whom it refers: the "Engine Manufacturer" as defined, the "Equipment manufacturer" as defined, a company that actually manufactures engines, a company that actually purchases engines, or something else. (ITA)

Agency Response: Because the commenter appears to be making a general statement about the regulation rather than a statement directed at specific proposed modified

text, staff does not believe that this comment is within the scope of the notice of modified text. However, staff believes that throughout the regulations the regulated entity (engine manufacturer or equipment manufacturer) is clear from the context. The regulations are focused on the compliance of engines to the regulations and the manufacturer who is granted the Executive Order. If the regulations are referring to a manufacturer other than the manufacturer who is granted the Executive Order, this is specifically stated and is clear from the context.

142. **Comment:** With regards to §2431(a)(38), the definition of "useful life"; this is a new regulatory definition (although a modification of it has apparently been in the test procedures.) ITA believes CARB should strike the last sentence of the definition, which reads as follows: "However, in no case may this period be less than the manufacturer's basic mechanical warranty period for the engine family." There is no reason to link commercial warranties with regulatory warranties, or to penalize manufacturers who might choose to offer longer mechanical warranties. CARB has already imposed very taxing emissions warranty requirements and should not reach for more with this requirement. (ITA)

Agency Response: The definition for "useful life" was included in the test procedures as proposed in the Staff Report, and approved by the Board. A copy of the definition was added to the regulations (section 2431) in the notice of modified text only to be consistent with the test procedures. The Board also approved decreasing in the useful life time period for engines with a displacement of 1.0 liter or less, and deleting the reference to defect warranty. The modifications effect both the Board approved test procedures and Board approved modifications to the regulatory text. Staff believes that warranties for emission related parts should be at least comparable to the manufacturers warranty for other parts because if a manufacturer is going to advertise and establish an engine as having a mechanical warranty period longer than the regulatory useful life, then the warranties should be offered as an entire package.

B. Labeling

143. **Comment:** Material Required for Tune-up Label (Section 2434(c)(1)) Under the current ARB provisions, engine manufacturers are required to use a metal tune-up label. However, many manufacturers have been (for years) using plastic. EMA would like the option of using either a plastic or a metal tune-up label. The underscored text denotes the recommended change to Section 2434(c)(1):

“(1) A plastic or metal tune-up label must be welded, riveted or otherwise permanently attached to the engine block or other major component in such a way that it will be readily visible after installation of the engine in the equipment. If the equipment obscures the label on the engine, the equipment manufacturer must attach a supplemental label such that it is readily visible.”

Such an addition would be in keeping with the current practice of most engine manufacturers and would be identical to what is required by ARB for Small Off-Road Engines (SORE).

(EMA)

144. **Comment:** ITA members also use primarily plastic labels and would also like to retain that option. (ITA)

Agency Response: Staff made modifications within the second notice of modified text as a result of EMA's and ITA's comments #143 and #144 above. The subsection now specifies that the label must be made of a permanent material, but does not specify that it must be of metal.

C. Warranty

145. **Comment:** With regards to §2435(b)(3)(D); there appears to be no reason for this requirement to document the identification of “high-priced” warranty parts. Because these parts carry a longer warranty than other parts, manufacturers will have no incentive to over-identify high-priced warranty parts. The requirement to document parts costs, labor rates and labor hours thus adds a burden with no corresponding benefit. (ITA)

Agency Response: The identification process for high priced parts must be documented not only to insure that parts are properly included in the high priced parts list, but also that parts were properly excluded. Requiring manufacturers to document this identification process allows ARB to make this determination, should it be necessary.

146. **Comment:** With regards to §2435(c)(1), (c)(2); in the third lines of (c)(1) and (c)(2), the references to “(b)(2) and (b)(3)” should be “(b)(2) or (b)(3).” (ITA)

Agency Response: Although paragraph (b)(3) refers to high-cost parts, while (b)(2) refers to general parts, both paragraphs concern the warranty period for emissions related parts. Therefore, "and" is correct.

147. **Comment:** Engine Manufacturer’s Option to Deny a Warranty Claim (Section 2435(c)(10)). The first sentence in Section 2435(c)(10) states that add-on or modified parts may not be used. EMA is in agreement with this requirement. The second sentence in Section 2435(c)(10) states that: “Such use must be grounds for disallowing a warranty claim made in accordance with this article.”

EMA manufacturers would like the option of either allowing or denying a warranty claim in such instances, and thus recommends that the “must” in the sentence above be changed to “may.”

(EMA)

148. **Comment:** ITA agrees (see EMA comment above) that the manufacturer should not be required, but only permitted, to deny a warranty claim under these circumstances. (ITA)

Agency Response: It was not staff's intent to force manufacturers to deny warranty in cases where add-on or modified parts were used, if the manufacturer chooses to honor the warranty as a "good will" gesture. Therefore, staff made modifications within the second notice of modified text as a result of EMA's and ITA's comments #147 and #148 above, stating that denying the warranty in such cases as mentioned, is at the discretion of the engine manufacturer.

149. **Comment:** Emission Control System Warranty Statement (Section 2436(a)). Under the heading of "Owner's Warranty Responsibilities," the regulation requires engine manufacturers to include the following sentence in the warranty statement:

"Your engine is designed to operate on (**specific fuel**) only. Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements."

EMA is not sure how the above sentence should be interpreted. Many LSI engine families will have more than one fuel type. EMA suggests that the sentence be modified as follows:

"Your engine is designed to operate on (**specific fuel(s) only, (or subject to prior approval by the Executive Officer, additional language that further explains fuel usage)**). Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements."

Such a change would allow for a proper explanation in cases where the engine is designed to run on more than one fuel type, as in the case of dual-fueled forklifts.

150. **Comment:** With regards to EMA's comment above, ITA had assumed that the existing language would be interpreted to yield this result that EMA seeks, but agrees that rewording is a good idea. (ITA)

Agency Response: Staff agreed with the intention of EMA's suggestion that engines may be certified using dual fuels. Therefore, staff modified this subsection within the second notice of modified text, replacing "(specific fuel)" with "(specific fuel(s))."

D. In-Use Testing

151. **Comment:** With regards to §2438(b)(3); the language erroneously states that the in-use engines must be submitted to the Executive Officer. In ITA's understanding, all that is intended is that an *identification* of the engines be submitted to the Executive Officer. (ITA)

Agency Response: Staff modified this paragraph in the second notice of modified text in response to ITA's comment. Staff intended that manufacturers provide a list and description of the engines, not the actual engines.

152. **Comment:** With regards to §2438(b)(3)(C); this provision, concerning the number of in-use tests for carryover engine families, is unclear. Specifically, if the one engine initially required to be tested fails, it is unclear whether an additional four or six engines must be tested under subsection (b)(3)(A) and whether an additional two or four engines must be tested under subsection (b)(3)(B). (ITA)

Agency Response: Staff believes the language is clear. If the manufacturer is testing a carry-over engine then the manufacturer can elect to test only one engine. However, if that engine fails, the manufacturer must utilize the in-test method as specified in subsection (b)(3)(A) or, for small-volume manufactures or small engine families, subsection (b)(3)(B). Therefore the manufacturer must test four engines, or two engines if the family or manufacturer fit the criteria for small engine family sized or small volume manufacturer, respectively.

153. **Comment:** With regards to §2438(c)(5); since the manufacturer already has to specify “the emission results,” the requirement of “identifying the pollutant which failed to comply with the emission standard” is redundant. (ITA)

Agency Response: Staff disagrees. Staff requests that the manufacturer include the identification of the pollutant which failed to comply with the emission standard within the emission results because it provides staff with the assurance that the manufacturer acknowledges and understands the results.

154. **Comment:** With regards to §2438(c)(6); the phrase “At the discretion of the Executive Officer” should be stricken as an unnecessary step. The manufacturer should have the option of testing additional engines or conceding failure before testing reaches the tenth engine. At a minimum, some boundaries should be placed on the Executive Officer’s discretion, to prevent the possibility of arbitrary or unfair treatment. (ITA)

Agency Response: The text of this portion of the subsection was the Board approved regulatory text, verbatim. Within the first notice of modified text, the text was only moved from another area of the regulation, and renumbered, for clarity. While staff would have responded to a comment related solely to the new positioning, this comment is outside the scope of the notice of modified text. Regardless, the determination of compliance/noncompliance is based on the manufacturer testing up to ten engines. It is necessary for the Executive Officer to have the authority to require a manufacturer to test up to ten engines before conceding failure in circumstances such as where the Executive Officer requires the extra data to determine the extent of the engine failure, or the extra data is necessary to determine whether or not potential problems exist with other engine families. It is also necessary for the Executive Officer to possess discretion in allowing a manufacturer to test more than ten engines in order for the Executive Officer to control the uniformity of manufacturer submitted

test data, for comparison, and to provide the opportunity for the Executive Officer to make sure that the manufacturers fully understand that the ARB is not forcing the burden on manufacturers to test more than ten engines. Manufacturers may, at any time, test more than ten engines, at their own free will, without requiring the approval of the Executive Officer. However, these engines cannot be included in the data set submitted to ARB.

155. **Comment:** SAE test procedure to be used to define power (Section 2438(e)(7)(A)). As currently written, the LSI regulation states that the power of each engine configuration should be the rated output as determined by SAE J1228. ARB has already acknowledged that SAE J1228 is not a suitable test procedure for LSI engines. In an ARB e-mail communication dated June 25, 1999, ARB stated that “SAE J1228” would be changed to state “SAE J1349 or J1995.” Although agreed to in previous conversations (and, as mentioned, written communications), the above change still needs to be inserted in Section 2438(3)(7)(A). (EMA)

156. **Comment:** With regards to EMA's comment above, ITA agrees that this oversight needs to be corrected. (ITA)

Agency Response: Staff modified this subsection within the second notice of modified text in response to EMA's comment.

E. Recall

157. **Comment:** With regards to §2438(c)(7); the discretion given to the Executive Officer to order a recall is far too broad. References to “among other factors” and “any other information” essentially give the Executive Officer unfettered discretion to order recalls, even when testing is successful, and even when (apparently) testing has not even taken place. The liberal standard requiring only the subjective belief that a component failure “may result” in the failure to meet applicable standards makes matters even worse. The language also leaves no room for correcting failures through the use of credits, and thus appears to conflict with the provisions for averaging, banking and trading set forth in §2438(e). Although subparagraph (7) uses the broader term “remedial action” at the outset, the next long sentence (which constitutes the remainder of the subparagraph) describes the Executive Officer’s authority to “order a recall,” with no further mention of any other form of remedial action. Although current CARB staff may believe that the use of credits to remedy noncompliance is a form of “recall,” this is so far from the ordinary meaning of the word that it must be corrected in order to provide industry and CARB staff minimal clarity in the future.

ITA believes that a more appropriate approach is the one taken in note 4 of §2433(b), where the Executive Officer must base any recall decision on “a statistically valid and representative sample of engines” and must find that a “substantial percentage” of the engines in a class or category has “an identifiable, systematic defect in a component” which causes a “significant increase in emissions.” As the wording of §2438(c)(7)

now stands, every noncompliance or suspected future noncompliance justifies a recall if the Executive Officer says so. This is extremely harsh. (ITA)

Agency Response: Staff disagrees that the Executive Officer has unlimited discretion to order a recall. Actually, the Executive Officer is limited to order a recall under two situations during in-use compliance testing; 1) substantial number of engines have a failed component which may result in the emissions of the engine to fail the standards during its useful life, or 2) the average emissions level of the engines tested exceeds the standards or other certification requirements. The Executive Officer is also provided the opportunity to review other test data to assist in determining whether to order remedial action.

The average, banking, and trading program is designed to allow manufacturers, who decide to use voluntary recall protocol, a method by which to remedy the non-conformity, without actually recalling engines. It is clear that the use of the credit program is a viable alternative to remedy a noncompliance of engines subject to recall. Retaining the credit remedy within the voluntary recall section remains necessary to ensure that all engines which fail to comply with the emission standards in-use, and are therefore subject to being recalled, are initially treated the same.

158. **Comment:** With regards to §2439, structure and references to “Recall”; first, the word “Recalls” should be changed to “Remedial Action” in the heading. As is clear from §2439(b)(1)(B)(ii), the section deals not only with recalls, but also with the use of credits to remedy cases of in-use noncompliance. The same problem appears in various other parts of §2439, rendering the provisions simply inaccurate. Thus, §2439(b), headed “Voluntary Emissions Recall” and dealing with recall plans, is also completely inconsistent with §2439(b)(1)(B)(ii), because that provision deals with the *alternative* to recall. As ITA has stated repeatedly, it makes no sense to require a “recall plan” when there will be no recall.

ITA appreciates staff’s most recent effort to modify §2439 to clarify that the use of credits is *in lieu of* a recall. Hence, the section now separates subsection (b)(1)(A) from subsection (b)(1)(B) and uses the word “or” to denote alternative types of remedial action. However, subsection (b)(1)(B)(i) still refers erroneously to “engines to be recalled,” even though subsection (b)(1)(B)(ii) explains immediately thereafter that the nonconformity will be remedied through the use of credits, *without* a recall. Overall, CARB needs to restructure §2439 in order to separate these two types of remedial action: (1) recalls and (2) the use of emission credits.

One outcome of doing so will be necessary clarification of §2439(b)(2), which is headed “Voluntary Recall Progress Report.” Since the use of credits to remedy nonconformance is not a “recall” in any normal sense of the word, one would ordinarily think that §2439(b)(2) would have no application in cases where the use of credits, instead of a recall, was the chosen remedial action. Given the confusion that arises from the loose usage of “recall” throughout §2439(b)(1), however, it will be unclear to the neutral reader what is intended by §2439(b)(2). Moreover, although CARB staff stated in recent discussions that changes would be made to clarify that

subsections §2439(b)(2)(A)-(L) do not apply in the case where credits are the remedial measure, such changes were apparently not made. This leaves the matter in doubt. Restructuring the section to separate the credit-oriented remedial action from the recall-oriented remedial action should also leave no doubt that recall plans are limited to recalls. (ITA)

Agency Response: As noted in the comment, manufacturers using the voluntary recall program have two "alternative types of remedial action." That is, they may repair the engines, or use the emission credit program to remedy the noncompliance. To clarify the language, staff modified text in section 2439. However, the placement of credit use within the recall section remains necessary to ensure that all engines which fail to comply with the emission standards in-use, and are therefore subject to being recalled, are initially treated the same.

159. **Comment:** In the short time available to it, ITA has attempted to point out some of the more troublesome problems in this draft regulation and to identify a few drafting errors that appear on a hurried reading of these long technical documents. While we hope that CARB will address the issues we have raised, we also believe that the regulation needs a painstaking line-by-line review to ensure that it is internally consistent and coherent throughout. We urge CARB to devote resources to that end. (ITA)

Agency Response: Staff believes the regulations are internally consistent and coherent throughout, but will consider making nonsubstantial changes that either staff discovers or are brought to staff's attention.

F. Miscellaneous

160. **Comment:** Applicability (Section 1(a)). In the LSI regulations, ARB has done a nice job in denoting which sections apply to which engines (i.e. LSI engines with displacement greater than 1.0 liter or LSI engines with displacement less than or equal to 1.0 liter). EMA recommends that the same type of clarity be provided in the test procedures.

This could be accomplished by adding the underscored text to Section 1(a) of the test procedures:

“(a) These provisions apply to new off-road large spark-ignition engines with displacement greater than 1.0 liter, produced on or after January 1, 2001.”
(EMA)

161. **Comment:** ITA agrees with EMA's comment above.

Agency Response: Staff modified this subsection within the second notice of modified text in response to EMA's comment, incorporating the suggested language.

162. **Comment:** With regards to §2433(b), note 4; the words “pursuant to owner request” should be added after the word “components” in the next-to-last sentence, as follows “Such remedial action is limited to owner notification and repair or replacement of defective components pursuant to owner request . . .” The purpose of this addition would be only to clarify CARB’s intended meaning. Although the remainder of the sentence clarifies that no recall “capture rate” is required to be met, the requested clarification would still be helpful. (ITA)

Agency Response: Staff believes that the manufacturer's obligation is clear from the current language. A change such as that suggested by the commenter would make it unclear as to what would specify an "owner's request", e.g. oral, written, etc. The commenter's additional language would also place an undue burden on the consumer to make such a request.

163. **Comment:** The following changes should be made: §9(d)(1)(iii) - At the end of the second line, the reference “(d)(1)(ii)” should be “(d)(1)(i).”; §9(d)(2)(i)(A) - The word “for” in the next-to-last line was erroneously stricken; §9(d)(2)(i)(D) - In the last line, the word “costing” should be “costs.”; §11(a)(5) - In the last line, the word “be” should be “is.”; §11(d)(2)(iii) - In the third line, “engine’s” should be “engines.” In the fourth line, the word “with” should be stricken. In the next-to-last line, the phrase should be “the engine’s durability . . .” (ITA)

Agency Response: Staff made modifications within the second notice of modified text as a result of ITA's comments above (comment #163).

164. **Comment:** “Useful Life” versus “Emissions Durability Period” (Section 11(d)(1)). The second sentence in this section states: “The duration of the engine durability demonstration shall be equivalent to the useful life hour period as defined in these Test Procedures.”

EMA believes that this sentence should read, “The duration of the engine durability demonstration shall be equivalent to the emissions durability ~~useful life hour~~ period as defined in these Test Procedures.”

“Emissions Durability,” was recently modified by ARB. As currently defined, (in both Section 2430(12) of the LSI regulations and Section 2 of the test procedures) it is, “the period over which, for purposes of certification, a manufacturer must demonstrate compliance with the standards set forth in Section 2433(b), Title 13, of the California Code of Regulations. The durability period is used to determine an engine family’s deterioration factors.

“Useful life” is a term that was recently added by ARB. It is defined in Section 2430(38) of the LSI regulations and Section 2 of the test procedures as, “a period of 7 years or 5000 hours of operation, whichever first occurs for engines having engine displacement greater than 1.0-liter, and 2 years or 1,000 hours of operation, whichever occurs first, for engines having engine displacement equal to or less than 1.0-liter...”.

The current use of “useful life hour” instead of “emissions durability” in the second sentence of Section 11(d)(1) completely negates the understanding EMA had with ARB during the October 22, 1998 Public Hearing. Most likely, the misunderstanding stems from an error in term usage and not from a misunderstanding on how the rule should be applied. In fact, the durability periods referred to in Section 2433(b) of the regulations and Section (7)(a)(1) of the test procedures, in addition to many past conversations with ARB, indicate that ARB meant “emissions durability period.” (EMA)

165. **Comment:** ITA agrees with EMA's comment above. This would appear to be especially important for the larger LSI engines, which have different periods for the certification durability demonstration versus the in-use compliance requirement until 2004. (ITA)

Agency Response: Staff modified section 11(d)(1) of the Test Procedures within the second notice of modified text in response to EMA's comment, replacing "useful life hour" with "emissions durability".

166. **Comment:** Useful Life” versus “Emissions Durability Period” (Section 11(d)(2)(iii)). For the same reasons provided above (see comment #164 above), EMA believes that the use of “useful life period” in the second to the last sentence of Section 11(d)(iii) should be changed to “emissions durability period.” (EMA)

167. **Comment:** ITA agrees with EMA's comment above. (ITA)

Agency Response: Staff does not agree with EMA's comment. Although staff proposed at the October 1998 hearing, and the Board approved, less stringent durability demonstration period requirements for the first three years of Tier 2, staff still requires that manufacturers test engines to at least 50% of their useful life period.

168. **Comment:** Footnote 3 of section 2433 (b) states: "Manufacturers must show that at least 25% of its California engine sales comply with the standards in 2001, 50% in 2002, and 75% in 2003." ITA assumes that the reference to "manufacturers" means "Engine Manufacturer," which is defined in section 2431 (a) (16) as "the manufacturer granted certification." This definition, however, leaves open the question of who is the manufacturer of an engine which is not granted certification, of which there will be many during the period 2001-04. Put differently, it leaves open the question of how sales of uncertified engines are allocated in applying the percentage requirement.

In contemplating this issue, CARB should realize that some ITA members may choose to be the "Engine Manufacturer" for the certified engines they place into forklifts destined for California, while other ITA members may arrange for the manufacturer of the engine block to hold the certificate and be the "Engine Manufacturer." This implies that the percentage limitations will apply sometimes to the ITA member and sometimes to the manufacturer of the engine block. CARB needs to ensure that its method of assigning the uncertified engines to a party for purposes of applying the percentage limitations results in a rational system for ensuring that the "percentage-of-

sales" rules yield the correct result in the overall California market, that no double counting occurs, and that every manufacturer is treated fairly.

If CARB has such a system in mind, it does not appear in the regulations. The starting point would seem to be a definition of "engine manufacturer" for uncertified engines. Without such a definition, any number of possible interpretation is possible and there is no assurance that the program will yield the intended result. (ITA)

Agency Response: Section 2430, the general applicability section of the regulations, paragraph (a)(2) states, "Every new off-road large spark-ignition (LSI) engine that is manufactured for sale, sold, or offered for sale in California, or that is introduced, delivered or imported into California for introduction into commerce and that is subject to any of the standards prescribed in this article and documents incorporated by reference therein, must be certified for use and sale by the manufacturer through the Air Resources Board and covered by an Executive Order, issued pursuant to Chapter 9, Article 4.5, Section 2433." Therefore, all engines that are subject to these regulations, are required to be certified. As a result, there will not be "uncertified engines" legally sold or offered for sale in California, even during the Tier 1 phase-in. Therefore, the addition of a definition of "engine manufacturer" for "uncertified engines" is not necessary.

Staff believes the commenter is confusing the term "uncertified engines" with engines which, as a result of the phase-in during Tier 1, may be certified, but certified as noncompliant with the emission standards in section 2433 (b). Since all engines will be certified either compliant or noncompliant, ARB will have "engine manufacturers" (i.e. manufacturers granted certification) of record for every engine, and thus a method of applying the percentages incorporated in the phase-in, without the possibility of double counting.

V. MODIFICATIONS TO THE ORIGINAL PROPOSAL - SECOND NOTICE OF MODIFIED TEXT

At the hearing, the Board approved the proposed sections 2430 through 2439, Title 13, CCR, and the associated test procedures, with some modifications to the originally proposed regulatory language. The modified language was sent out for public comment July 27, 1998, as Mail-Out MSC 99-19. The staff issued a second notice with further modifications and clarifications to address the concerns noted in comments received regarding Mail-Out MSC 99-19. The following is a description of the modifications included in the second notice, by section number. Additional background and justification for these modifications is provided in the respective section discussed in Part IV, above.

REGULATIONS - LSI ENGINES

§ 2431 - Definitions

The definition of "small volume manufacturer" was modified to clarify that the definition pertains to engine manufacturers.

§ 2433 - Exhaust Emission Standards and Test Procedures - Off-Road Large Spark-Ignition Engines

The originally proposed regulations mailed out with the Staff Report (MSC 98-20) and also included in the first 15-day Notice of Modified Text (Mail-Out MSC 99-19) inadvertently stated that the crankcase emission restriction stated in paragraph (b)(2) began in 2004. The correct year, as was stated in the Staff Report, is 2001. Paragraph (b)(2) was modified to correct the typewritten error.

§ 2434 - Emission Control Labels - 2001 and Later Off-Road Large Spark-ignition Engines

To decrease the burden on manufacturers, paragraph (c)(1) was modified to specify that tune up labels need not necessarily be made of metal, but must be made of a permanent material.

§ 2435 - Defects Warranty Requirements for 2001 and Later Off-Road Large Spark-ignition Engines

Section (c)(10) was modified to clarify that manufacturers have the option of either allowing or denying a warranty claim in instances where add-on or modified emissions-related parts are present.

§ 2436 - Emission Control System Warranty Statement

To decrease the burden on manufacturers, the warranty statement requirement, paragraph (a), was modified to allow manufacturers to specify more than one fuel in cases where the engine is designed and certified to run on more than one fuel type.

§ 2438 - In-Use Compliance Program

Staff added language to paragraph (b)(3) to clarify that manufacturers are required to submit the identification of test engines, and not the engines themselves, to the Executive Officer prior to the onset of in-use testing.

Staff corrected the units of power and the test procedure to be used in the determination of power in paragraph (e)(7)(A). The correctly cited procedures are more applicable to the type of operation of large spark-ignition engines.

§ 2439 - Procedures for In-Use Engine Recalls for Large Off-Road Spark-Ignition Engines with an Engine Displacement Greater Than 1.0 Liter

Paragraph (b)(1)(B)(i) was modified to clarify that if a manufacturer uses the in-use emissions credit, averaging, banking, and trading program to remedy a

nonconformity, the manufacturer shall provide the description of engines that would otherwise be subject to the recall.

Paragraph (b)(2) was modified to clarify that a manufacturer who uses the in-use emissions credit, averaging, banking, and trading program to remedy a nonconformity during a voluntary recall campaign is not subject to the reporting requirements of this paragraph.

Paragraphs (b) of Section 2434, (b) of Section 2435, (a) of Section 2436, and (a)(1) and (b)(1) of Section 2437 were modified to clarify that these sections apply to engines with a displacement of greater than 1.0 liter and which are certified to comply with the emission standards noted in Section 2433(b). This language clarifies that the engines granted Executive Orders showing they are in compliance with the Section 2433(b) emission standards pursuant to the 2001 -2003 model year phase-in are subject to the enforcement provisions (label, warranty, and compliance and production line testing). Those engines granted Executive Orders showing they are not in compliance with the Section 2433(b) emission standards but are legal for sale in California, pursuant to the phase-in, are not subject to these enforcement provisions.

TEST PROCEDURES - LSI ENGINES

§ 1 - General Applicability

The staff added language to paragraph (a) to clarify that the test procedures apply to only new off-road large spark-ignition engines with a displacement greater than 1.0 liter, produced on or after January 1, 2001. As a result, staff added paragraph (d) which states that large spark-ignition engines with a displacement of 1.0 liter or less are required to use the test procedures for small off-road engines.

§ 2 - Definitions

The definition of "small volume manufacturer" provided in the regulations, was added to the section for consistency.

§ 7 - Emission Standards for 2001 and Later Model Year Off-Road Large Spark-Ignition Engines.

The originally proposed test procedures mailed out with the Staff Report (MSC 98-20) and also included in the first 15-day Notice of Modified Text (Mail-Out MSC 99-19) inadvertently stated that the crankcase emission restriction stated in paragraph (c) began in 2004. The correct year, as was stated in the Staff Report, is 2001. Paragraph (c) was modified to correct the typewritten error.

§ 9 - Approval of Application for Certification; Test Fleet Selections; Determinations of Parameters Subject to Adjustment for Certification and New Engine Compliance Testing, Adequacy of Limits, and Physically Adjustable Ranges.

The staff corrected an incorrect reference in paragraph (d)(1)(iii).

The staff corrected grammatical errors in paragraphs (d)(2)(i)(A) and (d)(2)(i)(D).

§ 11 - Test engines

The staff corrected grammatical errors in paragraphs (a)(5) and (d)(2)(iii).

Due to the time period difference between "durability period" and "useful life" which now exists during the years 2004 through 2006 as a result of modifications presented by staff, and approved by the Board, at the hearing, paragraph (d)(1) was modified to clarify that, in generating deterioration factors, manufacturers must demonstrate durability to the emissions durability period, and not the useful life period. This modification reduces the manufacturer's testing burden, as intended.

VI. SUMMARY OF COMMENTS AND AGENCY RESPONSE - SECOND NOTICE OF MODIFIED TEXT

Written comments on the second Notice of Modified Text were submitted by the Industrial Truck Association (ITA).

Set forth below is a summary of each objection or recommendation made regarding the specific regulatory actions proposed, together with an explanation of how the proposed action was changed to accommodate each objection or recommendation, or the reasons for making no change. The comments have been grouped by topic whenever possible. Comments not involving objections or recommendations specifically directed toward the modifications made or to the procedures followed by the ARB in this second Notice of Modified Text are not summarized below.

A. Terms

169. **Comment:** The issue of how CARB will interpret the 2001 - 2004 phase-in provisions is especially important. Since it is clear to ITA that the LSI regulation's definition of "Engine Manufacturer" is inadequate to explain how the phase-in requirements will be implemented, and based upon telephone discussions with staff, ITA can only assume that staff has not yet determined how the requirements will be interpreted and intends to devise the implementation scheme after the regulation is finalized. ITA does not believe that this approach is appropriate, but is willing to work with staff to ensure a rational and fair system that provides the intended benefit to the industry.

It is important, however, that the issues be addressed as soon as possible. ITA's concern, as suggested in our earlier comments, is that the complexities of the manufacturing and certification arrangements among ITA members, engine-block

suppliers, and other parties leave significant questions regarding the respective obligations of these various industry members to meet the phase-in requirements.

As we have stated, the central omission in the LSI regulation seems to be the absence of any specification of who is the "manufacturer" of uncertified engines. The regulation states that the manufacturer of a certified engine is the certificate holder, but the regulation never states who will be considered the "manufacturer" of the uncertified engines that are sold in California. Since the percentage phase-in requirements apply to the total number of California engine sales made by the "manufacturer," it is imperative to know which sales will be attributed to which "manufacturer."

ITA offers three realistic but contrasting examples to illustrate the need for clarity. In the first example, assume that an engine block manufacturer sells engine blocks to a forklift manufacturer, who completes the engines, places them into forklifts, and sells them in California. Assume that for the certified engines representing 25% of the engine blocks, the forklift manufacturer holds the certificates. In the second example, assume exactly the same arrangement, except that, for the certified engines representing 25% of the engine blocks, the engine-block manufacturer holds the certificate. In the third example, assume that a third-party (neither the engine-block manufacturer nor the forklift manufacturer) completes the engines and holds the certificate for the certified engines representing 25% of the engine blocks, while the forklift manufacturer completes the uncertified engines. Who is the "manufacturer" of which engines in each case? More to the point, where is the regulatory language that answers the question.

These examples are all realistic possibilities that have been discussed within industry and with CARB. There are other possible arrangements that would complicate matters further, as will the fact that the same engine-block suppliers and third parties will be selling to a number of forklift manufacturers. Until CARB addresses these situations with a comprehensive and comprehensible approach to the phase in, industry members will be unable to finalize their manufacturing and commercial arrangements so as to benefit from the phase-in allowance. We urge CARB to address these issues promptly. (ITA)

Agency Response: This issue was raised previously by ITA during the comment period for the first notice of modified text. Please refer to the Agency's response to comment #168. However, to reiterate, all LSI engines will be certified either compliant or noncompliant. Staff believes the commenter is confusing the term "uncertified engines" with engines which, as a result of the phase-in during Tier 1, may be certified, but certified as noncompliant with the emission standards in section 2433 (b). The regulatory text which responds to ITA's question is in section 2430, which is the general applicability section of the regulations. Paragraph (a)(2) of this section states, "Every new off-road large spark-ignition (LSI) engine that is manufactured for sale, sold, or offered for sale in California, or that is introduced, delivered or imported into California for introduction into commerce and that is subject to any of the standards prescribed in this article and documents incorporated by reference therein,

must be certified for use and sale by the manufacturer through the Air Resources Board and covered by an Executive Order, issued pursuant to Chapter 9, Article 4.5, Section 2433." Therefore, all engines that are subject to these regulations, are required to be "certified." As a result, there will not be "uncertified engines" legally sold or offered for sale in California, even during the Tier 1 phase-in.

ARB will therefore have "engine manufacturers" (i.e. manufacturers granted certification) of record for every engine to be sold in California, and thus, in regard to ITA's concern, a method of applying the percentages incorporated in the phase-in. In response to ITA's three examples, for an engine to be sold within California, either the forklift manufacturer, the engine-block manufacturer, or a third-party is required to be the holder of certification for that engine, and therefore the "engine manufacturer". Staff believes that this will most probably, but not necessarily, be the manufacturer who completes the engine. Thus, in 2001, for whatever amount of engines to be sold in California that the forklift manufacturer is the holder of certification, the forklift manufacturer must have 25% of those engines certified to comply with the exhaust emission standards. The same is true for the engine-block manufacturer and any third-party manufacturer who holds certification for an engine.

Since this agency response requires only a straightforward reading of the regulations, as above, Staff is not proposing textual changes in response to this comment. However, staff plans to meet with ITA to clear up any remaining confusion regarding certification. An ARB certification workshop is also planned for the end of this year.

B. Miscellaneous

170. **Comment:** CARB has made some important improvements to the LSI regulations in this latest draft. Inexplicably, however, CARB has not addressed several issues that ITA raised in its earlier comments. Without repeating all of the points we have already made, ITA notes that those points still require attention. (ITA)

Agency Response: Staff has responded to all earlier comments, though not necessarily to ITA's satisfaction in all cases. Please refer to the Agency's responses in Part IV regarding comments to the first notice of modified text. In addition, staff this comment does not identify specific textual changes proposed in the second notice of modified text.