

FINAL STATEMENT OF REASONS

AMENDMENTS TO THE 1999 SMALL OFF-ROAD ENGINE REGULATIONS

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State of California
AIR RESOURCES BOARD

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

**PUBLIC HEARING TO CONSIDER AMENDMENTS TO THE 1999 SMALL
OFF-ROAD ENGINE REGULATIONS**

Public Hearing Date: **March 26, 1998**
Agenda Item No.: **98-3-5**

I. INTRODUCTION AND BACKGROUND

This rulemaking was initiated by the publication on February 6, 1998 of a notice of public hearing to consider the adoption of amendments to the regulations governing Small Off-Road Engines (formerly "Utility and Lawn and Garden Engines"). Concurrently the Staff Report entitled *Public Hearing to Consider Amendments to the 1999 Small Off-Road Engine Regulations* (Initial Statement of Reasons for Proposed Rulemaking, hereafter "Staff Report"), including the express terms of the amendments 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 amendments to California Code of Regulations, title 13, sections 2400 through 2414, and the incorporated "California Exhaust Emission Standards and Test Procedures for 1995 and Later Utility and Lawn and Garden Equipment". The principal purposes of the proposed amendments were to control emissions deterioration and to add to industry's flexibility in meeting the standards for engines below 25 horsepower (hp). Staff proposed amendments to the 1999 small off-road engine regulations, including a one-year delay in implementation, relaxation of emissions standards for nonhandheld engines, emissions durability requirements, averaging/banking/trading, harmonization with the federal diesel engine regulation, and modifications to the production line testing requirements.

At a public hearing held March 26, 1998, the Air Resources Board (the "Board") considered the proposed amendments and received written and oral comments on the regulatory proposal. Staff also proposed several modifications at the Hearing, most notably the replacement of the nonhandheld Tier 2 and Tier 3 standards with an alternative that would provide equivalent emissions benefits. The Board approved those changes, and in response to public comment requested that the amendments be modified to include "green" labeling as a market incentive program and a technology review every two years.

At the conclusion of the hearing, the Board approved the originally proposed amendments with the modifications described. In accordance with section 11346.8 of the Government Code, the Board in Resolutions 98-15-A and 98-15-B directed the Executive Officer to make the text of the modified amendments available to the public for a supplemental written comment period of 15 days. He 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 December 21, 1998. Several 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 January 5, 1999. After considering the comments received on this second Notice, the Executive Officer issued Executive Order G-99-002, 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 February 6, 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 amendments. This Final Statement of Reasons also contains a summary of the comments the Board received on the proposed regulatory amendments 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, sections 2402. 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 89.

Title 13, CCR sections 2402 and 2412 (c) identify the incorporated ARB documents by title and date. 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 small off-road 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 for a limited audience in the CCR.

The test procedures for compression-ignition engines incorporate portions of the CFR because the ARB requirements are substantially based on the federal regulations, as per the Statement of Principles entered into by ARB, Industry, and the U.S. EPA as described in the staff report on pages 32-33. Incorporation of the federal regulations by reference will simplify manufacturer certification.

Economic and Fiscal Impact. In developing the regulatory proposal, the ARB staff evaluated the potential economic impacts on private persons and businesses. Although some stakeholders contend that the staff proposal would be too stringent, the proposal actually relaxes the existing requirements. Overall, most manufacturers of small off-road engines and equipment are expected to benefit from the proposed amendments. The relaxation and extension of the 1999 standards will ease the technological challenge that the industry is facing and will provide the industry with additional time to complete the development of their compliant products. This, in turn, tends to lower the compliance costs for manufacturers, and results in a more cost-effective program to achieve the emission reduction goals outlined in the 1994 State Implementation Plan ("SIP") for ozone attainment. However, some manufacturers that have already developed compliant products may be adversely affected by the proposed amendments because they may not realize the return on their investment as soon as they have planned. These amendments would reduce the ability of these manufacturers to benefit from their efforts and realize any income that may be generated from licensing their technology to others. Moreover, it may discourage them in their future efforts to develop complying products on time. However, staff believes that the benefits gained by the industry as a whole from the proposed amendments outweigh the slight loss of opportunity to a few manufacturers. As a result, staff expects the proposed regulations to have positive impacts on California employment, business status, and competitiveness.

The proposed amendments would postpone or reduce any potential increase in the retail prices of small off-road equipment that might have resulted from the implementation of the 1999 standards. This is because the manufacturers would have less stringent standards and more time to develop more cost-effective products. Consumers would also benefit from the amendments because their choice of products would be greater than if the 1999 standards were retained. Furthermore, because the proposal relaxes and delays the standards, and provides features like averaging and low-volume consideration, the proposal will allow a greater number of manufacturers and technologies to continue to supply the California market.

Finally, the Board has determined that this regulatory action will not result in a mandate to any local agency or school district the costs of which are reimbursable by the state pursuant to Part 7 (commencing with section 17500), Division 4, Title 2 of the Government Code. The regulations apply only to engine and equipment manufacturers. Therefore, no state agency, local agency, or school district will incur costs in reasonable compliance with this regulation.

As discussed above, the regulations will have a net positive impact or no impact on businesses in general. Although not directly affected by the rule, small businesses are among those who would benefit. To the extent that indirect costs may be passed on to small businesses that purchase complying engines or equipment, they have been included in the cost and cost-effectiveness calculations of the staff report.

Consideration of Alternatives. The amendments proposed in this rulemaking were the result of extensive discussions and meetings involving staff and the directly affected parties (e.g., small off-road engine and equipment manufacturers). Staff considered all of the alternatives proposed by industry and was able to incorporate a majority of industry's proposed amendments into the regulation presented to the Board. The Board rejected several major alternatives for the reasons described in the staff report at pages 63-65, and in the responses below. As discussed below, a number of additional modifications proposed during the comment periods were incorporated into the final amendments. The Board has determined that no alternative considered by the agency would be more effective in carrying out the purpose for which the regulatory action was proposed or would be as effective and less burdensome to affected private persons that the action taken by the Board.

Comparison to Federal Regulations. The U.S. EPA also has regulations for small off-road engines (Title 40, Code of Federal Regulations, Part 90). Those regulations are similar to the California Tier 1 regulations that predated them. The U.S. EPA regulations differ from the ARB staff's proposal in a number of ways, including less stringent emissions standards, no control of engine deterioration, and no measures to increase industry flexibility such as averaging. The U.S. EPA is proposing a phase 2 regulation that will control engine deterioration and introduce flexibility measures such as averaging, but the emissions standards remain less stringent than the staff proposal. The staff has made every effort to minimize conflicts with the proposed U.S. EPA rule, while retaining specific features needed by California. Those efforts include aligning the structure of the production-line testing programs and the averaging programs. However, the proposal includes several differences from the U.S. EPA proposal, including year-round production-line testing, and more stringent emissions standards.

The staff analysis of the proposal indicates that the proposal will reduce emissions from ozone precursors in a cost-effective manner, beyond what would be accomplished either by the existing federal rule or by the federal proposal. Thus, the cost of the separate California program is justified by the benefit to human health, public welfare, and the environment. In addition, the differences from the federal program are authorized by Health and Safety Code sections 43013 and 43018.

II. SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES - - COMMENTS PRIOR TO OR AT THE HEARING

At the March 26, 1998 hearing, oral testimony was received from Autonnic Research, Briggs & Stratton and Tecumseh (jointly), the California Association of Nurserymen (CAN), the

California Landscape Contractors Association (CLCA), the Coalition for Clean Air, the Natural Resources Defense Council, the Sierra Club, Echo, the Environmental Council of Sacramento (ECOS), the Engine Manufacturers Association (EMA), the Outdoor Power Equipment Institute (OPEI), John Deere Consumer Products (John Deere), Komatsu Zenoah Company, Lawn Tech Equipment Company, Maurdyne Industries, Inc., McCulloch Corporation, the Manufacturers of Emissions Control Association (MECA), Pioneer Eclipse, Poulan/Weedeater and Husqvarna, the Portable Power Equipment Manufacturers Association (PPEMA), Ryobi, Sierra Research, and Tanaka. Of the entities providing oral testimony, thirteen submitted written comments as well. Additional written comments received by the hearing date were submitted by the Coleman Company, American Honda Motor Company (Honda), the Toro Company, the Academy of Model Aeronautics, the Bay Area Air Quality Management District (BAAQMD), the Sacramento Metropolitan Air Quality Management District (SMAQMD), the South Coast Air Quality Management District (SCAQMD), Westerbeke Engines & Generators, J. Moore Methods, Inc., Environmental Excellence Corporation, Muriel Strand, and 166 other entities as part of a Direct Mail Campaign. A complete list of all commenters is attached (Attachment 1).

In addition, a number of comments arrived after the end of the 45-day comment period. To a great extent, those comments reflected the same issues noted in the comments that did arrive prior to the hearing. The majority of the late comments were part of the Direct Mail Campaign and cited arguments from the PPEMA information sheet which was attached to the staff report as Attachment K. Therefore, staff did not include separate responses to those late comments in this document.

A number of commenters generally supported adoption of the proposed amendments. These commenters included the Sacramento Metropolitan Air Quality Management District, the Bay Area Air Quality Management District, the South Coast Air Quality Management District, and EMA. Comments in support of the amendments are generally not summarized below, unless the comment has relevance to another comment or response.

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.

A. Applicability

1. **Comment:** It is our understanding that the hobby application of these [model aircraft] engines and the impact of this regulation on the hobbyist was not previously considered by the Board, and as such our stakeholder segment has not had a voice in this process. We request the Board set aside any decision on the inclusion of the hobbyist application of these engines until representatives of the industry have had time to comment on the proposal and

present mitigating issues for the Boards consideration. (Academy of Model Aeronautics)

Agency Response: The notice of modified text included a revision of the "small off-road engine" definition that specifically excludes engines used in model airplanes, model boats, and model cars.

2. **Comment:** Pioneer Eclipse manufactures a line of equipment for inducing a high polish finish to different types of hard floors. All of the floors that we supply the engines for are for indoor applications, and so from the conception of this process, we have had to produce equipment with absolute minimum CO emissions, because they are indoor applications. The way we achieve this is we take gasoline small engines and convert them over to propane technology. . . .In making our own personnel familiar with the regulations, we found out because we were modifying the engines, the gasoline engines over to propane, we were considered tampering. To avoid that, we had to submit for our own certification for our propane setup. This we have done, and again, I think in the discussions that occurred today, they talk about a number of technologies that are available that are cleaner than Tier I or the Tier II. In this particular case, what we would like to do is be exempted from the regulations, the requirements for certification. (Pioneer Eclipse)

3. **Comment:** The cost to Pioneer Eclipse to meet these regulations is prohibitive for less than 200 units a year. All the costs to meet regulations, not including consulting fees, are in excess of \$85,000. (Pioneer Eclipse)

Agency Response: As pointed out at the hearing, the action to provide off-road aftermarket parts regulations will provide less burdensome options than the current requirement that engines converted to alternate-fuels must be certified as any other engine family. The process will require fewer emissions tests and paperwork than actual engine certification, so costs should be minimized. Additionally, once an aftermarket conversion is approved, the manufacturer will not need to conduct periodic testing, so all costs will be a one-time occurrence.

B. Standards

1. Unnecessary Relaxation

4. **Comment:** We recognize that the proposal reflects market and emission control realities and that the original California Tier 2 standards might have been extremely difficult to achieve. However we are concerned about the possibility of any further relaxation of the standards beyond the current proposed amendments. We would therefore oppose ARB's adoption of EPA's draft Phase 2 standards or any other standards that would lower the emission reductions to be achieved by the current proposal. (BAAQMD)

5. **Comment:** We understand that some engine manufacturers have sought to have ARB adopt less stringent standards in lieu of the current ARB proposal. We oppose any

revision to the current proposal that does not achieve equivalent emission reductions. (BAAQMD)

Agency Response: The action the Board ultimately took would not lower the emissions reductions to be achieved by the proposal in the staff report. The revisions to the engines greater than 65 cc, as stated in the first Notice of Modified Text, will require manufacturers to achieve emissions reductions equivalent to those outlined in the staff report. Thus, the emissions reductions shown in Table 13 of the staff report will be achieved.

6. **Comment:** The affected industry has been given approximately nine years lead-time to develop the requisite technology for the current regulation, given the 1990 adoption and 1999 implementation date for the Tier 2 standards. During this time period, Ryobi and Honda have developed the requisite technology to meet the 1999 standards for handheld (0-65 cc) equipment, and have stated a willingness to license and/or provide engines to other manufacturers. Given this situation, AQMD staff believes that the proposed one-year delay in the implementation of the 1999 standards for this equipment category is the maximum that should be allowed. (SCAQMD)

Agency Response: The adopted regulation allows only a one-year delay, from 1999 to 2000, for handheld (0-65 cc) equipment.

7. **Comment:** We do not have a problem with the Tier 2 standards. Great insight was used to set the standard. (Komatsu Zenoah)

8. **Comment:** Since 1994, there have been a number of other companies that have come along. You have heard from several of them today that have responded with clean technology that just demonstrates that the ARB's technology forcing rule has indeed worked. (Ryobi)

9. **Comment:** I urge the Board to act now and not to delay the decision on adopting the rule. Clean small engine technologies are proliferating. There are many engines, many manufacturers, different technologies to meet the proposed rule. (Ryobi)

10. **Comment:** Tanaka is a premium two-cycle engine manufacturer. Our products include line trimmers, hedge trimmers and other types of professional hand-held equipment. Years ago, when we began our compliance efforts with the State, we were forced to make some very key decisions about our future direction. The Tier 2 regulations set forth by ARB posed an unprecedented challenge to industry worldwide. We at Tanaka were forced to look within and identify our capabilities and limitations in the face of this adversity. We are neither lawyers nor lobbyists, but we are rather expert engine builders. Our decision was to build clean burning two-cycle engines. (Tanaka)

11. **Comment:** I think that the vigor of a lot of companies was determined

several years ago in attacking this. I made the statement that we are neither lawyers nor lobbyists. What we are is engine builders, and we are very good at it. We have been in business for a long time, and we accepted the challenge. We thought we could do it. We took several different approaches. We spent a lot of money on it, as all of these folks have, no doubt, but we had one goal in mind and that was to meet your Tier 2 proposal. We actively pursued it, and we feel that we have accomplished it. (Tanaka)

12. **Comment:** I am in stark contrast with a lot of the folks that are here today, I don't think that I would be here protesting that we meet these regulations if in fact we weren't confident that it did. (Tanaka)

Agency Response: These Comments indicate that several manufacturers believe that the 0-65 cc standard is appropriate, and that there will be a number of methods to comply with them.

13. **Comment:** On the hand-held regulations, we are actually generally supportive of the proposal that staff has brought forward. We do not believe that a delay is necessary, as has been indicated by several of the manufacturers. The technology is there today. You have the defense. You have the support you need to push ahead with this technology for the program. (NRDC)

Agency Response: For engines below 65 cc ("handheld"), the staff relaxed the requirements on CO and PM to ensure the availability of technologies to sufficiently control of HC+NO_x, the pollutants of most concern to the Ozone SIP. The delay in implementation, as noted on page 21 of the staff report, is to allow some lead time for industry to adjust to the durability requirements and to adjust to the model-year (as opposed to calendar-year) schedule.

14. **Comment:** EDC strongly supports leaving the Tier 2 standards in place, while implementing engine deterioration requirements for all engines. (EDC)

15. **Comment:** ARB has not demonstrated that industry cannot meet the Tier 2 requirements, so no relaxation should be granted. (EDC)

Agency Response: Page 24 of the staff report addresses this for engines above 65 cc. In a technological sense, some engines could meet the 1999 Tier 2 standards; however, those engines tended to be much more complex than the typical engine, which must be used in a high-volume, low-cost application like lawn mowers. Furthermore, staff did not have sufficient information indicating that conversion to 3.2 g/bhp-hr HC+NO_x and control of deterioration were both achievable by 1999. Therefore, staff took an intermediate course.

For engines below 65 cc, see the response to Comment 13.

2. Unfair Penalty for Those Who Can Produce Cleaner Engines

16. **Comment:** I want to touch on the issue of fairness. Ryobi has invested, since 1991, more than \$10 million in developing this technology, and you've heard some of the other companies have invested significant amounts of money as well, and we really believe that any further delay in this rule discounts the value of our investment significantly. (Ryobi)

17. **Comment:** Komatsu Zenoah's huge investment, positions us where we can obtain a large share of the market in California. We have done what you have asked. We trust that there will be no additional delays or any changes in the specifications. (Komatsu Zenoah)

18. **Comment:** It's our opinion that any relaxation to the Tier II regulations beyond what staff has proposed would present a penalty to manufacturers like ourselves who have made significant investments in securing our future in this marketplace. We have met the challenge presented by ARB and urge you not to change that challenge at this late date. (Tanaka)

19. **Comment:** ARB staff contend that "the benefits gained by the industry from the proposed amendments outweigh the slight loss of opportunity to these manufacturers, i.e., the manufacturers who have developed Tier 2 compliant products." Ryobi disagrees with this assessment. It is manifestly unfair that Ryobi and other manufacturers who invested tens of millions of dollars in developing Tier 2 capable engines to comply with existing law must have their investment discounted to benefit those who took no action to comply with the law. Just because some claim they cannot comply with the law is no reason to change the law in their favor. (Ryobi)

20. **Comment:** We think you are going too far to accommodate manufacturers in your attempt to relax this program. We are giving away too much here, and it is not justifiable because some of the manufacturers didn't invest the money to get there when they should have. (NRDC)

21. **Comment:** The relaxation creates an unfair economic disincentive for the manufacturers that operated in good faith, committed significant resources into research and development and now largely support the 1999 implementation date. (EDC)

Agency Response: As noted on page 61 of the staff report, a major concern in this rulemaking was the attempt to not provide a disincentive for those manufacturers who had successfully developed compliance strategies. The staff believes that the resulting emissions standards and regulations accomplish this, in part by the addition of the averaging, banking, and trading program. Furthermore, the amendments that have been made will ensure product availability and a minimum of market-place disruption, while still attaining the air quality benefits needed.

22. **Comment:** We used to be members of PPEMA, but we have had a parting of ways. In 1992, when we announced our new technology, and we were interested in

meeting the Air Resources Board Tier 2 standard, and at that time and today as well, PPEMA was not interested in these cleaner technologies to meet Tier 2. We had a parting of the ways then. (Ryobi)

23. **Comment:** We didn't go into this with a negative attitude. We went into this and we said, we are going to do it, because we owe the world cleaner equipment. Our approach was two-cycle and also four-cycle. Because of expertise in engineering, we went to work with Ryobi in a partnership agreement to develop a commercial engine based on their four-cycle engine. (Komatsu Zenoah)

24. **Comment:** Ryobi supports retention of the existing Tier 2 emissions standards.... Even so, Ryobi has advised ARB staff that it can accept the proposed changes to the Tier 2 standards. Ryobi cannot accept, however, any further delay, relaxation or change in the Tier 2 standards. Further delays, relaxations or changes would be manifestly unfair to Ryobi and the other manufacturers who have invested tens of millions of dollars and have taken substantial risks to achieve Tier 2 standards. Any such changes would punish those who invested in efforts to help California clean its air. (Ryobi)

Agency Response: The staff recognizes that several companies went to great efforts to develop technologies to meet the standards. As noted on page 61 of the staff report, failure to acknowledge those efforts would penalize the very manufacturers who have met the challenge. The staff believes that the addition of credit programs provides some compensation for the one-year delay.

25. **Comment:** In conclusion, let me say that as a basic issue of fairness, you owe it to the people who have invested because this comes up in your Tier 2 rule. Please adopt this rule. (Ryobi)

Agency Response: The staff recognizes the significant commitment in terms of money and other resources that several companies, including the commenter, have made to comply with the standards. As discussed on page 61 of the staff report, staff has acted carefully to limit the disincentive that could result from the delay of the standards.

26. **Comment:** It is very interesting to note that the major players of the marketplace are the one's that come to this meeting empty-handed. They have no solutions. All they have is questions and doubt. They're resisting change because of the great risk they have involved. Honda was not in the two-cycle engine business or the hand-held business until now. They invested a lot of money for a new market. They had never made a profit in this market. Ryobi is large. They are different. Red Max and Tanaka are very small players. Together they represent probably less than five percent of what Echo does. Why are these large players not coming here with a product that will meet the requirements of this Board? (Komatsu Zenoah)

Agency Response: See the response to Comments 22-24.

27. **Comment:** Even though Ryobi is willing to accept the proposed Tier 2 rule, Ryobi disagrees with the ARB Staff justifications (appearing in the Staff Report) in support of the proposed relaxation of Tier 2 emissions standards and the one-year delay in the effective date of the Tier 2 standards. (Ryobi)

Agency Response: The staff stands behind the reasoning, as outlined in the staff report (pages 19-22, 61). To ensure product availability and limit disruption to the marketplace, the delay and relaxation are necessary. Staff did include a credit program to ensure that manufacturers who met the original time frame can benefit from doing so. Some of the modifications allow a greater range of technological options to be used to meet the standards, which will help ensure product availability.

28. **Comment:** Philosophically, why give an advantage. Why help out the companies that failed to do what we asked them to do? If you are going to support one group, support the group that did what we asked them to do. They had eight years to do it. Some of them invested tens of millions of dollars, and you are giving a competitive advantage to people that did nothing. If you relax this program, you are giving a competitive advantage to the manufacturers that did not deliver the cleaner engine. That's wrong. (NRDC)

Agency Response: As noted in the response to Comment 27, some modifications were made to ensure product availability. The staff report addresses the issue of competitive advantage and the resulting disincentive to produce cleaner equipment on page 61 of the staff report. See also the responses to Comments 16-21 above.

29. **Comment:** We believe that a relaxation of the proposed standards hurts the companies that did exactly what California asked them to do. We think that is absolutely fundamentally wrong. We have had more than one company, in fact, three or four of them, meet the challenge, meet the standard, and now California is caving on them. You are backing out on the State's end of the agreement, as far as we are concerned. We don't think that is acceptable. (Coalition for Clean Air, Natural Resources Defense Council, and Sierra Club)

Agency Response: The Board approved only a one year delay in implementation of the 0-65 cc standards; this delay was needed to provide sufficient lead time for industry to meet the additional durability requirement being asked of them. In order not to disadvantage any manufacturer who was able to comply with the standard on the original schedule, the board approved an emissions credits program which included early banking. No additional weakening of the emissions standards is contemplated.

As for equipment greater than 65 cc, no manufacturers indicated that they could meet the original 3.2 g/bhp-hr standard, so the modifications to those standards evidently do not present difficulties to engine manufacturers. The effect on companies that provide emissions controls is discussed in Comments 81 and 82.

3. Lead Time

30. **Comment:** Westerbeke would like to propose that the number of years between the effective dates of Tier 2 and Tier 3 be increased. The first reason is that four years is not a long enough time period for engine manufacturers to gain back enough revenues on Tier 2 engines to begin funding Tier 3 engine development. Without an additional three years, many companies, namely small business, will not have enough funds or workforce to develop Tier 3 engines before the effective date. (Westerbeke)

31. **Comment:** The second reason is to allow small companies with a diverse product line [sic] the necessary amount of time to certify all their engines to the proposed Tier 3 standards. If this time consideration is not given small companies will be forced to begin to certify their engines to Tier 3 standards well before their larger competitors. (Westerbeke)

Agency Response: The staff presented and the Board approved an alternate proposal for engines above 65 cc. The alternate proposal did not include a third tier, so there will not be the inequities feared by the commenter. Without the need to redesign for Tier 3, manufacturers' ability to gain back revenues from Tier 2 engines will not be constrained. Similarly, manufacturers would not need to certify engines to standards more stringent than the Tier 2 standards.

32. **Comment:** In response to the PPEMA survey of the California Park and Recreation Departments, several expressed the view that the [0-65 cc] regulations should be phased-in over time. (PPEMA)

Agency Response: The staff proposal delays by one year and otherwise provides flexibility to a regulation that was originally approved in 1990. The Tier 2 emissions standards actually have been phased in over time. See Comments 6 and 33, and the responses thereto. As noted in Comment 276, Ryobi offered the first Tier 2-compliant technology in 1994, six years before the revised tier 2 will take effect. Further delays in the phase-in would harm those companies that have developed complying technology, as noted in Comments 16-29.

4. Handheld Engine Standards Relaxation

33. **Comment:** We look at it perhaps the other way, that maybe there is some technology being sold that is not tried and tested that perhaps has the ability to benefit those who have the technology. From our perspective, we are looking at, and we do believe that any one of these seven technologies could deliver the numbers, and we -- once we know what the target is, we will invest, and we will be in the marketplace. We are trying to do it with the least penalty on the consumer; if the price of these products goes up significantly, the marketplace is going to get much smaller. (McCulloch)

Agency Response: As the commenter is aware, the emissions target was set in 1990 as

part of the original rulemaking. See the response to Comment 6. Comments from other manufacturers, who have completed development and commercialization of these technologies indicate that it can be done by 2000, and at a modest price increase.

34. **Comment:** For example, we spent a billion dollars with a company that you may have heard of, BKM, researching fuel injection. We spent three and a half years working very diligently with them and very hard. We assigned three engineers to work with them, and it never delivered on any of the promises that were made by BKM, and we were incapable of helping them over the very rough breadboard prototype stage. (Husqvarna)

Agency Response: Not all efforts or paths lead to success, however, several do, and have, as demonstrated by Ryobi, Tanaka and Komatsu Zenoah in Comments 7-12. Companies that have not been able to develop independent ways of complying do have the option of purchasing engines, purchasing emissions credits, or licensing complying technology.

35. **Comment:** The investments that we have made as a company towards emission reductions include the technologies we have explored for engines, the equipment that we have purchased, the facilities, the tooling that we have modified, the manufacturing equipment and the staff represent a \$45 million investment from 1990 to 1998. Some of those are technologies that were explored and never incorporated and others, well you can see there is a peak about 1994 and 1995 when the first tier of California standards went into effect. So, there is a substantial investment just to stay in business. There are a number of technologies that we have explored that I talked about earlier that are not ready for production yet. (Husqvarna)

Agency Response: As noted in the response to Comment 34, there are other options for companies that have not yet been able to comply. However, several companies have developed cost-effective technologies that do meet the standards, and their situation must be addressed. See Comments 16-29 and the responses thereto.

36. **Comment:** Stihl and others within the industry have already reduced emissions from its products by over 50% in the past 5 years in compliance with Tier 1 regulations. (Stihl)

Agency Response: The Board appreciates the commenter's efforts to date toward reducing emissions. However, both the Tier 1 and Tier 2 standards were originally set in 1990. At that time, it was explicitly stated that the Tier 1 regulations would not, by themselves, be sufficient to meet California's needs. The staff proposal for 0-65 cc engines would actually provide more time and more flexibility than the original Tier 2 standards, but would require essentially the same levels to be met.

37. **Comment:** I have worked in air quality for about four and half, five years now, and without exception, every one of these meetings that I attend, there are a number of investors or entrepreneurs that are looking to profit from the regulations. They bear no

responsibility or accountability. It is solely on the shoulders of the manufacturer. When you regulate a product and propagate those regulations, it is the manufacturer of that engine and that product who has responsibility to maintain the emissions over the useful life of that product, not the investors who come and show you the wonderful new technology that holds promise. They are not liable. We, as manufacturers, are. (Husqvarna)

Agency Response: Table 6 of the staff report indicates that engine manufacturers are the ones who developed technologies to meet the standard. The 0-65 cc standards are supported by several manufacturers who stand to suffer great losses if they were incorrect in their assessment of their emissions capabilities. Staff does not believe, therefore, that the decisions were made lightly or without regard for the accountability they could bear. See also Comments 276-277 and the response to them.

a. PPEMA Proposal

38. **Comment:** Our alternative will deliver emission benefits at least equal to staff's proposal. It consists of several elements. The hydrocarbon and NO_x emission limits for nonpreempted engines will be more stringent than EPA Phase II, and they will be phased in over a period beginning 2001 through 2003. It will be divided into two cc categories, less than 20 cc and [20 cc through] 65 cc. Second, a voluntary spillage reduction program, which would include both preempted products as well as nonpreempted products. . . . There are approximately nine tons a day in spillage, approximately four of which come from products that are outside your jurisdiction and authority. We believe that a spillage program can achieve at least a 50 percent reduction in those numbers and can be implemented quickly. Thirdly, a scrappage program, which we would suggest be targeted to areas that have some difficulty in complying with their SIP obligations in 2005. The program would replace older equipment with complying Tier II engines. Fourthly, an incentive to manufacturers to produce, design, develop and produce low-emission engines. That would exempt those ultra-clean engines from production line testing requirements, a significant cost for any manufacturer. Last, but not least, we are prepared to commit to a Tier III following not only implementation of our Tier II proposal but some reasonable period of stability. We are suggesting the year 2006, possibly 2007. By the year 2010, because of the shorter lifetime of these products, you will have basically fleet turnover. The emission levels that we are suggesting are 86 grams of horsepower hour for the 20 to [65] cc engines, and 125 grams per horsepower hour for the under 20 cc engines. (PPEMA)

39. **Comment:** To avoid severe adverse economic consequences that would be caused by the Tier 2 HC+NO_x standards recently proposed by ARB staff while at the same time achieving staffs air quality goals, PPEMA has developed this alternative to staffs proposal. PPEMA's alternative includes several elements that, taken together, will be as effective as staffs proposed Tier 2 HC+NO_x limit, but at far less cost to California consumers, small businesses and manufacturers. (PPEMA)

40. **Comment:** We believe we have presented you a viable alternative, one

that gets you where you want to go, one that gets you where you told us you want to go, one that gets you where staff has told us you want to go in terms of tons per day. It's one that has very, very high, good cost effective solutions for not only the Board but for the consumers and the professional and commercial users of our products. We urge you to give it very careful consideration, and we are prepared to do whatever we can to work out any of the details that need to be worked out in the alternative, and we urge you to accept it. (PPEMA)

Agency Response: As staff noted at the Board hearing, the PPEMA proposal would not be as effective as the staff proposal because the emissions levels would be higher, and because spillage control cannot be used as a substitute for engine controls. Control of spillage emissions has already been identified a) as a subject for another rulemaking, and b) as a possibility to address the extra emissions revealed by the improved emissions inventory. Thus, spillage control cannot practically be used in this context to provide reductions in exchange for relaxation of the emission standards. Furthermore, adoption of the PPEMA proposal would not address the concerns of those who have met the emissions standard and would essentially be penalized by a relaxation. The revised production line testing program will essentially reduce testing for ultra-clean engine families as PPEMA's proposed incentive would, so the benefit to clean manufacturers would probably not be sufficient to make up for the loss in revenue. See Comments 16-29.

41. **Comment:** We gave [the PPEMA proposal] to the staff; they ran some initial calculations on it, and essentially, the difference between the PPEMA alternative and the current staff proposal is four to four and a half tons a day. The comparison that is the worst is roughly well over four tons a day, and the more favorable [using the Sierra Research assumptions] is 0.3 tons per day. So, it is a small, we think, it is a pretty small margin. (PPEMA)

Agency Response: The PPEMA alternative was not included in the staff report, as it arrived well after publication. However, the staff did evaluate the emissions benefits of the PPEMA alternative and determined that it would be 4.7 tons per day HC+NO_x above the staff's proposal in 2010, as noted at the hearing. Although PPEMA considers this margin small, it is significant compared to the incremental emissions reductions sought by the ARB in other rulemakings. The difference in the proposals is particularly significant with regards to the adverse economic impact of relaxing a regulation that companies relied upon when making investments over the last eight years. The PPEMA proposal does not address the issue faced by Ryobi, Tanaka, and Komatsu Zenoah, namely the effect on a company's ability to compete with the products developed in response to the original Tier 2 standards. Ultimately, the most acceptable compromise involved relaxing the timing of the Tier 2 standard to 2000 from 1999, and adding numerous manufacturer flexibilities to the program, including reduced production line testing, averaging, small volume manufacturer provisions, etc.

42. **Comment:** I would like to see the PPEMA proposal as it comes in. It sounds like about 20 to 30 tons, and there are five tons. It's not like we are close. (Lawn Tech)

43. **Comment:** Through the Homelite, John Deere and Green Machine

brands, John Deere occupies significant positions in both the consumer and commercial product markets. John Deere is also a member of the Portable Power Equipment Manufacturers Association and fully endorses and supports the comments submitted on behalf of its member companies. We are asking for your approval of the alternative regulation offered by PPEMA. (Deere)

44. **Comment:** We encourage you to weigh these concerns in the consideration of the Staff's proposed amendments and the alternative offered by PPEMA. John Deere believes that within the flexibility allowed by the PPEMA alternative we will be able to make products available that meet the needs of the users - technological, financial and safety -- while at the same time providing products that respond to the air quality issues of the state of California. (Deere)

45. **Comment:** We are also asking for just merely fairness, and the proposal that we are making is not asking that you cut us any break in that respect. All that we are asking is that we be treated fairly as well, and we are offering a proposal that gives the same benefits as the staff's proposal. (Deere)

46. **Comment:** We are determined to meet California's SIP goals while providing an affordable product for our customers in California. We believe the PPEMA proposal will allow us to meet these goals, which you will hear a little later, and we urge California Air Resources Board to accept the proposal. It will provide the head room needed to be able to manufacture products with the new regulation. (Echo)

47. **Comment:** Most of these manufacturers that are here, I am a dealer for. I have worked with them closely through the years. I have to commend the leadership here as well as outside, everybody is trying to do a good job. I truly feel that most of the manufacturers are trying to do a good job with this matter. The dealers pretty much would like to go with the PPEMA proposal. We just heard that they are also introducing possibly a Tier III for 2006 or 2007. We would also support that proposal. As time has gone through this noise and safety issues, most of the manufacturers have gone up to the plate and met those standards. I think eventually most of the major players will be there, also. We have this weighing of can we do it now, or can we do it later. (Lawn Tech)

Agency Response: See the response to Comment 41 regarding the PPEMA proposal.

48. **Comment:** The alternative proposed by PPEMA would avoid most of those adverse economic consequences while reducing emissions from handheld products by 48%-52% from Tier I levels. The Tier I regulations, which became effective in August 1995 have already reduced emissions from these products by 35% from unregulated levels. For a product category that represents less than 1% of statewide emissions, we believe this is an impressive achievement. (PPEMA)

49. **Comment:** The alternative proposed by PPEMA will provide a 50% reduction in emissions from handheld products without the major adverse economic impact of the Tier 2 proposal. We urge you to support the PPEMA alternative. (PPEMA)

Agency Response: Staff does not dispute the figures noted in the comment. However, that level of reduction does not represent the cleanest level that is currently achievable for a cost-effective price. See Comment 51 and the response thereto. Furthermore, as noted in the response to Comment 41, the PPEMA proposal would have an adverse impact on those companies that have met the standards adopted in 1990.

50. **Comment:** The fuel spillage alternative that PPEMA proposes is really not an alternative at all. It's voluntary. It's an MOU [Memorandum of Understanding]. So, it's not a regulation. It's not enforceable. There's no way that you can be assured the standards you think that you are getting from the alternative will in any way meet the standards that you have. The MOU with PPEMA will represent only 60 percent of the gas market. The rest of the gas market will not be obligated under that proposal. [PPEMA's Spillage MOU proposal] seemed to mistake the fact that they are getting emissions out of fuel spillage, which is not entirely what we are dealing with here. We are dealing with emissions from hand-held engines. Those are the emissions that you have to worry about. The fuel spillage is coming later. It makes no sense to even think about it now. We will deal with that later. (Ryobi)

Agency Response: The staff agrees that control of fuel spillage cannot be used to relax emissions standards, for the reasons noted on page 40 of the staff report and in the response to Comments 39 and 40.

51. **Comment:** The most recent PPEMA proposal asks for more delays. It doesn't recognize the proliferation of Tier II technologies. It does not recognize the broad application of these technologies. It doesn't recognize electric technologies. It doesn't recognize the dynamic market response, particularly in the last year that we have seen in response to Tier II and the number of companies that have come forward in just the last year and what might reasonably expect over the next couple of years as you head into your Tier II deadline. (Ryobi)

Agency Response: Staff agrees that the PPEMA proposal does not address all the issues that must be considered.

52. **Comment:** Even at 86 grams per horsepower hour, we are not certain that we will be able to meet the regulation with all of our products. Small chain saws, for example, will not be able to use higher efficiency catalysts because of the added fire hazard this might create. It will take an aggressive effort to achieve 86 grams as a corporate average and will require a diligent effort to quality control in order to maintain it. (Echo)

Agency Response: As indicated in the staff report on pages 15-17, and in comments by several manufacturers, the 54 g/bhp-hr HC+NO_x level can be met, and the engines can be used

for all applications. Furthermore, the averaging program will allow limited use of dirtier engines if a manufacturer finds implementation of the cleaner technologies troublesome. As the cleaner engines can be used in all applications, staff assumes that the primary use will be in low-volume products for which the expense of changing designs may not be warranted.

53. **Comment:** The PPEMA proposal, which is 125 grams per horsepower hour for zero to 20 cc, recognizes two of the issues that I brought up earlier, one that the Class 3 products are very cost sensitive, and two, that their ability to meet the regulations is much more difficult because of the small displacement. It also recognizes an even reduction from that class of engines compared to the engines 20 cc and above. Finally, the 86 grams per horsepower hour [would be the standard] for 20 cc and above. We do support this PPEMA position. (Husqvarna)

Agency Response: See the response to Comment 41 regarding the PPEMA proposal as a whole. The arguments noted therein apply equally to engines below 20 cc as those above. Although the complying engines that have already been developed are all above 20 cc, the technologies developed can be applied to the smaller engines. Staff's expectation is that the technology will migrate to the lower displacements.

54. **Comment:** With both the EPA Phase 1 and California Tier 1 is that there was approximately a 34 percent reduction from each class of engines, Class 3, 4 and 5. Then in EPA Phase 2, there is again another 30 percent reduction, and then we have the staff's proposal for the Tier 2. This basically set the stage of one, why was there three classes for hand-held? Well, originally it came from, they started at unique levels, and we took an even reduction from each of those product categories, and also, there is price sensitivity in each of those categories. Class 3 are the \$69 trimmers that I spoke about earlier. They are the most price sensitive. They also are requiring the largest reduction under staff's proposal. There is a 75 percent reduction from Tier 1 levels to the 54 grams. The Class 4 is approximately 70 percent, and the Class 5 is a little over 50 percent. (Husqvarna)

55. **Comment:** The overwhelming majority of the HC+NO_x emissions generated from hand-held products is from chain saws and then trimmers are a little under 30 percent and the blower category is a little over 20. Class 3 [engines 20 cc or less] is right around three percent of the total inventory. This is the same class of engines that staff has asked for the largest reductions from and, also, the most price sensitive. (Husqvarna)

Agency Response: The 1990 rulemaking established the three classes of handheld engines; it also established that there should be only one class when the Tier 2 standards were implemented. Although the commenter would like the extra consideration granted the smaller engines to extend to Tier 2, there is no indication that engines below 20 cc could not adopt the same technology used to meet the standard in larger engines. None of the complying manufacturers have raised any concern about the smaller engines. Staff notes that one of the Honda engines is only 21 cc, and that technologies such as stratified scavenging can be inexpensively applied to virtually any engine (see Comment 285).

b. Stihl Proposal

56. **Comment:** Therefore, we strongly suggest that ARB and the State of California join with the rest of the Nation by accepting the EPA plan. Stihl and other manufacturers of two stroke gasoline engines have been major contributors to the economic growth of California. The outdoor power tool industry provides thousands of jobs in California, and the industry has worked diligently to produce products which are not only environmentally friendly, but also add significantly to the convenience and prosperity of the citizens of your state. It is simply unfair to penalize the industry and the citizens of California, as the proposed Tier 2 emissions regulations would do, when reasonable alternatives, rigorous, but fair to all and achievable with existing state of the art technologies, are available. (Stihl)

Agency Response: As indicated on pages 15-17 of the staff report, and in the comments from Ryobi, Komatsu Zenoah, and Tanaka, existing state of the art technologies are capable of meeting the Tier 2 standards, at a reasonable cost. Accepting the proposed U.S. EPA plan would not be fair to those companies that have been able to comply with the Tier 2 standards, as indicated in the staff report (pages 61-62) and in comments from those companies (see Comments 16-29 and the accompanying responses). The complying products that will be offered will continue to contribute to the convenience and prosperity of the citizens, by performing the same functions as previously, while contributing substantially less pollution.

c. McCulloch Proposal

57. **Comment:** Our objective here is to provide a solution that supports California's 2010 State Implementation Plan and also offers an opportunity to purchase clean and reasonably priced products. McCulloch and Battelle put together a suggested Tier II, which we think is a very simple approach that addresses both the technical and economic equations. It is kind of a one, two, three approach here. One is establish a hydrocarbon and NOx limit at 74 grams per horsepower hour for all hand-held engines. We have established that there are technologies that will allow us to maintain the consumer market at 74, that would take us out of the market at 54, and we could begin that in year 2000, again, an agreement in the time frame with staff's proposal. Secondly, establish a hydrocarbons and NOx limit at 54 grams per horsepower hour for all hand-held engines with 300 hours. Let the marketplace police itself. The manufacturers are not going to put 50 hour engines out and try to market them as professional products. So, this proposal here, along with the agreement of implementing a fuel spillage effort, either voluntary or otherwise, we feel would meet both sides of the equation. (McCulloch)

58. **Comment:** [The McCulloch proposal] also has a minimum impact on emissions inventory, and it will deliver the numbers that the ARB staff proposal for 2010, and this does not reflect any effort of spillage. So, if there was any effort for spillage, that would be on top of this. (McCulloch)

Agency Response: The McCulloch proposal, by virtue of some equipment having emissions higher than 54 g/bhp-hr HC+NO_x, would not attain the full reductions needed. As mentioned in the response to Comment 50, control of spillage emissions is not available to make up relaxation of the emissions standards. Economically, the McCulloch proposal could damage the competitiveness of manufacturers who have invested to meet the 54 g/bhp-hr HC+NO_x standard. See Comments 17, 18 and 24.

59. **Comment:** The 74 grams per horsepower hour level would allow products with a modest premium, such as two-stroke and catalyst or stratified scavenging two-stroke, and when you are trying to reach the 54 grams per horsepower hour, where it requires a major technology change with relatively large costs and size and complexity, that that's more appropriate for the commercial engines in technologies like four-stroke, direct fuel-injection, or stratified scavenging or catalyst approach. (McCulloch)

Agency Response: The companies that have developed cleaner engines have indicated that the cost, size, and complexity of those technologies is by no means prohibitive for non-commercial use. Ryobi, for instance, markets its four-stroke trimmer for residential use. As noted on page 64 of the staff report, a more lenient standard for residential equipment was considered, but rejected.

60. **Comment:** Most of the emissions come from commercial grade products. So, by having the 54 for the commercial, you are controlling the inventory where it needs to be controlled, and by having 74 for the consumer, you are not having a negative impact on the inventory, yet you are maintaining, you are giving the marketplace the opportunity to have the products that are best suited. I would say that, one, this proposal preserves the consumer market. Secondly, it minimizes the impact on the California consumer as well as the California businessman and those businesses that are part of the supply chain. It allows industry to develop technologies most appropriate for their application in both the consumer and professional market. (McCulloch)

Agency Response: Although the commenter is correct that commercial equipment use provides the bulk of the emissions from this category, consumer products do contribute to air quality problems. Furthermore, Ryobi has shown that the Tier 2 levels are attainable by consumer products, at a reasonable price increase. In addition, the McCulloch proposal does not address the equity issue mentioned in Comments 16-29.

5. Nonhandheld Engine Standards

a. Opposition to the Original Proposal

i. Too Strict

61. **Comment:** EMA and OPEI and their members have actively engaged with the Board and its staff in the development of emission regulations for small off-road engines

since the late 1980's. We worked with you on the adoption of standards in December of 1990 and a review of those standards in January of 1996, and in the intervening time, we have been engaged in an active and positive dialogue with the staff, focused on identifying the best means to provide lower emitting, cost effective, technologically feasible and customer acceptable products for the California market. We agree with the staff that the Tier 2 program originally adopted in 1990, and currently set to go into effect in 1999, would not do that. We do not believe that the Tier 2, Tier 3 program outlined in Mail-Out 98-02 would be cost effective, feasible or customer acceptable. (EMA and OPEI)

Agency Response: Staff disagrees, for reasons laid out in the staff report (pages 47-53, 22), and noted in Comments 81-83. However, the Board approved an alternative, supported by EMA and OPEI, which should provide equivalent emissions reductions with less burden on the engine industry.

ii. Too Lenient

62. **Comment:** On the nonhandheld side, which appears to be the more difficult one, as far as attaining the standards, there in the staff report, there is a list, a table, which I actually attached to the summary of our comments, which indicates a list of manufacturers that don't necessarily meet the standard, some do, but some are right on the cusp, again we have several manufacturers, several engine types that have failed to meet it, or they are right on the cusp of meeting the standard. Consistency in our regulations and our regulatory program would suggest that the argument that the staff has made for the for the handheld, the smallest engines, saying that we have working examples, we should move ahead with the regulation, and I would like to make the same argument on the larger engines. If we have working examples that are meeting the standard, or on the cusp of meeting the standard, why does this Agency feel the need to triple, or quadruple the standard, not relax in a small way, but triple or quadruple the standard, plus, for us that's shocking, but staff feels the need to go even further and provide a significant delay in the implementation of these triple and quadruple standards. We strongly oppose that position and do not believe that the staff report justifies such a relaxation. (NRDC)

63. **Comment:** EDC strongly supports implementing the nonhandheld Tier 2 HC+NO_x and CO standards in 1999 and implementing new restrictions to limit engine deterioration as soon as possible. (EDC)

Agency Response: No manufacturer of engines above 65 cc indicated that it could meet the 3.2 g/bhp-hr HC+NO_x standard with its entire engine line. Furthermore, the 3.2 g/bhp-hr standard was a new engine standard only, and did not address the problem of emissions performance deterioration. Although the standards in the staff proposal and the standards ultimately adopted by the Board are numerically three to four times the original Tier 2 standard, a straight comparison is therefore inappropriate. Other commenters have indicated that even the levels discussed in the staff report would be too stringent. The staff stands by its report, and notes that the alternative ultimately adopted by the Board would attain emissions reductions

equivalent to those noted in the staff report.

64. **Comment:** We do not believe that the relaxation relative to the larger engines, greater than 65 CC, is appropriate or justified. We would ask this Board to have staff modify the amendments that they are proposing and return with a proposal that it achieves greater control efficiency. If you read the staff report thoroughly, you would notice that the existing standards proposed approximately a 90 percent control efficiency on this class of engines. The amendments being brought forward by staff today would relax that control efficiency down to about 67 percent, not pooh-poohing 67 percent, that's a significant reduction, but compared to 90 percent, it is a significant shortfall, it's a significant relaxation, once again, one that we don't think that we can afford, one that we don't think is necessary. So, a simple request is to ask staff to take this component of the proposal, rework it, come back with a greater control efficiency, maintain the technology forcing component, achieve greater emission reductions and better protect public health. (NRDC)

Agency Response: Although the board did adopt a modified program that would not require catalyst technology or the emissions reductions requested by the commenter, it did direct staff to continue its investigation of technical feasibility and return with a technology review during implementation of the Tier 2 standards. Depending on the results of that review, the board may direct staff develop more stringent controls.

65. **Comment:** With regard to the proposed amendments for nonhandheld (>65 cc) equipment, AQMD staff is concerned about the large emission reduction shortfall that will result, and the lack of substitute mobile source measures at this time to completely offset this shortfall. (SCAQMD)

Agency Response: As noted on pages 39 and 40 of the staff report, the majority of the differences between the emissions inventory projected in 1990 and the emissions inventory projected now are due to improved modeling that includes the effects of emissions deterioration as an engine ages, rather than the modification of the emissions standards. However, staff acknowledges that this shortfall must be made up; staff has identified spillage control as one possible mitigating measure, and will continue to pursue other measures.

b. Support for the Alternative Proposed at the Hearing

66. **Comment:** The small nonhandheld engine and equipment industry is characterized by a large volume of inexpensive, highly cost sensitive, entry level market products for consumer purchasers and a small volume of expensive, sophisticated specialty application products for commercial purchasers. In addition, the vast majority of the industry is not vertically integrated. In other words, different manufacturers produce the engine and the finished product. Those products are sold through a multi-channel distribution system that allows customers to purchase products through mass merchandisers, specialty dealers, distributors, mail order, and in some cases, even direct. Those factors constrain what, when, where and how

manufacturers can implement emission reductions. The program outlined on the staff's alternative proposal today recognizes those constraints and will result in a set of regulations that will provide significant emission reductions throughout the State, and additional reductions in the area that needs the most reductions. (EMA, OPEI)

67. **Comment:** The alternative program outlined by the staff today does provide significant emission reductions for California, and it does so recognizing the unique characteristics of the nonhandheld engine and equipment industry. The staff's alternative program will provide manufacturers with much needed flexibility and will provide an incentive to both pull-ahead technology and introduce lower emitting technologies early. We strongly support the staff's alternative proposal and urge the Board to adopt it. In doing so, EMA's engine manufacturing members commit to, one, provide nonpreemptive Class 1 engines in the time frames called for by and meeting the requirements of the proposed Tier 2 emission standards, and two, provide preemptive Class 2 engines in 2003, meeting the proposed Tier 2 standards. In addition, the affected manufacturers will also provide, on a Statewide basis, products that meet the requirements of the special program applicable only to the Los Angeles Basin extreme nonattainment area. That special program properly recognizes the unique air quality needs of the Los Angeles Basin extreme nonattainment area and will result in more than 60 percent of all small nonhandheld engines sold in California meeting the Tier 2 standards in the year 2000. (EMA and OPEI)

Agency Response: The alternative referred to was approved by the Board as a modification of the original proposal. Manufacturers are required to provide emissions reductions equal to those estimated for the staff proposal in the staff report. The full text of this alternative was included in the first Notice of Modified Text.

68. **Comment:** Briggs and Stratton and Tecumseh are the two leading producers of gasoline powered engines used in nonhandheld outdoor power equipment. Together these two companies supply more than 80 percent of the gasoline engines used by U.S. equipment manufacturers in this category. The list of companies who buy Briggs and Stratton and Tecumseh engines includes more than a dozen equipment manufacturers here in this State. Tecumseh and Briggs & Stratton have been working diligently with the staff and with other stakeholders to find a regulatory strategy that achieves the desired emission reductions in a manner and a time frame that actually can be achieved by the industry. These discussions have been quite difficult, but thanks to what truly has been an extraordinary effort, mutually, by both your staff and the industry over these many months, we have found in the staff's alternative proposal an approach that we think will work. (B&S, Tecumseh)

69. **Comment:** The proposed Tier II standards will require the development and introduction of engines with materially cleaner, and as is distinct from the original standards, more durable emissions performance. We believe we can produce cleaner, more durable engines by implementing a variety of significant improvements in engine design. (B&S, Tecumseh)

Agency Response: These comments were offered in support of the alternative proposal ultimately adopted by the Board.

70. **Comment:** Introducing the improved engines to the market will require us to retool and make other substantial investments. And since we talked about the benchmark of \$10 million, I can assure you we are talking about substantially greater than that amount. It also creates risks associated with introducing new products to consumers, because this is the entry level for most lawnmowers, and that is why it is so price sensitive. We believe we can meet these challenges for California production volumes, but there are severe limits to our production capacity. EPA recognized this production capacity limit by choosing a memorandum of understanding as the mechanism which it used to allow engine manufacturers to test-market these new technologies at volumes that can be achieved in the near-term. We need an approach like that for California that likewise achieves the desired reductions but does not place engine manufacturers and equipment manufacturers in the unintended predicament of having to produce greater volumes of this new technology that can possibly be achieved given the industry's production and distribution concerns. Our greatest concern is that while we can achieve the volumes needed for California, where other States opt into this program, we could not do the same elsewhere. And in fact, we could not do the same here in California, (B&S, Tecumseh)

71. **Comment:** We have to find a way to meet within our production constraints, the aggressive desire by California for the substantial emission reductions called for by the staff proposal. Now, we think that the approach recommended by the staff [the alternative nonhandheld proposal], which we fully support, is the right balance. It provides a basic Statewide program that assures the introduction of new technologies on a reasonable time frame, from 2002 to 2006. This is the basic program, and that any other State can opt into, because we can meet those targets, following the model established by Congress in the 1990 Clean Air Act amendments. (B&S, Tecumseh)

72. **Comment:** It also provides for a set of enhanced emission reduction requirements for the area of the very worst air pollution, namely the State's extreme nonattainment area of South Coast. California, as you know, is currently the only State with an extreme ozone nonattainment problem, and hence the enhanced program can only take effect in this State, in California, because other states could not opt in to these enhanced emission reduction requirements, as distinguished from the basic one's. (B&S, Tecumseh)

73. **Comment:** We are able to meet the most stringent requirements within our production and distribution limitations. Our customers, the original equipment manufacturers, who build the equipment around our engines, cannot separately distribute one type of equipment in one part of the State and another in another part of the State. Therefore, the only practical choice we have in order to demonstrate that we have met the extreme area requirements is to deliver the new cleaner, more durable engines throughout the entire State on the schedule required in the enhanced program, and we will do that. As a result, commencing with model year 2000, more than 60 percent of the engines sold in California will meet the Tier II

standards contained in the staff's original proposal. As part of the enhanced requirements, we are also agreeing to certify large volumes of clean construction and agricultural engines that otherwise would be exempt from California regulation. The alternative proposal thus delivers the same emission reductions that would be required by the staff's proposal in the same time frame, but in a manner that allows Briggs and Stratton and Tecumseh and its customers, many of whom are here in the State, to deliver a complying product without the catastrophic market disruptions that would otherwise occur. We very much appreciate the staff's effort in working with us, as indicated, up to the last minute, to resolve this difficult challenge, and we urge the Board to adopt the alternative proposal. (B&S, Tecumseh)

74. **Comment:** Mr. Carmichael suggested, for example, if clean engines were good for California, they should be good for everyone, and we don't quarrel with that. The problem is that like every other resource in the world, they are scarce, and you have to choose. You can't make engines for everybody in the same one to two year time frame that we are doing here. That's what EPA recognized and which this staff alternative proposal recognizes. If we were to spread across the country the maximum volume we could produce in a short time frame, California would get six percent, and we offering to give you a much, much greater percentage. (B&S, Tecumseh)

75. **Comment:** What the staff has done is to basically direct the perspective benefits of the original staff proposal that went out a couple months ago and has done it for various periods of years. You will see in one of the sections various benchmark years, from 2000 to 2010, where the staff has compared the inventory, has identified what the inventory would be under their proposal, and what they have then said is that under the proposal that we and they are now in agreement on, that we would have to meet those targets in those time frames, so that it is not just a quick snapshot. It's a dynamic equivalency, and then you see several ways in which we could get there. One, as I indicated, is to accelerate the introduction of the clean technology to the year 2000, which will be the high volume percentage of the market, and then we have a variety of other ways we can do this. We can use evaporative emission controls. We can certify engines for longer periods of time than provided in the staff's report, and those are fairly long, but if we can do better, we get credit for that. We can make the engines cleaner by any strategy, whether it's catalyst, whether it's clean fuels. If we can find a way to bring those to market sooner, we get benefit for doing that. (EMA, OPEI)

76. **Comment:** So, there is an immediate incentive, a dynamic incentive for any clean or new technology or any acceleration of a strategy, or even new strategies like evaporative control, to be brought in, and, of course, what the staff will do is to review the original plan to make sure that, in fact, it hits the benchmark emission years, and then if at any point it does not, they will require a revised plan and, of course, will hold us accountable for that. (EMA, OPEI)

Agency Response: The staff recognizes that industry has production limitations and would be better served by a program that limits manufacturers' responsibility. The alternative

adopted by the Board will provide the same emission reductions as the proposal in the staff report, while providing industry with greater flexibility.

77. **Comment:** The other point that Tim made that I think is important to distinguish is that the staff proposal, and our alternative proposal that we support as sent out three to four times the original standard. As the staff said at the very beginning of its presentation, that's apples and oranges. The original standard was a new engine standard only. The current proposed standard before the Board for the nonhandheld category is an in-use, fully deteriorated standard. In that sense, if you look at it apples to apples, it is every bit as aggressive as the original staff proposal. (B&S, Tecumseh)

Agency Response: As noted in the response to Comment 62, the staff agrees that any comparison of the original 3.2 g/bhp-hr standard and the staff proposal (or the alternative ultimately adopted by the Board) must recognize that the staff proposal addresses deterioration whereas the original standard did not. However, if the comment is addressing the alternative proposal as a whole and not just the Tier 2 within that proposal, the comment mischaracterizes the alternative proposal. Although the alternative proposal should provide the same emissions reductions as the proposal in the staff report, the alternative proposal cannot be considered "every bit as aggressive," because it does not have a technology-promoting Tier 3. See Comments 81 and 82.

c. **Limitations of the Alternative Proposal**

78. **Comment:** Tim mentions that there are some engines on the cusp. There are a handful. He mentioned six that already comply. If you look at these six, these technologies are not in place. Four of the six are Class 2 engines. You will look in vain to see a vertical shaft Class 1 lawnmower, the high volume, low cost lawnmowers that we are talking about introducing to the State. This is not a problem that has already been solved. It is a problem that needs an effort. We have been working on it for eight years. We are going to continue to work on it, but to suggest that somehow the technology is already out there for the engines that matter here, is incorrect. (B&S, Tecumseh)

Agency Response: The staff stands by its assessment of technology as detailed in the staff report. However, the alternative plan will attain the same emissions reductions as the proposal in the staff report, with less inconvenience to industry. See also Comments 81 and 82.

79. **Comment:** The extreme nonattainment language that appears in the revised proposal for engines 65 cc and above basically singles out Southern California and says that the engine manufacturers should provide cleaner engines for that part of the country because they have extreme nonattainment. My read of that is that's its intent is not really to do more for the extreme nonattainment area of Southern California, but the intent is to prevent other parts of the country from employing the same clean air standards, the same clean air technologies that would be available in California. That is fundamentally wrong, and we strongly oppose that

position, that concept, and it should not be embraced by this Board. (Coalition for Clean Air, Natural Resources Defense Council, Sierra Club)

Agency Response: The ARB's mission is to protect the air quality of the State of California, not of other areas throughout the nation. The alternative proposal would allow equivalent reductions in California, at presumably less cost to industry. Additionally, the manufacturers involved have indicated that they would not be able to guarantee full implementation of those technologies nationally, due to production limitations (see Comments 70-76). Therefore, the Board approved the alternative, which will ensure California receives the control it needs. If other states opt into the California program under the Clean Air Act, those states will receive some benefits from the program, although the "extreme nonattainment" clause will limit the industry's burden.

d. Tier 3

80. **Comment:** The revised proposal for engines 65 cc and above would eliminate Tier 3. Eliminating Tier 3 takes away the technology forcing component of this program. We need to keep setting tough standards in the future, driving these industries to do what all they can do to reduce emissions. (Coalition for Clean Air, Natural Resources Defense Council, Sierra Club)

Agency Response: Staff agrees that the eliminating the Tier 3 standards reduces the incentive for manufacturers to develop cleaner technology (see the response to Comment 76). However, other portions of the program will provide incentives to continue development, notably the technology review and the air index (see the response to Comment 331-339 regarding the technology review and the air index).

81. **Comment:** With regard to nonhandheld engines, to be totally frank, we cannot enthusiastically support the staff proposed change. We think that, while we commend their efforts to try to come up with an innovative way of getting comparable reductions, we think it falls short in two regards. First of all, it does not really take advantage of everything that could be done on the nonhandheld side between now and the year 2006. We are talking about eight years. Secondly, we think that it will not spur the kind of continuing technological advancement on the nonhandheld side that we have not seen, that we certainly are seeing on the hand-held side. (MECA)

82. **Comment:** We viewed the Tier III standards, which under the staff's [revised] proposal will be eliminated, as not the end of the story but just another step forward in a continuing effort to get to a truly clean small engine. We are concerned that the fact that there will no longer be a Tier III standard is going to send the wrong message not only to companies that are involved in catalyst technology but other innovative technologies, some of which you have heard about and staff has information provided over the past few months. (MECA)

Agency Response: The Board has asked staff to prepare a technology review so it may keep abreast of progress regarding control of emissions from these engines. That review and the possibility of more stringent standards should provide incentive for manufacturers to continue their research. Furthermore, as stated in Comment 75, manufacturers will receive credit for any clean technology they opt to use in advance of the adopted standards, which will serve as another incentive.

C. Technology

1. Technological Capability

83. **Comment:** We believe that the proposed amendments could be further enhanced by tightening the Tier 2 and Tier 3 standards applicable to non-handheld engines. Tighter Tier 2 standards could be met if catalysts were utilized -- the current proposed Tier 2 standards assume no catalyst usage. For Tier 3, we believe that overhead valve engines can be optimized to enable catalysts with 40-50% or more efficiencies to be utilized-the current Tier 3 proposal only assumes a 25% efficient catalyst. (MECA)

Agency Response: The staff agrees that nonhandheld (greater than 65 cc) engines can meet standards more stringent than those ultimately approved by the Board. Additionally, the upcoming technology review will provide the Board with an opportunity to revisit the issue in the near future and pursue more stringent controls if those prove necessary.

84. **Comment:** Maurdyne Industry has been developing a secondary air injection system to be used with small single cylinder utility engines. The system provides a low-cost maintenance free means of injecting the secondary air in proportion to engine speed with no net power loss or increased fuel consumption principally anticipated to be used with a catalyst. (Maurdyne)

85. **Comment:** We have recently completed testing on a catalytic muffler system for small gas engines (e.g., 5 HP). We are confident that your system falls well within the existing and future requirements (i.e. Tiers 1, 2, and 3). Our initial cost estimate reflects a per unit cost of less than \$15.00. (Environmental Excellence Corporation)

Agency Response: These are examples of the technologies that have been developed in response to the Tier 2 standards. The ARB welcomes and encourages any company that has developed technologies that will enable engine manufacturers to meet our standards to work with those manufacturers to develop compliant products. See Comments 75 and 76.

86. **Comment:** Board Member Edgerton mentioned the concept of "all feasible measures." I was actually going to address a similar concept relating to holding all segments of California society equally responsible for air pollution and holding them to a requirement to do everything that they can. In Southern California, BACT, Best Available

Control Technology, requires industries to employ the cleanest technology available. We have multiple examples, not just one example (which is required under BACT), but multiple examples of engines and manufacturers that meet the standards, once again, supporting our position that we should not be relaxing or delaying these standards. The focus of this Board is protecting public health. It should not be bending over backwards to accommodate the manufacturers that have failed to do their part to address the air pollution problem in this State. Yes, there should be an examination of where we could be flexible, and we need to be sensitive to impacts on the market, the consumers, manufacturers, jobs, all of that, but from our read of the staff report, this Agency has bent over backwards to accommodate manufacturers that have done less, not more, done less to achieve California's air quality goals. (Coalition for Clean Air, Natural Resources Defense Council, Sierra Club)

Agency Response: Staff disagrees with this assessment. Although the changes to the handheld (0-65 cc) engine standards relax the 1999 standards, they were made to allow a greater mix of technologies and achieve a similar level of control with regards to ozone precursors. The staff report addresses this on pages 19-22 and 63. With regards to nonhandheld (above 65 cc) engines, the proposal may appear to overly relax the emissions standards; however, that impression is a false one. Even if the 1999 standards could be met by all engines in the category, the problem of engine deterioration would remain. The proposal in the staff report was consistent with the technology on which the 1999 standards were based, and with control of emissions deterioration. Although the Board adopted an alternative to that proposal, the alternative must achieve the same reductions as the proposal in the staff report.

87. **Comment:** One of the problems we identified with the staff proposal that it doesn't aggregately highlight the potential of electric equipment. That is not listed here even though it is noted in another part of the report. There is significant potential for electric equipment, and in fact, if there is one goal that we should be shooting for, it should be zero emission equipment, and that is not communicated in this staff proposal. (NRDC)

Agency Response: The staff discusses electric equipment on pages 17 and 18 of the staff report. As noted therein, the significance is primarily that electric equipment remains a valuable as an option for some uses. Staff does not believe that electric technology is, at this time, sufficient to replace all types of equipment. However, the commenter's suggestion is well-taken. The upcoming review of technology will include a review of the capabilities of electric equipment and its ability to perform the tasks traditionally performed by engine-powered equipment.

2. Handheld Engine Technology

a. Catalysts can be used

88. **Comment:** From our perspective, we are very excited that catalyst technology looks like it is one of many different paths that will get you to [handheld] Tier II, and,

frankly, we expect some engine manufacturers will utilize catalyst technology to, as you heard today, to meet the proposed Tier II standards for hand-held engines. (MECA)

89. **Comment:** Catalyst technology is a cost-effective option for reducing emissions from handheld engines, and we believe it will be one of several options meet the proposed Tier 2 handheld engine standards. As we have noted in the past, applying catalyst technology to two-stroke engines offers special challenges., but these engineering issues can and are being addressed. Perhaps this is best illustrated by the advanced catalyst-equipped engine system Husqvarna is now using on many of its product lines. The Husqvarna catalyst-equipped engine also demonstrates that a properly designed system can meet the Forestry Service temperature limits. (MECA)

Agency Response: These comments are consistent with the staff's position as described in the staff report on pages 15-17. The staff does recognize catalyst use as one control strategy for handheld engines, including two-stroke engines. At least two manufacturers, Tanaka and Echo (see comment 92), are using or plan to use catalysts as part of their efforts to comply.

90. **Comment:** The extensive experience with catalyst technology on small two-stroke engines includes: Approximately 20,000 catalyst-equipped chain saws have been used in commercial and other applications. An estimated 4,000,000 catalyst-equipped motorcycles and mopeds have been sold worldwide. Catalysts in these applications must meet rigorous durability requirements. The outstanding durability of catalysts in two-stroke motorcycle applications is illustrated in two SAE papers (SAE No. 972142 and JSAE No. 9734755). Catalysts with an efficiency of approximately 70% showed virtually no deterioration over 200 hrs of rigorous bench aging. Well over 150,000 Husqvarna catalyst-equipped two-stroke engines have been installed on lawn and garden equipment for sale in the U.S. and Europe. Husqvarna is now using its catalyst-equipped engines on all trimmers, brush cutters, hedge trimmers, and blowers with displacements of 25-36 cc. When the Husqvarna engine was introduced, the manufacturer reported a 60% reduction in HC+NOx emissions. The catalyst used has been subjected to extremely rigorous I durability tests with resulting low emission deterioration. These tests included 400-hour bench aging at full throttle/full load and 200-hour, 180,000 on/off cycling. Husqvarna also reported that its catalyst/engine system had 30% more fuel efficiency. Finally, the Husqvarna system had a 40% improvement in power, a substantial reduction in visible smoke, and no typical two-stroke odor. (MECA)

Agency Response: These comments support the staff's contention that catalyst equipped two-stroke engines would be a realistic option to meet the Tier 2 standards. Furthermore, the comment indicates that some of the arguments against use of catalysts in general, namely poisoning from oil and high concentration of pollutants in the exhaust, are probably overstated by those opposed to catalysts, since a two-stroke engine represents the worst case for those conditions.

91. **Comment:** When Husqvarna introduced its advanced catalyst-equipped

engine, it did not increase the cost of its product to the consumer. (MECA)
(MECA)

92. **Comment:** Available and most cost effective is building an engine to a higher level of precision applying a fixed jet carburetor and adding a catalyst, this is the method that we are developing for our products. (Echo)

Agency Response: As noted on pages 16-17 of the staff report, the staff agrees that greater precision and use of a catalyst can be effective methods of controlling emissions. As indicated by Table 6 on page 19 of the staff report, however, it is not the only method. Furthermore, that approach may not be the most cost-effective for everyone.

b. Two-Strokes are the Only Adequate Technology for Handheld Applications.

93. **Comment:** For virtually all handheld applications, there is no adequate substitute for two-cycle engine products. (PPEMA and Direct Mail Campaign)

Agency Response: Although manufacturers are developing two-cycle products that will meet our Tier II standards, four-cycle engine products are available now. For example, Ryobi's four-cycle string trimmer has been on the market since 1994, and Honda has a four-cycle engine, available since 1997. Independent surveys verify that consumers are completely satisfied with the performance of these products. Electric equipment has also been available for years. Finally, even were the statement true, there are two-stroke engine that meet the standards, some of which are shown in Table 6 on page 19 of the staff report.

94. **Comment:** You guys are still addressing that, the issue of two-cycle versus four-cycle, one is dirtier than the other. It basically sounds to me that once we are at this level that we are going to be at the same emissions of two-cycle versus four-cycle, so that shouldn't be the issue, whether one is dirtier than the other one. (Lawn Tech)

Agency Response: The emissions standards have always been and remain performance-based standards, rather than prescriptive. Both four-stroke engines and two-stroke engines can meet the emissions standard, as noted in Table 6 of the staff report.

c. Opposition to the standards does not mean other technologies have been ignored

95. **Comment:** We are not embracing two-stroke because it's only technology out there. It does happen to fill a niche, and it has fulfilled our customers needs and the requirements of the products we manufacture for a large number of years. The technologies we have looked at for future application are tolerance control. Tolerance control is nothing more than tightening down the tolerance of the components that relate to emissions, being the piston,

the cylinder, the carburetor, those kind of components, and there a good share of emission reductions that can come from those components. It does cost money though. It requires new equipment. For example, this year and the following year, we will purchase new machines to machine our pistons that go into our two-stroke engines. These machines cost a million and a half dollars apiece. (Husqvarna)

96. **Comment:** Enleanment is another strategy that has a lot of potential, and we have focused a great deal on that. It requires, also, improved cooling systems to account for the cylinder distortion that goes with the leaner mixture. Two-stroke engines and four-stroke engines, from air cooled engines, receive some of the cooling benefit from the fresh charge that comes into the engine. So once you have removed some of that charge by enleanment, you have less cooling to cool the piston cylinder. (Husqvarna)

97. **Comment:** Porting and combustion chamber changes and stratified charge and air scavenged, you all are going to hear about, I would like to lump those together a little bit. Those hold a lot of promise for two-stroke engines at a fairly reasonable cost. They are not new. We have worked with these for over five years. It does require very extensive testing and development to perfect these types of technologies, and then you have fuel injection in four-stroke. (Husqvarna)

Agency Response: Other companies have invested the resources and developed cost-effective complying engines. Some of those engines use two-stroke technology and some do not, but multiple methods of complying exist. The staff is cognizant of the large investment that new technologies may require and that not all attempts to develop new technologies are successful, but several companies have made the investments and found solutions. To relax the requirements beyond the staff's proposal would create a disincentive for emissions research, and punish the companies that were successful. See Comments 16-29 and the responses thereto.

98. **Comment:** Four-stroke technology is not new and has been considered for our products in the past, but over the past 50 years two-cycle engines have become the design of choice, because they are the most powerful and the most reliable. All other methods are unproven and experimental at best. Even some of these, such as fuel-injection, will remain infeasible due to their high cost and unreliability. (Echo)

Agency Response: See the Response to Comments 95-97. There are other manufacturers, such as Ryobi, who disagree with Echo's assessment. Similarly, other companies (Komatsu Zenoah and Tanaka) stand poised to produce two-stroke engines that meet the standards. The technologies are often very simple (hence reliable) and the costs of those technologies are reasonable. See Comments 102, 103, 206, and 207 and pages 43-47 of the staff report.

99. **Comment:** I think that if we can move in this process, it is a tough decision, that if we can just keep moving forward we will be there. There are some

manufacturers that I do consider still experimental. I am hearing words of assumption, that evolving models could meet, that is a difficult thing. (Lawn Tech)

Agency Response: The staff's proposal was not based on assumption, but on actual testing. The products on display at the hearing met all requirements necessary for certification under the staff proposal. Furthermore, the numerous technologies available (see pages 12-19 of the staff report) indicate that equipment-users will have a wide variety of options.

d. Four-stroke Engines

100. **Comment:** Poulan/Weedeater has manufactured two different types of four-stroke prototypes in the last 10 years. One that was geared towards trimmers, the second was applied to our chain saws. Both of these applications run into problems during the development cycle. I will talk about that in a minute. The major problems with using that technology, from my company's perspective, was cost and weight, and the third one was durability. (Husqvarna)

101. **Comment:** For commercial applications, four-stroke engines remain unproven and essentially experimental when one considers the rough handling these products receive in actual application. Our field tests seen on existing four-stroke engines has uncovered several endurance and performance problems. (Echo)

Agency Response: Staff views these arguments as attempts to show why little or no progress towards the standards was achieved, but they are directly contradicted by those companies that actively pursued four-stroke or other complying technologies. Furthermore, although use of four-stroke engines is one compliance strategy, it is by no means the only one. Staff notes that Komatsu Zenoah and Tanaka both serve the commercial market and have found other ways to comply. Komatsu Zenoah and Ryobi have jointly developed a commercial four-stroke engine that is actually lighter than a comparable two-stroke. The manufacturers of those engines have met all endurance and performance requirements associated with the equipment at hand.

e. There are Technologies That Comply

102. **Comment:** We not only have one product, we have two products. We have developed a stratified scavenging engine. It is very simple. It's been around a long time. But being around and everybody understanding it is different than being able to make it work. The technology is not that advanced or radical. We use a basic engine and make some conversions to it. The technology that we have is adaptable to low-priced equipment, if that low-priced equipment is fairly well manufactured. (Komatsu Zenoah)

103. **Comment:** There are some great advantages in two-cycles, compactness, high-powered weight ratio, which is extremely important, simple construction,

which reduces end, low cost. The disadvantages of a two-stroke engine is high THC emissions and low thermal efficiency. The drawbacks are mainly results of short circuiting of mixture during the scavenging process. Our major target was to reduce the short circuiting of the engine. The research and development targets were conforming to the original Tier II standard. We set out to comply with that standard. We didn't come up and say, well, if we do this, we get so far. We said, we are going to comply to it. The engine that we had out on display, and most of you had a chance to run it, is the newest design of a regular engine. We changed a few parts to it for the new technology to make it a stratified scavenging engine. It did not require a completely new engine. (Komatsu Zenoah)

Agency Response: The Comments counter the arguments that complying handheld equipment technology is experimental, expensive, and not suitable for multiple uses.

104. **Comment:** There are advantages to a stratified scavenging engine. One is that it runs cooler, which relates to longer life. The exhaust temperatures are almost 10 percent less. One of the disadvantages, it does not develop quite as much horsepower. (Komatsu Zenoah)

105. **Comment:** We greatly improved the erratic combustion over our current engine, which is a very important thing, which means that it runs smooth at an idle. It is a very simple design. Typically, the area that the manufacturers are most concerned with is the exhaust. Our current two-stroke engine runs at 250 degrees. We also believe we may be able to possibly improve that. The current two-cycle engines from the horsepower has been happening over many, many years. As time goes on, we will be able to improve this greatly in this engine. It is very, very simple. Problems that you run into with something like this is a heat factor, and we have reduced the heat. (Komatsu Zenoah)

Agency Response: These two comments show that use of stratified scavenging technology provides not only cleaner emissions, but durability benefits to the user. It does produce slightly less horsepower than an uncontrolled engine, but the reduction in heat provides opportunity to address the issue. Without the proposal in place, this technology would likely not have been developed because of the power loss. However, with the goal in place, the technology was examined, and ancillary benefits identified that may overcome the minor disadvantage.

f. Manufacturing variations must be taken into account.

106. **Comment:** We learned through the manufactured Tier I products that in order to meet 180 grams per horsepower hour, or HC plus NOx, for a Class 4 engine, we must develop product capable of 135 grams per horsepower hour. This provides a head room of 45 grams. On a prototype engine being designed for Tier II in the laboratory, we have been able to meet 41 grams per horsepower hour after two years of development and experimentation. This engine is hand built under ideal conditions, very precise and without variables. Comparing this to the proposed standard of 54, we have only 13 grams of head room. This is simply not enough to

allow for manufacturing variations in the engine and in the emissions components on the engine. Realistically, since this is our only alternative, we must have a standard of 86, which is what the PPEMA proposal will be. (Echo)

Agency Response: The test results shown in Table 6 of the staff report show that the Honda, Tanaka, and Komatsu Zenoah strategies all result in levels much below the 54 g/bhp-hr HC+NO_x standard. The smallest amount of compliance margin available to those engines is still over 21 grams. Although the first-generation Ryobi engine is quite close to the standard, Ryobi has indicated that it can be calibrated to run more lean, reducing the HC emissions dramatically.

107. **Comment:** Ten identical production engines with design parameters of four percent CO were tested, we saw a low of two and a half percent and a high of six percent. Measuring CO on the assembly line is a quick and reliable way to indicate what is happening to the emissions level. Normally, more CO means more hydrocarbon emissions. This simple test proves that significant variations do exist. (Echo)

108. **Comment:** For example, let's look at the 54 CC chain saw. You see a value of approximately about 75 to 80 grams per horsepower hour of hydrocarbons. The darker blue bar directly on top of that shows the certification value that we must adjust the engine to all parameters, meaning the rich and lean limits of the carburetor. That shows that in order to certify that engine we would have to go to the top of the blue bar, which is about 90 grams per horsepower hour. On top of that the lighter blue bar represents the variations, and we call it head room that we require to account for the variations in manufacturing tolerances that we have. (Husqvarna)

Agency Response: The staff does not dispute that significant manufacturing variations can exist; furthermore, all manufacturers must face the issue, although it may be more significant for some than others. However, the intent of the Tier 1 regulations was for manufacturers to improve production practices and to reduce engine to engine variability. The willingness of several manufacturers to commit to the 54 g/bhp-hr HC+NO_x standards indicates that those manufacturers, at least, have confidence that they have controlled that variability, as well as emissions levels, sufficiently.

109. **Comment:** It's not possible for us to maintain 54 grams per horsepower hour HC plus NO_x as a corporate average because we need head room to allow for manufacturing tolerances and deterioration of performance over the life of the engine. It does not matter what type of technology is used to achieve this level. All engines will be subject to manufacturing variations, and there is no affordable way to automatically adjust for these deviations. An automobile is able to achieve to maintain emissions levels through the use of computers and sophisticated sensors. The cost to the owner of a car with such a system is well over a thousand dollars. Obviously, this method of controlling emissions is not economically feasible on hand-held power products such as those in our industry. (Echo)

Agency Response: See the response to Comments 107 and 108. Staff notes that Ryobi, Tanaka, and Komatsu Zenoah all expect to meet the standards with an acceptable amount of compliance margin. The cost increases associated with their technologies range from no increase for Komatsu Zenoah stratified-scavenging technology to a 5 percent increase for Tanaka stratified scavenging with catalyst, to \$20 for Ryobi four-stroke technology. Computers and sophisticated sensors will not be needed at this level of control. Rather, careful attention to the machining and assembling of parts is all that is needed. See Comment 102.

110. **Comment:** I wouldn't call it a ban [of two-stroke engines], but what it's doing is it's making it necessary for us to go to some technologies that we feel we can't afford to put on these units and don't feel that four-cycle for us is a solution because of its performance and its durability. (Echo)

111. **Comment:** Re: the letter from Echo to its dealers: It's my feeling that's the way the proposal is written, at 54 grams, it's intended for, and I think we heard testimony from staff themselves, that you will be needing to go to four-cycle engines, or some advanced form of technology, perhaps fuel-injection, which is simply, to us, not economically feasible, and it puts us in a position where we don't have a product available to meet the 54, even though we are spending a great deal of time and effort (Echo)

Agency Response: Although the commenter is concerned about using expensive or inappropriate technologies, the complying technologies will neither impair performance or raise costs excessively. See Comments 235-267 and 206-207 and the responses thereto.

112. **Comment:** Direct injection and stratified charge, and four-strokes, too, have been around for decades. These are not new technologies. The paper patents on this stuff have been produced for years and years and years, and yes, many attempts have been made to commercialize those products unsuccessfully. (Deere)

Agency Response: In this case, a number of manufacturers have stated that they will be able to meet the standards using a number of those technologies. As the Commenter states, many attempts have previously been made. Obviously, companies such as Ryobi, Tanaka, and Komatsu Zenoah believe that they have learned from those attempts, and perfected the technology. The presence of the Ryobi four-stroke engine on the market since 1994 proves that commercialization can be achieved, even in the face of competition from cheaper and dirtier engines.

113. **Comment:** Currently, four-stroke engines are configured for trimmers and brush cutter applications only, and chain saws have a very different engine requirement. This graphic up on the wall right now with the chain saw graph on the top and the trimmer on the bottom, shows a very different power curve. The low end of the chain saw peak is near the end of the trimmer power curve. As you can see, if you would use this trimmer to cut wood, it would be past its peak in power at the minimum cutting rpm. As a chain saw company, we design engines specifically to cutting wood, and the requirement is very different. The line tip speed on

the trimmer, as you can see here, the rpm is generally less, and the power needed is not as much, and it doesn't need to rise. On the other hand, to have a good performing chain saw requires a different engine. Also, I think it is worth noting that if you just look at a chain saw, logic tells that you can't take an engine off of a trimmer and say, here's an engine, let's put it on a chain saw. It's the packaging and everything wrapping around the product and the all-position nature of how you use a chain saw that's important. So, chain saw engines are different. (McCulloch)

Agency Response: The staff recognizes that chain saws are a distinct application. Trimmers do form the largest segment of the handheld equipment market, and it is only natural for companies to approach the high volume applications first (see Comment 280). However, the technologies that have been developed are suitable for use in chain saws, as attested to in Comments 102, 103, 114, and 283-285. Tanaka, Komatsu Zenoah, and Ryobi have all indicated that chain saws will be one of the future products. Finally, chain saws above 45 cc are considered farm or construction equipment, and are not subject to these regulations.

114. **Comment:** All of the Tier II capable engines shown on the previous chart that have been developed since 1997 are all positioned, that includes the new Ryobi engine. It means it can be operated in all positions, upside down. It means it's appropriate for chain saws. (Ryobi)

Agency Response: This comment refutes the argument that complying four-stroke technologies would not be available for chain saws. See Comment 113.

3. Nonhandheld Engine Technology

115. **Comment:** Cost-effective catalyst technology is available for both side- and overhead valve nonhandheld engines to achieve HC+NOX reductions of 40 to 50% beyond the engine out levels that will be achieved in meeting the proposed Tier 2 standards. As noted above, we believe both the Tier 2 and Tier 3 standards applicable to non-handheld engines could be tightened. (MECA)

Agency Response: Staff agrees that further emissions reductions are possible. however, as noted in Comments 70-76, manufacturers are concerned about their ability to meet production volumes that would be required if other states opted into the California program. The alternative that was worked out would require the same emissions reductions as the staff proposal. Manufacturers that offer cleaner engines will benefit from the generation of emissions reduction credits, so there is still some incentive to continue to pursue emissions reductions. Finally, the Board asked for a technology review, which will examine the issue in more detail with an eye towards revising the standards if necessary.

116. **Comment:** Application of catalyst technology to non-handheld engines has been demonstrated. Nearly 100,000 lawn mowers and other lawn and garden equipment have been sold with catalysts. In the U.S., over 80,000 catalyst-equipped lawn mowers have been sold

to assist in meeting the California Tier 1 and federal Phase 1 standards and that number could reach 150,000 by the end of 1998. In addition, over 25,000 small, four-stroke engines used on equipment indoors have been equipped with catalysts to meet OSHA requirements. (MECA)

Agency Response: Staff agrees that the use of catalytic converters on small four-stroke engines is well-established, despite the claims in Comments 61 and 78.

117. **Comment:** To achieve catalyst efficiencies of 40 to 50% at the end of a non-handheld engine's regulatory useful life also will require a systems approach in which the engine/catalyst/exhaust system are integrated. Again, the major effort is in design and in selection of a properly sized and formulated catalyst for the particular application. Proper fuel management is an important consideration, but it does not mean that expensive fuel delivery systems are required. Design improvements such as improved combustion efficiency, leaner engine settings, and improved fuel delivery are possible strategies. The addition of air will also be part of the control strategy, but this can be achieved by using a pulse valve or even a simple opening. Also, the muffler must be designed to house a properly sized catalyst. Production tolerances likely would need to be improved, for example, to better control for oil consumption, and possibly more durable parts employed, but these types of improvements likely will occur in any event as engines are required to meet tighter emission standards for their full useful lives. Again, the type of engine changes needed are principally design and product improvements. Any additional hardware should add minimal costs. (MECA)

Agency Response: Staff believes that the commenter has outlined the situation accurately, and will consider these issues for the upcoming technology review.

D. Durability

1. Emissions Durability Periods

118. **Comment:** There should be an hour(s) category provided between the 50-hour disposable engine and the 300-hour commercial engine. Actually, we would suggest the partial harmonization of hours by adding categories from Class 1 of 125 hour and 250 hour. 250 hours would replace the current 300-hour category and 125 would be a new middle category. The proposal of two categories may fit the current market but in the future 4-stroke engines will not be designed for either the commercial or disposable product categories. The design target for these future 4-stroke engines will be less than 300 hours and a middle hour designation is needed for them to be economically viable. We urge California to work with EPA to harmonized on both the maximum hours at 250 and a new category at 125 hours. (Honda)

Agency Response: The 125 hour option was added as part of the notice of modified text. The maximum hours at 300 was retained, as other commenters (see Comment 119) agreed that 300 hours was an appropriate measure for commercial equipment less than 65 cc.

119. **Comment:** We took the staff 50 hour and 300 hour limits, because we think that's a very appropriate way to look at it, because clearly, 50 hour engines are consumer, and 300 hour engines are professional. (McCulloch)

Agency Response: Staff agrees that the 50 and 300 hour limits are appropriate for equipment below 65 cc. Those periods were developed by the U.S. EPA in conjunction with industry during the regulatory negotiation process, and California's adoption of them further harmonizes the two programs.

120. **Comment:** In summary, the THC emissions and the thermal efficiencies were greatly improved by the use of stratified scavenging. These tests satisfy the proposed ARB Tier 2 standard. Those ratings, emission ratings, get better as some hours are put on that engine. That engine will last a lot more than 300 hours. It is rated at 14 air fuel mixture on both engines, the current engine and the prototype engine. The THC is 80 percent lower at the rate of speed in the new engine. The second prototype engine also achieved your target in CO and NOx. (Komatsu Zenoah)

Agency Response: The commenter's experience with complying technology (stratified scavenging) is that durability and emissions are both quite good.

121. **Comment:** Westerbeke would like to propose to the Board an additional useful life period for Class 2 engines of 1000 hours. This additional useful life period will be in harmony with both of EPA's proposed rules for non-road CI and SI engines. Harmonization with EPA on useful life periods will help reduce the testing requirements for all manufacturers. (Westerbeke Engines & Generators)

Agency Response: Staff does not necessarily agree that 1000 hours is appropriate, and is concerned that it could lead to over-estimation of emissions credits. U.S. EPA was considering restrictions on cross-class averaging to prevent windfall credits; this program does not restrict cross-class averaging, but must still guard against windfall credit generation. A federal useful life of 1000 hours should not in any way conflict with a California emissions durability period that is shorter, so harmonization will be preserved. Additionally, staff notes that the commenter would qualify as a small volume manufacturer, and would not need to conduct any durability testing unless it so chose. Thus, the commenter has another option to reduce its testing burden.

2. Deterioration Factors

122. **Comment:** Aging engines to determine deterioration factors is a very expensive and time consuming task. The flexibility proposed to allow small volume engine manufacturers to forgo useful life testing is appropriate, since small volume engine manufacturers have very limited resources. To force small businesses to perform useful life tests of 250 or more hours is impractical. Deterioration factors should be assigned to small businesses depending on the class of engine, useful life, and application. (Westerbeke Engines & Generators)

123. **Comment:** Small volume manufacturers should be given the option to develop their own deterioration factor if they choose to do so. (Westerbeke Engines & Generators)

Agency Response: The regulation allows small volume manufacturers to use an assigned deterioration factor rather than perform engine aging, as noted on pages 34-36 of the staff report. However, any manufacturer that does not wish to accept an assigned deterioration factor remains free to determine a deterioration factor using the same procedures as other manufacturers. Staff did not believe it necessary to include a third option whereby a manufacturer would determine its deterioration factor in a different way than any other manufacturer could.

124. **Comment:** The major differences between these standards [is that] Tier 1 and Phase 1 were new engines only. Phase 2 and Tier 2 are in-use, meaning the engines must comply throughout their useful life. That is a big differential, mostly from an emissions standpoint, but also from a durability standpoint from the manufacturer.(Husqvarna)

Agency Response: Actually, neither ARB nor EPA's proposed program is an in-use program to the extent that the phrase connote testing of actual consumer equipment and possible recall if emissions standards are not met. Rather, both programs require that the engine manufacturers demonstrate some emissions durability. The addition of this burden has been counterbalanced by the relaxation of the emissions standards, and the delay of implementation. .

125. **Comment:** Mr. Carlock's slide showed deterioration of four-stroke engines. They deteriorate. (Deere)

Agency Response: The staff agrees that four-stroke engines demonstrate emissions deterioration. The procedures adopted require manufacturers to show that deterioration will not cause an engine's emissions to exceed the family emission limit during the applicable emissions durability period. Staff believes that this arrangement, along with the averaging program, offers manufacturers the maximum flexibility in determining how to meet the standard while still maintaining control over deterioration.

126. **Comment:** I don't think that we know that they [the two-stroke engines from the demonstration] do over 300 hours. (Echo)

Agency Response: As noted at the hearing, the two-stroke engines on display at the hearing had met all the proposed requirements for engines with a 300 hour emissions durability period. See Comment 120.

127. **Comment:** We must consider the deterioration factor. Although two-cycle engines do not significantly deteriorate over time, catalysts do. They are subject to failure due to vibration as well as simple contamination. I don't think anyone knows for sure what

would happen to a catalyst on a small engine over the 300 hour durability requirement in the real world. Remember, we have commercial products. It's 300 hours. The type of fuel, the additives, the type and amount of oil used will impact the life and performance of the catalyst. (Echo)

Agency Response: Staff agrees that there are issues associated with the use of catalysts. However, as MECA noted in Comments 88-90, there are numerous instances of successful use of catalysts on two-stroke engines. If catalysts are not desired, other complying technologies are available.

128. **Comment:** Running the unit on the choke for extended periods can do damage. All of these variables including the type of fuel, the additives, and the type and amount of oil are out of the manufacturer's control, but we must still allow for the deterioration caused by them. (Echo)

Agency Response: See Comment 90, wherein MECA describes the successful use of catalysts on two-stroke engines. Also, pages 30-32 of the staff report discuss these issues.

129. **Comment:** Part II, section 3 of the Test Procedures requires that engine testing be conducted to determine the engine deterioration factor for each engine family. ARB should offer the option to adopt a pre-assigned deterioration factor. (EMA)

Agency Response: An assigned deterioration factor is available to low volume manufacturers as defined in Part II, section 3(b). However, because of great variety of engines and control technologies, individual deterioration factors will be more representative of the actual characteristics of the various engine families. Additionally, manufacturers who build durable engines could be penalized under the assigned deterioration factor system, in that credits they were entitled to would not be available. Also, deterioration factors only need to be calculated once per engine family, unless the engine family is recertified. Since the revised regulations provide for only a single tier of standards, the burden is low.

130. **Comment:** Part II, section 3(a)(2)(A) and (B) In determining the deterioration factor for each engine family, ARB allows a manufacturer to choose the test points, however a period of ± 2 hours for equally divided test points must be used. This is too tight a figure and EMA recommends that this be changed to a period of at least -5 and +10 hours. (EMA)

Agency Response: The ± 2 hour limit provides a window of four hours, one-half a standard work shift. Furthermore, the period as a percentage of an engine's emissions durability period is quite high from ± 4 percent (for a 50-hour engine below 65 cc) to ± 0.4 percent (for a 500 hour engine above 65 cc). This window is much greater than similar windows for other categories. For instance, if an on-road vehicle has a useful life of 100,000 miles, and must be tested within ± 250 miles, the window is only ± 0.25 percent. Since all service accumulation will

be done in a laboratory rather than in real-world use, and since deterioration factor testing must be done only once for each engine family, staff believes that the four-hour window is both appropriate and not overly burdensome.

E. Credit Program

131. **Comment:** Westerbeke supports the average, credit, and banking system proposed in the amendments. Westerbeke supports the early banking proposal with one modification. The modification to the early banking proposal is to allow any manufacturer whose engines are below the Tier 2 standards to bank credits. This action will likely promote early banking of credits. Early banking of credits should be encouraged. Early banking will reward manufacturers for pushing their clean engines to market sooner. (Westerbeke Engines & Generators)

Agency Response: The program does allow early banking.

132. **Comment:** This paragraph 2408(b)(5)(C) states that credits may be used to cover subsequent production. ARB should expand this to also include past production. (EMA)

Agency Response: As noted in Section 2408 (b)(5)(D), a manufacturer may use credits to cover past production upon Executive Officer approval, if that manufacturer adjusts the failing engine family's Family Emission Limit accordingly. Additionally, as per Section 2407 (d)(5), when assessing consequences for production line failure, the Executive Officer will consider all information provided by the engine manufacturer and other interested parties (e.g., the equipment manufacturer), including the availability of emissions credits to remedy the failure, prior to taking punitive action.

133. **Comment:** Paragraph 2408(b)(5)(C) states that the use of credits to remedy a nonconformity may be used "at the discretion of the Executive Officer." Provided that manufacturers have credits available, manufacturers should be allowed the full use of their credits and credit usage should not be discretionary. (EMA)

Agency Response: This remains at the discretion of the Executive Officer and usage of credits will be allowed in most cases, as provided for in the regulations. However, the staff reserves the right to impose other penalties in cases of egregious noncompliance, such as a habitual offender.

134. **Comment:** 2408(d)(1) Early banking based on the 3.2 g/hp-hr standard needs to be revised to reflect the 9.0 g/hp-hr standard for Class II and 12.0 g/hp-hr standard for Class 1. (EMA)

Agency Response: This has been revised in the first Notice of Modified Text.

135. **Comment:** 2408(f)(4) This paragraph eliminates some of the flexibility of the AB&T program. ARB should allow full flexibility to adjust FEL's, and no restrictions should be imposed on the flexibility of averaging, banking and trading. Anything that does so reduces the efficacy of the AB&T program. (EMA)

Agency Response: Manufacturers have the freedom to adjust FEL's on a forward going basis. However, for engines that have already been produced, a determination will have to be made on a case by case basis to encourage responsible selection of Family Emission Levels. See also Comments 132 and 133 and the responses thereto.

136. **Comment:** We would like clarification on this entire section 2409. (EMA)

Agency Response: Staff modified the language in this section to improve its clarity and ensure its consistency with other parts of the regulation. The section refers to credits generated between the FEL and production line test results (i.e. credits for good compliance margin -- Section 2408 refers to credits generated for differences between FEL and the standards.) The staff plans also to conduct some meetings for industry to provide examples of how the credit programs would work.

137. **Comment:** 2409(c)(2) By requiring a credit rate of 1.1 to 1 to demonstrate a zero or positive credit balance, ARB is discounting credits. The ratio should be 1 to 1. (EMA)

Agency Response: As noted in the response to Comment 136, Section 2409 refers to credits generated when the production line test results are below the FEL. Traditionally, manufacturers have not received any credit for the compliance margin; instead the benefit has gone entirely to the air. In this case, discounting of these credits enables both the manufacturers and the air to benefit from producing engines with significant compliance margins. In contrast, full credit is given for certification credits between the FEL and the standards.

138. **Comment:** Part I, section 9(d) [of the Test Procedures] states that emissions reduction credits may be used to modify the manufacturer's corporate average "as an addend in the numerator of the equation in paragraph (1) below." This is not clear and requires further explanation. (EMA)

Agency Response: The staff revised the language to clarify the use of credits in the corporate average and ensure consistency with Sections 2403 and 2408 of Title 13. Those changes are shown in the first Notice of Modified Text.

139. **Comment:** Part I, section 9(d)(3) ARB requires the emissions reduction credits be expended at a rate of 1.5 pounds for each excess pound. Rather than discounting credits, ARB should provide for a 1 to 1 exchange, especially if made up in the

following model year. (EMA)

Agency Response: The language has been revised so that manufacturers who make up end-of year deficits during the following model year will be allowed a 1 to 1 exchange. After that, the rate will be 1.5 to 1, to ensure speedy resolutions to any deficits. The changes are indicated in the first Notice of Modified Text.

F. Production Line Testing

140. **Comment:** The cum-sum production line statistical sampling method should be available for manufacturer use during the remaining Tier I model years. (Honda)

Agency Response: Paragraph (b)(1) of Section 2407 allows manufacturers to request alternative procedures that show an equivalent assurance of compliance. Although staff did not believe that it was appropriate to allow a complete conversion to Cumulative Sum during the remainder of Tier 1, a manufacturer has a way to accomplish that under the current provisions.

141. **Comment:** Westerbeke would like to propose an exemption for small volume manufacturers from all Production Line Testing. This will reduce the burden on manufacturers, and allow them to redirect those resources to new product development

Agency Response: Production line testing is the final evidence that a manufacturer is offering complying engines; hence, staff does not believe that any manufacturer should be fully exempted from the program. However, manufacturers have the option of choosing one percent testing in place of the cumulative sum procedure for production line testing. Although cumulative sum guarantees fewer tests for large engine families than the one percent testing, small volume manufacturers may minimize their tests by retaining the one percent testing.

142. **Comment:** Another flexibility provision Westerbeke would like to propose is to exempt very clean engine families from PLT as a method of rewarding manufacturers for achieving such low emissions, while also giving them the incentive to strive to manufacture very clean engines. Very clean engines would be defined as engines whose emissions are below the proposed Tier 3 standards during the Tier 2 time period. (Westerbeke Engines & Generators)

Agency Response: The staff's production line testing program is itself a lesser burden than currently exists. The staff does not wish to lose the information provided by production line-test data altogether. Staff has provided small-volume manufacturer provisions, most notably the ability to use an assigned deteriorating factor in lieu of costly engine aging. Furthermore, the Cumulative Sum procedure is designed to pass very clean families in a small number of tests, and this incentive would be applied dynamically --i.e., an engine family that is clean could pass PLT in as few as two tests per production quarter.

G. Labeling

143. **Comment:** The engine emission label for Tier 1 already contains a lot of information and is therefore too large to fit in most locations on an engine. With the additional requirement for an hour statement the label will become very difficult to place in a visible and nonvulnerable location. There should be options for some information to appear in other locations on the engine. For example, "refer to the owner's manual" could be moved from the emission label and placed on another label. Another item that could be simplified is the requirement for both the manufacturer name and trademark. When one name will adequately identify the engine manufacturer there should be the option to delete the second identifier. Honda would also suggest that the abbreviations for tier are allowed, i.e. T2 or TII and the listing of the years of the standard are dropped and the family name and manufacture date is considered sufficient to identify the year of compliance and the standard level.

We also request that the Staff and Board harmonize label requirements with the EPA so that simple and common language will allow an engine to be labeled for different tiers, phases, and different classes especially during the EPA transition years. There will be a need for a reasonable label to be applied to 50 state engines. Harmonization should also include a standardized name for this off/non-road category of engines. (Honda)

Agency Response: Staff has provided for a relaxed engine label provision as part of the post-hearing amendments included in the first Notice of Modified Text. The information that would otherwise be contained on the engine label can instead be indicated in the owner's manual. Staff believes the simplified label requirements will facilitate harmonization with the U.S. EPA requirements.

144. **Comment:** The emissions durability period hours should be explained in the owner's manual only. To the extent that category identification would be required, it is strongly recommended, (due to space constraints on the label), that the label identify the category, but that an explanation of the category be provided in the owner's manual. This would allow for a 50 state label. (EMA)

Agency Response: The hours requirement has been deleted from 2404(c)(4)(H), and the engine label requirements modified to allow greater flexibility to manufacturers. These changes were included in the first Notice of Modified Text.

145. **Comment:** The Manufacturers of Emission Controls Association is a nonprofit association of companies that manufacture emission control equipment for mobile sources. We have 33 member companies. A number of those companies are working on technologies for small engines. When the Board adopted the regulatory program for small off-road engines, it really caused a spark in substantial R and D efforts. There has been considerable effort, and perhaps maybe some effort greater in some areas than others, but nevertheless, considerable progress. It certainly put our companies into action in response to and

reliance of the Board's proposal and continuing interest in this area. Our companies have spent literally millions of dollars in R and D efforts with catalyst technology, and the result of that investment together with over 25 years of experience in catalyst technology has led us to the point today where we are seeing catalyst technology being put on both nonhandheld and hand-held engines, and I think that is a real success story. The first point I would like to make is with regard to the comment that was made earlier and, actually, several people have commented on it, and that is the role of market based incentives. I personally, and I think we as an organization, feel that market based incentives can play a very, very important role. It is not a substitute for a comprehensive regulatory program, but it can be a very, very effective enhancement, and I would like to talk about some thoughts that we have on that subject. One thing that was mentioned, the idea of labeling and emission indexing. We think that is an excellent suggestion. Something that might, perhaps, be modeled after the index labeling for the current automobiles with a range of zero to 100 with, perhaps, zero the electric powered engines, and 100 being your Phase 1 or Tier 1 standards. (MECA)

146. **Comment:** There is a significant additional opportunity to achieve emission reductions beyond those which will result from the proposed standards by also using market-based mechanisms to promote the manufacture, sale, and use of low-emitting lawn and garden equipment. We support the concept of labeling lawn and garden equipment. Further, we believe all lawn and garden equipment should be required to provide emission information, and not just those engines that are low-emitting. The consumer deserves to know how much pollution they breathe and to have sufficient information available to them to make an informed choice. (MECA)

147. **Comment:** Finally, we have a couple of requested changes, at least one of them is relatively easy for this Board to implement and some may be a little bit more difficult. The easy one first. Staff is proposing a modification to the labeling requirements relative to durability. We would encourage this Board to go a step further and to require as part of that labeling requirement some form of emissions index, some number, or scale that indicates to the consumer what the emissions are associated with this piece of equipment that they are purchasing, and it should apply to all small engines sold in California. It is important for us to educate the consumers, educate every Californian on the impact of the purchases that they make, whether it's an automobile or a piece of equipment. It is a simple thing to do. This Agency can require it, and we strongly urge you to do it. (NRDC)

Agency Response: The staff has included an Air Index program, which is described in the first Notice of Modified Text, and amended in the second Notice of Modified Text. The program will require manufacturers to make emissions information available to consumers prior to purchase.

148. **Comment:** An important element in promoting the manufacture, sale, and use of "green" lawn and garden equipment would be for ARB to establish a program for the voluntary certification of engines that emit significantly below the mandatory program. A

properly formulated market based program and a concerted public education program could lead to a substantial market for low-emitting lawn and garden equipment. First, we believe as consumers are educated regarding the levels of pollution to which they are directly exposed in operating equipment and the contribution of using that equipment to the State's air quality problems, a strong demand for clean products will emerge. Second, air districts may seek to achieve SIP emission credits for programs designed to replace older, high-emitting lawn and garden equipment with equipment meeting the low emission standards. Third, government agencies may be very interested in purchasing "green equipment" to be used by their employees. Fourth, commercial lawn and garden service companies likely will be interested in purchasing "green equipment" to protect their workers and to enhance their image in the community. (MECA)

149. **Comment:** We have tried to be proactive and come up with some suggestions about, perhaps, ways, if the Board decides to go ahead and approve the staff's most recent recommendation, things that might be done to try to address some of the concerns that I mentioned, and we really suggest three things here. First of all is to -- we have suggested adopting optional reduced emission standards for HC and NOx beginning in the year 2000, and that suggestion was based on a similar idea that has been expressed with regard to heavy-duty engines. Now having said that, the staff may have some ideas on how to accomplish the same goal without necessarily specifically adopting optional low emission standards. The concept is to set some targets out there around which you can build a market based incentive program. (MECA)

Agency Response: The Air Index Label will provide some opportunity for this effort, by apprising all consumers of the relative emissions levels of various products. The staff will also be further examining the possibility of optional standards programs in a future effort.

150. **Comment:** We perceive an after-market for this device. It is a substantial and growing percentage of consumers would be willing to pay a premium for very low emissions equipment, provided that they are adequately informed. The second request that I have is a green labeling program. This is similar to, I think, what Tim Carmichael was talking about with emission index labeling. We would propose two ranges to be recognized by this labeling program. Emissions in the 40 to 60 percent range of mandated standards would qualify for low emissions labeling, below 40 percent of mandated standards would qualify for an ultra-low emissions labeling. But the important point with respect to the labeling is that what we want to be able to do is to have the promotional benefits of such a program be available not to just engine manufacturers but to after-market suppliers such as ourselves, and we propose that such after-market systems would have to meet a durability period equally or exceeding the certified emissions durability period of the engine on which it is going. (Maurdyne)

Agency Response: See the response to Comments 148-149. Also, note that the Board considered and adopted regulations for aftermarket parts in November 1998.

151. **Comment:** Finally, Maurdyne requests that such a "green" labeling

program commence in 1999. (Maurdyne Industries, Inc.)

Agency Response: Although the staff has developed an Air Index program in response to the Board's directive, lead time considerations and the desire to allow industry flexibility in disseminating the information have made a 1999 implementation date untenable. The details of the Air Index program are described in the first Notice of Modified Text, and amended in the second Notice of Modified Text.

152. **Comment:** From a marketing standpoint, the dealers would encourage, of course, any safety levels labels. We would like noise, the dBa; we would like the HC and NOX labels put on them. From a marketing standpoint, consumers could choose as we go through these levels, the 50 versus 300, we would like to see those labels. (Lawn Tech Equipment Company)

Agency Response: Safety labels and noise labels are beyond the scope of this action. The Air Index program does require manufacturers to provide information regarding HC + NOx levels and durability.

153. **Comment:** The second element of our proposal is for the staff to look very hard at the issue of market based incentives and see what could be done in that area. I think a program either based on optional reduced emission standards, or some other fashion, whether it's set targets, it could have an effect. We would be very interested if the Board directs the staff to go forward with a comprehensive evaluation in this area, we would be very anxious to work with the staff on that. I can just tell you that I have talked to a number of air quality officials at the local level, and other states, and they are very interested in a program like this, and we are suggesting something similar with EPA, so I think it is something that has tremendous possibilities. (MECA)

Agency Response: The Board directed the staff to establish a working group to examine the possibilities of optional standards. Staff expects to finalize the working group (which will include various interested parties) by early 1999. Any action resulting, such as the establishment of optional standards, will be done in the context of a separate rulemaking.

H. Environmental Impact

1. Need for Further Controls

154. **Comment:** The Tier II rule is essential to meet the SIP goals. (Ryobi)

155. **Comment:** It's important, to conclude, that we are dealing with Clean Air Act goals. The Clean Air Act has goals which are to achieve the maximum degree of emissions possible and attain those standards at the earliest possible date, considering the economic, technological and fuel factors, among others. The staff has done that. They have

given you a proposal which is worthy of your consideration, in fact, I think demands your adoption. (Ryobi)

Agency Response: The staff agrees. Discussion of the SIP is contained on pages 37-42 of the staff report.

156. **Comment:** Emissions from this category of engine comprise 2% of the ROG and 3% of the NOx inventory in our region. While these percentages are relatively small, every feasible emission reduction strategy must be employed if we are to attain health based air quality. (SMAQMD)

157. **Comment:** In the Bay Area, these small engines emit about 11 tons of hydrocarbons per day. Although these emissions are a modest fraction of our overall hydrocarbon inventory, given the overwhelming contribution from motor vehicles, they represent a significant portion of our off-road emission inventory. Only recreational boats and light construction equipment contribute more hydrocarbon emissions. As a result, we believe that efforts to control emissions from these engines are important, necessary, and fair, given the degree of regulation of other off-road categories. (Bay Area AQMD)

Agency Response: Staff agrees. The inventory is discussed on pages 37-42 and 61 of the staff report.

158. **Comment:** There is another reason I think that you are right. I am really a California citizen. I have lived most of my life here. My grandkids live here, and I appreciate you protecting them. (Jim Cotton of Komatsu Zenoah)

159. **Comment:** The numbers of people here today are not representative of the overall public interest. Those testifying in favor of weakening the standards are paid to come here. On the other hand, I think it is safe to say that not one in a thousand members of the public even knows this hearing is going on, and those that do are mostly at work and can't attend. According to the ARB's own literature, 90 percent of Californians live in areas of polluted air. Every little bit of pollution harms us. According to a 1997 article in The Sacramento Bee, 152,000 people in Sacramento County, for example, have health conditions that make them particularly vulnerable to the effects of air pollution. That's 13 percent of our population. Consumer Reports and others, such as World Watch have pointed out that industry typically exaggerates the cost of complying with new regulations. Even some manufacturers here today support the 1999 standards. Finally, the engines most able to comply with the emissions standards will tend to be quieter, and this is a major advance for the quality of life in our communities. We support clean air and oppose weakening of the requirements on these small engines. We believe the interest of the general public and clean air outweigh the needs that some members of one industry see as their route to profitability. Please continue to place the good of the entire population above the interests of one industry. (ECOS)

Agency Response: The staff generally agrees with the Comment. However, the characterization of the changes as simply "a weakening" of the requirements is inappropriate. Although the standards are numerically larger, implying that they are less stringent, they include a durability compliance component that was previously missing. See the response to Comments 62 and 63.

160. **Comment:** The small non-road engines are relatively uncontrolled with respect to emissions. Their contribution to regional air pollution is significant. States and regions need greater emission reductions from a variety of sources in order to achieve air quality goals, and cleaning emissions from small engines is a critical part of a comprehensive clean air strategy. (MECA)

161. **Comment:** Additional benefits from clean small nonroad engines will be derived in the micro-environment of the customer whose breathing space is polluted when using lawn and garden equipment the non-handheld engines are made by a fairly small number of engine manufacturers who sell engines to a large number of equipment manufacturers. Engine manufacturers have the technical skill and resources to make the necessary engineering effort to design and market clean engines. (MECA)

Agency Response: The staff generally agrees with these Comments.

162. **Comment:** I urge you not to relax the air pollution standards for two-stroke engines, as the exhaust emissions from their gasoline-oil fuel often occurs in residential areas where citizens are readily exposed to the toxic and smelly constituents of this type of exhaust. (Muriel Strand, PE)

Agency Response: The staff proposal, although a relaxation of CO and PM standards, would achieve essentially the same emission levels of HC+NO_x. Furthermore, as discussed on page 20-21 of the staff report, reduction of HC levels will result in a reduction of PM levels. This will, in general, reduce public exposure to those pollutants.

2. No Need for Further Controls

163. **Comment:** Exhaust emissions from two-cycle products are insignificant -- less than one percent of California's total air pollution. (PPEMA and Direct Mail Campaign)

164. **Comment:** We strongly oppose these rules for the following reasons: Exhaust emissions from these two stroke products account for considerably less than one percent of California's total air quality contribution. (Stihl)

165. **Comment:** [In response to the PPEMA survey of the California Park and Recreation Departments,] Several Departments questioned the need for such drastic regulations given the small amount of air pollution from hand held products. (PPEMA)

166. **Comment:** The respondents in all four focus groups [involved in the study sponsored by PPEMA] concluded, by midway through the discussion, that California's efforts to clean up air pollution are misguided, putting so much effort into a one percent problem. Comments of all four discussion groups reflected this point, which was expressed most eloquently by Lisa in the Sacramento focus group, as follows: "What about the other 99%? Let's concentrate all these efforts over there, because it seems we get better bang for the buck. What's another hundredth of a percent from hand held power tools, when you can get say 2% off of cars.' (PPEMA-Moore)

167. **Comment:** PPEMA is greatly concerned that the proposed regulations will have an extreme adverse economic impact on all businesses in the industry, both large and small, and consumers will have to pay significantly more for handheld products. A prime example of the anticipated economic impact is gas trimmers. Approximately 270,000 gas trimmers were sold in California last year. Forty-two percent of those units sold at retail for less than \$80 and sixty-six percent sold for less than \$100. The proposed regulation is premised on converting those products to 4-stroke engines which retail for \$180-\$250. This economic impact speaks for itself and is particularly dramatic when you remember that the entire handheld product category represents less than one percent of statewide emissions. (PPEMA)

Agency Response: There are many sources of air emissions that contribute to California's air pollution problem. Passenger cars and trucks cause about one-half of the air pollution in California, and they are stringently regulated to less than one-one hundredth (1/100) of pre-control emission levels. In order to meet our federal- and state-mandated clean air goals, ARB must reduce all sources of air pollution. California cannot rely on a few industry sectors to do the whole job. Ignoring any of the many sources of air pollution would prevent us from meeting mandatory clean air goals and protecting the health of our citizens. In addition, the cost-effectiveness of reducing emissions from these sources is well within the range of other measures recently adopted by the Board.

Although emissions from two-cycle engines are a small proportion of California's total air pollution today, in the future their importance will increase as other sources are controlled. This is because small two-cycle engines emit very high levels of air pollution. For example, a half-hour of lawn mowing with a typical walk-behind mower produces as much hydrocarbon emissions as driving a 1995 automobile for about 100 miles. Even more dramatically, using a commercial chain saw for two hours produces the same amount of hydrocarbons as driving a 1995 car for about 2500 miles. Also see Comments 156 and 157 regarding the needs of local districts to reduce emissions wherever possible.

168. **Comment:** Manufacturers are committed to cleaner air and already have reduced emissions from handheld products more than 30%. ARB is asking for emissions from two-cycle engine products to be reduced a total of 81 % - an extreme and unreasonable requirement given the small amount of emissions from these products, less than 1%. (PPEMA and

Direct Mail Campaign)

Agency Response: Standards for two-cycle products have been on the books since 1990, with the first tier regulations coming into effect in 1995, requiring an emission reduction of approximately 30 percent. The Tier 2 standards have also been on the books since 1990, and were developed with full knowledge of the reductions expected from the Tier 1 standards. Several manufacturers have developed engines in response to those Tier 2 emission standards and should not be penalized for their efforts. See Comments 16-29 and the responses thereto. Also see Comments 154 -162 regarding the need for control of this category.

169. **Comment:** The great majority of the respondents believe California should adopt the Federal Phase 2 regulations for two-cycle hand held power equipment; 80% favored the EPA approach, 20% favored the ARB approach. The respondents believe the State's proposed Phase 2 regulations are excessive and unnecessarily stringent for this minimal source of air pollution, and they see no logical reason for the State to take such drastic measures. (PPEMA-Moore)

Agency Response: As discussed above, these emission reduction requirements have been on the books since 1990, and several manufacturers either have products on the shelves or have told us they will have products ready by 1999 that meet the requirements. The emissions levels are based on what technology can cost-effectively achieve. Because of California's problem with air quality, we need to make the maximum clean air gains based on what can be achieved by technology in any area. The U.S. EPA standards were considered, as discussed on page 63 of the staff report. However, the U.S. EPA standards would add 23.8 tons per day of HC+NO_x to the 53.3 tons per day already needed to meet the controlled inventory from these engines, as set forth in the SIP.

170. **Comment:** We evaluated whether California consumers would support the proposed Tier 2 approach of ARB or Phase 2 air quality regulations proposed by the U.S. EPA for small handheld products powered by two cycle engines. Participants were average homeowners, who live in areas where they are likely to come in some contact with the use of these handheld products, either their own use, their gardener, or their neighbors. We did not specifically select individuals who own or use small handheld two cycle products. We discovered in the discussions that the majority of participants did in fact own one or more small handheld two cycle products, but also included a number who do not own or use these products. Our primary findings from this series of four focus groups were quite clear and consistent throughout the State, as follows: Most Californians believe automobiles are the major source of air pollution in California and that air quality has markedly improved over the last 5 years, principally due to reductions in auto emissions. California voters are not very concerned about the emissions from small, portable, handheld two-cycle power equipment. Once the respondents learned that small, portable, hand held equipment produces less than 1% of the emissions in California, all four groups of respondents repeatedly questioned "Why are we even talking about this?" and "Why is this being given so much attention?" (PPEMA-Moore)

Agency Response: See the responses to Comments 168 and 169.

171. **Comment:** Overwhelmingly, the respondents [to the study sponsored by PPEMA] strongly oppose regulations that would harm these industries, both the manufacturers of handheld equipment and the industries that use this equipment as a vital part of their daily operations, most notably the gardening and yard care industry, for no noticeable decrease in air pollution. (PPEMA-Moore)

Agency Response: The staff proposal was carefully developed to provide some relief from the original 1999 standards for manufacturers of handheld equipment while not punishing those who had developed complying engines. The result is that all standards were delayed by one year and relaxed. The CO and PM standards were significantly relaxed, while the HC and NO_x standards were combined to allow a greater range of technologies. This ensures that complying products will be available. The emissions reductions achievable are both significant and relatively inexpensive --see Comments 154-162, 206, 207 and 260.

172. **Comment:** California voters want cleaner air, and they support the overall efforts of both the State and Federal government to reduce air pollution. The voters recognize that air quality is greatly improved today because of State and Federal regulation of the auto industry. California voters believe that eventually all industries should meet acceptable standards. But the voters also believe the Federal and State government should use common sense in establishing regulations for industries. In this particular case, California voters believe the State is demanding too much, too soon, and putting industries at risk for negligible emissions reductions from an insignificant source pollution. It is very clear from this research that an overwhelming number of focus group participants preferred the EPA approach to the ARB approach, given the limited potential of the ARB Tier 2 proposal. In general, the EPA approach was considered to be a reasonable approach. The ARB technical staff approach was considered to be extreme. And the respondents were satisfied that the Portable Power Equipment Manufacturers were being reasonable by being willing to comply with the EPA Phase 2 regulations. (PPEMA-Moore)

Agency Response: Staff believes that it was fair in developing the emissions standards, as demonstrated by the discussion in the staff report, and the support for those standards that several companies offered at the hearing. Additionally, staff believes that the information provided to the focus groups did not include all the information included in the staff report, particularly that one company had developed a compliant engine by 1994, that more than one company could meet the standard, that regulations were on the books since 1990, or that the staff proposal increased flexibilities from the existing requirements.

3. Increase in Emissions

173. **Comment:** The combination of the proposed relaxation of emission

standards and the increased emission inventory could result in a substantial emission reduction shortfall, estimated to be on the order of 53 tons per day statewide in the year 2010. ARB staff has identified an additional strategy to be implemented in the future that would partially offset this 53 tons per day shortfall--control of fuel spillage emissions from small off-road engines. Nevertheless, AQMD staff requests that ARB commit to develop and implement additional mobile source measures, beyond those designated in the SIP, to completely offset the 53 tons per day emission reductions shortfall. AQMD staff is concerned that without such action some parties might propose to unfairly place this additional emission reduction burden on the stationary source sector. (SCAQMD)

174. **Comment:** The roll back that is proposed by staff has a profound negative impact on the State Implementation Plan. (NRDC)

175. **Comment:** We strongly oppose the elimination of Tier 3 as proposed by staff. Relative to the California SIP and air quality, the proposed relaxation combined with inventory changes has a really profound impact on the SIP, more than 50 tons per day. That is a huge emissions burden, and in fact, it is a multiple exponentially bigger than most of the regulatory programs will achieve. (NRDC)

176. **Comment:** In fact, California can't afford the luxury of that relaxation. You relax standards when you attain the air quality standards. You relax the regulatory standards on industry when you can afford to do it. Right now we are in the position of scrambling for every ounce of reductions that we can find from every industry. A relaxation here not only hurts the engine manufacturers that have done what they needed to do to achieve the standards, it hurts every other industry that this Agency is going to be forced to go after, to squeeze out additional emission reductions. (NRDC)

Agency Response: Pages 37-42 of the staff report address the impact of the staff proposal on the SIP. The agency is aware of its obligations under the SIP and will continue to investigate ways to mitigate the shortfall. However, the original 1999 standards reflected neither technological capabilities of industry nor the need to control deteriorated emissions from these sources, and needed to be adjusted to do so. Pages 12-22 of the staff report discuss this in detail for handheld engines, and pages 22-32 discuss it for nonhandheld engines.

177. **Comment:** EDC strongly supports maintaining the handheld CO standard of 130 g/bhp-hr, perhaps modified slightly upward to account for technological constraints. (EDC)

178. **Comment:** We are separately concerned about carbon monoxide attainment. Southern California just recently received attainment status for carbon monoxide. Every time that we relax a CO standard, we fear that attainment status is in jeopardy. We are worried that this might slip us back, and that is a serious concern. (NRDC)

Agency Response: As noted in the staff report (pages 19-20), an overly stringent CO standard could have excluded otherwise viable HC+NO_x control strategies. Since CO attainment is expected by the year 2000, and the increase due to the staff's proposal will not affect attainment (staff report, page 41), staff opted for the course that allows for the greatest number of compliance alternatives that still achieves the reduction of ozone precursors. However, staff will include CO emissions in the upcoming technical review for the Board.

179. **Comment:** One point that hasn't been raised today, which I actually expected to come up, it was raised from a different perspective, one of the gentlemen that spoke earlier today talked about concerns for the users and safety concerns for the users, but there was no mention about the concerns relative to air pollution and the emission exposure of the current users and those people that will continue to use these pieces of equipment. Here is another very individualized concern that this Board needs to be aware of. There is an impact from the emissions from these pieces of equipment on the people that use them on a daily basis, and in fact, on the people that use them once a month. (NRDC)

Agency Response: The Air Index program is intended to provide equipment users with emissions information that can be used to guide purchasing and usage. The optional standards program (see Comments 337-339 and the accompanying responses), should it be adopted, would also help in that regard.

180. **Comment:** This letter is in response to your proposed amendments to the small off-road engine regulations. The amendment proposes to relax the existing adopted regulation for this off-road category through less stringent emission standards and a delay in the implementation of those standards. AQMD staff is concerned about the potential air quality effects of such actions. (SCAQMD)

Agency Response: Staff believes that it has characterized those impacts fully in the staff report.

181. **Comment:** Electric-power consumption comes at an environmental cost. Although the staff has been reluctant to approach this issue, the environmental costs of electric power for an electric handheld product are significant and, in some measures, comparable to gasoline-powered products. Highly regulated utilities notwithstanding, the inefficiencies of power generation, transmission losses, conversion inefficiencies to mechanical power all lead to noticeable environmental impact - even in California for which natural gas is the primary fuel source, but which imports a major share of its electric power (or rather exports its pollution). These verified findings are even prior to consideration of global warming issues and the effects of CO₂ generation. (Deere)

Agency Response: The staff finds this argument ludicrous. The pollution from electric power generation can be and is more efficiently controlled than small engines, because there are less sources. Instead of controlling 1000 handheld engines, one could control a single power

plant. The requirements on stationary sources such as power plants are much more stringent than the standards in question. Even with transmission losses and other inefficiencies, electric power generation is more efficient than a base two-stroke engine that expels 30 percent of its fuel unburned during normal operation.

182. **Comment:** Battery powered products also have an environmental cost. While air may be the medium of concern for the Air Resources Board, other environmental impacts should be considered. The introduction of heavy metals into our water systems as a result of increased, uncontrolled battery usage presents a serious danger. (Deere)

Agency Response: The disposal of batteries is controlled currently, and improvements are continually being evaluated as part of the electric vehicle program, which would generate far more battery waste than the increase expected in battery-powered handheld equipment.

4. Handheld Engine Inventory

183. **Comment:** The 11 tons per day that was the difference between the SIP numbers that the EPA Federal Phase 2 numbers and staff's proposal, is based not on the emission rate in the inventory that you approved but another one. It is not based on 39 grams per horsepower hour. It is, in fact, based on 22. In other words, the benefits are not based on the inventory that you proposed but instead on a number that we found out about on Monday. (PPEMA)

Agency Response: The inventory report (Mail-Out MSC 98-04) reflected the original tier 2 standard, based on the technologies expected to be used at the time of adoption -- i.e., base two-strokes with catalyts. The staff proposal was based on engines whose manufacturers indicated would comply with the revised proposal -- i.e., stratified-scavenging two-strokes, and four-strokes. It specifically did not include technologies that engine manufacturers did not present as complying (e.g., it did not include the Husqvarna E-tech engines mentioned in Table 6 of the staff report).

184. **Comment:** What I am going to talk about today are differences in the emission benefits, cost, and cost effectiveness of the staff's proposed revisions to the Tier 2 standards relative to this alternative that PPEMA has developed and put forth. During the staff presentation, you saw comparisons of the benefits of Tier 2 to the Federal Phase II standards. The PPEMA alternative goes beyond that to lower emission levels. The differentials that I talk about between the Tier 2 proposal and the PPEMA alternative deal only with exhaust emissions; I haven't gone through and taken into account these other programs to get additional emission reductions. Using the staff's methodology, the HC+NO_x emissions inventory for hand-held engines in 2010, the first phase of regulations, Tier I/Phase I, dropped from about 63 to about 45 tons per day, about a 20 ton per day difference, roughly a third of the original inventory. Moving to Phase II would get you another 10 tons roughly down to about 35, and moving beyond that into the realm of the PPEMA alternative, and the Tier II standards gets you somewhere between

another 5 or 6, or as Bob Cross pointed out earlier, 11 tons per day. So, the first point here is that the biggest bite out of the bar, if you will, in terms of emission reductions, has already occurred due to the Tier 1, Phase 1 standards. Moving over to the right-hand side of the chart there, you see the PPEMA alternative at about 29 tons per day, Tier 2 at about 30, and a Tier 3 at about 25. This first larger bar is computed using the emission factor that Mark Carlock talked about earlier today that was in mail-out 98-04. The other one is an adjusted emission factor that I understand the staff has used to estimate the benefits of its revised proposal. (Sierra)

185. **Comment:** This slide just shows what these two different emission factors are. You've got zero hours in a deterioration factor, or DF, which is used to estimate the increase in emissions over time from these engines. The zero hours, about 40, and what Mark talked about today, it's about 22 and a quarter, and what the staff has indicating that their proposal is, and there are changes in the deterioration factor, as well. (Sierra)

186. **Comment:** This is Table 6 out of the staff report that shows what staff published in terms of engines that it felt were representative of those that could meet the Tier II standards and their emission levels. If you can go all the way down to the bottom of the chart, or back up a little bit, it is my understanding that the adjusted Tier II emission factor is based on data from the two Honda four-strokes, the ICAT BKM/Tanaka fuel-injected two-stroke and the Komatsu Zenoah stratified scavenging two-stroke engines. The two Honda emission levels are labeled for new engines, so is Komatsu Zenoah. ICAT BKM isn't labeled. It's a prototype engine. I'm assuming that is new. The point to be made here is that those are emission levels that are very much below the 54 gram per horsepower hour level, which is kind of average base standard in that manufacturers comply with it on average. We have got a Ryobi engine, and we've got three Husqvarna engines all with emissions that are much closer to the 54 grams per horsepower hour level of the standards that were apparently not included in this adjusted emission factor. (Sierra)

Agency Response: Husqvarna had indicated very strongly to staff that it did not want staff to refer to the E-Tech engines as being able to meet the 54 g/bhp-hr HC+NO_x level. Therefore, staff did not include them in its modeling of the proposal. Contrary to the comment, staff did include the Ryobi engine in the modeling, but its effect was somewhat balanced by the much lower initial levels of the Honda four-stroke. The modeling also included the effects of deterioration.

187. **Comment:** We talked about earlier today uncertainties in the inventory, the impact of assumptions and what it means to get equivalent tons. What I have done here is gone through and made some adjustments to this, or revisions, if you will, to keep that terminology correct, to suggest a Tier 2 emission factor and I have made a comparison of that to the PPEMA alternative, and what we see is that what was four tons per day earlier, in terms of emission differentials, become 0.3 tons per day now using what, I think, are more reasonable assumptions. I talked about two issues related to the inventory earlier today, the chain saw activity and the separation of residential and commercial. My revisions here include those factors,

as well as adjustments to the revision of the adjusted Tier 2. the staff estimates, going back to my first slide, the differential is about four tons per day, so that sets kind of the upper limit, and I'm looking to see what happens if we start to change some of the staff's assumptions. (Sierra)

Agency Response: The Board approved the inventory before this action, but at the same meeting. The Board accepted the staff's assumptions as appropriate for modeling this category. As noted in the response to Comment 184-186, the commenter's suggested changes run counter to information provided by a member of the commenter's client organization.

188. **Comment:** The emissions differential between the PPEMA proposal and the staff proposal, in terms of exhaust emissions, ranges from four tons per day to .3 tons per day, depending on the assumptions that you make. To put that value in perspective, the 2010 Statewide inventory for hydrocarbons and NOx is 4,900 tons per day. These are very small differences, and they're within the uncertainties associated with this tool that we are using to measure things here, the off-road model. (Sierra)

Agency Response: The staff does not dispute that the emissions differences between the staff proposal and the PPEMA alternative are small compared to the entire statewide emissions inventory. However, it does dispute the lower end estimate. The emissions reductions are significant, as noted in the staff report (pages 37-42 and 61). Furthermore, when considering the differences between the PPEMA proposal and the staff proposal, the Board must consider the position of those manufacturers who invested to meet the standard in response to the original 1999 standards and succeeded. See Comments 16-29.

189. **Comment:** What has also been shown here is that if you change staff's assumptions to move away from this adjusted Tier II emission factor, which basically assumes that two-strokes are 40 percent below the standard for their entire lives, you get cost effectiveness numbers that exceed the staff's criteria for what represents cost effective hydrocarbon and NOx control. (Sierra)

Agency Response: See the response to Comment 188 regarding changing the assumptions. The staff's assumption regarding two-stroke engine deterioration is based on information provided by two-stroke engine manufacturers, including PPEMA members.

190. **Comment:** One of the most troubling issues surrounding the Tier 2 proposal is the absence of a finalized emissions-inventory for these products and the consequent inability to predict emissions benefits resulting from the regulation. We understand that the emissions inventory will be considered at the March 26 Board hearing when the Tier 2 proposal will also be presented. We further understand that we will not see the final proposed inventory until a few days before the hearing which will not provide us an adequate opportunity to review and comment on the inventory and the estimated benefits from the regulation. As a result, it will not be possible for the Board to adequately consider and assess alternatives to the Tier 2 proposal. Such a procedure, we believe, lacks the elements of fundamental fairness and due

process to which all persons affected by the Board's regulations are entitled. (PPEMA)

Agency Response: PPEMA was involved in staff's efforts to improve the emissions inventory, primarily through its contractor, Sierra Research. In fact, the direct reason for work continuing on the inventory to the time it did was because staff was addressing PPEMA's comments. Staff could have given PPEMA certainty sooner, at the cost of deferring action on its comments, but chose to allow the maximum input possible. Staff does not believe that this continued consideration of the PPEMA position in any way lacks fairness to PPEMA.

5. CEQA Concerns

191. **Comment:** ARB has failed to fulfill its California Environmental Quality Act (CEQA) obligations to analyze the impact of the proposal on ambient air quality in each state non-attainment area and to consider and adopt measures to mitigate adverse impacts identified. ARB's failure is a poor model for Districts to follow. (EDC)

Agency Response: As the commenter correctly noted, ARB's certified regulatory program must meet CEQA's substantive requirements, albeit under reduced environmental documentation requirements. The ARB complied with all applicable CEQA requirements and the requirements of the Board's certified regulatory program, 17 Cal. Code Regs. §§ 60005-60007. The Staff Report serves the same purposes of and substitutes for an environmental impact report or negative declaration.

As required by § 60005, this Staff Report contained a description of the proposed action, an assessment of anticipated significant long- and short-term adverse and beneficial impacts associated with the proposed action, and "a succinct analysis of those impacts." (See Staff Report at pp. 37-42.) The circumstances under which this proposal was considered are unusual in that they made a limited change in a small but significant component of a comprehensive statewide plan. The most significant impacts of this proposal are those relating to California's efforts to attain and maintain ambient air quality standards for ozone. On November 15, 1994, ARB approved a state implementation plan (1994 Ozone SIP), which provides a comprehensive description of how ozone precursor emissions -- NO_x and ROG -- will be reduced to ensure timely attainment of the federal ozone standard. The 1994 Ozone SIP includes control measures at the federal, state, regional, and local levels targeting all controllable sources of ozone precursor emissions. The ARB has considered the proposed amendment of the small engine regulations, emission reductions from which were included in the 1994 Ozone SIP baseline, in the context of the SIP, and in doing so has complied with applicable CEQA requirements to identify adverse impacts.

Because ARB identified potentially significant effects that the proposal might have on the environment, it was obligated to and did identify in the Staff Report several alternatives (Staff Report pp. 63-65) and committed to pursue fuel spillage and other sources of emissions reductions (Staff Report p. 40) to mitigate potential adverse impacts. However, the Board did

not simultaneously adopt mitigation measures because none were immediately available. For every ozone nonattainment area, the 1994 Ozone SIP approved by ARB and submitted to U.S. EPA under the federal Clean Air Act includes all reasonably available emission reduction strategies plus commitments to do more. Thus the stable of feasible mitigation measures to offset the loss of anticipated emissions reductions from this proposal is empty. The original Tier 2 standards represented one of the many innovative and far-reaching strategies relied upon in formulating the 1994 Ozone SIP. However, to assume that there are other substitute measures that can easily be plugged in to offset the modified Tier 2 reflects a lack of understanding about the lengths to which the affected agencies have already gone. In addition, due to the procedural complexities and length of the regulatory process, it is not ARB's practice to concurrently introduce or accept at the hearing the kind of vague or indirectly related mitigation measures referred to in the comment for adoption in conjunction with a proposed regulation. Given these circumstances, it would be very difficult if not impossible to fashion effective, reasonable mitigation measures that are not already included in the SIP. See also the response to Comment 40.

Finally, Districts must of course independently meet their own CEQA obligations. Contrary to the commenter's assertion, however, ARB's conscientious review and analysis of the air quality impacts of these amendments and its commitment to seek reductions from other sources provides appropriate guidance to Districts addressing similar issues.

192. **Comment:** ARB has failed to fulfill its California Environmental Quality Act (CEQA) obligations to analyze alternatives and to adopt a preferred environmental alternative. (EDC)

Agency Response: The commenter applies an improper test to ARB's alternatives analysis: whether there is substantial evidence to support an environmentally preferred alternative. Rather, the correct test is whether there is substantial evidence in the record to support the Board's substantive equivalent of findings and a statement of overriding considerations contained in Board Resolutions 98-15-A and 98-15-B.

Clearly the Board met its CEQA obligations, properly stated. The Board considered an adequate number of alternatives, including one preferred alternative. The Board then concluded that the potential associated short- and long-term adverse environmental impacts were more than outweighed by the prospect of preserving market integrity, controlling engine deterioration, and accounting for an improved and higher emission inventory.

In addition, even if we agreed to use the commenter's improper test, ARB stands by its reasoning for rejecting the preferred alternative. ARB repeatedly identified technological and economic barriers to affected industries as a whole in implementing the existing 1999 Tier 2 emission standards (e.g. Staff Report pp. 2-3, 24, 38-39), as discussed elsewhere in these Responses.

See also the response to Comment 191.

6. Other

193. **Comment:** In addition, please be aware that many users of lawn & garden equipment are mobile commercial landscape maintenance enterprises which typically have with them gasoline cans with which to refuel these devices. During the warmer months this process constitutes a source of evaporative emissions which may not be adequately addressed by current evaporative emissions estimates. (Muriel Strand, PE)

Agency Response: As noted on page 40 of the staff report, the staff will investigate refueling controls.

194. **Comment:** Four-stroke engines in handheld equipment create the concern of oil replenishment requirements and crankcase oil disposal to the environment. (Deere)

Agency Response: See Comment 191 and the accompanying response.

195. **Comment:** I was also intrigued by Mr. Griswold's comment about crankcase oil emissions, somehow they make our engine a dirty product. Last time I heard, it is illegal to dispose of oil improperly. Meanwhile, his two-strokes put out all the oil, minute-by-minute, day-by-day, hour-by-hour, into the environment with no control. (Ryobi)

Agency Response: The staff agrees with Ryobi's comment. As discussed on pages 20-21 of the staff report, two-stroke engines do emit oil into the air, primarily as particulate matter. Oil from four-stroke engines is subject to the same laws as oil from automobile engines, so the effect on the environment, if different from present, should be less than the effect of two-stroke oil.

I. Cost and Cost Effectiveness

196. **Comment:** PPEMA conducted a telephone survey of California Park and Recreation Departments to determine their views and comments on the proposed regulations for handheld products powered by two-cycle engines. More than 36 departments participated in the survey. Most Departments were not aware of any proposed air quality regulations for handheld products powered by two cycle engines. Virtually all Departments anticipate there will be a major impact on the cost effectiveness of their operations. Departments anticipate a devastating effect on their ability to do a good job, for example, these products are being used everyday because of the recent storm activity in California. (PPEMA)

Agency Response: Despite the information contained in the staff report regarding two-stroke engines that can meet the standards, PPEMA has not acknowledged the ability of two-stroke engines to meet the emissions standards. Additionally, PPEMA's estimates of the cost to comply are greater than those mentioned by the staff and manufacturers prepared to comply (see

Comments 206, 207 and 260). Staff has concerns that the PPEMA survey did not include cost and performance information based on such engine designs as stratified scavenging two-stroke engines that will not cost or perform differently than traditional two-stroke engines (see Comment 206), other two-stroke engines that will have only a 5 percent increase in price (see Comment 207), or an averaging program that will allow manufacturers to continue making some currently available two-strokes (staff report, page 35 and Attachment H).

197. **Comment:** The Supervisor of the park grounds at the State Capitol in Sacramento may have to triple his work force. (PPEMA)

Agency Response: The reasoning behind this is not understood. Presumably this refers to a case of total equipment unavailability, as none of the complying technologies would require extra operators or more time than existing equipment. As noted in the staff report and the responses to Comments 268-290, equipment will be available.

198. **Comment:** Eliminating two-cycle engine products will hurt consumers by making personal yard care more difficult and costly and professional yard care more expensive. (PPEMA and Direct Mail Campaign)

Agency Response: The regulation would not eliminate two-cycle engine products, as at least two manufacturers have been able to develop complying two-strokes. Professional yard care will not be made more expensive because products will be available at a comparable cost to today's equipment. An additional benefit is that the cleaner engines will use less fuel, producing significant savings from fuel economy improvements (staff report, pages 45-46).

199. **Comment:** Alternatives to current two cycle engine products may cost more than twice current prices. (PPEMA and Direct Mail Campaign)

Agency Response: The additional cost to consumers of complying equipment will range from zero to \$35 over the current prices of comparable equipment. While PPEMA may disagree with ARB's cost estimates, we have performed extensive research and four-cycle and complying two-cycle engine manufacturers have agreed that our research is sound. Staff is confident that equipment will be available at reasonable costs, although some lower-end gasoline products may be supplanted by electrics.

200. **Comment:** Our cost to produce the [four-stroke] trimmer that we had designed and tested was \$165. The cost was double of the current two-stroke product [which was one reason it was discontinued.] (Husqvarna)

Agency Response: This cost is at odds with the information acquired from other manufacturers who produce and sell four-stroke equipment; other companies have managed to produce four-stroke trimmers more cheaply. Four-stroke equipment is probably not the best alternative for this commenter, particularly considering the catalyst-equipped engines it has

developed and offers with no cost increase over base two-stroke product (staff report, pages 16-17, Comment 91). Husqvarna has stated that their catalyst technology does not meet the standards, but, as noted in the staff report, it has significant potential..

201. **Comment:** We costed the four-stroke technology and went to great lengths, and we've costed the stratified technologies, and much like Homelite, I think we are probably at odds. In fact, the numbers that we come up with that are suggested being retail numbers look closer to the cost numbers to us. (McCulloch)

Agency Response: Staff's cost estimates are detailed in the Engine, Fuels and Emissions Engineering (EF&EE) report (Attachment J to the staff report) and have been consistent with and supported by those manufacturers who have been able to comply.

202. **Comment:** The proposed standards, by eliminating many useful tools, will have an adverse impact on many of California's most productive citizens. These products form the mainstay of sales for over 600 retail dealers in California, including several thousand employees, and literally hundreds of thousands of their customers. Further, such products account for a very important part of many other types of retailers in the State. This loss of retail sales will also inevitably reduce sales tax collections in the cities and counties, as well as losses to the State Treasury. (Stihl)

Agency Response: Retailers will sell the cleaner equipment instead of today's equipment, so sales tax is unlikely to be significantly affected. While the standards would eliminate engine designs unable to comply, there are several alternatives to those designs (see pages 12-19 of the staff report).

203. **Comment:** Such regulations could place California in an unfavorable competitive position in its search for economic growth. Your historical efforts to demonstrate a more favorable business climate for California could be set back by regulations such as this which create great cost but negligible benefits. Other states which have adopted the more realistic Federal EPA standards would be in a more competitive position. (Stihl)

Agency Response: Staff does not understand the argument that the regulation will put the state into an uncompetitive position, since the regulations apply only to engines sold in California, the majority of which are used in California.

204. **Comment:** If California accepts more onerous requirements than the rest of the country, products sold in adjoining states could migrate into California. Such activity would be very difficult to regulate, as well as a waste of valuable resources. (Stihl)

Agency Response: Although some people may smuggle products not meeting the California requirements, the advantages of doing that are small, considering the minor price increases expected by complying manufacturers. Furthermore, the penalties for selling uncertified

equipment in the state act as a deterrent to such activity.

205. **Comment:** Many hundreds (more accurately thousands) of Californians rely on the reliability of such tools in the conduct of their occupations. California occupations as the lumber industry, gardening, landscaping, and lawn maintenance, will all suffer serious economic harm. Likewise, hundreds of California towns, cities, park districts with their many hundreds of employees will be deprived of these cost effective tools with which to perform their duties. (Stihl)

Agency Response: The staff proposal would not harm the reliability of handheld power equipment nor the availability. See the responses to Comments 197 and 202.

206. **Comment:** Cost feasibility, we've been informed that this engine when it is introduced, in a smaller size, will be offered in the United States at no additional charge. The stratified scavenging engine is cost effective. It will meet the ARB's standards, and it is relatively simple construction, with minimal additional parts. (Komatsu Zenoah)

207. **Comment:** I will say that the Tanaka design will incorporate probably a five percent increase at the retail level. Our products are very high-end. We only sell to the professional landscaper. We don't market anything that is a homeowner consumer product. So, admittedly, our products are a lot less price sensitive than a lot of the manufacturers who testified today, but we expect that to be insignificant. (Tanaka)

Agency Response: These comments indicate that, if anything, staff has overestimated the costs in the staff report, which are worst-case estimates. A five percent increase in this category, even for a high-end product, is quite small. To exceed the \$35 worst-case estimate used for calculating cost-effectiveness in the staff report, the base price of the equipment would have to be over \$700.

208. **Comment:** An honest accounting of the financial costs resulting from adoption of four-cycle technology clearly demonstrates the loss of major markets to handheld product manufacturers, the restrictions of product availability to users, and the resulting costs to the public - all for no added benefit to the environment. The capable research and analysis by Sierra Research are referenced as related to the cost effectiveness of the Staff's proposal. [A point that bears emphasis is that] the costs of converting to four-cycle technology as presented by the Staff and their contractor EF&EE are grossly underestimated. No manufacturer has supported the Staff's conclusions regarding costs, except to the extent of vague, unsupported promises of someday making available a \$100 retail price string trimmer. Our cost estimate found an incremental price increase of \$66 for a high volume unit family (raising an opening price trimmer to \$135 and the average price to \$156). This estimate is based on detailed analysis of the cost elements, realistic manufacturing and tooling costs, and reasonable, actual production volumes. (Deere)

209. **Comment:** As part of our review, we did a detailed cost analysis, of the current four-stroke technology, and quite frankly, we don't know how you can build those products at the premium identified. (McCulloch)

Agency Response: See Comments 206, 207 and 260 and the response to Comment 199. The EF&EE results were generally consistent with and supported by those manufacturers that have indicated they can comply with the regulations.

210. **Comment:** We have performed a critical review of the reports generated by EF&EE, which has been staff's contractor evaluating the cost of compliance, or cost of moving to the Tier 2 standards. We have looked at EPA Phase 2 technology and ARB Tier 2 technology, which is what EF&EE has addressed in various reports, and then we have also looked at estimates for the cost of the PPEMA alternative. EPA Phase 2 is about \$6 an engine, based on our estimates, and PPEMA alternative is \$20 to 25, and ARB Tier 2 is on the order of \$50 to \$55. Those estimates are higher than ARB staff's, and again, they reflect the correction of some mistakes and the use of, what we think, are some more reasonable assumptions that are laid out in the report that we prepared for PPEMA. What I want to draw your attention to before I move on is this differential in cost between the PPEMA alternative and the ARB Tier 2 standards, which ranges from about \$25 to \$30 per engine. (Sierra)

Agency Response: The figures cited in this comment are contrary to the figures presented in Comments 206, 207, and 260 by manufacturers that can meet the standard. Although these figures may reflect the costs encountered by the PPEMA companies, the standards can be met cheaper, as shown by Komatsu Zenoah, Tanaka, and Ryobi.

211. **Comment:** We calculated cost effectiveness using the staff's estimate of benefits for their proposal versus the PPEMA alternative using this cost interval of \$25 to \$30 per engine. What you see are cost effectiveness ratios ranging from about \$5,000 to \$9,000 per ton of emissions eliminated. Staff's kind of going rate for these emission reductions ranges from about \$4,000 to \$10,000 per ton. Now, [making only] this change to the emission factor that I talked about, you see that the cost effectiveness numbers changed dramatically. Now the cost effectiveness ranges from \$10,000 to \$60,000 a ton, which is above the staff's maximum rate of about \$22,000 a ton. Both of these columns were done for the combination of residential and commercial engines. As I mentioned this morning, residential engines make up most of the population, but they don't get used very much. Basing a slightly modified methodology, I went back and looked at cost effectiveness for residential engines based on their 50 hours of life. Here, except for the large chain saws, the cost effectiveness ratios are in the \$23,000 to \$29,000 a ton range, again, above the \$22,000 a ton maximum rate of ARB staff. (Sierra)

Agency Response: Staff does not believe that the figures used to calculate the cost-effectiveness in the Comment are appropriate. See the responses to Comments 186 and 187 regarding the suitability of using different assumptions to determine emissions and Comments 206, 207 and 260 regarding the costs of compliance.

212. **Comment:** There was an item in the staff report, where the cost of compliance, they had the dealers at a 16 percent gross profit. Generally we are at 25 percent gross profit. So, there was roughly nine or ten percent there. So, on a \$300 item, that would probably go up \$30. Generally speaking, from the distributor level to the dealer there is a \$25, sometimes \$30, but being conservative, I'll say \$25. (Lawn Tech)

Agency Response: Comments by complying manufacturer indicate that the final figures used by staff are appropriate. However, staff has also calculated the cost and cost-effectiveness using the commenter's suggested dealer mark-up. As the commenter notes, using a 25 percent dealer mark-up instead of a 16 percent mark-up leads to approximately 10 percent increase in cost, bringing the highest noted cost from \$35.55 per unit to \$39.10 per unit. Even with this correction, the worst-case cost effectiveness for control of handheld equipment rises from \$1.30 per pound reduced to \$1.43 per pound reduced (\$2860 per ton reduced), still well below the \$11 per pound (\$22,000 per ton) used as an upper boundary for cost-effectiveness. This cost-effectiveness figure does not include the benefits of improved fuel economy, which would further lower the cost per pound reduced.

213. **Comment:** [Another point of Sierra's analysis that bears mentioning is] Market sensitivity to reasonable price increases can be tolerated; price increases on the scale projected for conversion to four-cycle will lead to severe product unavailability and extreme user dissatisfaction. To look only at price increases or the absence thereof is fallacious and misleadingly simplistic. Such an approach fails completely to look at internal company costs and margins, profits or the absence of profits, restructure of companies, and competitive and market dynamics. In the case of the Tier 1 rule, prices did not rise simply because the manufacturers absorbed these costs, margins were squeezed and profits reduced, eliminated or losses incurred. So far, most of the manufacturers have survived, but only through the benevolence of their parent companies, the strength of relationships with preferred customers or significant participation in the smaller, but more profitable premium product market. Companies cannot absorb increased costs indefinitely; ultimately the practice leads to job losses. (John Deere)

214. **Comment:** California business makes up a significant portion of the supply chain providing manufacturers with components that build some eight million trimmers, blowers, hedge trimmers and saws annually. McCulloch alone purchases in excess of \$11 million annually from some 20 independent companies located across California. Significant volume reductions in any given engine family or increases in technology that cause the technology change would likely impact these California businesses significantly. (McCulloch)

Agency Response: Although not the staff's intention to penalize any company, the proposal may well lead to changes in the existing market, as cheaper, more polluting equipment is replaced with cleaner equipment at a slightly higher cost or with electric equipment at the same or lower cost. Some companies able to comply with the standards with engine-powered equipment are indeed primarily in the commercial equipment market (Komatsu Zenoah, Tanaka); however, others are primarily in the residential consumer market (Ryobi). Furthermore, electric equipment

is and will be a large portion of the consumer market for these tools. As mentioned in the staff report (pages 56-58), the likely effect of the proposal on California business and jobs is actually positive, because the proposal relaxes existing requirements. Furthermore, any shift in market will likely lead to increased jobs in other sectors -- e.g., manufacturing electric lawn care equipment.

215. **Comment:** You have seen the major investments that Husqvarna and Poulan/Weedeater has made. I have also shown you that we feel there are several technologies that have some potential. We do feel that the time frame that the staff is proposing is compressed, and that compressed time frame has some high risks. Those high risks are the potential for new products, new technologies that will fail in the marketplace for the reasons that I have mentioned earlier. There is also the risk that promising technologies that require a long lead time to develop will be abandoned because of the shorter time period, and also there is a potential for higher cost with less emissions reductions versus time. Some of the technologies that we have discussed do take a considerable amount of time to develop but have a very high potential for the future. (Husqvarna)

Agency Response: The staff proposal adds a year to the existing time frame for the Tier 2 standards. Manufacturers have been on notice since December 1990 that further reductions would be required. In the time from then until the hearing, four companies developed means to comply, including one company (Honda) that had not previously been in the market, but saw an opportunity for expansion. Staff disagrees that the standard creates any risk that developing technologies will be abandoned with less time; however, the averaging program will allow manufacturers who need more time to stagger their product introduction if they so desire. Further delay would penalize those companies that did develop means to comply. See Comment 216.

216. **Comment:** I was rather intrigued by the Poulan/Weedeater investment profile. I was struck that I couldn't quite tell what he was investing in, but I could tell the years. This Board adopted this rule in 1990. The first time they began heavy investment was 1994 and 1995. Where were they when the Board put the rule out? (Ryobi)

Agency Response: This comment shows the situation faced by those companies that can comply with the standards. Namely, that other companies may not have devoted sufficient resources to comply, and could unfairly benefit from holding back those resources. See Comments 16-29.

217. **Comment:** Another method to achieve 54 grams, which is the one recommended by the staff proposal, is to use four-stroke engines. For the volume of products sold in California, absorbing the cost of what amounts to building a new manufacturing facility [to build four-stroke engines] is simply not realistic for our company. (Echo)

Agency Response: The staff's proposal does not recommend any single technology for compliance. The standards were originally set with the expectation that manufacturers would use

catalytic converters to reduce emissions from two-stroke engines. The reality has been that several other methods of reducing emissions have been developed, and the staff has responded by relaxing ancillary standards (CO and PM) while retaining a strong amount of control over the pollutants of most concern, HC and NOx. With regards to the cost of production, there are compliance strategies that apply to two-stroke engines and do not require extensive additional equipment.

218. **Comment:** We went down and took a real look at the ability to meet these Tier 2 emissions levels as proposed. The only twist we put on this was we said, to maintain the consumer marketplace, we looked at it as a maximum of \$30 premium at retail for all the 50 hour product. (McCulloch)

Agency Response: The \$30 figure is similar to the figure noted in our contractor's report. The manufacturers who have complying technology have either said or implied that their technology would cost less than that amount (see Comments 206, 207, and 260).

219. **Comment:** If you look at this from a pure technological perspective, you can say, sure there is stratified technology and there is overhead valve technology that meets the letter of the agreement, but can it do it and meet the marketplace needs of the low-end consumer, which is 70 to 80 percent of the total market. (McCulloch)

Agency Response: The staff analysis did show that there could be restrictions on product availability, most notably in the lower power/lower cost consumer tools, as noted on page 62 of the staff report. Furthermore, the staff highlighted the issue in its presentation. Although very cheap engines may vanish, electric equipment with the same (or lower) price is available to serve those needs.

220. **Comment:** On the consumer side, lawn and garden hand-held products are, for the most part, discretionary products, although admittedly the alternatives aren't very attractive. Creating the best products for the intended task in terms of weight, balance and all position operation, durability and cost, are all key considerations. We know the market is elastic. You don't have to do a lot of price elasticity studies. All you really have to do is look backwards. It wasn't too many years ago when the opening price point for gasoline powered trimmers, for example, when it was \$149, the market was around 2 million units. Today the opening price point is at \$69, and the marketplace is about 4.1 million units. (McCulloch)

221. **Comment:** We also went out for OEM quotes, and not casual numbers, but total replacement type volumes, and we found that the cost increase was from 45 to 150 percent in the engine cost. So, we know that those kind of numbers would have a major impact on the elasticity of the marketplace. (McCulloch)

222. **Comment:** I think McCulloch can build an engine as clean as Ryobi's, but I don't think McCulloch can build an engine at 54 and satisfy the market where there is 70

percent plus of the products that are delivered today are selling for around \$69, and I feel, and in our analysis we made the assumption that we could go to \$99, which is a 40 percent increase. If we went to \$99, clearly, the market would shrink, but we felt like that was a reasonable approach. We feel like when you start going over the \$99 limit, you go up to the \$149 limit, the market will suffer dramatically. (McCulloch)

223. **Comment:** Obviously, if the cost goes up tremendously, our ability to amortize over volume, that cost, or spread that cost over the volume is reduced, and it becomes a vicious cycle. If the price goes up, the volume goes down and round and round. (Husqvarna)

Agency Response: The staff recognizes that market elasticity, as well as technology, may reduce the market for low cost/low-power trimmers. Although the engine-powered market may shrink, the electric-powered trimmer market will expand to meet consumer demand. See the response to Comment 219.

224. **Comment:** We have examined, we have developed, prototyped, and licensed several of these technologies that are under discussion. We have significant financial investment. It has been heavy in the engineering and testing expenses, licensing, consultant fees, purchase and replacement of production equipment, the tooling and so forth. The objective of clean engines is shared by us. We have explored many avenues. Some of those avenues, however, lead to dead-ends. That is thought, to us, the natural evolution of these products. Some technologies will work and will be accepted and others will not. (Deere)

225. **Comment:** I think it is noteworthy that McCulloch invested \$2.8 million in 1997 in the development of the new electric products, and we have a very aggressive product plan going forward with the introduction of new electric products, so just the fact that companies are investing in new technologies, I mean, that goes beyond just four-stroke, it certainly includes electric, as well. Our technology review included, again, all of the potential technologies that would meet the emissions, that included two-stroke with catalyst, two-stroke stratified, the four-stroke side valve and overhead valve, we looked at rotary technology and we looked at port and direct injection. We also looked at these, not only from the technology perspective, but we looked at these from the economic perspective, which I think is equally as important. (McCulloch)

Agency Response: Although staff is sympathetic to the Commenters' point, it does not address the situation at hand, where some companies have encountered dead ends, but others have not. To structure the regulation to accommodate those who have failed 1) doesn't result in cleaner air, and 2) financially penalizes the manufacturers who have succeeded. The proposal represents the staff's effort to balance the economic concerns of the two groups of manufacturers with the public interest in reducing pollution.

226. **Comment:** Also noteworthy is today's typical consumer is much less technical, and I think this has been expressed, but I think we have to keep an eye toward the

products, and what I would call, dumbing down, the process to make sure that the products are not so technical that they're difficult to operate. (McCulloch)

Agency Response: Complying engines will be no more complicated to operate than current models. See Comments 102, 103, and 285.

227. **Comment:** From an economic perspective, we looked at the impact on the major California retailers. We see a major shift in distribution over the last ten years, where hand-held products are delivered at a little over 70 percent of the retail through mass channels today, we would predict that to mature at a little over 80 percent in the not too distant future. McCulloch contacted three of our largest retailers, Sears, Home Depot and K Mart. We wanted to get a perspective of how they view these proposed Legislation changes. Significant investments have been made by these retailers in California in lawn and garden. The importance of lawn and garden in the category relative to their overall store, and we asked them to rate that on a 1 to 10 scale, and an overall rating of the 3 companies is 7.6, you can see that they are expressing concern about what happens here. You can see also that we asked them to rate their concerns relative to a number of other issues here, migration to alternative power sources, like electric, 7.7 is not a casual concern, seasonal impact in the stores, departmental volume loss, price sensitivity, product weight, all rated rather high. (McCulloch)

Agency Response: Although the mix of products offered may not be exactly the same as it is now, retailers will continue to have lawn and garden product to sell. Engine-powered products will remain on the market, although electric-powered products will probably fill the lower price points.

228. **Comment:** Our current four-stroke equipment sells in the \$179 to \$199 range. Next year, we will have a four-stroke trimmer that will sell for \$129. We believe that technology featured can be sold at \$100, and of course, we offer electric and cordless equipment as well, which retails at price points beginning as low as \$50. (Ryobi)

229. **Comment:** In 1994, Ryobi produced the world's first small hand-held four-stroke engine that was capable of meeting the Tier II emission regulations. Ryobi markets a line of trimmers and brush cutters using this engine that retails for \$179 to \$199 and can be used with add-on accessories, as you saw this morning, as blowers, vacuums, hedge trimmers and snow blowers. (Ryobi)

230. **Comment:** While the customer satisfaction with these four-stroke products is very high, Ryobi recognized that engine weight and all-position use was areas for continuous improvement. Ryobi has been successful in enhancing its technology to develop light-weight, all-position, four-stroke engines. This engine will be used to power string trimmers, brush cutters and again, our add-on accessories for residential and commercial use. These products will retail this fall at \$209 to \$249. (Ryobi)

Agency Response: These comments indicate a broad range of products will be available, even from a single manufacturer.

231. **Comment:** We sat in the office with BKM, the company that is developing the fuel-injection system, and the numbers that they quoted to us was \$35 to \$37, if the industry volume shifted, and there was significant volume there that allowed manufacturers that were supplying components to hit those high volumes and bring that cost down. So, even that \$37 was a qualified number, at cost. (McCulloch)

Agency Response: Fuel-injection of two-stroke engines, although able to meet the standards, was not among the technologies brought to staff as ready for the market, which may indicate that it is too costly compared to other approaches. However, fuel-injected two-stroke engines may wind up being quite cost-efficient with further work. Regardless, there are technologies that do comply at low costs, as attested to in Comments 206, 207, 228-230, and 260.

232. **Comment:** In 1990, when the ARB adopted the Tier 1 and Tier 2 emission standards for small off-road engines, it sparked substantial research and development efforts on the part of engine manufacturers and emission control technology companies that is bringing about important design improvements in small off-road engine technology. As a result, today there are multiple technological pathways to achieving the proposed standards and even greater reductions as well. (MECA)

233. **Comment:** Catalyst manufacturers, drawing on over 25 years of experience in automotive catalyst technology and investing over \$6,000,000 in catalyst R & D, have developed robust catalysts that can provide significant and lasting emission reductions in small engine applications. Engine manufacturers, like Husqvarna, have formed engineering ownerships with catalyst manufacturers and the results have been extremely impressive. (MECA)

234. **Comment:** In response to, and in reliance on, the Board's initial action in 1990, as well as the Board's continuing expressed interest in significantly reducing emissions from small off-road engines, MECA member companies have invested in excess of \$6,000,000 in developing catalyst technology for small off-road engines. As a result of this investment and combined with the catalyst industry's over 25 years of experience, catalyst technology has become one of the attractive, available technology options for significantly reducing emissions from small off-road engines. Indeed, catalysts are now being installed on a variety of handheld and non-handheld engines and the prospects for even greater applications and emission reductions are excellent. (MECA)

Agency Response: Staff agrees.

J. Consumer Impact

1. Weight

235. **Comment:** Overall, the respondents' willingness to increase price or weight, or reduce power or portability reached a ceiling at 5-10 percent. In the end they may begrudgingly pay a little more, if they really need the product-but they wouldn't even consider buying a product that lacks the power or portability to do the job. And each person has a weight limit for these products that they physically can't exceed. The respondents were very concerned that consumers would lose the availability of reliable small hand held power equipment. They found this particularly hard to accept given that there would be negligible reduction in emissions. (PPEMA-Moore)

Agency Response: See the response to Comment 196 concerning staff's concerns about this study. Also note that the price increases for the Komatsu Zenoah and Tanaka complying engines both fall below ten percent (Comments 206 and 207). The weight of complying engines is comparable to or less than existing two-stroke engines (see Comments 238, 241, and 242). In general, equipment capable of meeting the criteria needed will be available, even though it may not include the exact models that are available now.

236. **Comment:** One reason the four-stroke product for the chain saw was discontinued was that the size and weight was over double the current two-stroke product. I might also mention that in order to obtain the required horsepower for the four-stroke chain saw, the displacement was well above the preempted class of 45 cc for the four-stroke. (Husqvarna)

Agency Response: Ryobi states that its later generation four-stroke products are suitable for chain saw use (see Comment 238). Additionally, the Komatsu Zenoah and Tanaka engines are two-stroke engines that would be suitable for chain saws.

237. **Comment:** Weight, I don't know whether you were picking up the equipment out there, but that has not been resolved. (Deere)

Agency Response: See Comment 238.

238. **Comment:** You, again, saw a demonstration of the trimmer that is featured on the left-hand side. This little 26 CC jewel weighs less than seven pounds. It is one horsepower, and it meets Tier II. These latest four-stroke enhancements make it possible for this technology to be used in all-position use applications, such as chain saws. Currently, Ryobi does not manufacture chain saws. However, we expect to have a concept prototype available later during this year. (Ryobi)

Agency Response: The on-going development efforts mentioned in this comment support the commenter's contention that further relaxation of the standards would constitute a financial penalty to the manufacturer.

239. **Comment:** The product development cycle that we have developed over the 51 years of the history of our company is as follows: First, build a prototype to prove the concept, does it work? Then there is some testing and debug of the prototype, does it meet some of our needs that the design intended, and then the next stage is to design that prototype so it can be manufactured and can be tooled. The next step is to invest in tooling and develop the tooling to go into production with it. Then you must go back and refine durability and quality based on the changes that were made to the manufacturing and tooling. You must check for standards compliance, not just air quality, but there are safety standards and user standards that are in place, fire safety, U.S. Forest Service, those types of standards. Then the next step is to go into a pilot production and do some testing, verification and validation of those products based on the pilot production run. When a project is first started there are a set of parameters that are developed that include cost. Once you've reached the pilot production stage, you must go back and verify, does the product meet those intents and will it still meet the standards? Sometimes there's manufacturing changes that we have to go back and then redefine the product to make it meet those standards. Then comes production, and we call this an experimental stage, because there are still three major hurdles that the product has to go through. Does it meet the marketing sales needs? Can they sell it, market it to our customers? Are the customers going to accept the product whether it be the features, function or price? And then, are the customers going to perceive the quality and durability as a value to them? Then finally, after it stood that test, the product does become an acceptable market proven product, and we consider it a success. (Husqvarna)

Agency Response: The staff is very much aware that development of a new product is time-consuming and requires many factors to ensure success. That is why the Board set 1999 standards in 1990, why the Board asked for a status report before implementation of those standards, and why the staff proposal included an implementation delay.

240. **Comment:** As far as the staff proposal is concerned, it is critical that our handheld tools: 1) perform properly, and 2) not fall apart after a few months use; and with the increasing concern about ergonomics in the workplace, it's also important that the tools not be too heavy. (CLCA)

Agency Response: Manufacturers of complying equipment have indicated that they understand this. See Comments 230, 238, 241, and 242.

241. **Comment:** This second prototype engine is five percent lighter., than the current engine of the same displacement. (Komatsu Zenoah)

242. **Comment:** You saw the two-stroke and four-stroke models, residential and commercial. The new Ryobi engine is a commercial engine. It will also be sold to consumers. Aside from its all-position use, we have significantly reduced the weight. It actually weighs less than our more popular two-stroke models right now. (Ryobi)

Agency Response: These comments indicate that manufacturers have taken factors such as weight and multi-position use into consideration when developing their complying products.

2. Safety

243. **Comment:** Further, considering the use of these tools in such applications as fire control, rescue, and park maintenance, the quality of life and even the safety of the citizens of California may be reduced. For example, each year, hundreds of chain saws are used to fight fires in California. These saws are used by the State of California, many of its Counties, and other parties to assure the safety of people, homes, and property. Today, and in the foreseeable future, there is no substitute for the two-stroke chain saw. (Stihl)

Agency Response: Two-stroke chain saws will remain available, since there are two-stroke engine designs that can meet the standards. Staff also notes that since 1990 emergency agencies have been able to ask for an exemption if it cannot find complying products; furthermore, many of the units used by these agencies are preempted from California's authority and must comply only with federal regulations.

244. **Comment:** The third constraint facing the manufacturer, and one that has received virtually no consideration, is that of product safety - the immediate risk of personal injury or property damage to the user or bystander as a result of the product's design or malfunction. Given the nature of handheld power equipment - which are designed to cut, trim, clip, blow - the issue of product safety has been pervasive in the industry and remains a high priority and concern with both new and existing products. The last thing that any responsible manufacturer wants to see is injury to the user of its products. Technology mandates, whether driven by standards or government regulation, cannot adequately anticipate and often create product hazards. For example, air bags, or in the outdoor power equipment industry, chain brakes for chain saws. There is a real risk in the Staff's proposal that these conditions can arise. In operation under extreme conditions, much less under normal conditions, we do not know and have reasons to suspect the reliability of 4-cycle engines. (Deere)

245. **Comment:** Users will reject unsafe products, either in response to the product's reputation or through the product liability system. As stated at the beginning of these remarks, it is the user that ultimately determines the acceptability of a new technology. If even the perception of reduced safety is present, as for example, the risk of fires or burns from catalysts, the user will reject the product. (Deere)

246. **Comment:** While there may be trade-offs in regard to certain features of these products, there can be no trade-off when it comes to safety. The Staff may believe that product safety is not their concern and that it is acceptable practice to send unproven, unreliable technology out into the field, but if a safety hazard is introduced, it is not acceptable. (Deere)

247. **Comment:** In working with product safety over the years, we have become aware of several truisms that derive from the interaction of technology and product hazards: New technologies will introduce new and unexpected hazards that must be identified and addressed before the product is released to the user. The record is replete with examples in which this simple rule was not followed. (Deere)

Agency Response: As noted, the revised standards do include a durability demonstration that would help reveal any safety problem. Additionally, as the commenter stated, "The last thing that any responsible manufacturer wants to see is injury to the user of its products." That statement remains true for the manufacturers who have developed complying technologies. None of the companies supporting the handheld equipment standards are new to the business of producing engines, and all are aware of the need for caution. With regards to the reliability of four-stroke engines, see Comment 276.

248. **Comment:** We also do not know the effects of heavier equipment and resulting fatigue. The rush to enforce their use may lead to the exposure of users to unacceptable hazards. (John Deere)

Agency Response: Complying equipment should be no heavier than existing equipment. See Comments 241 and 242.

249. **Comment:** No where is to be found an evaluation of the following hazards, which are only listed here by way of examples:

- * fuel and fuel vapor exposures to ignition sources of new technology engines
- * malfunctions of engines during critical operations as a result of unproven reliability
- * fire and burn hazards from extreme engine temperatures
- * increased damage from fire as a result of unavailability of products needed for clearing or material removal (Deere)

Agency Response: The staff did not address these specific concerns. We believe these are conditions that would be considered by manufacturers of new technologies, and should be no different than those facing current engines. However, see the response to Comments 255-258 regarding safety and Comments 268-290 regarding product availability.

250. **Comment:** Similarly, the increased use of electric corded products will necessitate electric cords and other sources of electricity in the outdoors where inadequate grounding, poor electric insulation and connections, cut cords, and wet conditions may lead to higher risk of electrocution or electric shock. (John Deere)

Agency Response: Electric equipment is offered today, so presumably these are existing hazards which have been minimized. Furthermore, manufacturers of electric equipment do take efforts to ensure safe use of their equipment, just as the manufacturers of gasoline

equipment. In fact, those manufacturers are often one and the same.

251. **Comment:** There are more global concerns than just the product, and one, again, example I give, is if we are talking about increased use of electric products, we are talking about more cords dragged around outdoors. That is not a consideration, typically, that a manufacturer would look at when looking at a singular product. (Deere)

Agency Response: See the responses to Comments 250 and 253.

3. Electric Equipment

252. **Comment:** We do feel even going from \$69 to \$99 as an opening price point that's going to force a lot of customers into electric products, and we want to have a solution that participates on both sides. We do sell gas and electric products. So, we have invested in the electric side, although we also feel very strongly that the electric products do not meet the requirements that the customer demands in all aspects, the power, the portability, the positioning, things of that nature. (McCulloch)

253. **Comment:** Finally, in regard to user acceptance of the unspoken alternative - electric powered products - the following should be noted: Electric products are now available and have been available for years at prices comparable to and competitive with the opening price point gas-powered products. Yet, purchasers and users still have need for and prefer in large numbers gas-powered products. Why? Convenience, utility, labor savings, safety, durability. (Deere)

Agency Response: Electrics are not "the unspoken alternative;" the staff report and staff presentation explicitly state that use of electric equipment is expected to increase. Since electrics are a significant portion of residential market today, the staff believes that their feasibility is at least as well established as current two-stroke engines. Similarly, the safety aspects are also established; electric equipment is typically approved by Underwriters' Laboratory. Certainly, electric equipment is both convenient and safe for residential use, in that owners would not need to keep gasoline and oil on the premises. It is true that the current marketplace accommodates both electric and gasoline-powered products, and that some consumers, even at the opening price points, prefer gasoline-powered products. However, the staff's evaluation done for the staff report revealed that the performance of electrics was comparable to gasoline for residential products (page 17 of the staff report). As such, although some may prefer gasoline-equipment for reasons unrelated to performance, the need for that equipment is not demonstrated. Utility and labor savings, as well as durability, are much more significant in the commercial market, where equipment must be operated all day long, in a variety of locations. Nowhere has staff indicated that electric equipment would be the appropriate replacement for commercial equipment. See page 18 of the staff report.

254. **Comment:** Furthermore, if electric products are seriously considered as

alternatives to conventional two-cycle engines, the technological feasibility and acceptance, the financial costs and economic consequences, the safety implications and the environmental impact merit close scrutiny. This project has not even begun. It is procedurally unfair to base a rule or regulation on an undeclared rationale or justification that has not been fully evaluated. (Deere)

Agency Response: Staff does not have preferred technology, and has not based the standards on electric equipment. What staff has done has noted that electric equipment is an alternative for those manufacturers unable to offer a complying engine for residential use. Most manufacturers of handheld equipment currently offer both electric and engine-powered products. The emissions limits are performance standards and, as several testified, there are several technologies available to meet those standards. In fact, the emission reductions in the staff report are actually a worst-case that assumes the engine-powered equipment population and use remain as high as they would be in the absence of Tier 2 requirements -- i.e., no switch to electric equipment. It also does not include the cost benefits of electric equipment in the cost calculations.

255. **Comment:** The myth of electric products as an acceptable substitute should have by now been dispelled by the difficulties experienced with electric vehicles. It should be clear that a mandate of unacceptable technology is not workable. Forcing a product on an unwilling user does not provide an answer to technological needs, does not satisfy the demands of the work requirements and is ultimately a failed strategy. (Deere)

Agency Response: The staff proposal does not mandate electric technology. Furthermore, since electric equipment is already in the market it has been proven to be workable.

4. Other

256. **Comment:** The staff's current preferred technology, the four-stroke engine, is not new. Indeed it was used on chain saws years ago when two men carried saws around in the woods and when saws operated dangerously slow. Improvements have been made to the engines, as expected. Yet as expressed time after time, there are inherent limitations to the technology that cannot be overcome and disadvantages that directly impact performance. These characteristics have been aptly stated in prior statements and comments by the PPEMA and others. Despite the claims of the proponents of this technology, success over these deficiencies has not been demonstrated. Our tests and analysis have shown that these problems persist: limited multi-position operation. (Deere)

Agency Response: Ryobi notes in its comments that its latest version of the engine does possess full multi-position capability. See Comment 238. Also note that the staff does not have a preferred technology. The emissions levels set in 1990 were based on the use of two-stroke engines with catalysts; the technologies that manufacturers have brought forward include stratified scavenging two-stroke engines, stratified scavenging two-stroke engines with catalysts, and four-stroke engines. However, the staff report also indicates that catalyst-equipped two-

stroke engines, and fuel-injected two-stroke engines are possibilities, as well as electric equipment.

257. **Comment:** Husqvarna's four-stroke trimmer did not meet our durability requirements with our field crew, which was tested side by side with our comparable two-stroke products. (Husqvarna)

Agency Response: Although Husqvarna's four-stroke trimmer did not meet their durability requirements, the Ryobi four-stroke trimmer has been on the market since 1994, indicating that it does meet customer needs.

258. **Comment:** Four-stroke engines have an inability to operate at high speeds - required by chain saws and blowers (Deere).

Agency Response: The speed of four-stroke engines is sufficient to operate blowers -- Ryobi offers a blower attachment for their four-stroke engines. Ryobi does not currently manufacture chain saws, but expects to have a prototype four-stroke chain saw shortly. See Comment 238.

259. **Comment:** I have also had an opportunity to review the report that discusses the three focus groups conducted by ARB in Sacramento during October, 1997. It appears that the results of these focus groups are similar, although not identical, to those conducted by our firm. (PPEMA-Moore)

Agency Response: The focus groups that staff examined were included in the EF&EE report. The results of those surveys are quoted in the staff report, and indicate that the staff's worst-case estimate of a \$35 increase would be in the range of acceptability. As comments by Ryobi and Komatsu Zenoah show, prices could well be lower. Additionally, electric equipment is available, and for a lower price than comparable gasoline equipment, as stated in the staff report and Ryobi's comments (see Comments 206 and 207).

260. **Comment:** Benefits of this four-stroke technology go beyond meeting the regulations. This technology offers lower noise, lower operating costs and no oily drips at competitive weight, power and all-position use. Retail price increase for this technology is estimated at \$20 for high volume production. Ryobi has embarked on developing a whole family of new four-stroke products, trimmers that will accept add-on accessories. We expect consumers to be able to purchase these trimmers for \$129 retail in 1999. These engines, all 26 to 31 cc, for residential and commercial hand-held equipment, will be available in the year 2000. (Ryobi)

Agency Response: The benefits listed above increase the chance of consumer acceptance of four-stroke technology in applications that have traditionally used two-stroke technology.

261. **Comment:** User acceptance to us has not been demonstrated. The evidence is there in the extent of product returns of these products, retailers rejection of them, including on one occasion, withdrawal of the product, and announcements of next generation micro four-strokes before even the present generation has reached the end of its life-cycle, they must at present be regarded as experimental. (Deere)

Agency Response: See Comments 230 and 260 regarding consumer acceptance of handheld four-strokes. Additionally, staff notes that the Commenter has criticized four-stroke technology for its perceived flaws (see Comments 237, 256, and 258), but also criticizes the continuing improvement of the technology (the current Comment). The products are being produced and sold throughout the country, and have been since 1994, so they should not be regarded as experimental, unsuitable or unproven for use.

262. **Comment:** As to the other announced or promised technologies capable of reaching the staff's recommended limits - including direct injection and stratified charge - once again these are not new. We have examined, analyzed, prototyped and developed them, and found them so far lacking. Direct injection and stratified charge are generic descriptors of a multitude of different systems. (We maintain volumes of papers and patents describing various attempts to apply these concepts to two-cycle engines.) Without a detailed exposition of their technical limitations, the proof of their non-acceptance by users is their complete absence in the marketplace for handheld equipment. It is true that one company has announced that they will begin production of a stratified charge engine, but to our knowledge, the first engine has not come off of the production line, much less had true field experience or opportunity for acceptance by actual users. (Deere)

Agency Response: The developers of those products are ready to put those engines in the marketplace. Their concerns (see Comments 16-29) are that the modest price increases would not be accepted if others were allowed to continue to sell Tier 1 products, and that they would be unable to recoup their investments.

263. **Comment:** Over the years in the outdoor power equipment industry, the driver for technological change, the causative factor, has been the customer. Most often this is expressed by the customer with his or her pocket book, i.e., the decision to purchase or refrain from purchasing a product. However, the customer's decision to purchase can be influenced by what the manufacturer can and is willing to offer to sell. Here, and directly relevant to the issues we face today, come into play the constraints with which the manufacturer must contend in order to be successful with a product. Three of these constraints are primary:

- the user's acceptance of the technology
- financial limitation dictated by the user (value to price relationship)
- safety of the user and others affected by the product

The common element of these constraints is the user: if the manufacturer does not offer a product

that meets the user's needs, at an acceptable price and that is protective of the user and others, the user will not buy and the manufacturer will cease doing business. As stated above, the user typically expresses these constraints by the decision to buy and on these shoals many products have died. It is not uncommon, however, and most enlightened business decisions result from a manufacturer's anticipation of the purchaser's preferences: Will the product perform to the user's expectation? Will a purchaser pay the price needed to produce the product? Will the product be safe to use? And these user needs can often be expressed through standards and regulations, as this industry has long recognized. (Deere)

264. **Comment:** We have a very good track record with the technologies that we are using today. Many of the technologies in the development cycle take several years to prove out. Are they durable in the customers hands? Ultimately, we as manufacturers can make the most product in the world that we feel, and you as regulators can promulgate the best standard for the finest air quality that you could hope for, but what is going to decide whether these products are successful or not is the customer that must use the product. Will it perform for him? Is it durable? Does it meet his expectations? Is it a good value for the price he paid? (Husqvarna)

Agency Response: Staff understands that even the cleanest equipment must be accepted by the consumer. However, in objective terms (weight, performance, cost, etc.) the complying Tier 2 technologies offered by Honda, Ryobi, Tanaka, and Komatsu Zenoah should be acceptable, since they are similar to currently available products.

265. **Comment:** We understand that manufacturers of the ones that can comply have made significant inroads in this, and we applaud that, and in fact, our retail members would gladly sell those products and grower members would gladly use them. Most of the concern is that of these alternatives, the new technology, the oldest has been around for four years, and some of them aren't even on the market yet but yet are being touted as replacements, to replace products that have been in the market and developed over decades, and that is of concern to us. We just are skeptical whether that equipment has undergone adequate field testing, and all the applications and circumstances. I mean how many different positions, and what not, can you get on a farm with these types of machinery. I doubt that all that has been done adequately to really field test the equipment sufficiently. (California Association of Nurserymen)

Agency Response: The manufacturers indicating that they can comply, with the exception of Honda, are all currently involved in the handheld equipment market, and thus have realistic estimates of their customers' requirements. The comments they made at the Hearing indicate that they are very much aware of the need for multi-position operation, durability, light weight, etc. Although some of the products have not yet been brought to market, the manufacturers have spent years preparing them. All the manufacturers are experienced and established companies that understand the risks of producing an unacceptable product. See Comments 11, 12, and 277.

266. **Comment:** From a servicing standpoint, when we went to Tier 1, we got to see the problems, in other words, hard-starting, the idea of product failure, there are service bulletins that we get, generally speaking, that the manufacturers do a great job now. Things are getting tighter. Things break easier. They are harder to fix. When we went to service school for Honda, we asked them, what are the tools to use, is it a serviceable engine? You know, they've got the little tiny valves, and there were basically no tool to do that, and in our industry, we call that an Oklahoma valve job, where we have to go in and just clean the valves, and there is no tool for that. We have product safety recalls that comes out. We have hard-starting. We have ignition failures. So, these are concerns as we get into these tighter tolerances. (Lawn Tech)

Agency Response: The concerns of the Commenter are well-taken. As noted, though, those situations do occur with current products; to some extent, they will occur with any product. However, the additional requirement of a durability demonstration will ensure that manufacturers take these concerns into account. The engines that were shown at the hearing as ready to be certified, had been tested to 300 hours of use, which is considered an appropriate amount of time for commercial equipment.

267. **Comment:** In response to the PPEMA survey, California Park and Recreation Departments emphasized the need for portability, multi-position use and minimum weight. A few Departments are reviewing alternative hand held technologies. No Department supports the use of electric products. (PPEMA)

Agency Response: As noted on pages 15-17 of the staff report, the technologies likely to be used would meet the need for portability, multi-position use and weight. See also Comments 241 and 242. As noted on pages 17-18 of the staff report and in the staff's presentation, electric equipment is projected to be used mainly by residential users, rather than professional or commercial work. Other technologies are available for commercial use.

K. Product Availability

1. Two-Stroke Equipment

268. **Comment:** Eliminating two-cycle engine products could hamper fire prevention efforts and create potential safety problems in fire danger areas. (PPEMA and Direct Mail Campaign)

Agency Response: ARB regulations do not apply to fire and police forces so they may purchase non-California-certified products if California-certified products do not meet their fire and safety needs. This provision (Section 2403 (d), changed to Section 2403 (e) by the proposal) has been part of the ARB's regulations since Tier 1, and has not been changed in any way. In addition, this regulation does not affect larger chain saws (>45 cc engine displacement), which are generally used for clearing hazards in fire areas.

269. **Comment:** Because no two-cycle engine product can meet California's current proposal, the result will be the elimination of virtually all such equipment in the State. (PPEMA and Direct Mail Campaign)

270. **Comment:** Stihl Incorporated is one of the major American manufacturers of handheld power equipment utilizing internal combustion engines. Stihl, working with PPEMA, is involved in the ongoing discussions with the staff of the Air Resources Board, concerning the proposed Tier 2 exhaust emissions regulations for handheld equipment. The Tier 2 proposals are based on four-stroke technology which is not available for most handheld power equipment sold in California. Even for equipment where this technology may be available, there is a gross contradiction between the negligible contribution to the overall emissions situation and the unacceptable economic effects and technical feasibility of the proposed regulation. The ARB, proposal would eliminate virtually all two-stroke chain saws, string trimmers, blowers, and hedge trimmers in all of California. (Stihl)

Agency Response: These statements are not true. Komatsu Zenoah (Redmax) and Tanaka have certified modified two-cycle engines meeting the Tier 2 standards. Ryobi and Honda have developed and produced small four-cycle engines for handheld products that meet the Tier 2 standards adopted in 1990. See pages 15-17 of the staff report for a discussion of these and other technologies.

271. **Comment:** Eliminating two-cycle engine products will encourage increased water use for outdoor maintenance projects. (PPEMA and Direct Mail Campaign)

Agency Response: This statement assumes that the ARB action will eliminate two-stroke engines. As noted in Comments 10, 23, and 277 and the response to Comments 269-270, this is untrue. Furthermore, this statement could only be true if our rule was going to eliminate leaf blowers, which it will not. The fact that several municipalities are planning on banning or have banned leaf blowers is related to two issues that ARB does not regulate: noise pollution and careless blowing of dust and leaves into inappropriate places. ARB is only concerned, in this case, with the emissions that are emitted by the leaf blower's engines. Technology can solve that problem.

272. **Comment:** The California Association of Nurserymen is a Statewide trade association representing approximately 1,400 members, wholesale growers as well as retail garden centers and associated businesses as well. We address the proposed regulation today on two fronts. First on the basis of the users of the product, and secondly from the standpoint of those who retail the product, the retail garden center. Our concern in both cases are the manufacturers of the current products, and in talking to some, there are roughly 20 manufacturers of these products, state that they can't comply with the proposed rule, and thereby, a lot of these products will go by the wayside and will go off the market. (CAN)

Agency Response: See Comments 102, 103, 238, and 260 regarding the ability of complying engines to substitute for dirtier engines. Although some particular products will go off the market, substitutes that meet every objective criteria (weight, performance, etc.) will be available. operation). The averaging program (staff report, page 35) will even allow the continued production of some current engines.

2. Low-End Consumer Equipment

273. **Comment:** We have some significant problems with the staff proposal. We think it will essentially mean the demise of low cost two-stroke hand-held equipment. (PPEMA)

274. **Comment:** The price difference that staff talked about on the four-stroke trimmers with a comparatively equipped two-stroke trimmer, the problem is that you still have these \$69 trimmers that will need to be replaced with something, the only other alternative out there currently was that four-stroke that we talked about. (Husqvarna)

275. **Comment:** Two complying commercial units with two-stroke technology have extremely high price increases associated with them. My primary concern is not that commercial market. We are in the consumer market with that low-end product of where there is significant volume, very low emissions contribution. (Deere)

Agency Response: It may be true that low-cost two-stroke equipment would not be available. However, pages 15-19 of the staff report indicate that there are numerous alternative technologies available, including electric equipment. See pages 37-42 of the staff report regarding the need for reductions from these emissions sources.

3. Complying Handheld Products

276. **Comment:** Ryobi makes about two million engines a year. We have the largest market share in trimmers for our brand, and we have about a 20 percent market share of the hand-held category in the U.S. Our products are distributed nationally, primarily through the home centers. We also produce OEM products for Sears, Toro, Steel, other manufacturers. We support the existing Tier II rule for hand-held engines. We have made a significant investment to meet this, just as the gentleman from Tanaka indicated. We took a look at this back 1991. We made an announcement back in 1992 that we were going to have an engine out to meet Tier II, and in fact, we delivered that engine in 1994, and it's one of the two engines that you saw out there. (Ryobi)

277. **Comment:** Our significant progress with [a consortium to build a fuel-injected single cylinder engine] is briefly described in the staff's recent proposal published in prelude to this meeting. Another design and optimized scavenging two-cycle with a catalytic converter was developed by our engineering staff. This was the machine that you folks viewed

this morning. This 40 CC engine meets all of the requirements set forth in staff's recent proposal and is scheduled for production in July of this year. If the Board accepts the staff's proposal, we expect to be the first to certify a two-cycle hand-held engine to the Tier II standards. We have an application that is complete and has been submitted to staff. This will be the realization of a long-term goal of ours. This was an objective that we set many years ago. We are in the prototype stages with a 26 CC version of the same design and are confident that we will have it in production late this year or early next. (Tanaka)

Agency Response: These comments support the staff view that there has been sufficient time for manufacturers to develop complying technologies and prepare for production, in contrast to Comment 32. This comment also indicates that support of the Tier 2 standards is not limited to entrepreneurs and others who will bear no responsibility, as claimed in Comment 37.

4. Foregone Opportunity to Make Other Improvements

278. **Comment:** A lot of the investments were made at the expense of components or products that were foregone. They cost money to design and develop and that money went into emissions development rather than new products. (Husqvarna)

Agency Response: This consequence of spending money to improve one feature of a product, a lack of money to make other improvements, applies to all companies equally. Fortunately, some of the new technologies have advantages, such as less noise, less fuel consumption, etc, that can be used to improve marketing. See Comments 16-29 concerning the need for manufacturers to recoup their costs.

5. Effect on Existing Tools

279. **Comment:** We would ask just that the Board not rush into taking away the valuable tools that we have today, and make sure we do have adequate means of performing these work tasks. We have good products today. We're just concerned about the durability and what not. (CNA)

Agency Response: The proposal would neither take away existing tools, nor would it prevent the dissemination of adequate equipment.

6. Availability of All Equipment Applications

280. **Comment:** My comments are focused on the homeowner consumer for the Poulan/Weedeater Division, and the professional side for Husqvarna. We make hand-held trimmers, blowers, chain saws, edgers and hedge trimmers. A lot of the focus that we have been talking today on, which you saw demonstrated earlier out on the table, was strictly for trimmers. There has been a lot of conversation, and some companies stating they can make other products,

but a lot of those technologies were geared for, and the products you saw, were string trimmers only. That still leaves blowers, chain saws, edgers and hedge trimmers without a technology for some of those. (Husqvarna)

Agency Response: String trimmers form the largest segment of the handheld equipment market, and it is thus reasonable that manufacturers develop complying string trimmers first. All the manufacturers have indicated that their technologies would be equally applicable to other applications, and that they have plans to pursue those applications. The averaging program could also come into play. See Comments 283-285 and 287-289 and the responses thereto, as well as pages 15-17 of the staff report.

281. **Comment:** The California Landscape Contractors Association is a nonprofit trade association of State licensed landscape contractors. We have approximately 2,500 members throughout the State of California. Although we are a good sized organization, I believe I also speak for a much larger group, the tens of thousands of people who make a living maintaining residential, commercial and public landscapes in urban California. Our best guess is that this number substantially exceeds 50,000. These not very well organized as a trade. They are unlikely to be here today, even though their livelihoods could depend on the decisions that you make today. Together we comprise the bulk of the State's landscape industry, an \$8 billion industry in 1995. So, small businesses, big industry. As I'm sure you have all recognized, portable power equipment is essential to the landscape maintenance business. String trimmers, leaf blowers, hedge trimmers, these are the tools of our trade. They are just as important to us as the nail gun, or power saw is to the carpenter. They are second only in importance to the lawnmower. Clearly, we can't go back to using shovels, rakes, hoes any more than carpenters can give up their tools. With respect to electrical equipment, with respect to electrical leaf blowers, our members tell us that it takes twice as long to do the job with electric blowers as compared to gas powered blowers. Our members are very concerned about the proposed regulations. (CLCA)

Agency Response: Staff does not expect commercial users to substitute electric equipment for their current gasoline-powered equipment. Commercial gasoline-powered equipment will be available, as attested to by Komatsu Zenoah and Tanaka. Furthermore, averaging will allow manufacturers the flexibility to offer base two-strokes. See pages 60 and 62 of the staff report.

282. **Comment:** CLCA believes that landscaping improves the environment, and many of our members consider themselves to be environmentalists. We don't want to be obstacles to cleaning up, admittedly, dirty air. Without getting into the technical merits of the different proposals that are being debated today, a subject of which we have no expertise whatsoever, we simply wish to convey that we can live with any compromise that keeps gas powered hand tools on the market. We can live with any air emissions strategy that manufacturers can realistically accomplish. Furthermore, we are committed not only to fixing the problem but hopefully to working with the Air Board and manufacturers to head off misguided

local bans that, in our opinion, conflict with the Air Board's jurisdiction in regulating mobile sources. (CLCA)

Agency Response: The staff agrees that CLCA's concerns are appropriate. Staff believes the approved regulations will not eliminate gasoline-powered hand tools. As several manufacturers testified, the complying engines and equipment that have been developed do meet these requirements. Customer satisfaction with the Ryobi four-stroke is high, some four-stroke models are lighter than comparable two-strokes, two-stroke technologies that are available do not significantly increase weight or decrease performance. Durability testing is now required, so users will actually have greater certainty that equipment is durable. Although staff expects increased use of electrics in consumer applications, gasoline products will still be available. See Comments 283-285.

283. **Comment:** We also intend to expand this category of products and the larger engines from 40 cc to 60 cc, two to three horsepower range, that will utilize the high speed four-stroke technology that can be used to power chain saws, brush cutters, blowers and other applications, these engines could also be available in the year 2000. (Ryobi)

284. **Comment:** Our second prototype engine is a 34 cc unit, that I previously said, is a basic model. It is brush cutter trimmer engine. There's a reason why it's a brush cutter trimmer engine from Komatsu Zenoah America. We typically do not do much in chain saws in the United States. The biggest potential for us is in line trimmers. That is why we developed that engine the way that it is. (Komatsu Zenoah)

285. **Comment:** That technology will fit on any engine that we build. It has lean combustion technology, airhead stratification, and it has no catalyst. (Komatsu Zenoah)

Agency Response: These comments demonstrate the suitability of complying technologies for a variety of products.

7. Other

286. **Comment:** I think eventually most of the major players will meet the emissions standards also. We have this weighing of can we do it now, or can we do it later. I think there are some good manufacturers out there that we would all hate to see go because some of them have better products. So we want to encourage them to stay in the marketplace based on that. We get involved with, are we going to break it or bend it. When I have sat in these meetings with them, a few of them are just about ready to break right now. (Lawn Tech)

Agency Response: The availability of numerous complying technologies, combined with averaging and the one-year delay should allow even those manufacturers who oppose going beyond the tier 1 standards to offer products. Licensing is also an option, at least with regard to Ryobi four-stroke technology (see Comment 287).

287. **Comment:** Ryobi four-stroke technology is available to others through licensing and OEM agreements. (Ryobi)

Agency Response: Ryobi's willingness to license their technology provides yet another option for manufacturers who have not yet developed a means to comply.

288. **Comment:** Ryobi also offers zero emission electrical equipment, such as blowers, trimmers and hedge trimmers. They retail from \$29 to \$79. The trimmers can also use our add-on accessories. In addition, Ryobi offers a line of zero emission battery products such as trimmers, hedge trimmers that retail for \$59 to \$99. Ryobi support, and supports the existing Tier 2 rule. (Ryobi)

289. **Comment:** We have heard a little bit about the choice available to California consumers, what's going to happen if you adopt a Tier 2 rule, will product be available to California consumers? Look at the percentage. If you look at the total market in California, 65 percent of the total hand-held market is electric as opposed to gas. In each one of the categories identified there, trimmers, blowers, hedge trimmers, significant numbers of electric equipment, even in chain saws, if you look at the bottom line there, please, if you look at chain saws at 45 cc and under, you see nearly a 50/50 break in electric and gas. (Ryobi)

Agency Response: These comments indicate that low-priced consumer equipment is available now and will be in the future.

290. **Comment:** Most of the respondents were very concerned that they and other consumers would pay the price if these small hand held products are forced to comply with overly strict regulations in a time period too short to allow development of new technology. (PPEMA-Moore)

Agency Response: As Ryobi, Honda, Komatsu Zenoah and Tanaka have shown, there has been sufficient time to develop new technology since the regulations were adopted in 1990. However, the revisions do provide an extra year before implementation.

L. Harmonization

291. **Comment:** The alternative proposal will provide a significant, although not complete measure of harmonization with EPA's proposed program. In that regard, there are a number of technical issues that should be addressed to minimize to the greatest extent possible differences between ARB and EPA procedures. Those differences have no impact on emissions but significant impact on costs. We are ready to work with the staff and EPA to identify and minimize such differences. We urge the Board to direct the staff to work with manufacturers and EPA to avoid unnecessary costs and duplicative regulatory burdens. (EMA, OPEI)

Agency Response: The Commenter submitted detailed written comments noting the areas of concern. Those comments are included in this document; the bulk are in Section M, Specific Comments on the Test Procedures. The Board directed staff to work to resolve the harmonization issues. Where it was possible to harmonize without jeopardizing the benefits of the California program, staff has attempted to harmonize. See also the first Notice of Modified Text.

292. **Comment:** Westerbeke would like to further encourage EPA and ARB to harmonize as much as possible, especially in the areas of standards, compliance programs (such as PLT), deterioration factors, and test procedures. Harmonization will help reduce the burden on manufacturers. (Westerbeke Engines & Generators)

Agency Response: Staff's intention is to harmonize as much as possible with the U.S. EPA procedures, but harmonization of the emissions standards and timing may not be possible because of the different needs of California. However, with regards to testing and other procedures, the staff has harmonized as much as possible. See the response to Comment 291.

293. **Comment:** We fully support the staff's proposal to align the emission regulations applicable to small nonroad compression ignition engines with those of EPA. ARB, EPA and the effected CI engine manufacturers signed a statement of principles regarding the regulation of nonroad CI engines. The emission regulations set forth in the SOP will provide California the emission reductions it requires from CI nonroad engines. EPA has been doing its part to implement the SOP. It is proposed and will soon finalize the SOP standards. As such, it is appropriate for the Board to extend the existing Tier I standards applicable to small diesel engines until January 1, 2000. Thereafter, set forth in the SOP, we expect ARB and EPA to fully align their emission regulation programs, such that a nonroad CI engine certified by either ARB or EPA will be fully accepted by the other. Today's proposal for small CI engines is an important step toward that ultimate goal.

Agency Response: Staff agrees.

294. **Comment:** Toro supports the comments submitted in connection with this proceeding by the trade associations to which it belongs, the Portable Power Equipment Manufacturers Association and the Outdoor Power Equipment Institute. Toro comments separately in order to emphasize one issue of particular concern, namely the harmonization of ARB's proposed Tier 2/3 carbon monoxide ("CO") emissions standard for nonroad engines over [65] cc used exclusively in snowthrowers with the Phase 2/3 CO standard proposed by the U.S. EPA for non-handheld engines. Harmonization will enable Toro to produce and certify snowthrower engines that can be sold across the United States, rather than be confronted with needing to meet two separate standards. Such harmonization will create production efficiencies and reduce costs sufficiently for Toro to justify a presence in the relatively small snowthrower market in California without having any negative impact on the state's CO inventory. (The Toro Company)

Agency Response: Engines over 65 cc used exclusively in snowthrowers need comply only with the CO standard (see Section 2403). The CO standard that would apply is the same as the Tier 1 standard, with an adjustment for deterioration. According to the Statement of Principles, the U.S. EPA plans to do the same with the federal Phase 1 CO standard. However, the federal Phase 1 CO standard is less stringent than the California Tier 1 standard, because California fuel differs in composition from federal fuel. Furthermore, CO from wintertime products is a concern (see Comments 177-178). Therefore, staff did not make this change.

295. **Comment:** After January 1, 1999 replacement engines need to minimally comply with 1995 regulations. ARB should change this to harmonize with the federal regulation which allows uncertified replacement engines.

Agency Response: The replacement engine language in Section 2403 (f) has been modified to follow the federal requirements. The modified language is included in the first Notice of Modified Text.

296. **Comment:** The Cumulative Sum Production Test Procedure needs to be harmonized for 50 state engines. Manufacturers should be able to use same data for both ARB and U.S. EPA. (EMA)

Agency Response: There is no prohibition in the Cumulative Sum procedure (Section 2407, Title 13, CCR) against using data generated under the federal program, provided that the engine family in question is a 50-state family; i.e., certified both in California and federally.

297. **Comment:** Part I, section 14 of the Test Procedures is overly burdensome. ARB should have full harmonization with EPA concerning certification applications. The applications should be electronic, as EPA's are, and should minimize the amount of information required in the application. Information required in the application should be limited to that which is necessary for ARB to determine compliance. EPA's Phase I electronic version should be sufficient, with the addition of those elements necessary for an in-use compliance program. (EMA)

Agency Response: ARB has included an explicit provision which will allow the certification staff to work with manufacturers (on a case-by-case basis) on issues of application content and layout. With prior approval by the Executive Officer to ensure compatible formatting with ARB software capabilities, manufacturers would be able to submit certification requests electronically. The modifications are shown in the first Notice of Modified Text.

298. **Comment:** ARB and EPA should provide harmonized durability periods. EMA recommends that ARB harmonize with the hours specified by EPA for Class 1 engines. (EMA)

Agency Response: The data do not support a minimum useful life period of 66 hours

for class 1 (lawn mower-type) engines. According to the Emissions inventory report, lawn mowers have a typical life of 7 years, with an average life of 35.9 hours per year, or approximately 250 hours. The staff believes that is an appropriate period for manufacturers to select, but does provide a minimum durability period of 125 hours for those manufacturers who build particularly short-lived engines.

M. Specific Changes to The Test Procedures and Regulations

A number of typographical errors were noted and have been corrected.

299. **Comment:** The definition of actual credits in 2401(a)(7)(iii) references “actual applicable production/sales volume.” Industry market analysis estimates should be sufficient. (EMA) 2407(d)(3)(B)(ii) The “actual California sales” figures referenced here do not exist. They can not be reported because the information is not tracked by anyone. ARB should continue to accept industry market analysis estimates. [These same issues are a concern in 2408(f)(1), 2408(i)(2) and Part I, section 9(d)(4) of the Test Procedures.] (EMA)

Agency Response: The first Notice of Modified Text contains a definition of eligible sales that will allow the use of market estimates.

300. **Comment:** The definition of “Emissions Durability Period” in 2401(a)(13) should not include the reference to the year 2000 and subsequent model years. (EMA)

Agency Response: This change has been made.

301. **Comment:** The definition of “Emissions durability values” in 2401(a)(14) should refer to bench aging instead of dynamometer aging. (EMA)

Agency Response: The definition was modified to provide flexibility as to how a load is placed on the engines. Dynamometers remain acceptable, as do other techniques of placing a load on the engine, such as using a brake or generator, which are typically the other methods used in “bench aging”.

302. **Comment:** Clarification should be provided on the definition of “Point of first retail sale” in 2401(a)(28) (EMA)

Agency Response: Staff has clarified that its intent is to harmonize with the U.S. EPA; the definition is consistent with their proposed language. Matters of interpretation can be handled during the certification process.

303. **Comment:** To harmonize with EPA, 2401(a)(32) should make it clear that snowmobiles are not covered under this rule, including snowmobiles designed for use by

children which may, in fact, have a “speed governor” installed for safety purposes. (EMA)

Agency Response: The language has been modified to address this issue.

304. **Comment:** The revisions to the definitions of hand-held versus non hand-held engines in 2403(b); Footnote No. 4 to “Exhaust Emissions Standards” Table, may be a concern if exceptions are not made. The problem is specific to engines used in compact snow blowers. ARB should provide for an exception for these products, such as it did in Tier I. The same language occurs in the test procedures, Part I, section 9(b); Footnote No. 4 to “Exhaust Emissions Standards” Table.

Agency Response: ARB agrees that the non-handheld test cycle would not be appropriate under the above circumstances. The existing regulatory language (Part I, Section 20 of the Test Procedures) provides for use of an alternative test cycle if the standard test cycle does not represent actual operation. This issue can thus be addressed during the certification process. The difference in the standards (400 g/bhp-hr CO vs. 410 g/bhp-hr CO) does not warrant the possible confusion from listing yet another standard.

305. **Comment:** Paragraph 2407(a)(4) limits break-in before testing to the same extent it is performed on production line testing engines (ref. subsection (b)). What are the hours? Manufactured recommended break-in? (EMA)

Agency Response: This provision has the same intent as the previous production line audit procedure. The only change is semantics -- the term “quality audit” has been replaced with the more general term “production line.” The break-in hours are thus limited as currently noted in Section 21 of Part I of the Test Procedures.

306. **Comment:** 2407(c)(2)(B) For the Cumulative Sum procedure, an expression is provided for determining the number N of tests required for each model year. ARB needs to clarify which term is squared in that expression. (EMA)

Agency Response: This was clarified in the first Notice of Modified Text. The entire expression (encompassing both numerator and denominator) is squared.

307. **Comment:** There is an incorrect reference in 2407(c)(3)(A)(vi). ARB should clarify the reference to regulatory paragraph “(c)(4)(ii)(6)”, which does not seem to exist anywhere in the current draft. (EMA)

Agency Response: The reference was corrected in the first Notice of Modified Text. The correct citation is “(c) (2) (B) (iv)”.

308. **Comment:** 2407(c)(3)(A)(viii) This section cites a ten working-day notification window, while paragraph 2407(c)(4)(D) cites a two working day window. ARB

should clarify the difference between these two sections, and why the notification periods are different. EMA suggests that both these windows be extended to allow for a 30 day notification period. Paragraph 2407(c)(4)(D) states that if two consecutive engines fail, need to report within 2 working days. (EMA)

Agency Response: ARB has corrected these references to consistently provide a 10 day period.

309. **Comment:** Section 2407(c)(3)(A)(ix) states that “if a manufacturer performs corrective action on an engine family and then resumes production, all previous tests will be void, and Cum Sum analysis will begin again with the next test”. ARB should clarify why this requirement is different than the requirement in 2407(c)(3)(A)(iii), which states that if a running change is implemented, the Cum Sum statistic calculations for the model year will remain unchanged. A running change may be a corrective action, and all corrective actions would be running changes. (EMA)

Agency Response: The section has been rewritten to clarify that it is limited to failing engine families only.

310. **Comment:** 2407(c)(4)(E)(vii)3 It is not understood what is meant by “initial test results before and after rounding and final test results for all exhaust emission tests...”. (EMA)

Agency Response: The language was taken from the U.S. EPA Cumulative Sum program; ARB’s intent is to harmonize with U.S. EPA. Manufacturers have the option of running multiple tests on a PLT engine, and using the average of those initial tests as the final test result for evaluation in the Cumulative Sum equation.

311. **Comment:** ARB should clarify whether 2407(d)(6)(A) refers to the single failed engine or to the whole engine family. We believe it should refer to the single failed engine. (EMA)

Agency Response: Staff has clarified that this refers to the single failed engine.

312. **Comment:** There are two problems with the definition of power in 2408(f)(1). The first is that the maximum modal power of the certification test engine should be used to represent the family, rather than the maximum modal power of each configuration within the family. Such a definition would simplify calculations for manufacturers, and would have the benefit of being traceable back to a specific well-controlled emission test, records of which are provided to ARB already during certification. Conceptually, using a single test engine to represent the power of a family is no different than using a single test engine to represent the emissions of a family, as is the case with certification. Also, the selection of the appropriate power to use in the calculations is not relevant to emissions, provided that the same power

calculation is used equally on both the credit generating and credit-using side of the credit calculation equations. It therefore makes sense to choose the method of implementation that is clearest, best-defined, and least-burdensome. Contrary to ARB's assumption, manufacturers do not routinely generate maximum modal power data for every available engine configuration. If such a requirement were imposed, the resulting administrative burden on industry would be overwhelming and would obviate the benefits otherwise associated with the AB&T program. (EMA)

313. **Comment:** Modal power for each configuration is not available. Therefore, this requirement is not feasible. (EMA)

314. **Comment:** Part I, section 9(d)(1) What is the intended definition of horsepower? Is it maximum modal power?

Agency Response: The power used in calculations is relevant to credit generation because the credits may be traded to other manufacturers, who may have more narrowly defined engine families. The intention of the credit program is to reflect, as much as possible, actual emissions, which is facilitated by the use of sales-weighted maximum modal power. The ARB has added language in the second Notice of Modified Text to allow the Executive Officer to approve the use of alternate procedures to harmonize with the federal program.

315. **Comment:** The paper work required to comply with 2408(g) creates an excessively high reporting burden. A spreadsheet which includes corporate credit balance information to be supplied to the agency on an annual basis should be sufficient. (EMA)

Agency Response: Staff revised the regulatory language to allow information to be submitted in spreadsheet fashion, and included an example with the first Notice of Modified Text.

316. **Comment:** Part I, section 9(d)(2) of the Test Procedures states, "the Executive Order certifying the California production for a model year must be obtained prior to issuance of certification Executive Orders for individual engine families...;" does that mean certifying production volume estimates? (EMA)

Agency Response: The language has been modified to allow this information to be submitted in spreadsheet form, as per the Response to Comment 315.

317. **Comment:** The provision of Part I, section 14(b)(2)(xi) should only apply to those manufacturers that offer high altitude adjustment kits. (EMA)

Agency Response: Staff modified the language so that the requirement will apply only to manufacturers who recommend high-altitude adjustments.

318. **Comment:** Part I, section 18(h) of the Test Procedures requires closed

crankcases for all engines. Manufacturers recommend that ARB adopt a provision that would allow operators of equipment powered by non-wintertime only engines to open the crankcase breathers on such equipment during operation below 32 degrees Fahrenheit. Manufacturers have been advised of several engine failures resulting from carburetor icing or frozen breather connections which occur when engines typically operated in warm weather are operated in below freezing conditions. Such failures are the direct result of the presence of the high moisture content breather gas in the induction system in cold ambient temperatures. While systems can be designed to provide for intake air and breather heating during those operating conditions, the cost and complexity of such systems is not warranted for the limited number of units which actually operate under those conditions. (EMA)

Agency Response: As previously, the ARB will use enforcement discretion in dealing with this issue. It should be noted that the circumstances noted in the comment are relatively rare in California.

319. **Comment:** Part III, section 6(d) This section requires that the [analyzer] response to methane be determined when conducting analysis of natural gas fueled engines. We require more specific details of this test requirement. If the [analyzer] is required to be calibrated on a propane and nitrogen mixture, why not use a methane and nitrogen mixture to determine the methane response rather than a methane and air mixture? (EMA)

Agency Response: This change was made.

320. **Comment:** Part III, section 11(a)(2)(iii)(B) requires the use of natural gas representative of commercial natural gas generally available in California. OEMs need the flexibility to use natural gas which is available locally to the engine manufacturer's test site. (EMA)

Agency Response: If equivalency can be shown, then such fuel will be allowed for certification. The paragraph, along with a similar paragraph in Part IV, section 4(a)(2)(iii)(B), has been revised to allow locally available commercial fuel to be used for service accumulation.

321. **Comment:** Part III, section 12(b)(2)(ix) ARB specifies that "data sample intervals should be less than one-half of the response time for the fastest instrument system being used." This should be changed to "1 second" so as to be harmonized with EPA.

Agency Response: This has been modified to harmonize with the federal procedure.

322. **Comment:** Part III, section 12(d) ARB's provisions for the engine test cycle should be harmonized with EPA's. (EMA)

Agency Response: This has been modified to harmonize with the federal procedure.

323. **Comment:** Part III, section 14(c)(4)(i) The calculations for fuel flow seem to assume Indolene fuel (average hydrogen-to-carbon ratio of 1.85/1 and a molecular weight of 13.85). This should be generalized to account for other fuels such as propane or natural gas. (EMA)

Agency Response: Staff has added section 14(c)(5) with the general equations to simplify the process for certifying with other fuels.

324. **Comment:** Does the test cycle which will be used to quantify these emissions really match the ways they are used? (Muriel Strand)

Agency Response: Because the engines in question are used in a multitude of applications, no one test cycle can represent all operations. However, the test cycles as they have been developed are accepted by industry and the U.S. EPA as being generally representative of actual operation. The staff action did include a change to the handheld (65 cc and below) test cycle to make it more representative. (See page 22 of the staff report)

325. **Comment:** EPA requires rounding to the nearest cubic centimeter and California to the nearest tenth of a cubic centimeter. When the displacement break was still at 50 cc we could have had one engine that was Class 4 in California and Class 5 federally. If possible could the same criteria be used for rounding? (Honda)

Agency Response: Staff has modified its rounding procedure to ensure consistency with the U.S. EPA, as noted in the first Notice of Modified Text..

326. **Comment:** In the primary selection criteria list for Engine Families and Engine Family Groups there is both the requirement for an engine to be in the same Class and for the difference in displacement not to exceed 15% of the largest engine. Honda thinks that this restriction should be eliminated to harmonize with EPA and to eliminate a technically incorrect requirement. For example, we have two engines of 22 cc and 31 cc that share a cylinder assembly and many other components and the 15% limit prevents them from being members of the same family. If the objective is to group engines together that have similar emissions and emission durability then the 15% requirement becomes too restrictive. (Honda)

Agency Response: The staff did not modify this requirement. The 15 percent requirement has not been found to be too restrictive in the past. Although when dealing with very small displacements, a variation of only a few cc can exceed that allowable 15 percent variation, the differences of scaling can be significant. For example, Table 6 on page 19 of the staff report indicates that the zero-hour emissions of the 22 and 31 cc Honda engines are 17.1 and 15.5 g/bhp-hr, respectively. The difference could be significant, especially with regards to credit generation and use.

N. Miscellaneous

1. Spillage

327. **Comment:** Ryobi disagrees with the apparent ARB Staff position of "Finding the Additional Reductions Needed" insofar as the source is reduced fuel spillage emissions. Ryobi understands that ARB intends, in the future, to achieve additional emissions reductions by reducing fuel spillage emissions and that emissions from fuel spillage are not now in the statewide inventory. Therefore, it does not make sense to suggest in the Staff Report for this Tier 2 rulemaking proceeding, which will reduce emissions from handheld engines, that emissions reductions from reduced fuel spillage are relevant to this rulemaking. (Ryobi)

328. **Comment:** Please be aware that many users of lawn & garden equipment are mobile commercial landscape maintenance enterprises which typically have with them gasoline cans with which to refuel these devices. During the warmer months this process constitutes a source of evaporative emissions which may not be adequately addressed by current evaporative emissions estimates. (Muriel Strand)

Agency Response: Staff has determined that issues of evaporative refueling emissions and spillage goes beyond the small off-road engine category, and will be dealing with it in a separate rulemaking.

329. **Comment:** There was one other item on the spillage, just so you know this is available. Our shop keeps these. This is a little spillage device for containers, and it costs the dealer \$2.64. So, I know staff chose not to put that forward. I wish they would have. I think we can do that now. The dealer certainly can. The manufacturers can put that in with their product. I think that could be moved forward real quickly. (Lawn Tech Equipment Company)

Agency Response: This information will be considered when staff addresses spillage control in more detail.

330. **Comment:** The fuel spillage alternative that PPEMA proposes is really not an alternative at all. It's voluntary. It's an MOU. So, it's not a regulation. It's not enforceable. There's no way that you can be assured the standards you think that you are getting from the alternative will any way meet the standards that you have. Moreover, this MOU with PPEMA will represent only 60 percent of the gas market. The rest of the gas market will not be obligated under that proposal. (Ryobi)

Agency Response: Control of spillage emissions cannot be used to relax the exhaust emissions standards. See the response to Comments 327 and 328.

2. Technology Review

331. **Comment:** The third thing that I would like to suggest is a technology review. I'm not suggesting that it be done every two years, but I think the idea of doing a

workshop after two years has some value. (MECA)

332. **Comment:** I do think that four years from now it would be worthwhile to have a formal technology review. That technology review would be designed to accomplish three things. First of all, take a look at how things are going. How is the program that you will adopt today doing in terms of emission reductions. Secondly, what is the state of technology development that we are talking four years from now, and the point that I earlier made that I think more could be done now, I think if we look in four years, where are things, is there more that could be done technologically. The third part of this review would be, what does California need in terms of future reductions? I think the issue has been raised about catalyst technology. We obviously feel that the proof is in the pudding. We have spent a good deal of time providing information to the staff. We think it is a real solution. (MECA)

333. **Comment:** The Board should direct the staff to report, with recommendations, to the Board no later than 2002 on: 1) the progress in reducing emissions from small off-road engines through implementation of the Tier 2 -standards and other alternative strategies outlined in the staff's March 26, 1998 proposal, 2) the technological feasibility of cost effectively achieving emission levels below the Tier 2 standards, and 3) the air quality benefits that could be derived from greater reductions in HC+NO_x from small off-road engines.(MECA)

334. **Comment:** We are concerned about having a regulated sense of review. We think we are always under review. There is always a challenge to develop. And the staff's alternative is putting in place an incentive type program that will, in fact, develop technologies, and part of the alternative proposal is close communication between the manufacturers and the staff. I'm a little concerned about scheduling that, such that it stands in the way of the work that needs to be done. (EMA, OPEI)

335. **Comment:** I think the idea of some sort of a workshop or something with the staff might be a means of doing that. I am always getting concerned that if we take the Board's time and we have to go through all the process that is involved in that, it gets somewhat debilitating. I would have no objection to the idea of a public workshop. (EMA, OPEI)

336. **Comment:** Maurdyne and other businesses have made substantial investments in successfully meeting the challenge of reducing small engine emissions. The ARB staff acknowledges that some engine manufacturers who have developed current Tier 2 compliant engines will be adversely impacted in recovering their investment by the relaxed standards and delayed implementation schedule contained in the proposed regulations. The Board must encourage, rather than discourage, such research and development efforts and investments by reasserting a technology-forcing role in reducing small engine emissions. To this end, Maurdyne respectfully requests that the Board include in the proposed regulations a formal program of technology review to occur, at a minimum, or every two years. If technological developments and cost effectiveness indicate that an adjustment to emissions standards is warranted, the ARB should retain the flexibility to do so. Freezing the standards for the next six years merely retards

and discourages technological innovation. (Maurdyne Industries, Inc.)

Agency Response: The Board directed the staff to conduct a review in two years. This will allow the staff to review EPA progress, as well as industry progress and the need for further emissions reductions. The resolution contains language mandating the review.

3. Optional Standards

337. **Comment:** We believe there is a significant additional opportunity to achieve emission reductions beyond those which will result from the proposed standards by also using market-based mechanisms to promote the manufacture, sale, and use of low-emitting lawn and garden equipment. An important element in promoting the manufacture, sale, and use of "green" lawn and garden equipment would be for ARB to establish a program for the voluntary certification of [engines that] emit significantly below the mandatory program. A properly formulated marketing program and a concerted public education program could lead to a substantial market for low-emitting lawn and garden equipment. . . . The Board should adopt optional reduced-emission HC+NO_x standards for 2000 and later model year small off-road engines as listed below:

Optional Reduced Emission HC+NO_x Standard

(in grams/bhp-hr)

Class I	Class II	Class III	Class IV	Class V
8.0	6.0	38.0	38.0	38.0
4.5	3.5	26.0	26.0	26.0

(MECA)

338. **Comment:** The Board [should] direct the staff to report, with recommendations, to the Board no later than December 1998 on possible strategies to promote the manufacture, sale, and use of equipment with engines meeting the optional reduced emission HC+NO_x standard (MECA)

339. **Comment:** We also recommend that ARB, at a future date, explore ways the small off-road engine control program could be modified to promote the certification of very low-emitting engines. For example, select administrative, reporting, or compliance testing requirements could be eased somewhat for manufacturers certifying very low-emitting engines. (MECA)

Agency Response: The Board directed the staff to investigate the possibilities of optional standards, although not with a December 1998 deadline. Optional standards will be examined in the context of a unified program with other off-road categories, specifically spark-

ignition engines greater than 25 horsepower.

4. Support

340. **Comment:** The Sacramento Metropolitan Air Quality Management District urges your board's adoption of the proposed standards. (SMAQMD)

341. **Comment:** While some small engine manufacturers have indicated that these standards cannot be met, other manufacturers of small engines have indicated that they are able to meet these standards. Given the established capability of the industry to meet this challenge, the ARB should adopt the staff proposal and deliver these emission benefits to California's breathers. We look forward to your positive action on this matter. (SMAQMD)

342. **Comment:** We understand that some engine manufacturers have sought to have ARB adopt less stringent standards in lieu of the current ARB proposal. We oppose any revision to the current proposal that does not achieve equivalent emission reductions' We have two reasons for our opposition. First, a reduction in the emission benefits of this regulation may jeopardize Bay Area progress toward achieving California's ozone standard. Because Bay Area stationary sources are now well controlled, it is extremely difficult to find stationary source emission reductions of the magnitude promised by the ARB small engine regulations. Second, any further retreat from the original California Tier 2 standards would effectively punish those companies that have invested in new technologies to meet the original 1999 Tier 2 standards. In particular, a relaxation of the 54 grams per brake horsepower hour standard now proposed for engines with a displacement of 60 cubic centimeters or less would harm, rather than reward, several companies that have developed new technologies at considerable expense to meet the original Tier 2 standards. (Bay Area AQMD)

343. **Comment:** I do want to commend the Board for their outstanding efforts in addressing this source, as well as many of the other sources. The progress that has been made in moving towards that 2010 attainment has been nothing short of remarkable, so I do want to congratulate you on that. I also want to commend the staff for a truly outstanding staff report, and a lot of hard work in putting this proposal together. (MECA)

344. **Comment:** The staff report supporting the proposal provides an excellent analysis of ongoing technological advancements and discusses fairly the issues associated with reducing emissions from small off-road engines. (MECA)

345. **Comment:** We commend the Air Resources Board for its continuing efforts to address emissions from small off-road engines. We believe the proposed amendments are an important step forward in reaching the ultimate objective of very low-emitting lawn and garden equipment. Further, we believe that with a properly fashioned and implemented regulatory program, the small engine of the future will be very low-emitting, cost effective, more fuel efficient, more powerful, and more durable. Further, we believe this lawn and garden equipment

will be extremely popular with consumers and will make an important and needed contribution to California's continuing efforts to achieve clean air. (MECA)

346. **Comment:** I will just close by saying that I think the Board is taking a big step forward. We wish it were a little bigger, but in any event, I want to pledge very strongly our commitment to work with the Board and staff to advance this program. (MECA)

Agency Response: Staff acknowledges the support.

5. Other

347. **Comment:** ARB staff have proposed emissions limitations for model year 2000 engines and beyond that do not rely upon the present handheld/nonhandheld distinction. Coleman thinks that this is an excellent solution to the handheld/nonhandheld dilemma. All that Coleman is suggesting now is that ARB modify its present regulations to provide industry this regulatory relief immediately. (The Coleman Company)

Agency Response: The Coleman Company's proposal has been incorporated into the revised regulations. See the first Notice of Modified Text.

348. **Comment:** If the Board does not provide additional flexibility for marine engines, it will place a significant burden on engine manufacturers which could force some companies to either go out of business or leave the market, further reducing the number of competitors. The Board must also include the proposed flexibility provisions to reduce the burden on small engine manufacturers, otherwise they will be placed at an unfair disadvantage to its larger competitors. (Westerbeke Engines & Generators)

Agency Response: Most of the items the Commenter asked for were granted. Although there was no additional flexibility specifically for auxiliary marine engines, the numerous small volume manufacturer provisions (no deterioration factor testing, a cap on production line testing), combined with the deletion of the Tier 3 program, should provide sufficient relief.

349. **Comment:** I worked with AQMD down south with Rule 1623 on the Trade-in Program. We think that is a great idea. We encourage scrappage programs. (Lawn Tech Equipment Company)

Agency Response: The Board directed the ARB staff to prepare a similar exchange program for handheld equipment, as noted in the resolution for the item. That program is being worked on outside the scope of this rulemaking.

350. **Comment:** The landscape industry might seem a little touchy on this issue, but you have to understand that from the point of view of the landscape maintenance professional, his or her tools are getting hit from two sides. You have the Air Resources Board

tightening up air emissions requirements, and you also have cities and counties banning leaf blowers outright, and it's getting a little scary. Now, you might respond that there are two separate issues here, air emissions and noise, the latter of which are not your concern, but that is not really true. In a very recent court decision, the City of Los Angeles cited air quality as a major reason for its ban. (CLCA)

Agency Response: The Air Resources Board does not have the authority to control noise, nor to override any local actions to prohibit use of leaf blowers.

351. **Comment:** Most small engines are sold today do not include usage meters; in contrast, odometers are used on all highway vehicles so that the user is aware of the usage. Under the proposed regulations, durability periods will be selected for each engine and the end user will be informed by the label. It is acknowledged that there are wide variations between the calendar time and the actual engine usage, depending on such factors as the equipment application, climate and types of service. The calendar time to approach the end of useful life for an engine could be anywhere from five years to a single season on commercial applications. Usage meters keep the public informed and active in the small engines emission reduction program. We feel that high emissions are inevitable if an engine is operated well beyond the selected durability period, and we stress the importance of keeping the end-user informed of the actual accumulated time. It's not likely that end-users will be inclined or able to accurately keep track of accumulated usage without an installed automatic meter. In addition to informing the end-user of accumulated time, there is the issue of maintaining the engines properly. [The regulations should address this issue.] (Autonnic)

Agency Response: The regulations do address the issues of usage and maintenance, by requiring manufacturers to offer a two-year warranty on their engines. The staff agrees that usage meters can be very helpful regarding maintenance and consumer awareness, but does not believe that requiring manufacturers to include usage meters is appropriate at this time. However, the issue will be looked at in more detail during the technology review (see Comments 331-336), and in the efforts to boost consumer awareness.

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

At the hearing, the Board approved the proposed amendments to sections 2400 through 2414, 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, by section number.

Section 2401 - "Sales," "horizontal-shaft engine," "vertical shaft engine," and "extreme non-attainment area" were added and some other definitions were modified to provide further clarification. The definition of "sales" was included to provide greater specificity regarding the information that would be deemed acceptable by the Executive Officer. The definition of

"Certification Emission Reduction Credits" was modified for consistency with the definition of "sales."

"Horizontal-shaft engine," "vertical shaft engine," and "extreme non-attainment area" were added to explain the terms used in the modifications to section 2403 that involve emissions standards and other requirements for spark-ignition engines greater than 65 cc.

"Small off-road engines" was modified to clarify that the regulation does not apply to snowmobiles, model airplanes, model boats, or model cars.

Section 2403 -The Board approved several modifications to the originally proposed amendments of section 2403:

1. Handheld/Nonhandheld Distinction - As noted in the staff report, the staff's intent in substituting the 60 cc division for the handheld/nonhandheld distinction was to simplify the certification process without throwing any currently-certified engines out of compliance. Following publication of the staff report, one manufacturer identified a 62 cc engine certified for handheld uses. Therefore, the staff recommended, and the Board approved, placing the division at 65 cc rather than 60 cc.

Additionally, one manufacturer requested that the transition from handheld/nonhandheld to displacement-based standards be made immediately. As noted at the Public Hearing, this change would not cause any certified engine to fall out of compliance and the benefits of the change, such as the simplification of the certification process, would be available immediately. Therefore, the staff has modified § 2403 to remove the handheld/nonhandheld distinction entirely. This change has also been reflected throughout the test procedures and the remainder of the regulations.

2. Durability Periods - One manufacturer requested that the staff institute an intermediate durability period for engines 0-65 cc, as is being considered by the U.S. EPA. Staff agrees that an intermediate durability period between 50 and 300 hours would be appropriate, as the 50 hour and 300 hour durability periods were originally chosen to reflect the durability of a basic two-stroke engine. Manufacturers will utilize other technologies in addition to the basic two-stroke technology, which may not be adequately described by the durability periods proposed in the staff report. Therefore, the option of a 125-hour durability period has been added for engines 0-65 cc.

3. Emissions Standards for Spark-Ignition Engines Greater Than 65 cc - At the hearing, the staff proposed, and the Board approved, an alternative to the standards proposed in the staff report. The alternative is projected to attain the same emissions reductions from these engines as the original staff proposal, but would provide manufacturers greater flexibility to attain those reductions. The alternative would delay the implementation of the Tier 2 standards until 2002 for engines equal to or greater than 225 cc and horizontal-shaft engines below 225 cc, and

until 2006 for vertical-shaft engines less than 225 cc.

Manufacturers who produce more than 40,000 spark-ignited engines per year between 65 and 225 cc for sale in extreme nonattainment areas (based on data for engines produced for sale in such areas in model year 1998) will be responsible for additional emission reductions to attain the emissions reductions equivalent to the proposal in MSC 98-02. Each affected manufacturer must submit a plan to achieve its share of the additional emission reductions. The Executive Officer shall evaluate the plans based on the estimated model year 1998 sales in the extreme nonattainment areas, and will allocate responsibility proportionally based upon those estimates. The plans submitted must in the aggregate provide for emissions reductions that are equal to or greater than the difference between: 1) the reductions that would have been achieved in the extreme nonattainment areas in calendar years 2000, 2001, 2005 and 2010 by all engines greater than 65 cc displacement that would have met the emissions reduction requirements proposed in MSC 98-02; and 2) those same engines meeting the modified standards contained in MSC 98-32.

The additional reductions are to be obtained mainly through engine improvements, such as early introduction of clean engines, evaporative emissions controls, the voluntary certification of construction and farm equipment engines not subject to ARB requirements (a manufacturer choosing voluntarily to certify an engine must also certify that it will honor all compliance and warranty requirements set forth for small off-road engines) and/or other measures approved in advance by the Executive Officer.

Affected manufacturers must also demonstrate that at least 60 percent of engines greater than 65 cc sold in extreme nonattainment areas comply in model years 2000 and 2001 with the standards applicable to the 2006 model year. The percentage will be based on the total projected sales by all manufacturers of engines greater than 65 cc in the extreme nonattainment areas in those model years, and will be allocated proportionally between the manufacturers subject to this requirement.

The extent to which manufacturers have met these obligations will be evaluated on the basis of statewide implementation of the plans' provisions, since manufacturers have indicated that they cannot track the destination of their engines more specifically than statewide.

4. Averaging - Staff has clarified the description of the averaging program to ensure consistency with §2408 and the Test Procedures, specifically with regards to the averaging of pollutants other than HC+NO_x. Averaging of other pollutants is allowed; however, there are no provisions for emissions credits for pollutants other than HC+NO_x and particulates, so banking and trading is allowed only for HC+NO_x and particulates. The staff has also clarified that the final accounting process for credits allows manufacturers one model year to make up any end-of-model-year credit deficit before credits are discounted.

5. Replacement Engines - The requirements for replacement engines greater than

225 cc have been aligned with the U.S. EPA's requirements, which allow for the continued production of older-model engines, provided the engine manufacturer has ascertained that no certified engine is available with the appropriate physical or performance characteristics to repower the equipment, the engine manufacturer or its agent takes ownership and possession of the engine being replaced (or the Executive Officer has approved an alternative), and the replacement engine is clearly labeled as such.

Section 2404 Engine Label and Air Index - At the hearing, the Board directed the staff to include incentive programs to encourage the production and purchase of clean engines. These programs are to provide additional emissions information to the potential purchaser.

The staff has added language to require an Air Index label, similar to that used for on-road vehicles, on each piece of new equipment. The engine manufacturer must arrange for a label with the engine family's Air Index to be attached to the equipment, where a potential consumer can view the information prior to purchase. For engines 0-65 cc, inclusive, the engine manufacturer must also arrange for a label with the engine family's Air Index to be attached to the equipment packaging. The manufacturer would direct the consumer to the owner's manual for a detailed explanation of the information. If the Air Index is not part of a label permanently attached to the equipment, it must be designed for removal only by the ultimate purchaser.

The Air Index will provide a relative comparison between the emissions expected from various engines. The SORE Air Index is based on comparing the engine family's family emission level to the applicable HC+NO_x standard. The Air Index label must include a graphical representation of the Air Index, information regarding the significance of the Air Index, and an indication of the emissions durability period of the engine.

Additionally, the engine label requirements have been modified to provide greater flexibility. If there is insufficient space on the engine to accommodate a label that contains all of the specified information, the Executive Officer could allow the engine manufacturer to exclude some items, placing them instead in the owner's manual.

Section 2407 - Staff made numerous minor changes to provide further clarification of the Cumulative Sum procedure, to correct references, and to align the program more completely with the proposed United States Environmental Protection Agency (U.S. EPA) program.

Section 2408 - The staff has modified some of the language involving emissions reductions credits and the averaging, banking and trading programs in order to clarify the provisions and improve consistency with § 2403 and the test procedures. Additionally, at industry request, the staff has added language to explicitly state that the reporting requirements can be met by use of a spreadsheet containing the various information.

Section 2409 - Staff has made some modifications to this section to remove an incorrect reference to averaging of production credits. Although production credits may be used to modify

a manufacturer's corporate average, they are not in themselves averaged.

Test Procedures - 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. These modifications include provisions allowing electronic submission of certification applications, allowing the manufacturers to recommend high-altitude adjustments that would not increase emissions beyond those of the unadjusted engine at high altitude, allowing service accumulation for natural gas engines to use fuel available near the test site, and aligning with the U.S. EPA specifications for determining engine displacement.

The staff has made several other modifications throughout the regulations and test procedures to correct grammatical and typographical errors, correct references and citations, increase alignment with the U.S. EPA, and improve the clarity of the regulations and test procedures.

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

Written comments on the first Notice of Modified Text were submitted by the Engine Manufacturers Association (EMA), the Outdoor Power Equipment Institute (OPEI), the Portable Power Equipment Manufacturers Association (PPEMA), Black and Decker, American Honda Motor Company (Honda), and Suzuki.

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. Comment Period

352. **Comment:** PPEMA has serious concerns over the timing of ARB's 15-day notice. The ability of PPEMA members to comment effectively on staffs proposed changes is significantly hampered by the release of the proposal on December 21, 1998 with a due date for comments of January 5, 1999, because this brief period encompasses the holiday season. Some PPEMA members cease general operations over this period, making it difficult for them to analyze ARB's notice and to formulate meaningful comments. PPEMA, in turn, must allow sufficient time for membership feedback and discussion. Although ARB staff must conclude this rulemaking within the time required by California procedural rules, the regulated industry should not be penalized for the delay in the release of the 15-day notice until nearly nine months after ARB's March hearing. PPEMA understands that staff intends to issue a second 15-day notice on or about January 11, 1999 in response to comments it receives on Mail-Out #98-32. PPEMA

supports use of a second 15-day comment period to permit industry to address any further modifications to the SORE regulations. At the same time, PPEMA, encourages staff to accept and carefully analyze any comments it receives after January 5, 1999, and prior to final adoption of the amendments, in response to ARB's first 15-day notice. (PPEMA)

353. **Comment:** Because the timing of ARB's 15-day notice has created certain logistical problems for regulated parties, PPEMA requests that staff continue to consider comments that it receives after January 5, as well as issue a second 15-day notice in response to comments it receives in response to this first notice. (PPEMA)

354. **Comment:** We would like to start by requesting an extension of the deadline for comment. Because of the end of year holidays, there have been only four working days for Honda to translate, review, and respond to the notice. Considering the new text in the notice, and the very recent and substantial changes that we understand are planned by EPA to the Phase 2 Regulation, four days are inadequate to provide any detailed comments and constructive alternative suggestions. (Honda)

Agency Response: The ARB is bound to a schedule in its rulemaking efforts. This schedule requires that the complete regulation package be filed with the Office of Administrative Law (OAL) within one year of the publication of the 45-day notice (Government Code sec. 11364.4(b)). In this case, the OAL deadline was February 5, 1999. This schedule, combined with staff's efforts to address all the comments received prior to and at the hearing and staff's need to allow time for public input on a potential second modified regulation, has resulted in the first Notice of Modified Text being issued in late December. Staff informed the commenters that it would consider comments received after the deadline, and that a second Notice of Modified Text would be forthcoming. Despite the inconvenient timing, the above parties did not submit any further comments regarding the first notice.

B. Air Index Label

355. **Comment:** ARB cannot propose the amendment concerning air index labels as a 15-day modification because it is not sufficiently related to the original 45-day public notice text. ARB must proposed such amendment as a new regulatory change subject to the full 45-day rulemaking procedure (PPEMA.)

Agency Response: Government Code section 11346.8(c) provides that a state agency may make substantial modifications to proposed regulations if the regulations, as modified, are sufficiently related to the original text that the public had adequate notice that the change could result from the original proposal. The statute requires that the modified regulations must be made available for public comment for at least 15 days prior to their adoption. As discussed below, the modifications contained in the first modified text proposed in mail out MSC 98-32 regarding air index labels are sufficiently related to the original text such that the public had adequate notice as required by Government Code section 11346.8(c). Moreover, the modified regulations were

made available to the public for written comment for at least 15 days, as required by statute.

The original regulatory text proposed by Staff (Mail-Out MSC 98-02) does not contain specific language requiring an air index label as later adopted by the Board. However, the adoption of regulations that are different from the regulations as proposed at the initiation of the rulemaking procedure is a common practice, and is clearly authorized under the Administrative Procedures Act (APA). In fact, participants in the public hearing process, including the commenter, purposely seek to and in some cases do persuade the agency into action differing from the original proposal. (See Western Oil and Gas Ass'n v. Air Resources Board [WOGA] (1984) 37 Cal. 3d 502, 526-527; Schenley Affiliated Brands Corp. v. Kirby (1971) 21 Cal.App.3d 177, 193.) Specifically, the APA provides:

“No state agency may adopt, amend or repeal a regulation which has been changed from that which was originally made available to the public pursuant to Section 11346.5, unless the change is (1) nonsubstantial or solely grammatical in nature, or (2) sufficiently related to the original text that the public was adequately placed on notice that the change could result from the originally proposed regulatory action.”

The statutory provision allowing substantial changes to a regulation based on public comment is consistent with the holding in Schenley, supra, 21 Cal.App.3d 177. In Schenley, which construed the APA before its 1981 amendment and recodification, the court stated:

“Thus, eventual adoption of a regulation of a regulation differing from that described in the pre-hearing notice is one objective of the hearing process. Fairness too is a statutory desideratum. After an opportunity for participation in a hearing considering the subject or issue evoked by the pre-hearing draft or summary, *affected interests cannot claim unfairness when the agency's consideration of new information and views persuades it into a different enactment* dealing with the identical subject or issue. To confine the agency to the terms of its pre-hearing proposal would negate a basic purpose of the hearing. To require a new notice and hearing would tie the agency into time-consuming, circular proceedings transcending the statutory objective.

“Although section 11424, subdivision (c), requires a pre-hearing notice of the text or summary of the proposed action; although it does not echo the federal statute's alternative permission for a notice describing the subject or issue, nevertheless, *it is not offended if the adoption procedure culminates in a regulation differing substantially from that described in the published notice but devoted to the same subject or issue.*” (21 C.A.3d at 193; *emphasis added.*)

Neither changes to Section 11346.8(c) to codify the above holding in Schenley nor subsequent legislative amendments change the basic APA structure allowing substantial modifications to the original proposal. To codify the Schenley holding, the predecessor to the current 11346.8(c) was amended to prohibit substantial change or modification to proposed

regulations “unless such change or modification is related directly to the same subject or issue noticed pursuant to Section 11424.”¹ (Government Code Section 11346.8; Stats. 1978, Ch. 131.) This version arguably allowed agencies to adopt modified regulatory text totally unrelated to that originally proposed, so long as the subject was the same. The 1981 amendments then only slightly altered the Section 11346.8 language to require that “the resulting adoption...is sufficiently related to the text made available to the public pursuant to Section 11346.5.” (Stats. 1981, Ch. 865; Stats. 1981, ch. 1091.) The 1981 amendments, while precluding the total departure arguably allowed by its predecessor, in no way indicate an intent to constrain substantial modification of the originally proposed regulations. And a subsequent California Supreme Court case found the Schenley holding intact on this point. (WOGA, 37 Cal.3d at 526.)

The relevant question here is how to define the subject or issue that was before the Board. Even narrowly defined in favor of the commenter, that subject was consumer information to be conveyed on utility engines, also known as small off-road engines. A state agency cannot allow commenters to divide and subdivide the subject into something so specific that the agency could not change its proposal once issued. To allow the commenter here to so narrowly define the current subject as “air index” would render the APA regulatory hearing process a nullity and would lead to the circular agency proceedings eschewed by Schenley and certainly not contemplated by the Legislature in the APA. Moreover, given the broad spectrum of regulatory options referred to in the 45-day Notice and Staff Report, including retaining the original and more stringent (1990) timetable implementing Tier 2 emissions standards (Staff Report p. 63), the Board clearly acted within the scope of the notice by adopting modified regulations containing provisions in lieu of the original timetables.

In Government Code Section 11346(c), as well as in Schenley, the central question is one of fairness. Here, the 45-day notice stated, “Staff proposes that manufacturers be required to note the durability period on the engine label, on the equipment label, on the equipment packaging, and in the owner’s manual.” As described in the accompanying Initial Statement of Reasons/Staff Report, this proposed change was designed to aid consumer choice. (Staff Report, p. 34). A reasonable member of the affected engine industries could have determined from such notice that the public hearing process could result in not only altering the durability period information and location(s) of that information, but could also result in adding additional consumer-information requirements pertaining to the subject engines. In addition, given that the Board was considering amendments that would delay the Tier 2 emission standard, a reasonable member of the affected engine industries could have determined that the public hearing process could result in other provisions intended to offset the delay. Finally, at the public hearing proper the final modification(s) need not have been proposed either in specific detail or in a specific regulatory section, so long as the issue was broached, as the commenter admits was the case here.

For all the above reasons, the Board properly adopted the air index label as a 15-day

¹ Section 11424 is an earlier version of Government Code Section 11346.5, which describes the required 45-day notice content.

modification that was sufficiently related to the original 45-day public notice text. ARB need not propose the same amendment as a new regulatory change subject to the full 45-day rulemaking procedure.

356. **Comment:** On one specific issue in the notice, Honda supports the concept of engine labels and an air index to the extent that the label is practical and can provide useful information to the consumer. For the reasons listed below, we do not believe the label proposal is practical.

- a) Engines are sold through a multi-step distribution system and have many different applications. Therefore, it is not possible to assure that the final product using the engine will have a visible label.
- b) Equipment manufacturers, especially the commercial type, use the fuel tank and other available surfaces of the engine and equipment for instructional and warning labels so these locations will most likely not be available for an 'air' label.
- c) Many types of equipment enclose the engine so a label provided on the engine will not be readily visible unless the equipment manufacturer is required to provide a supplemental 'air' label on the equipment.
- d) A 'hang tag' would be the most flexible method to convey the 'air' message but unfortunately, it is also the most vulnerable to be lost in the distribution and equipment manufacturing process.

Unfortunately, in this short time we have been unable to develop an alternative label proposal that could be informative for the consumer and reasonable to implement. We will attempt to provide comments if an extension to the notice is granted. (Honda)

357. **Comment:** PPEMA objects to ARB's proposed amendment concerning air index labels because it creates additional burdens for engine manufacturers without providing any tangible benefit for consumers.' According to §2404(a), ARB believes that "information regarding engines' emissions levels may influence consumer choice," and that the proposed label is intended "to provide potential ultimate purchasers with information regarding relative emissions levels." The proposed label, however, does not convey useful information. To use the label cited by § 2404(1)(2)(C), an air index of seven indicates that an engine is cleaner than one with an index of eight, but does not communicate the more significant fact that the engine's emissions are actually more than the double the Tier 2 standard. Indeed, to discover what the label means, the potential purchaser must "[check the owner's manual for further details." *See* § 2404(1)(2)(C). Although space limitations necessarily restrict the amount of material that can be put on the label, a label intended to provide point-of-purchase information but which requires resort to the owner's manual is of little or no value to the consumer. (PPEMA)

358. **Comment:** Finally, ARB's proposal that the air index label must adopt a specific format also is unnecessarily restrictive. Some of the information in the specified label may be condensed or stated differently, while still meeting ARB's purposes. To address this issue,

PPEMA suggests that ARB revise § 2404 to state that the label format described therein is exemplary only, thereby allowing engine manufacturers to develop alternative formats to convey air index information. (PPEMA)

Agency Response: The Air Index program in the second Notice of Modified Text provides manufacturers with additional time to devise alternative means of providing information to the potential purchaser.

359. **Comment:** Aside from PPEMA's concerns over the air index label's lack of value and ARB's rulemaking procedure, staffs proposed requirements for the label's location are too restrictive. Under staff's proposal, the air index label must be "readily visible" and either be included on the engine label, be a separate label intended for removal only by the ultimate purchaser, or be an engine hang tag. Moreover, the air index label must also be attached to the packaging for equipment using engines 65 cc and less. Singling out 65 cc and under engines for special packaging labels is both unfair and unnecessary. PPEMA suggests that ARB simply require that a single air index label be "readily visible" to the ultimate purchaser, as that term is defined in the proposed regulations, and omit any specific location requirements. This would satisfy the regulation's purpose of making information about relative emissions performance available to the consumer at the time of purchase, while providing a flexible approach that avoids unnecessary and redundant labeling. Such flexibility is needed because some equipment using engines 65 cc and less is displayed without any equipment packaging, e.g., at servicing dealers, while many types of lawn and garden equipment (using engines above and below 65 cc) are packaged at general retailers. (PPEMA)

Agency Response: Manufacturers of engines 65 cc and less tend to be vertically integrated (i.e., they produce both engine and equipment), and thus have greater control over how the products are packaged. Equipment below 65 cc is most often displayed in boxes, meaning that a consumer's decision could be based on the features enumerated on the box. Therefore, Air Index information should be included on the box. This was stated as a requirement to provide certainty to manufacturers as to when a box must be labeled. However, the revisions to the Air Index contained in the second Notice of Modified Text would allow manufacturers to use an alternative that was equally effective.

360. **Comment:** The staff seems to have ignored the existence of electric equipment altogether in their analysis of consumer choices, emissions credits, and green labeling. (Black & Decker)

361. **Comment:** ARB should clearly state that any emissions label it issues is available to electric equipment as well as engine equipment. (Black & Decker)

362. **Comment:** Exclusion of electric equipment from participation in green labeling and other market incentives would mislead consumers and attract them away from the optimum clean-air alternative. (Black & Decker)

Agency Response: The staff did not ignore electric equipment. See the response to Comment 86. Electric equipment was not included in the credits and labeling program because the regulations under discussion apply only to engines. The possibility of the Board action setting a requirement for electric equipment was not identified in the 45-day notice; inclusion would have been a possible violation of state regulation. Manufacturers of electric equipment will be included in the optional standard program and market incentives programs that will take place outside the umbrella of that notice (see Comments 337-339), and the capabilities of electric equipment will be included in staff's preparation for the upcoming technology review.

C. Credit Program

363. **Comment:** As currently drafted, the definition for "Sales" or "Eligible Sales" provided in Section 2401(a)(33) can only be used for averaging, banking or trading. Since the definition for "Sales" provided in Section 2401(a)(33) must apply to all instances where the term "Sales" appears, the words "for the purposes of averaging, banking or trading" should be deleted from the current definition. To avoid any potential confusion, the term "Actual sales" should be defined and given the same definition as the terms "Sales" or "Eligible sales" provided in Section 2401(a)(33). (EMA)

Agency Response: Staff made modifications to address this in the second Notice of Modified Text. Staff described "actual sales" in the definition of "sales."

364. **Comment:** Regarding the proposed definition for the terms "sales" and "eligible sales," PPEMA supports the proposal to permit engine manufacturers, upon approval by the Executive Officer, to estimate their California sales through a combination of market analysis and actual federal production or sales. Consistent with this proposed definition, the Executive Officer may allow manufacturers to use this methodology to estimate their California sales for purposes of calculating corporate averages for certification and compliance with Production Line Testing engine sampling and credit calculation requirements. ARB should extend this flexible approach to §2408's requirements for end-of-year and final reports, which currently call for calculating eligible sales based upon the location of the "point of first retail sale." Application of the proposed definition of "eligible sales" to end-of-year and final reports will allow manufacturers to use a single methodology for determining California sales for all aspects of the SORE regulations. Such flexibility is particularly important for engine manufacturers who cannot track actual retail sales of products that they sell to distributors located in California. Alternatively, PPEMA requests that ARB interpret its previously approved definition of "point of first retail sale" to include sales to distributors located in California. (PPEMA)

Agency Response: Such an interpretation is consistent with the staff's intent. The staff has added some language to Sections 2408 and 2409 to clarify. The clarifying language was included in the second Notice of Modified Text.

365. **Comment:** A broader approach to creation of credits will be better for the environment. (Black & Decker)

366. **Comment:** Exclusion of electric equipment from eligibility for credits will create a perverse incentive, encouraging the sale of low-emission engine equipment rather than zero-emission electric equipment. (Black & Decker)

Agency Response: See the response to Comment 362.

367. **Comment:** Section 2403 includes extensive new regulatory language regarding the calculation of corporate averages and the use of emissions credits. Although PPEMA does not object at this time to the formula for calculating credits, we believe that the means of calculating and using of credits requires further explication from ARB staff. Moreover, we do have serious concerns about staffs proposed restrictions on credit usage. Specifically, the proposed amendments require that credits be used at a generate-to-spend ratio of 1.5 to 1 beginning with the second model year after they are generated. That proposal extracts a substantial penalty from manufacturers who have the ability to generate and bank emissions credits. Rather than encouraging engine manufacturers to produce engine families with emissions levels below the Tier 2 HC+NO_x and PM standards, staffs proposed 33% discount factor rewards production strategies in which credits are used in the same year that they are generated or in the year immediately following, i.e., when they have maximum value. Instead of providing an incentive to produce credit-generating engine families, staffs proposal encourages manufacturers to have corporate averages that are only slightly under the actual Tier 2 standards. Stated differently, the proposal creates a disincentive to producing cleaner engines.

We note that ARB's PLT credit program uses a generate-to-spend ratio of 1.1 to 1, while end-of-year negative credit balances must be made up at a ratio of 1.2 to 1 if not fully recovered in the next model year. Given these provisions, staffs proposed 1.5 to 1 ratio certainly seems unreasonably harsh. Accordingly, PPEMA suggests that if any discounting at all is required for certification credits, it should be limited to credits used more than 1 year after they are generated and then by no more than 10%. (PPEMA)

Agency Response: The staff has added language to Section 2403 to clarify that banked emissions credits are not discounted for use in a future year except for those applied to a deficit carried forward more than one model year. That change is included in the second Notice of Modified Text.

368. **Comment:** As discussed previously, PPEMA supports staff's proposal to permit engine manufacturers, upon approval by the Executive Officer, to determine "eligible sales" for purposes of certification emissions credits through the use of market analysis and actual federal production or sales volumes. This flexible approach should also be permitted for credit calculation for end-of-year and final reports. (PPEMA)

369. **Comment:** PPEMA notes that it supports staffs proposal to permit use of averaging, banking and trading for purposes of complying with PM limits, which program we understand is limited to two-stroke engines and to diesel engines. (PPEMA)

370. **Comment:** Due to the complexity of ARB's emissions credit programs, PPEMA requests that staff schedule a workshop in early 1999 to explain certification requirements, credit calculation and the use of averaging, banking and trading ("ABT"), and to answer manufacturers' questions and concerns on these subjects. (PPEMA)

Agency Response: Staff plans to conduct an explanatory workshop regarding the changes to certification, including the averaging, banking, and trading program.

D. Engines 66 cc to 224 cc

371. **Comment:** You have asked that we provide only comments relating to the modifications described in this notice. We respectfully request that you consider the additional issue outlined below which is outside the content of the current notice. Resolution of this issue may require action in the notice or an extension if granted, by a separate petition, or a Tier 3 rulemaking.

One of the basic principles for small engine regulations is some form of harmonization that allows one engine to be sold in all 50 states. We hope this principle continues to be of importance in future regulations. However, changes being considered by EPA for the Phase II regulation may actually result in a standard that is lower than California for zero to 65 cc engines and a more appropriate, but higher standard, for engines between 65 and 100 cc displacement. California has been the leader in establishing an engine displacement based standard that does not confuse the equipment manufacturers with hand and non-handheld definitions. We understand the challenge of trying to harmonize with EPA absent the availability of their actual proposal, but based on our understanding of EPA's direction, we ask that you consider adding a 65 to 100 cc category with standards appropriate for technology leading engines of this displacement. (Honda)

372. **Comment:** Development of the small engine has made it difficult to write a regulation that both challenges technology and meets the needs of this non-integrated industry. Before finalizing the proposed changes to the Tier 2 regulation we request that you:

- review the new information that has caused EPA to consider re-proposing part of the Phase 2 regulation;
- consider a harmonized emission standard for 65 - 100 cc engines;
- reconsider the practicality of the Emission and Air Information Label; and
- provide some additional time for data input and alternative suggestions.

(Honda)

373. **Comment:** Suzuki believes that for engines between 66 cc and 100 cc displacement, the emission standards contained in the 66-224 cc category are too sever when

considering the high combustion chamber surface to volume ratios inherent with four-stroke engines of 100 cc and below. These engine occupy an important place in the market, powering very small generators, pumps, and other implements that require a lightweight and compact power plant to facilitate hand-carryable mobility of the implement to the worksite. Suzuki believes the appropriate HC+NO_x emissions standard for this new engine class is [40 g/bhp-hr (29 g/kw-hr)], using the same hourly durability periods and implementation dates that ARB has adopted for 66-224 cc engines. (Suzuki)

374. **Comment:** Suzuki anticipates that the new category will likely be included in the EPA final rule. ARB adoption of Suzuki's proposed engine displacement cut point and exhaust emission standard will allow for needed harmonization between California and Federal engine certification. This is of special importance considering EPA's recent decision to extensively revise the Federal Phase 2 small-engine certification requirements to harmonize with the small off-road engine regulations adopted by ARB. (Suzuki)

375. **Comment:** Extending the comment deadline would make it possible to provide information about the potential performance of engines in this category. (Honda)

Agency Response: This is a new issue, and is not responsive to the Notice of Modified Text. However, staff notes that there are currently engines below 100 cc certified to the Class 1 standards. Furthermore, the staff has serious concerns about harmonizing with an anticipated change to a proposal that will be "extensively" revised. Staff will examine this issue in more detail during its preparations for the technology review.

E. Other

376. **Comment:** The table in 2403(b) should be expanded to include the exhaust emission standards and implementation dates for those engines greater than or equal to 25 HP with a displacement of 1.0 liter or less, as directed by the Board on October 22, 1998. (EMA)

Agency Response: This modification is outside the scope of this action.

377. **Comment:** 2403(b) Footnote 1 is in error in that it defines Class I engines as those between 65 and 225 cc. In fact, since the term Class I is used in the table only to describe Tier 1 standards, the Tier 1 definition of Class I engines (those under 225 cc) should be used. The table of standards uses displacement ranges (not class definitions) to describe the Tier 2 standards, so there is no need to define Class I for Tier 2. (EMA)

Agency Response: This was a change presented at the hearing, and is not an error. See Comment 347 and the response thereto.

378. **Comment:** 2403(e)(1), 2408(f)(1), 2408(h)(1)(C) and 2409(f) The 15-

day notice still defines power as "the sales weighted maximum modal power, in horsepower." As we have discussed at length, it is critical that ARB harmonize with EPA. EMA's understanding is that EPA will not require sales weighting and will simply define power as the maximum modal power as measured during the certification test. A requirement in California that power be defined on a sales weighted basis: will not harmonize with EPA; will require manufacturers to test each and every configuration within an engine family (which is not routinely or cost-effectively done); will require manufacturers to track engine model sales in a manner that is not at all practical or cost-effective and, indeed, may not be feasible; is unnecessary because any need for sales weighting is accounted for in the ABT calculation; and will impose significant additional costs and burdens without any corresponding emission benefit. Power variations between engine models and configurations are minimal and will have little, if any, impact on emissions. Further, the requirement to sales weight power is particularly onerous for the non-handheld industry because of its non-integrated nature. EMA urges ARB to delete the sales weighting requirement and harmonize its definition of power with that of EPA. (EMA)

Agency Response: The staff added language to facilitate harmonization following final U.S. EPA action on this matter.

379. **Comment:** Section 2403(g)(2)(B) requires engine manufacturers to provide, by model, a numerical estimate of the number of replacement engines expected for the year and a description of the physical or performance characteristics that will necessitate the use of a replacement engine. Since the need for a replacement engine is dependent upon the application, engine manufacturers are not in a position to predict the physical or performance characteristics that will necessitate the use of a replacement engine in advance of the event. Engine manufacturers should only be required to provide a numerical estimate of the annual number of replacement engines by model. The provision requiring, at the beginning of each model year, a description of the physical or performance characteristics of those models that indicate that a certified replacement engine is not available should be deleted. (EMA)

Agency Response: The staff modified the section to require the description at the end of the model year, rather than forcing manufacturers to predict the information.

380. **Comment:** Section 2406(a) requires the following statement to be furnished with each new 1995 and later small off-road engine, "The California Air Resources Board (and manufacturer's name, optional) is pleased to explain the emission control system warranty on your (**year**) engine." As currently drafted, engine manufactures must supply the specific year of the engine in the warranty statement. This is an excessive burden, as it would require manufacturers to reprint their warranty books each year. The year requirement should be deleted; or in the alternative, engine manufacturers should be allowed to print the words "and later" after the year. (EMA)

Agency Response: The staff modified the language to clarify that manufacturers may include more than one year in the statement (including the phrase "and later").

381. **Comment:** Part I Section 18(h) requires that all engines must have closed crankcases. A provision should be added that would provide manufacturers with an exemption to this requirement subject to approval by the Executive Officer. (EMA)

Agency Response: This is not responsive to the 15-day notice. As with the crankcase concern described in Comment 318, the matter will be handled by Executive Officer discretion.

382. **Comment:** Part II Section 1 states, “For 2000 and later model years, manufacturers must select an emissions durability period for each engine family as detailed below.” The statement “For 2000 and later model years” must be corrected to read “For engines certified to emission standards subject to a durability period as set forth in Section 2403(b) of the California Regulations for 1995 and Later Small Off-Road Engines”. This is necessary because not all engines will have in-use standards in 2000, and therefore this section describing how to determine deterioration factors is not applicable in all cases in model year 2000. (EMA)

Agency Response: Staff made modifications to address this in the second Notice of Modified Text.

383. **Comment:** [With regards to] Part II Section 3(a): As is allowed under the EPA program, engine manufacturers should be allowed to exercise good engineering judgment in establishing deterioration factors. For example, engine manufactures should be allowed to carry-over and carry-across deterioration factor data from one engine family to another with similar emission characteristics to avoid unnecessary testing burdens. (EMA)

Agency Response: Carry-over and carry-across of deterioration factors is allowed under current certification practice. Staff therefore, does not believe that a change to the language is necessary.

384. **Comment:** Part II Section 3(a)(2)(A) and (B) The timing tolerance for each test point should be $\pm 4\%$ of the emissions durability period. (Example: for an emissions durability period of 50 hrs, the test point timing tolerance will be ± 2 hrs; for an emissions durability period of 250 hrs, the test point timing tolerance will be ± 10 hrs.) A $\pm 4\%$ timing tolerance will provide ARB the accuracy they require in the determination of the deterioration factor and will also provide the engine manufacturer the flexibility needed when accumulating hours on the engine. Since the method of least-squares is required by Section 3(a)(6), a $\pm 4\%$ timing tolerance will not alter the deterioration factor determination but will provide manufacturers with flexibility. (EMA)

Agency Response: This comment is not responsive to the Notice of Modified Text. See the response to Comment 130.

385. **Comment:** In Part III Section 12(b)(2)(ix), the ARB specifies that “data sample intervals should be less than one-half of the response time for the fastest instrument

system being used.” This should be changed to “1 second” so as to be harmonized with EPA. (See 40 CFR 90.412(c)). (EMA)

Agency Response: This change was made in the second Notice of Modified Text.

386. **Comment:** Regarding Part IV Section 2(b)(5), Section 19(b) and (c), and Section 21: Upon approval by the Executive Officer, manufacturers should be allowed to use continuous analysis of the steady state mode instead of bag sampling. This will simplify the procedure for those manufacturers using Constant Volume Sampling test procedures and decrease costs. (EMA)

Agency Response: This request is not responsive to the Notice of Modified Text. Such a change has implications that cannot be dealt with in the context of 15-day changes.

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

At the hearing, the Board approved the proposed amendments to sections 2400 through 2414, 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 December 21, 1998, as Mail-Out MSC 98-32. The staff issued a second notice with further modifications and clarifications to address the concerns noted in comments received regarding Mail-Out MSC 98-32. The following is a description of the modifications included in the second notice, by section number.

Section 2401 - The definition of "sales" was modified to provide further clarification regarding the information that would be deemed acceptable by the Executive Officer. Staff added language to specify that the phrase "actual sales" refers to sales figures derived from known production volume at the end of a model year, rather than a projection done at the beginning of a model year.

Section 2403 - The staff made several modifications to section 2403.

1. Standards - The standards table shown in 2403 (b) in Mail-Out MSC 98-32 contained a minor redundancy that was in error. The staff has made corrections to return it to the form adopted by the Board.

The other modification to 2403 (b) would exempt engines used exclusively in snowthrowers and ice augers from the requirement that they possess closed crankcases. This modification is intended to harmonize with the federal requirements.

2. Averaging - The staff has added language to clarify that banked emissions credits are not discounted for use in a future year except for those applied to a deficit carried forward

more than one model year.

In addition, the formula for calculating emissions averages and emissions credits has been modified to allow the Executive Officer to approve alternatives to the sales-weighted maximum modal power when calculating emissions credits. This slight modification will allow the Executive Officer to consider harmonizing with the upcoming federal regulations in the event that the United States Environmental Protection Agency chooses to use maximum modal power of a single configuration in its calculations.

3. Replacement Engines - The staff has modified the language to allow manufacturers to submit at the end, rather than the beginning, of the model year a description of the physical or performance characteristics that indicate why certified replacement engines were not available.

Section 2404 - The staff has revised this section to allow alternatives to the default Air Index label. After a trial period wherein manufacturers may use alternatives to the default Air Index label, the Executive Officer will hold a hearing to determine if alternatives are sufficiently effective. If so, the Executive Officer will allow manufacturers to continue using those alternatives; if not, manufacturers would be required to use the default Air Index label.

Section 2407 - The staff has corrected an incorrect reference in paragraph (c)(3)(A)(viii).

Section 2408 - The staff has modified the procedure for calculating emissions credits to allow an alternative to sales-weighted maximum modal power, as noted above for section 2403. The language describing sales calculations in terms of "point of first retail sale" were modified to ensure consistency with the definition of "sales," and to add specificity regarding the types of sales information that will be acceptable.

Section 2409 - As in Section 2408, the staff has modified the procedure for calculating emissions credits to allow an alternative to sales-weighted maximum modal power, as noted above for section 2403. As in section 2408, language describing sales calculations were modified to ensure consistency with the definition of "sales," and to add specificity regarding the types of sales information that will be acceptable.

Test Procedures - The staff made two additional clarifications to the Test Procedures.

1. Part I - The standards table shown in Section 9 in Mail-Out MSC 98-32 contained a redundancy and a minor omission that were in error. The staff has made corrections to return it to the form adopted by the Board.

2. Part II - The staff changed Section 1 to clarify that only engines subject to an emissions durability standard need to comply with the provisions for determining an emissions durability level. 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 staff has made several other modifications throughout the regulations and test procedures to correct grammatical and typographical errors, correct references and citations, increase alignment with the U.S. EPA, and improve the clarity of the regulations and test procedures.

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

Written comments on the second Notice of Modified Text were submitted by the Portable Power Equipment Manufacturers Association (PPEMA), Maudyde, and Black & Decker.

Both PPEMA and Black & Decker indicated that the second Notice of Modified Text did not favorably address all comments made in response to the first Notice of Modified Text. The concerns are addressed in "Summary of Public Comments and Agency Responses -First Notice of Modified Text." 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. Air Index Label

387. **Comment:** The modifications to the Air Index that allow manufacturers to provide information without specific placement, specific label, or specific packaging requirements are sound and should be made permanent, as they provide greater freedom in choosing how to convey the information. A significant drawback is that the revised proposal retains specifications for a default Air Index label that tends to make the flexibility provisions somewhat illusory. (PPEMA)

Agency Response: The staff disagrees that including default specifications impairs the flexibility provisions in any way. The default provisions are retained to provide industry with a) one acceptable means of complying, and b) a benchmark so that manufacturers know the intent of the requirement and how alternatives will be evaluated.

388. **Comment:** The Air Index provisions provide little or no guidance on how and when the Executive Officer will make the decision regarding alternatives to the default air index. (PPEMA)

Agency Response: The ARB disagrees. The Air Index provisions provide the Executive Officer with discretion to make a determination within identifiable bounds and only after a date certain.

The amended regulation provides specific guidelines that the Executive Officer must follow in evaluating alternatives. The Executive Officer must compare alternatives to the default; if that is not possible, because there are insufficient engines with the default label, the Executive Officer will compare the degree of consumer awareness to other similar consumer information programs. The commenter can now determine that interim results will be evaluated against results from either engines employing the default program specified in the regulation or similar programs. If it becomes necessary to evaluate interim results against similar programs, the programs chosen must have attempted to disseminate reasonably similar consumer information. In addition, the hearing will provide an opportunity to comment on the validity of comparing interim results to any similar program(s) chosen. The regulation provides the commenter with notice that the hearing to make this determination will occur after and no sooner than January 1, 2003, and the Executive Officer must as always provide proper notice of the chosen hearing date.

389. **Comment:** The regulations presume that emissions from lawn and garden engines are a significant factor in consumer purchasing decisions. Will ARB distinguish between purchasers for whom emissions are an important concern, and who therefore are more likely to be aware of air index information, from those for whom it is less of a concern? (PPEMA)

Agency Response: The evaluation will be a relative comparison to the default provision. Therefore, if consumer awareness is low for the default, manufacturers will not have a high threshold to prove an alternative is equally effective. Whether purchasers value emissions highly when making a decision should not affect that comparison. The evaluation is intended primarily to gauge consumer awareness at the point of purchase.

390. **Comment:** The regulations provide that if not enough products use the default label to provide a comparison, the Executive Officer will base the comparison on consumer awareness of air index information for other products, such as automobiles. PPEMA believes that comparison of products as divergent as a \$150 string trimmer and a 15,000 automobile is inappropriate and of little value. (PPEMA)

Agency Response: The products themselves would not be compared; rather, the consumer awareness of emissions would be compared. Staff believes that the comparison is a valid one, because in neither product are emissions likely to be the main determinant for purchase. If anything, the comparison favors the small engines, where there are fewer overall factors to consider (i.e., no concerns about color, upholstery, and the various options a consumer must consider when purchasing an automobile). Furthermore, the regulations provide that the comparison is not limited to automobiles; other similar consumer information programs may be

considered. See also response to Comment 388 above.

391. **Comment:** There is substantial uncertainty associated with ARB's plan to allow flexibility in conveying Air Index information. PPEMA recommends that ARB omit the default air index labeling requirements, providing a fair opportunity for engine manufacturers to create their own systems for conveying the information and allowing industry and ARB staff to jointly develop a fair methodology for assessing the value and impact of air index labels prior to the Executive Officer's hearing. (PPEMA)

Agency Response: The provisions contained in the second Notice of Modified Text do provide flexibility to manufacturers, as even in the absence of a manufacturer using the default provisions, a determination can be made. Staff is always open to working with industry to improve the regulations. However, if the commenter's suggestion was followed, it could delay the dissemination of the air index information for several years. This delay could hamper manufacturers of cleaner equipment from establishing that equipment in the market place and overcoming possible resistance to potential price increases.

392. **Comment:** The proposed revisions tend to emasculate the consumer information intent behind the labeling provisions. ARB should give residential and commercial consumers the emissions information they need as soon as possible to make informed purchases. ARB should require the use of the emissions index label, including a graphical representation of the Air Index and an explanation of the significance of the Air Index, starting in the year 2000. (Maurdyne)

Agency Response: The revisions noted in the second Notice of Modified Text is intended to provide manufacturers the flexibility to present an alternative to the default proposal. Under the revisions, a manufacturer that can achieve the same level of consumer awareness with an alternative may do so. This should reduce the cost to manufacturers, as they have the possibility of using an alternative more suited to that manufacturer's standard operations (i.e., less expensive to implement). Although full equivalency with the default program cannot be determined until after the Executive Officer's evaluation, staff expects manufacturers to begin investigating alternatives immediately. Thus, consumers will have greater access to emissions information than they currently have, and it is in the manufacturers' interest for the consumer to obtain substantially similar information in the interim.

393. **Comment:** Information regarding the emissions durability period of the engine can be added to the label as the durability requirements apply under section 2403. If a manufacturer desired, for marketing reasons, to voluntarily certify an engine to a durability period prior to the required year, then such durability information could be added to that engine's Air index label upon obtaining such voluntary certification. (Maurdyne)

Agency Response: The revisions to the Air Index label would require manufacturers to make information regarding the emissions durability period available to potential purchasers. The

commenter's suggestion would appear to be an acceptable way of accomplishing that. However, staff does not believe that the commenter's suggestion is the only way to accomplish that goal. The revisions noted in the second Notice of Modified Text are intended to provide manufacturers the flexibility to present an alternative that may prove equally effective.

394. **Comment:** ARB should delete the provisions pertaining to commercial applications. Commercial consumers should be entitled to receive the same comparative emissions level and durability information as any other consumer. (Maurdyne)

Agency Response: The Air Index provisions, as shown in the second Notice of Modified Text, would not apply to engines and equipment which a manufacturer has demonstrated are used almost exclusively in commercial applications in which consumer information is not likely to affect a purchasing decision. An example would be something that is typically purchased in bulk from a catalog, rather than in person. Since the information is not likely to affect a purchase decision, staff does not agree that the information needs to be included.

B. Credit Program

395. **Comment:** ARB requires manufacturers to use emissions credits at a rate of 1.5 to 1 in order to make up a corporate average exceedance caused when actual engine sales differ from projected sales if that deficit is not fully recovered in the next model year. This discount rate is excessive, particularly in light of the fact that production line credits are discounted at a 1.1 to 1 ratio, and corporate average exceedances that result from a production line failure are redressed at a 1.2 to 1 ratio after the next model year. (PPEMA)

396. **Comment:** ARB has not explained why a corporate average exceedance attributable to a difference in actual and projected sales should require heavier credit spending than a corporate average exceedance that results from a production line testing failure. Penalizing manufacturers with a 1.5 to 1 ratio because actual sales did not match projected sales is unfair, because projected sales are, by their very nature, estimates. ARB should revise the regulation to state that emissions credits shall be used at a rate of 1.2 grams to 1 gram to address corporate average exceedances that are not remedied within the year after they occur. Alternatively, if the 1.5 to 1 ratio is maintained, PPEMA suggests that ARB allow engine manufacturers two full years to redress a corporate average exceedance without any credit discounting. (PPEMA)

Agency Response: The discount factors are to encourage manufacturers to comply as soon as possible, maximizing the air quality benefits. A lower discount is allowed for production line failures because the Executive Officer has more options to address production line failures, particularly in the case of multiple or egregious failures. Furthermore, manufacturers have the ability to correct for production line failures during the process, minimizing the damage. In the case of a mistake made due to misprojecting sales, the discounting of credits is the Executive Officer's only recourse, and the problem cannot be corrected midstream. Therefore, the incentive

to estimate sales as accurately as possible must be kept high. Although the commenter believes that a 1.5 to 1 discount is unfair, the discount only applies after a one-year grace period. The grace period should allow manufacturers sufficient time to generate or purchase additional emissions credits, particularly given that several manufacturers expect to generate emissions credits beginning with the 1999 model year.

397. **Comment:** ARB's averaging, banking and trading provisions are extremely complicated. PPEMA urges ARB to hold a workshop in the very near future to explain the entire credit program and its relationship to certification, production line testing and reporting requirements. (PPEMA)

Agency Response: Staff plans to hold such a workshop in the early spring of 1999