RESPONSE TO COMMENTS ON THE NPRM

Emission Standards for New Nonroad Spark-Ignition Engines at or Below 19 Kilowatts

DRAFT
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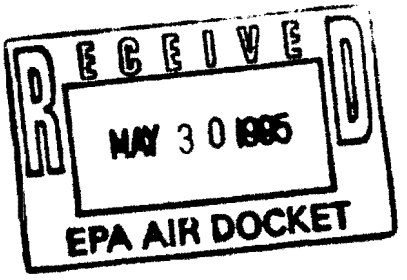

U.S. Environmental Protection Agency
Office of Air and Radiation
Office of Mobile Sources
Certification Division

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SECTION 1: INTRODUCTION

On May 16, 1994, the Environmental Protection Agency (EPA) published in the Federal Register a Notice of Proposed Rulemaking (NPRM) for emission standards for new nonroad spark-ignition (SI) engines at or below 19 kilowatts (kW) (hereafter, "small SI engines"). The purpose of the small SI engines NPRM, as required by Congress in section 213(a)(3) of the amended Clean Air Act, is to regulate emissions from a category of new nonroad engines and vehicles that, in EPA's judgment, cause or contribute to air pollution in areas that failed to attain the National Ambient Air Quality Standards (NAAQS) for ozone or carbon monoxide (CO).

The Agency held a public hearing on this proposal on June 21, 1994, in Ann Arbor, Michigan. Six individuals, representing engine, equipment, and emission controls manufacturers and associations, presented prepared statements and answered questions. A transcript of the public hearing is available in the docket for this rulemaking. The public comment period during which the Agency accepted written comments on the proposal was originally slated to close on July 15, 1994, but was extended until August 5, 1994. The Agency received submissions regarding the NPRM from 33 commenters, including 16 engine or equipment manufacturers or manufacturer associations, one emission controls manufacturer association, one environmental consulting company, one environmental organization, one equipment dealer association, one private citizen, one state farm bureau, one professional association, and 10 state or local government agencies or associations.

How to use this document

The purpose of this document is to summarize and respond to the comments submitted by the public. Included in the document are responses to the issues raised at the public hearing and in the written and oral comments received by EPA. Each of the remaining sections of this document is structured by topic, rather than by individual commenter. Sections begin with a brief description of the approach taken in the May 16, 1994 NPRM, followed by a summary of the relevant comments and finally by EPA's response to those comments. All of the written comments submitted to EPA, as well as records of all oral comments received during the comment period, are contained in EPA's Nonroad Engines and Vehicles Small Spark Ignition Engine Docket (EPA Air and Radiation Docket, Docket Number A-93-25).

Table 1 lists those commenters who expressed their views to EPA regarding this rulemaking.

Table 1: List of Commenters on the Small SI Engines NPRM

Ardisam, Inc.

Association of Local Air Pollution Control Officials (ALAPCO)

Auger and Power Equipment Manufacturers Association (APEMA)

The Black & Decker Corporation (BDC)

Briggs & Stratton Corporation

California Air Resources Board (CARB)

California Bureau of Automotive Repair (BAR)

City of Chicago, Department of Law

ECHO, Incorporated

Engine Manufacturers Association (EMA)

General Equipment Company

Holliday Environmental Services, Inc.

Honda, American Honda Motor, Co.

Ralph Hovnanian, private citizen

Illinois Farm Bureau

Kohler Co.

Kubota Corporation

Machinery and Electrical Products (MEP)

Manufacturers of Emission Controls Association (MECA)

National Arborist Association (NAA)

Natural Resources Defense Council (NRDC)

North American Equipment Dealers Association (NAEDA)

Northeast States for Coordinated Air Use Management (NESCAUM)

Onan Corporation

Outdoor Power Equipment Institute (OPEI)

Portable Power Equipment Manufacturers Association (PPEMA)

State and Territorial Air Pollution Program Administrators (STAPPA)

State of Louisiana, Department of Environmental Quality

State of New York, Department of Environmental Conservation

State of Tennessee, Department of Environment and Conservation

State of Wisconsin, Department of Natural Resources

Tecumseh Products Company

The Toro Company

In summary, EPA received a range of comments; generally the industry and their associations found aspects of the proposal too burdensome while the states and environmentalists expressed concern that the NPRM was too lenient on several issues. The most frequently addressed issue in the comments was the proposed August 1, 1996 effective date. States, with their concerns about emission credits, suggested effective dates ranging from January 1, 1996 to no later than the proposed August 1, 1996 date. Industry, on the other hand, prefers a delay in the effective date, and thus supported options ranging from January 1, 1997 to January 1, 1999. Many other comments addressed the handheld definition, the proposed emission standards, and details of the test procedure. Industry also expressed concern about certification and in-use testing requirements, and believed EPA to have underestimated the economic costs of the proposal. In addition, many industry entities raised concerns about post-certification issues such as Selective Enforcement Audits (SEA), defect reporting and voluntary recall, and emission defect warranties.

After reviewing the comments and the data submitted by some of the commenters, EPA developed a final rule that incorporates many of the ideas raised.

SECTION 2: STATUTORY AUTHORITY

Summary of the Proposal

In the proposal, EPA cited those sections of the Clean Air Act that provide authority for the requirements contained in the proposal, and discussed the mandate of CAA section 213. The emission contribution of the subject engines as indicated in the Nonroad Study[1] was presented, and the background of the rulemaking was detailed.

Summary of the Comments

The Portable Power Equipment Manufacturers Association (PPEMA) commented that EPA failed to make an affirmative significance determination that small engines contribute significantly to ozone or CO in nonattainment areas; without such a determination, according to PPEMA, EPA's emission standards lack statutory authority.[2]

EPA's Response to the Comments

EPA does not agree. In the proposal's statutory authority discussion, EPA stated its finding that small engines are a class or category of nonroad engines that contribute to air pollution. See 59 FR 25399 at 25400 (May 16, 1994). EPA also cited section 213(a)(3)'s requirement that EPA regulate those classes or categories of new nonroad engines that, in EPA's judgment, cause or contribute to ozone or CO in nonattainment areas. EPA did not make a finding under section 213(a)(4) with respect to other pollutants, as it did in the large CI proposal, because EPA did not propose to regulate small engine emissions other than VOCs, CO, or NOx.

The statutory authority discussion specifically incorporates by reference the significance determination for nonroad engines proposed on May 17, 1993 (58 FR 28809), which was finalized as proposed at 59 FR 31306 (June 17, 1994). In the proposal's background discussion, EPA states that small SI engines are the source of five percent of summer VOCs in the 19 ozone nonattainment areas included in the Nonroad Study, and five percent of winter CO emissions in the 16 CO nonattainment areas included in the study. See 59 FR 25399 at 25400 (May 16, 1994).

EPA does not agree that a finding of significant contribution must be made for each class or category of nonroad engine regulated under section 213(a)(3). Paragraphs (1) and (2) of section 213(a) make it clear that EPA's significance determination should be based on whether emissions from all new and existing nonroad engines are significant contributors to ozone or CO concentrations. There is no indication that the significance determination should be based on contributions from various subcategories of nonroad engines. By contrast, if the Administrator makes an affirmative decision regarding aggregate significance, then section 213(a)(3) requires the Administrator to promulgate regulations for those classes and categories of nonroad engines and

vehicles "which in the Administrator's judgment cause, or contribute to, such air pollution." This mandate does not include any reference to a determination of significance for classes or categories. Moreover, EPA's interpretation is supported by the legislative history of the Act. See S. Rep. No. 228, 101st Cong., 1st sess. 103-105 (1989); H. Rep. No. 490, 101st Cong., 2nds sess. 309-310 (1990); CHAFFEE-BAUCUS STATEMENT OF SENATE MANAGER, 136 Cong. Rec. at S16938 (daily ed., Oct. 27, 1990). EPA notes that the requirement in the Senate bill that would have mandated EPA to make individual significance determinations for each class or category regulated was deleted from the Clean Air Act as it was finally passed by Congress. Thus, the Agency believes Congress did not intend a showing of significant contribution to be required for regulation of classes or categories of nonroad engines and vehicles. This issue is discussed in further detail in the large CI final rule at 59 FR 31306, 31309 (June 17, 1994).

SECTION 3: EFFECTIVE DATE, APPLICABILITY, AND DEFINITIONS

3.1 Model Year and Effective Date

3.1.1 Summary of the Proposal

This rule will become effective beginning with the 1997 model year. EPA proposed an effective date of August 1, 1996 for implementation of this rulemaking; engines manufactured on or after August 1, 1996 for use within the U.S. would have been subject to the standards and requirements of the rule. On model year, EPA proposed in the alternative: (1) a model year beginning August 1 and ending July 31 of the succeeding year, (2) a model year like that in the on-highway program, and (3) a model year like that in the on-highway program but running from August to July rather than January to December.

3.1.2 Summary of the Comments

EPA received comment on the proposed effective date from manufacturers and industry associations, states and state and local air officials, and an environmental association. Several states, state and local air officials, and an environmental association supported an effective date of January 1, 1996.[3] They argued that delayed implementation decreases the value of a phased approach to small engine regulation by eroding the near-term benefits of a program intended largely to provide near-term benefits.[4] A state, an environmental association, and associations of state and local air officials that are participants in the negotiated rulemaking for the second phase of small engine regulation stated that their agreement to participate in the negotiated rulemaking was based partly on a January 1, 1996 effective date for the Phase 1 rulemaking.[5]

Several states and a manufacturer supported the proposed effective date of August 1, 1996.[6] One state argued that industry has had ample notice, and that to delay would reward parties that have not devoted resources in good faith to develop cleaner engines.[7] Another state commented that it would have to adopt California's regulation for SI engines under 25 horsepower to get the SIP credits it needs if the federal effective date is delayed.[8]

Several manufacturers and industry associations supported an August 1, 1997 effective date, citing lead time considerations.[9] An association pointed out that, from the promulgation of the final rule in May 1995 to the effective date of August 1, 1996 would provide only one year of lead time prior to implementation.[10] The association stated that one year of lead time is insufficient for engine manufacturers to retool to achieve emission compliance for implementation of nationwide standards, or for equipment manufacturers and component suppliers to modify their products to accommodate new or redesigned engines.[11]

Another industry association and a manufacturer pointed out that an August effective date does not coincide with the production cycle for all engines covered by this rule; many operate on a calendar year basis.[12] That association supported an effective date for products that are not preempted in California two years after California's regulations become effective (e.g., January 1, 1997), and an effective date for products that are preempted in California two years after this Phase 1 rule takes effect (e.g., January 1, 1999).[13] The association cited lead time concerns, particularly in regard to products that are preempted from regulation in California.[14] One manufacturer supported a January 1998 effective date for engines used in products that are preempted from regulation in California, arguing that the additional lead time is critical to prevent disruptions in supply since most attention has been focused on engine development for nonpreempted products.[15] Other dates supported by manufacturers or industry associations include November 1, 1996,[16] November 1, 1997,[17] and January 1, 1998.[18]

On model year, comments were received from manufacturers and industry, state and local air officials', and environmental associations. All comments supported the on-highway model year definition.[19] An industry association stated that the on-highway model year definition would provide needed flexibility in certifying seasonal products.[20] Another industry association commented that because the on-highway model year definition allows two firsts of August, manufacturers would have the greatest flexibility during the period of the year they are most likely to introduce new models.[21]

3.1.3 EPA's Response to the Comments

EPA is finalizing a model year 1997 effective date and adopting the on-highway model year definition. The 1997 model year will run from January 2, 1996 to December 31, 1997.

EPA acknowledges industry's need for sufficient lead time. EPA also acknowledges the need of states to realize reductions of air pollutant emissions, and to adhere to schedules mandated in the CAA for reasonable further progress toward VOC reductions from 1990 levels and for attainment of the ozone National Ambient Air Quality Standard. The model year 1997 effective date provides additional lead time for those manufacturers that take advantage of the flexibility allowed by the model year definition; it also allows early introduction of complying products by manufacturers that are in a position to produce complying products earlier in the model year rather than later.

EPA is allowing additional lead time for Class V engines covered by this rule that are used in farm and construction equipment or vehicles which CAA section 209(e)(1)(A) preempts from state regulation. The effective date for such Class V engines is January 1, 1998. Although one association commented that even more additional lead time is necessary for preempted products,[22] EPA is not persuaded that more additional lead time is essential since manufacturers have already gained increased knowledge of and experience with the technologies and calibrations that are available for their engines to meet the standards.

Under the final rule, the model year includes January 1 of the calendar year for which it is designated and does not include a January 1 of any other calendar year. The maximum duration of a model year is one calendar year plus 364 days. A certificate of conformity is issued for each engine family introduced into commerce for a single model year. The annual production period within a model year for any specific model within an engine family begins either: (1) when such engine is first produced, or (2) on January 2 of the calendar year preceding the year for which the model year is designated, whichever date is later. The annual production period ends either: (1) when the last such engine is produced, or (2) on December 31 of the calendar year for which the model year is named, whichever date is sooner.

It is a prohibited act to introduce a specific model year engine into commerce prior to or after the model year for which the certificate is issued and in effect. However, in recognition of the fact that some manufacturers will be in a position to ship certified engines prior to January 2, 1996, EPA is making an exception for engine families that are certified by EPA prior to January 2, 1996; such engine families may enter commerce prior to January 2, 1996 once a certificate of conformity has been issued.

Engines produced after December 31 of the calendar year for which the model year is named are not covered by the certificate of conformity for that model year. A new certificate of conformity demonstrating compliance with applicable standards must be obtained for such engines, even if they are identical to engines built before December 31.

To provide maximum flexibility in the start-up of this program, the Agency is interpreting the Phase 1 model year definition somewhat differently than in the on-highway program. For the

1997 model year only, manufacturers may choose to produce both certified and uncertified engine families during annual production periods that begin prior to September 1, 1996. All engines manufactured during annual production periods that begin on or after September 1, 1996 must be certified. In addition, annual production periods that begin prior to September 1, 1996 may not exceed 12 months in length, to ensure that all engines are certified no later than calendar year 1997. EPA has determined that flexibility in the interpretation of the model year definition for program start-up is necessary in fairness to manufacturers both to provide necessary lead time and to account for the variability in production periods of the small SI engine industry.

For example, a manufacturer of lawnmower engines with an annual production period from July 1996 to June 1997 might choose to certify two-thirds of its engine families by July 1996, with the remainder of its production being uncertified. Normally, the manufacturer must certify all its engines in every annual production period; the enhanced flexibility provided by this special interpretation, which allows manufacturers to choose when to begin certifying in production periods beginning before September 1, 1996, is for the start-up of this program only.

The lawnmower manufacturer in the above example may call the engine families certified in calendar year 1996 either model year 1996 or model year 1997 engines; the advantage to calling them model year 1997 engines is that they can then be built past December 31, 1996. Similarly, the lawnmower engine families certified in calendar year 1997 may be called model year 1997 or model year 1998 engines, but only model year 1998 engines may be built beyond December 31, 1997.

Another example is a string trimmer engine manufacturer that operates on a January to December production period. The manufacturer may choose to certify any portion of its engine families in January 1996, and must certify all its engine families in January 1997.

EPA expects that manufacturers will federally certify a substantial number of engine families in calendar year 1996 to take maximum advantage of "green" marketing strategies. Most of the engine families covered by this regulation will already have been certified to California standards prior to model year 1997. No data are available for EPA to accurately predict the percentage of small engine families that will be certified in calendar year 1996. For purposes of state implementation plan submittals, EPA is estimating that half will be certified in calendar year 1996.

The model year definition, with a maximum duration of one calendar year plus 364 days, is primarily intended to allow flexibility in the introduction of new models. Under no circumstances should the model year definition be interpreted to allow existing models to "skip" annual certification by pulling ahead the production of every other model year. While this situation, to the Agency's knowledge, has not occurred in the past, a practice of producing engines for a two year period would violate the Congressional intent of annual certification based upon an annual

production period. The Agency is not currently setting forth rules for how to determine when abuse has occurred, since this has not been a problem to date. However, the Agency is requiring that engine manufacturers certify annually based on an annual production period.

3.2 Nonroad Engine and Vehicle Definitions

3.2.1 Summary of the Proposal

EPA proposed to incorporate the nonroad engine definition proposed and finalized in the large CI rule. EPA also proposed to amend the definition of nonroad vehicle proposed in the large CI rule by including nonroad equipment within the definition of nonroad vehicle. EPA is finalizing these definitions as proposed.

3.2.2 Summary of the Comments

EMA, OPEI, and PPEMA object to the definitions. EMA and OPEI object to the nonroad engine definition, and to the definition of the term "new," and incorporate by reference their comments on the large CI rule (EPA Air Docket A-91-24) and the waiver of preemption to California for nonroad engine and vehicle standards (EPA Air Docket A-91-18).[23]

PPEMA objects to both the nonroad engine and nonroad vehicle definitions because the definitions are expressed in terms of engine applications; according to PPEMA, EPA is not authorized to regulate engine applications other than vehicles.[24] PPEMA comments that including equipment within the category of vehicles is a strained interpretation, beyond judicial tolerance.[25] PPEMA accuses EPA of equating engines with engine applications in an unsuccessful attempt to remain within the authority granted by the CAA.[26] PPEMA rejects EPA's responses to its comments on the large CI rule.[27] PPEMA also requests an explanation of why the nonroad vehicle definition in the proposal is unlike that in the large CI rule, where nonroad vehicle and nonroad equipment are defined separately.[28]

STAPPA and ALAPCO support EPA's view that Congress used the terms "engine" and "vehicle" in a generally inclusive manner and support adding equipment to the nonroad vehicle definition.[29]

3.2.3 EPA's Response to the Comments

In regard to the objections of EMA and OPEI to the nonroad engine definition, and to the definition of "new," EPA incorporates by reference its previous response to those comments. See 59 FR 31306, 31310-31313 and 31328-31331 (June 17, 1994).

EPA also stands by its previous response to PPEMA's comments on the nonroad engine definition in the large CI rule (see, e.g., 59 Fed. Reg. 31306, 31313-31314). In summary, EPA

is authorized by CAA sections 213 and 301 to regulate both nonroad equipment and particular applications of nonroad engines, as well as nonroad engines and nonroad vehicles. The final large CI rule includes a definition for nonroad equipment.

In Phase 1, the definition of nonroad equipment is incorporated into the definition of nonroad vehicle. EPA does not agree that including equipment with vehicles in a definition for the purposes of nonroad engine regulation is an interpretation beyond judicial tolerance. Rather, EPA is refining a term of art for the purposes of these regulations; it is simply more efficient as well as convenient to refer to nonroad engines and vehicles than to nonroad engines, vehicles, and equipment. Moreover, EPA notes that Congress clearly intended for nonroad equipment to be included within the regulatory scope of this rule, as is shown by the legislative history. See S. Rep. No. 228, 101st Cong., 1st sess. 104 (1989).

3.3 Definition of Handheld Equipment, Snowthrowers, and Two-stroke Lawnmowers

3.3.1 Summary of the Proposal

The Agency proposed that small SI engines be categorized as either handheld or nonhandheld, depending on the usage of the equipment in which the engine is installed. To qualify as handheld, it was proposed that the engine be required to meet at least one of the following three criteria:

(1) the engine must be used in a piece of equipment that is carried by the operator throughout the performance of the intended function(s);

(2) the engine must be used in a piece of equipment that must operate multipositionally, such as upside-down or sideways, to meet its intended function(s); or

(3) the engine must be used in a piece of equipment for which the combined engine and equipment dry weight is under 14 kg, no more than two wheels are present, and at least one of the following attributes is also present: (a) the operator must alternately provide support or carry the equipment throughout the performance of its intended function(s); (b) the operator must provide support or attitudinal control for the equipment throughout the performance of its intended function(s); or (c) the engine is used exclusively in a hand portable generator or pump.

3.3.2 Summary of the Comments

Comments on this issue were submitted by several engine and equipment manufacturers and their respective associations, as well as by environmental and state organizations. In general, state and environmental organizations suggested that EPA tighten the definition to further limit the extent of the handheld category and prevent abuse of the classifications, while manufacturers and

their organizations suggested loosening the definition to allow the equipment of concern to their group to fall into the handheld category.

Specific suggestions for tightening the handheld definition included adopting CARB's definition with perhaps a list of additional equipment that the EPA wished to define as handheld,[30,31,32] revising the weight limit for handheld equipment downward,[33,34] revising the definition to include only equipment for which the operator bears the entire weight during all non-idle operation,[35] tightening the use of the terms "support" and "attitudinal control,"[36,37] removing all products with any wheels from the handheld category,[38] and removing lightweight snowthrowers,[39,40] pumps and generators[41,42,43] from the definition of handheld. Specific suggestions for loosening the definition included revising the weight limit upward,[44] removing the weight limit completely,[45,46,47] allowing augers,[48] two-stroke lawnmowers,[49] and two-stroke snowthrowers[50,51,52,53] into the handheld category, and clarifying whether certain pieces of marginal equipment met the definition of handheld (specifically, cart-attached cut-off saws, two-stroke three-wheeled edgers up to 30 cc,[54] hover trimmers,[55] and all pumps and generators under 14 kg regardless of the usage of the same engines in other products[56]).

3.3.3 EPA's Response to the Comments

The Agency is retaining its handheld equipment definition largely as proposed, with the only changes being the addition of a fourth category for one-person augers under 20 kg and the elimination of the term "exclusively" from the category for pumps and generators. Based on an extensive review of product literature, the Agency believes that this revised definition adequately describes those types of equipment that are legitimately handheld while excluding nonhandheld applications.

As described more fully in the preamble to the proposed rule, the necessity for a distinction between handheld and nonhandheld equipment is based in part on the substantial difference between emissions from current four-stroke and two-stroke engines, which is an inherent result of their design differences. Although two-stroke engines have significantly higher emissions, their use is necessary in some applications because they are generally lighter for the same rated power and can be used in any orientation, unlike their four-stroke counterparts. As a result, applications requiring that the user carry the device or use it in multiple positions generally need two-stroke engines at the current time. Conversely, nonhandheld applications do not require two-stroke technology, as they are ground-supported and not multipositional, and hence can and should use the inherently cleaner four-stroke engines.

It is not feasible at this time, given the timing of this rulemaking and the currently available technology, to require all engines to meet the four-stroke standards. However, the emission reductions being required by this rule are, on a percentage basis, of the same magnitude for the

two-stroke and four-stroke engines. Of course, the Agency is not requiring the use of either two-stroke or four-stroke engines in any particular type of equipment. If technological advances are such that two-stroke engines can meet the nonhandheld standards, manufacturers are free to utilize that technology or any other technology that can meet the standards. The distinction between handheld and nonhandheld is not to specifically limit the use of any type of engine but, rather, to limit emissions as much as is achievable while recognizing the unique needs of handheld applications.

The Agency is sympathetic to comments that it should coordinate its handheld definition with CARB. Nevertheless, it believes that its definition clarifies and expands on the CARB definition in important ways. An investigation into the types of equipment each definition would cover reveals that there is a very high degree of overlap. Only a few categories were identified that would be covered by one but not both definitions. Given the different mandates of the two organizations and the specific air quality problems of the State of California, EPA believes it is not inappropriate for the definitions to be slightly different.

Many types of equipment are counted by both EPA and CARB as handheld, by virtue of the general segments of the definitions (criteria (1) and (2) above): being carried by the operator throughout their use and/or being used in multiple orientations. While CARB requires equipment to meet both of these criteria to be considered handheld, EPA considers only one to be sufficient. Nevertheless, the majority of equipment that consumers would consider handheld are considered to be so by both organizations. This includes string trimmers, hedge clippers, brush cutters, clearing saws, leaf blowers, chain saws, and zero- and one-wheeled edgers. Additionally, both CARB and EPA are exempting two-stroke engines used in snowthrowers from the nonhandheld standards. CARB is instead requiring two-stroke engines used in snowthrowers to meet the handheld standards; EPA is requiring them to meet the handheld CO standard but will not require them to meet the HC standards, either handheld or nonhandheld, unless manufacturers of these engines opt to certify to those HC standards.

The two organizations are aware of only a few pieces of equipment which do not overlap. These differences arise from the non-general segments of the definitions (criterion (3) above). Specifically, CARB does not consider to be handheld the following items that EPA would allow to be included in the handheld category: zero- to two-wheeled tillers under 14 kg, two-wheeled edgers under 14 kg, and zero- to two-wheeled pumps and generators under 14 kg. Additionally, EPA is revising its handheld definition to include one-person ice and earth augers under 20 kg.[57]

Certain other engines -- specifically, those under 175 hp used in farm and construction equipment -- are covered solely by EPA regulations. This is because section 209 of the CAA preempts engines under 175 hp used in farm and construction equipment from separate coverage by any State or political subdivision. The following is a partial list of farm and construction

equipment: earth augers, brush cutters and clearing saws 40 cc and above, chain saws 45 cc and above, chippers, compressors, continuous diggers, cultivators, agricultural mowing equipment, pumps 40 cc and above, concrete, masonry, and cutoff saws, and trenchers.[58] Spark-ignited engines at or below 19 kW used in these pieces of equipment are therefore subject only to EPA regulation. Of these pieces of equipment, brush cutters, clearing saws, chain saws, and concrete, masonry, and concrete/cutoff saws[59] meet EPA's general definition of handheld equipment, while pumps, cultivators, continuous diggers, and trenchers must be under 14 kg and have no more than two wheels to be considered handheld, and augers must be under 20 kg and be intended for one-person use to be considered handheld. Chippers, compressors, and agricultural mowing equipment would fall under the nonhandheld category.

Some commenters suggested that equipment weighing 14 kg is too heavy to be handheld, but did not suggest an acceptable alternative weight. Although the Agency agrees that 14 kg is indeed heavy for some uses and some consumers, it believes that certain pieces of equipment at that weight would be used in a handheld manner (such as lightweight edgers and tillers). It is likely that market forces would limit the manufacture and sale of "handheld" equipment that is too heavy for the typical consumer of such products. Indeed, a review of product literature indicates that 14 kg appears to be the break point that the market has chosen between equipment types powered with two-stroke engines and those powered by four-stroke.[60,61]

Additionally, for products not falling into the general handheld definitions, a product weight of less than 14 kg is not, in and of itself, sufficient to qualify as handheld. Such products are also limited to no more than two wheels and must require some degree of operator carrying, support or attitudinal control in order to qualify as handheld; that is, they must not be completely ground-supported. The Agency believes that these additional constraints will prevent true nonhandheld equipment from inadvertently falling into the handheld category.

On the other hand, the mere fact of some degree of ground support should not disqualify a piece of equipment from the handheld category. Some lightweight products requiring some level of ground support, including products with one or two wheels, would typically be considered handheld by the general public. Equipment such as tillers and edgers with up to two wheels would require some carrying, support or attitudinal control; lawnmowers and three- and four-wheeled edgers, conversely, would be completely ground-supported and thus not handheld.[62] The term "carry" means that the entire weight of the equipment is borne by the operator. The term "attitudinal control" is meant to apply to situations where the equipment is partially ground-supported but the operator must regulate its horizontal or vertical position in order to prevent it from falling over. Similarly, the term "support" is meant to apply to some operator control to prevent the equipment from falling, slipping or sinking; the entire weight of the equipment does not have to be supported or carried by the operator. However, if such equipment is over 14 kg, the

Agency continues to believe, based on its review of product literature, that it is not intended for use in a handheld manner. The Agency does not concur with one commenter that a tiller meeting the above attributes of having no more than two wheels and requiring some operator support should be considered handheld even though it weighs 33 kg.[63] Such a weight is clearly beyond the bounds of what the marketplace has considered handheld and, for such a product, the weight increment between a two-stroke and a four-stroke engine is relatively insignificant.

Some commenters stated that pumps and generators under 14 kg should not qualify as handheld, as the incremental weight of a four-stroke engine should not be an issue in transport from, say, a truck to a construction site. Although the EPA agrees with this assessment for the example cited, the categorization was intended primarily for small pumps and generators that would be transported into remote areas for emergency work or for operation of household equipment in a remote cabin. Transportation in such instances would be much further than to a construction site, and the weight would therefore become more of an issue. The State of California has a special provision allowing such equipment with non-certified engines to be purchased by emergency response organizations. The Agency is taking a somewhat different route toward a similar end, while making these pieces of equipment more widely available.

The Agency wishes to clarify that all pumps and generators under 14 kg with no more than two wheels will be categorized as handheld equipment. The phrase "the engine is used exclusively in a generator or pump" in the definition was not meant to preclude handheld status for pumps and generators with engine models that are also used in other pieces of handheld equipment. Rather, the provision was meant to prevent equipment manufacturers from installing an engine certified for use in a handheld pump or generator in a piece of nonhandheld equipment. Equipment manufacturers and importers are prohibited from utilizing engine families certified to the handheld standards in equipment not meeting the handheld definition, and are liable for civil penalties if they do so. Thus, the term "exclusively" in the handheld definition is superfluous and has been removed.

The Agency also wishes to clarify that only earth and ice augers that are under 20 kg (including a bit of typical size for that model) and are sold for use primarily by one person will be considered handheld. Two person augers, and any auger of 20 kg or more (including the bit) must meet the nonhandheld standards. The Agency believes that this slight broadening of the definition reasonably responds to the needs of auger manufacturers to continue to provide a lightweight, high-strength, high-powered product during the time frame of the Phase 1 regulations. The Agency does not believe that there is a need for two-person augers to be included as handheld, as weight is much less of a concern in that case. Additionally, several four-stroke two-person augers are already on the market, demonstrating the availability of four-stroke technology, its utility to the consumer, and its marketability. Finally, concerns that the two-stroke engine models used by

auger manufacturers will be discontinued appear to be unfounded, since these engines are also used in snowthrowers. Thus, their market demand would be sufficient for the engine manufacturers to invest in their redesign so they may meet the handheld standards and continue to be offered for sale.

The Agency was only partially convinced by auger manufacturer comments of the technological necessity for two-stroke engines in their products. To the extent that the Agency sees a need for two-stroke technology on augers at the current time, it is for one-person augers only. Such equipment may legitimately have a need to retain as light a weight as possible in order for one person to be able to counter the torque generated by the drilling operation, retain the auger in a vertical position, lift it from the hole, and transport it to and from the drilling location. Additionally, in contrast to truly nonhandheld equipment, which is fully ground-supported, augers have no frame, wheels, or other supporting devices and, thus, require operator contact for attitudinal control during use. In contrast to other equipment that is clearly handheld, however, augers tend to be of a heavier construction in order to withstand the significant forces they encounter during use, so that the 14 kg weight limitation may not be as relevant to augers as to other types of equipment. A review of product literature and manufacturer comments indicate that an upper limit of 20 kg would include most or all one-person augers currently on the market.

Auger manufacturers are predominantly small companies, and therefore are somewhat constrained in their ability to quickly reengineer their product, acquire a new engine source, and absorb the costs of a four-stroke engine. It is for this reason, coupled with the technological reasons cited above, that the Agency is allowing one-person augers under 20 kg to meet the handheld definition for this Phase 1 regulation of small SI engines. However, this definition will not necessarily be carried into future regulation of small SI engines, such as in the Phase 2 negotiated rulemaking activities currently underway.

Comments from auger manufacturers on this rulemaking dwelled largely on the need to retain the current product, presumably due to cost implications. The Agency believes that relief is necessary in order for these manufacturers to continue to function in the short term and that the special attributes of augers set them apart from other equipment that is clearly either handheld or nonhandheld. However, further clarification of the technological need for two-stroke engines in augers would be necessary for the Agency to continue to include them in the same category as equipment more obviously in need of light weight and/or multipositional use.

3.4 Lawnmowers

3.4.1 Summary of the Proposal

Under EPA's proposal, all lawnmowers would be classified as nonhandheld equipment. EPA requested comment on the ability of two-stroke lawnmower engine manufacturers to meet nonhandheld standards, the impact such a requirement would have on such manufacturers, the need for relief for such manufacturers, and the impact such relief might have on the environmental benefits of the proposal. EPA requested comment on four options for providing relief for two-stroke lawnmower engine manufacturers.

3.4.2 Summary of the Comments

Two industry associations and one manufacturer recommended that EPA allow two-stroke lawnmower engine manufacturers to meet handheld standards.[64] They commented that two-stroke lawnmower engines would effectively be eliminated from the market under the proposal.[65]

One manufacturing company will be particularly impacted by the requirement that lawnmower engines meet nonhandheld standards because it is the largest producer of two-stroke lawnmower engines.[66] It commented that the definition of handheld and nonhandheld should not be used to discriminate against engines according to their application;[67] to bypass the requirement of technological feasibility;[68] to distort the competitive balance of the industry by banning major products;[69] and to place disproportionate burdens on one company as the price of maintaining an important product line -- all with no commensurate air quality benefit.[70]

The company commissioned a report (Heiden Associates, Inc., April 20, 1993) that estimated emissions from two-stroke lawnmowers in the nonattainment areas included in the Nonroad Study.[71] According to the company, the study found that two-stroke lawnmower emissions account for 3.9 percent of nonroad VOC emissions in those nonattainment areas.[72] The contribution to CO was one half or one third of the VOC contribution, and the NOx contribution was calculated at zero.[73] Eliminating two-stroke mowers would not accomplish even a .2 percent nationwide VOC reduction, since four-stroke units would replace the two-stroke units, according to that comment.[74]

The company originally favored the option for relief of meeting handheld standards until Phase 2. It commented that this option would reduce the disparate impact it would face compared to the rest of the industry, and would provide it with the incentive to continue emissions development work.[75] Later, supplemental comments favored the declining production cap option.[76]

An industry association commented that lawnmowers with two-stroke engines are important to equipment users who have to contend with steep inclines.[77] If it is not technologically feasible for two-stroke lawnmower engines to meet nonhandheld standards, an undue burden could be placed on landscapers and other users, according to this comment.[78]

A state commented that it sees no reason to grant special concessions to some manufacturers because their current product line uses a more polluting technology than their competitors; such a policy would penalize those manufacturers that have pursued cleaner technologies.[79] The state argued that complying engines are available and a sufficient number of manufacturers participate in the market to ensure competition.[80] None of the options for relief presented seems wise because none prevents continued use of higher polluting machines when complying engines are available, according to the state.[81]

Environmental and state and local air officials' associations expressed strong opposition to the options for relief for two-stroke lawnmowers; given that 90 percent of lawnmowers sold in the U.S. already rely on four-stroke technology, it can't be argued that four-stroke engines are not available technology for all lawnmowers.[82] The state and local air officials commented that the expected difference between a two-stroke and four-stroke lawnmower is equivalent to approximately 300 grams of HC per hour of operation, or 7,500 grams per year for a typical homeowner.[83] A new automobile emits roughly 0.7 grams of HC per mile driven, which means that the difference between a two-stroke and four-stroke during one hour of grass cutting is approximately equivalent to the emissions associated with an entire month of commuting for a typical driver.[84] For many households, the difference for a single season's mowing could be comparable to nearly an entire year of driving, according to the comment.[85]

Environmental and state and local air officials' associations commented that manufacturers have had ample opportunity to react to requirements that might reasonably have been expected.[86] These manufacturers participated in the process that led to the December 1990 adoption of CARB's standards and have already enjoyed a four year period in which to take appropriate action.[87] The state and local air officials commented that regulatory relief for these manufacturers would fail to provide appropriate market stimulus in a global marketplace that is increasingly sensitive to environmental performance and fuel economy.[88] Those associations also commented that such regulatory relief would compromise the effectiveness of Phase 1, and thereby undermine their acceptance of the phased approach to regulation of small engines.[89]

3.4.3 EPA's Response to the Comments

EPA is finalizing its proposal that lawnmowers be classified as nonhandheld equipment. However, in response to industry comments, EPA is providing an exception to the nonhandheld standard to allow two-stroke lawnmower engine manufacturers to produce a declining percentage of two-stroke lawnmower engines that meet handheld standards until model year 2003. This relief for two-stroke lawnmower engine manufacturers is justified by the economic hardship that would result if two-stroke lawnmower engines were required to meet nonhandheld standards upon the effective date of Phase 1, and by the need for additional lead time for two-stroke engines used in

lawnmowers to meet nonhandheld standards; EPA has concluded that handheld standards are the most stringent standards achievable for two-stroke lawnmower engines in the near term given these economic hardship and lead time considerations.

Economic hardship that would result if two-stroke lawnmower engines were required to meet nonhandheld standards is documented in two sets of comments from one engine manufacturer.[90] It stated that it would be forced to close a manufacturing plant that employs 230 people unless some form of relief from the requirement that two-stroke lawnmower engines comply with nonhandheld standards is granted.[91] The plant is devoted to two-stroke engine operations, according to the comments.[92] The manufacturer commented that the declining production option would avoid closure of the plant and maintain a minimally necessary market presence for its two-stroke lawnmowers during Phase 1.[93] The manufacturer stated that its principal goal and long-term strategy is to develop technology that will enable two-stroke lawnmower engines to meet Phase 2 nonhandheld standards.[94] Reducing sales below 50 percent would destroy the market for the product before Phase 2 technology could be implemented, and reduce plant utilization to unacceptable levels, according to the manufacturer.[95]

The need for additional lead time was a common theme among industry commenters, although only one two-stroke lawnmower engine manufacturer addressed the difficulty, if not impossibility, of two-stroke lawnmower engines meeting nonhandheld standards by the effective date of Phase 1.[96] According to the manufacturer, it is not technologically feasible for two-stroke engines to meet nonhandheld standards at this time.[97] The manufacturer stated in its comments that more engineering effort is required for two-stroke lawnmower engines to meet handheld standards than for four-stroke engines to meet nonhandheld standards, partly due to the difference in duty cycles for handheld and nonhandheld engines, with handheld engines having the advantage of a higher horsepower divisor than is obtained under the variable nonhandheld load specifications.[98] The manufacturer stated that it is an engineering uncertainty whether and how valve-control techniques developed in the past, to enhance power output for smaller two-stroke engines used in products such as chain saws, might be used to reduce emissions in lawnmowers.[99] Finally, the manufacturer stated that while it is conceivable that its technology development could permit the introduction of engines meeting the Phase 1 nonhandheld standards during Phase 1, the prospect of this occurring before the year 2001 is remote.[100]

CAA section 213(a)(3) specifies that nonroad emission standards must achieve the greatest degree of emission reduction achievable through the application of available technology, giving appropriate consideration to cost, lead time, noise, energy, and safety. Taking into account the economic hardship and lead time considerations discussed above, EPA has determined that handheld standards subject to a declining production cap are the most stringent emission standards achievable for two-stroke lawnmower engines at this time.

Under the declining production cap, two-stroke lawnmower engine manufacturers that wish to continue producing two-stroke lawnmower engines must establish a production baseline. The production baseline is the highest number of two-stroke lawnmower engines produced in a single annual production period from 1992 through 1994. Documentation verifying the production baseline must be submitted to EPA with the application for certification. In model year 1997, two-stroke lawnmower engine manufacturers may produce 100 percent of their production baseline, which must be certified to handheld standards. In model year 1998, two-stroke lawnmower engine manufacturers may produce 75 percent of their production baseline. From model year 1999 until model year 2003, two-stroke lawnmower engine manufacturers may produce 50 percent of their production baseline in each annual production period. In model year 2003, two-stroke lawnmower engine manufacturers must meet either Phase 1 nonhandheld standards or Phase 2 nonhandheld standards, whichever are applicable.

Although EPA's approach is not consistent with CARB regulations, which require all lawnmowers to meet nonhandheld standards with no exceptions, EPA believes there are two valid reasons for the distinction. First, Congress has recognized the need for California to maintain its own mobile source emission control program (see section 209 of the CAA) because it faces difficult and distinct air pollution problems and, as a result, may adopt measures more stringent than those that apply in the nation as a whole. Second, EPA's nonroad emission standards are not allowed to be more stringent than is achievable after consideration of cost and lead time according to section 213(a)(3) of the CAA. Although California is constrained by similar criteria per the authorization criteria of section 209 (e), consideration of such criteria is limited to the State of California. EPA must consider cost and lead time when nonroad emission regulations affect the nation as a whole. EPA has concluded that in order for the Agancy to meet the section 213(a)(3) requirements to consider cost and lead time in setting its nationally applicable standard, it is reasonable to provide for this limited relief for manufacturers of lawnmowers that use two-stroke engines. This conclusion in no way prejudges whether California should grant similar relief.

EPA agrees with commenters that four-stroke technology is generally available for lawnmowers, and that two-stroke engines are more polluting than four-stroke engines. Unlike EPA's treatment of two-stroke versus four-stroke snowthrowers, EPA is not distinguishing two-stroke and four-stroke lawnmowers as separate products, but rather is recognizing the technological infeasibility of two-stroke engines used in lawnmowers meeting the nonhandheld standards by the effective date. Still, although four-stroke technology is theoretically available for all lawnmowers, it is not immediately available for manufacturers of two-stroke lawnmower engines, due to the cost and lead time concerns discussed above. In light of these concerns, EPA is providing a reasonable opportunity for two-stroke lawnmower engine manufacturers to come

into compliance with nonhandheld standards over the period in time during which these standards will apply.

3.5 Snowthrowers

3.5.1 Summary of the Proposal

EPA proposed that snowthrowers meeting the handheld definition be considered handheld equipment; all other snowthrowers would be considered nonhandheld.

3.5.2 Summary of the Comments

EPA received comments from environmental, industry, and state and local air pollution officials' associations, and from manufacturers. In general, industry either opposed regulating snowthrowers for HC emissions or favored relaxed emission standards for two-stroke snowthrowers, while environmental and state and local air officials' associations favored more stringent standards.

One industry commenter argued that EPA should at a minimum exempt snowthrowers from the hydrocarbon standards, since emissions from snowthrowers do not demonstrably contribute to summertime ozone nonattainment concentrations.[101] According to the commenter, Phase 1 accomplishes no demonstrable purpose by regulating snowthrower hydrocarbon emissions, as snowthrowers are used exclusively during the winter and reductions achieved by regulating snowthrowers would have no benefit for areas seeking reductions in order to attain the ozone NAAQS during the high ozone season.

Industry commented that there are no snowthrowers with spark-ignited engines that weigh under 14 kg;[102] only electric versions are available under 14 kg. As a result, all snowthrowers covered by the proposal would be subject to nonhandheld standards. According to industry, if snowthrowers with two-stroke engines must comply with nonhandheld standards, EPA would effectively be banning such equipment and placing an unreasonable hardship on that segment of industry.[103] One manufacturer stated that it is technically infeasible to meet nonhandheld standards.[104] Another manufacturer commented that EPA should increase the weight limit in the handheld definition to 30 kg, to include snowthrowers with two-stroke engines.[105] The Nonroad Study indicates that 26 percent of snowthrowers have two-stroke engines.[106]

Industry offered three main lines of reasoning for the position that all two-stroke snowthrowers should be considered handheld: (1) Snowthrower manufacturers assumed that Phase 1 standards would mirror CARB's standards, including its special exceptions.[107] (2) Snowthrowers do not contribute to summer ozone nonattainment.[108] In addition, because all

snowthrowers exceed 50 cc and the CO standard for nonhandheld and handheld in the over 50 cc class is the same, there would be no additional air quality benefit provided by the application of nonhandheld standards to snowthrowers.[109] (3) Two-stroke snowthrowers have design, performance, and operational characteristics that fill a unique market niche, and have many of the attributes of handheld equipment.[110]

The unique design, performance, and operational characteristics cited by industry include size, weight, maneuverability, and ease of storage and transport.[111] Two-stroke snowthrowers have only two wheels (neither of which touch the ground during operation), and operators must provide continual support and attitudinal control by raising and tilting the equipment in order for it to perform.[112]

Commenters noted that two-stroke snowthrowers use a 5.4 kg (12 pound) engine and a single belt-drive system, eliminating the weight of additional belts and pulleys.[113] Moreover, almost all two-stroke snowthrowers are 'single-stage,' according to comments, meaning that they use an auger to gather snow and expel it from a single chamber.[114] By contrast, almost all four-stroke snowthrowers are two-stage units that use an auger to gather snow into one chamber and a separate impeller to discharge it from a second chamber, according to comments.[115] The engines in four-stroke snowthrowers weigh between 11 and 27 kg (25 and 60 pounds).[116]

Environmental and state and local air officials' associations opposed handheld status for two-stroke snowthrowers.[117] They expressed concern about the high levels of unburned air toxics emitted by two-stroke engines, given operator proximity.[118] The associations pointed out that for larger snowthrowers, four-stroke models are available, and for the small two-wheeled version, electric models are available.[119]

3.5.3 EPA's Response to the Comments

Since EPA agreed to undertake a phased approach to small engine regulation in March 1993 (see 59 FR 25399 at 25400-25401 for a detailed explanation), EPA has maintained that its Phase 1 program would be based on CARB's and incorporate the same emission standards, where it is appropriate to do so in a nationally, rather than regionally, applicable regulation. EPA is not persuaded that it was appropriate for manufacturers to assume that by adopting CARB's standards, EPA would also adopt CARB's exceptions to those standards. Under the commenter's approach, EPA would not be able to regulate farm and construction equipment, solely because CARB is prohibited from regulating such equipment under the Act. However, as discussed below, EPA will treat 2-stroke snowthrowers consistent with CARB.

The comment that it makes no difference whether snowthrowers are considered handheld or nonhandheld, because the CO standard is the same, is moot in light of the fact that industry requested and is being granted various relaxations of the class I, II, and V CO standards.

After considering the comments, the Agency has concluded that the HC standard will be optional for snowthrowers. This is because, as discussed in the preamble to the proposed rule (see 59 FR at 25416) and by industry comments, snowthrowers are operated only in the winter, which means that they do not measurably impact ozone nonattainment concentrations and thus need not be subject to stringent control requirements aimed at controlling ozone nonattainment. On a national level, ozone nonattainment is primarily a seasonal problem that occurs during warm, sunny weather. Regulating HC emissions from products used exclusively in the winter, such as snowthrowers, will not advance the Agency's mission to correct this seasonal problem. EPA recognizes that California will be regulating HC emissions from snowthrowers, and today's decision should in no way prejudice California's efforts. The Agency notes that California faces a uniquely difficult problem in that its ozone nonattainment season is year round, and that Congress has recognized California's potential need to adopt measures that are more stringent than those that apply in the nation as a whole. EPA, instead, must promulgate regulations that apply nationally in scope and that address the air quality problems that face the nation generally.

Under today's rule, while manufacturers of snowthrowers will still be required to certify to and comply with applicable CO standards, they will be required to certify to the HC standards only where they opt to become subject to those standards. The Agency expects that many snowthrowers will in fact be certified to meet the HC standards, since the technology necessary to meet those standards will be readily available to snowthrower manufacturers and since manufacturers may wish to be able to take advantage of "green marketing" opportunities. However, the Agency does not believe it is appropriate at this time to absolutely require all snowthrowers to be certified to meet a standard that is meant to address ambient air quality problems that do not exist when these products are in use. This decision in no way affects snowthrower manufacturer responsibilities with respect to CO standards. Moreover, if an engine manufacturer produces an engine that is used in snowthrowers and in other products that are not used exclusively in the winter, that engine must be certified to the applicable HC standard.

According to information submitted by industry, the weights of two-stroke snowthrowers range from 16.3 kg (36 pounds) to 39.9 kg (88 pounds); the average weight of the two-stroke models listed was 29.5 kg (65 pounds).[120] In EPA's opinion, a product line ranging in weight from 16.3 to 39.9 kg cannot fairly be considered light in weight (except in relation to something heavier), or specifically designed to be lifted or carried, and EPA is not inclined to raise the weight limit in the handheld definition to 30 kg to accommodate such equipment.

EPA is persuaded by comments describing the design, performance, and operational characteristics of two-stroke snowthrowers that two-stroke snowthrowers form a distinct product class from four-stroke snowthrowers. As two-stroke snowthrowers are a distinct product class that depends on a relatively lighter-weight product, EPA does not consider four-stroke technology to be generally available technology for the relatively light-weight two-stroke snowthrowers.

EPA shares the concerns raised by commenters about operator proximity to high levels of unburned air toxics emitted by two-stroke engines. However, EPA lacks sufficient data to address those concerns at this time.

EPA agrees with comments that two-stroke snowthrowers would meet the third prong of the handheld definition but for the weight criterion. Rather than amend the weight criterion in the handheld definition to include two-stroke snowthrowers, however, EPA is providing an exception to the nonhandheld standards that will require two-stroke snowthrower engines to comply with the handheld CO standard but not require them to meet the HC standards, either nonhandheld or handheld, unless they opt to certify to those HC standards.

3.6 Use of Power Rating as Cutoff for Applicability

3.6.1 Summary of the Proposal

The Agency has limited the applicability of this action to engines at or below 19 kW (25 horsepower) rated power. While the Agency considered limiting the regulation's applicability based instead on a total displacement, it chose to propose and adopt a power-based cutoff for consistency with CARB's 25 horsepower limit. Manufacturers have generally encouraged consistency with the nonroad regulations being implemented in California, and EPA has tried to achieve this whenever it believes that it is harmonious with the Agency's mission and directives.

3.6.2 Summary of the Comments:

The Agency is aware of the concern raised by STAPPA/ALAPCO that the measurement of rated power is subject to engine configuration and test conditions, and that a cutoff based on power might create an incentive for manufacturers with engines just below the cutoff to change engine and/or test procedure parameters to result in a higher measured power in order to escape the scope of this regulation. In their comments, STAPPA/ALAPCO supported the one liter displacement cutoff that EPA identified as an alternative in its examination of data from Power Systems Research.[121] In that study, the relationship between total displacement and rated power suggests that a one-liter total displacement cutoff would affect nearly an identical group of engines as a 19 kW cutoff.

3.6.3 EPA's Response to the Comments

Using a displacement-based cutoff would cause a limited number of engines to be included that would not be included using a 19 kW cutoff (that is, engines above 19 kW but less than one liter displacement), such as some of the larger two-stroke engines. On the other hand, a limited number of engines that would have been covered under the provisions of the proposal would go unregulated under this scenario (that is, engines under 19 kW but greater than one liter); examples would include some of the larger industrial four-stroke engines. The Agency believes that the number of engines potentially involved is small enough to make this a marginal issue for this interim rule. Many of the larger two-stroke engines that would have fallen within a 1-liter displacement limit would have been exempted from coverage in this rule because of their use in recreational vehicles.

For this reason, and because EPA believes that consistency with the proposed CARB regulations is appropriate in this case, EPA has chosen to leave the 19 kW cutoff in place. The Agency will take the matter up for consideration in the Phase 2 negotiated rulemaking, currently underway.

3.7 Non-Coverage of Compression-ignition Engines

3.7.1 Summary of the Proposal

The Agency did not propose to regulate small CI engines in this action for the reasons discussed in the preamble to the proposed rule. The Agency sought comment on this issue in its proposal because of the potential that unregulated CI engines could be substituted for post-control SI engines. In EPA's view, while this may occur in some cases (for example, small agricultural tractors), the most price-sensitive products, such as string trimmers and lawnmowers, are unlikely to shift significantly toward CI engines due to technological limitations, consumer preference, or both.

3.7.2 Summary of the Comments:

Both CARB and NRDC commented that EPA should include coverage for small CI engines in this rulemaking. Expressing its concern that applying a combined HC+NOx standard only to SI engines might cause a market shift to CI engines, CARB supported regulating both SI and CI engines in this rulemaking to effectively control emissions.[122]

The NRDC comments reiterated concerns about the effect of delaying standards for this group of engines. Delaying the regulations, NRDC argued, will result in their having little beneficial impact on achieving deadlines for attainment, even in severe nonattainment areas. Since

the states are specifically precluded from regulating farm and construction equipment, some of which employ small CI engines, NRDC has urged EPA to move quickly to establish standards for small CI engines. In addition, NRDC pointed out that small CI engines are addressed in the CARB proposal, and says that they should be included in EPA's rule for the sake of consistency.

3.7.3 EPA's Response to the Comments

The Agency has elected not to include small CI engines as a part of this rulemaking. As part of the Sierra Club v. Browner settlement, EPA must determine by November 1996 whether to undertake a rulemaking which targets emissions from small CI engines.

Small CI engines have different emission characteristics from the engines addressed by this proposal, emitting much lower levels of HC and considerably higher levels of NOx than small SI engines. In contrast with its approach to this rulemaking, which is focused on achieving reductions in emissions of HC, EPA would be more likely to focus on NOx in a regulation addressing CI engines. Presently EPA lacks sufficient data regarding baseline emissions and control technologies for nonroad CI engines in this power range to determine appropriate standards. To devise appropriate standards and test procedures would require that EPA undertake a supplementary proposal. If EPA were to go through the process before finally promulgating a small SI rule, it would cause EPA to miss its court-ordered deadline for the final small SI rule and would delay promulgation of regulations already developed for small SI engines. Therefore EPA has chosen not to include small CI engines from this rule while working to address the issue of regulating small CI engines in a separate rulemaking.

3.8 Non-Coverage of Recreational Propulsion Engines

3.8.1 Summary of the Proposal

The Agency did not propose to apply the provisions of this rule to engines used in recreational vehicles, examples of which include snowmobiles, off-road motorcycles, ultralight planes, and all-terrain vehicles. Engines used in recreational vehicles that are not regulated in this rule are defined by the following characteristics: use of a continuously variable throttle (as opposed to a governor), rated engine speeds in excess of 5,000 RPM, and wide variations in both engine load and speed. Because they do not qualify as recreational vehicles under the criteria of this rule, golf carts and similar vehicles that have the characteristics identified above are subject to the emission standards set forth in this action.

The Agency's primary reason for not applying this rule to engines used in recreational vehicles is the extremely transient operation of the products in which these engines are used. Their

characteristically transient operation limits the ability of the proposed steady state test procedure to adequately represent exhaust emissions. This decision is not based on any determination that these engines do not contribute to air pollution and therefore need not be controlled. The Agency has chosen not to apply this rule to engines used in recreational vehicles in order that it may proceed quickly with a program for other small SI engines. Developing new test procedures and standards appropriate for recreational vehicles would significantly delay implementation of standards for the other small engines, delaying air quality benefits, as well as causing EPA to violate the deadline for promulgation of this rule agreed to in the Sierra Club consent decree.

The Agency solicited comment on the non-inclusion of engines used in recreational vehicles, on the criteria used to identify such engines, and on the appropriate test procedure and emission standards if EPA were to include such engines in this rulemaking.

3.8.2 Summary of the Comments:

NRDC stated that by omitting nonroad recreational engines from this rulemaking, EPA will not fulfill the requirements of the Clean Air Act Amendments of 1990 or the consent decree.

The City of Chicago likewise was concerned with EPA's decision not to include nonroad recreational engines in the rule. It points out that a great many vehicles with these engines are used throughout the ozone nonattainment areas surrounding southern Lake Michigan. Therefore it recommends that EPA speedily move forward on regulations to address such engines.

While CARB was of the opinion that such engines would not have been appropriately controlled in this rulemaking, it encouraged EPA to continue studying recreational engines for future regulation.

However, the Illinois Farm Bureau took the position that EPA was correct in not including recreational engines in this rule and that it should not consider regulating them in any future rule. The Illinois Farm Bureau's rationale is that many recreational vehicles are employed for non-recreational purposes in agriculture.

3.8.3 EPA's Response to the Comments

As part of the Sierra Club v. Browner settlement, EPA will determine whether to undertake a rulemaking which targets emissions from engines used in recreational vehicles. The Agency will announce its intentions regarding such a rulemaking in the future.

3.9 Non-coverage of Marine Propulsion Engines

3.9.1 Summary of the Proposal

In the proposal, EPA stated that the rule would explicitly exclude from regulation small SI engines used to propel marine vessels.

3.9.2 Summary of the Comments

The only comment EPA received on this matter (from CARB) was in support of EPA's decision.

3.9.3 EPA's Response to the Comments

The Agency is not applying this rule to marine propulsion engines (examples of which, in this power range, include outboard marine engines) because it is developing emission standards for such engines in a separate action. The proposal for this action, published November 9, 1994,[123] is also under court order and is currently due to be promulgated in November 1995. However, small SI engines used on marine vessels for purposes other than propulsion, such as generators and pumps, are subject to the provisions of this rule.

SECTION 4: CERTIFICATION REQUIREMENTS AND EMISSION STANDARDS

4.1 Equipment and Vehicle Manufacturer Requirements

4.1.1 Summary of the Proposal

EPA proposed that equipment and vehicle manufacturers using small nonroad engines must use appropriate handheld or nonhandheld certified engines, and prohibited the introduction into commerce of nonroad equipment and vehicles lacking appropriate certified engines after August 1, 1996. EPA also proposed that equipment and vehicle manufacturers apply a supplemental label to the equipment or vehicle if the engine label is obscured by the equipment or vehicle. EPA requested comment on a separate effective date for equipment and vehicle manufacturers, due to concern about inventories of noncertified engines that could not be incorporated into equipment or vehicles by the effective date. Finally, EPA proposed that new replacement engines manufactured after the effective date of this rule be subject to this rule. EPA is finalizing these requirements.

4.1.2 Summary of the Comments

EPA received comments both supporting and questioning its authority to require the use of certified engines. One industry association commented that EPA has no authority to require the use of certified engines.[124] A manufacturer and an industry association commented that EPA's

authority under CAA section 213 does not extend to equipment.[125] A state, state and local air officials, and an environmental association supported the requirement that equipment manufacturers use complying engines.[126]

Several industry associations commented that the prohibition on introducing into commerce equipment and vehicles lacking appropriate certified engines after the effective date could impose a substantial hardship on industry, and is unnecessary to prevent stockpiling;[127] equipment manufacturers now minimize the period they store engines to avoid the substantial costs associated with financing and warehousing inventoried engines, according to comments.[128] Two associations asked EPA to clarify that neither equipment manufacturers nor dealers have any special obligation to convert their inventories to use certified engines.[129] A manufacturer asked EPA to clarify whether existing inventories may be used following the effective date.[130]

In regard to supplemental labels, two industry associations requested that EPA clarify the meaning of the word "obscured," and allow the supplemental label to be less comprehensive than the engine label, consistent with California.[131] One engine manufacturer supported the requirements as proposed.[132]

Most comments did not support a separate effective date for equipment and vehicle manufacturers.[133] An industry association commented that establishing no separate effective date is also consistent with California.[134] A state commented that a separate effective date should be based on the date of equipment manufacture, rather than the date of introduction into commerce.[135] Separate effective dates recommended by a manufacturer and an industry association included six months after the effective date,[136] and February 1, 1998.[137]

On replacement engines, an environmental association and state and local air officials support the requirement that new replacement engines for pre-1996 equipment meet certification standards.[138] One manufacturer expressed concern that there may be products for which a complying engine does not exist; such products would have to be replaced in total at a much higher cost.[139] An industry association commented that it may be unreasonable to assume that only a small percentage of equipment will need replacement engines; it recommended that surveys be conducted.[140]

4.1.3 EPA's Response to the Comments

EPA is finalizing the requirement that nonroad equipment and vehicle manufacturers use appropriate handheld or nonhandheld certified engines, effective with the 1997 model year. In EPA's view, the most effective way to ensure that certified engines are used in nonroad equipment and vehicles is to require such engines to be used. CAA sections 213, 216, and 301 provide authority for this requirement, since EPA is required to establish standards that apply to nonroad

engines and the vehicles in which they are used, including nonroad equipment. The definition of nonroad vehicle, which includes nonroad equipment, is discussed elsewhere in this document.

EPA is finalizing the requirement that equipment and vehicle manufacturers apply supplemental labels to their equipment and vehicles if the engine label becomes obscured by the equipment or vehicle. Comments in regard to supplemental labels are discussed elsewhere in this document.

EPA is not establishing a separate effective date for nonroad equipment and vehicle manufacturers. EPA recognizes that certified engines are not likely to be available in the numbers needed by nonroad equipment and vehicle manufacturers on the effective date, and that equipment and vehicle manufacturers will continue to use noncertified engines built prior to the effective date until noncertified engine inventories are used up and certified engines are available. As long as equipment and vehicle manufacturers do not inventory engines outside of normal business practices (that is, as long as they do not stockpile noncertified engines), equipment and vehicle manufacturers will be considered in compliance. EPA is adding language to 40 CFR 90.1003(b)(4) to this effect. Dealers have no obligation under this regulation to convert their inventories to equipment and vehicles with certified engines.

In proposing that new replacement engines manufactured after the effective date of this rule be subject to this rule, EPA requested comment on the need for manufacturers to produce replacement engines for use in pre-1996 equipment, and the extent of such a need, if any. EPA received no information directly on point, leading EPA to deduce that manufacturers do not see any significant problems with this requirement. As a result, EPA does not believe a survey is necessary. If there are pre-1996 equipment or vehicles for which a complying engine does not exist in the future, the option of rebuilding the original engine is still available. EPA is finalizing this requirement as proposed.

4.2 Engine Family Definition

4.2.1 Summary of the Proposal

The Agency proposed using the criteria for determining engine families as are currently used for on-highway motorcycles: combustion cycle, cooling mechanism, cylinder configuration, number of cylinders, engine class, and the number, location, type, and thermal reaction characteristics of catalytic converters. Comment was solicited on adding governed RPM range as a criterion for determining engine family, because of a concern that a wide-governed range in the same engine family may result in unrepresentative emission test results.

labeling requirements so that a single label could meet the requirements of both programs.[145] Industry commenters expressed general concern that the labeling requirements are excessive, and that the cost burden would not be justified on the basis of need. Other comments centered on the requirement that equipment manufacturers attach a supplemental label identical to the original if the original is obscured.[146] Several commenters also stated specifically that the unique engine identification number requirement was costly and unnecessary.[147]

4.3.3 EPA's Response to the Comments

The Agency has decided to retain the provision requiring equipment and vehicle manufacturers to apply a supplemental label to the equipment or vehicle if the original label is obscured. This provision is compatible with CARB, and ensures that owners, dealers, and repair personnel will have access to necessary engine information without disassembling the original vehicle or equipment.

After considering the comments, the Agency has decided to provide manufacturers with additional flexibility in the labeling requirement. To reduce manufacturer burden and provide compatibility with CARB, EPA will accept a label that has been approved by CARB that contains language indicating that federal standards have also been met. The Agency will accept the following: 1) a harmonized CARB/EPA label for 50-state engine families, 2) a CARB label with additional language saying it meets federal standards for the 49-state label, and 3) the EPA-proposed label.

In addition, the Agency has dropped the unique engine identification number requirement. Based on information supplied by engine manufacturers and their associations,[148] EPA determined that the information to be gained by requiring the unique number did not justify the additional capital and administrative costs to the manufacturers. Because no useful life time period or in-use standard is being established, the Agency has decided to allow in-use testing and recall on a voluntary basis for Phase 1 and, as a result, there is no need for EPA to require the unique engine identification number.

4.4 Cap on Noise

4.4.1 Summary of the Proposal

The Agency proposed that noise levels of small SI engines not be allowed to increase as a result of the new emission standards. In proposing the small SI engine regulations, EPA did not expect that engine noise levels would be affected by the type of engine changes it anticipated to be necessary to meet the proposed gaseous exhaust emission standards. The primary source of noise

from nonroad small engines originates from combustion and the moving parts in the engine, such as the piston, valve train, and so forth. Noise from combustion is controlled primarily through the engine muffler. The Agency believes the principal method that will be used by all engine manufacturers to meet the proposed emission regulation will be leaner air/fuel ratios. Therefore, it proposed that noise levels in future engines which meet the new standards must not exceed that of current production engines.

The Agency requested comment on the possible impact of the proposed regulation on engine noise.

4.4.2 Summary of the Comments

A concerned citizen stated that EPA should control noise emissions from small engines, arguing that the noise such engines generate can cause stress. That commenter specifically urged EPA to use its authority to regulate noise under section 213(a)(3) of the Clean Air Act and under the Noise Control Act of 1972, 42 U.S.C. 4901-4918.[149,150]

In jointly prepared comments, STAPPA and ALAPCO stated that they are not convinced that the noise cap is necessary, because they do not believe there is any significant likelihood that noise levels will be affected. Indeed, no commenter submitted any information supporting the contention that noise levels could increase as a result of the Phase 1 regulations. However, were EPA to go ahead with its proposal to control noise, STAPPA and ALAPCO were concerned that EPA had not proposed requirements by which it could determine compliance with a noise cap.

Onan, EMA, OPEI, and Tecumseh stated that EPA should drop the requirement that noise not increase. ECHO requested that EPA modify its proposed requirement on noise to read that "sound levels shall not increase over the current allowable standards (if applicable) for the equipment types."[151] PPEMA questioned EPA's authority to impose noise caps and recommended that EPA delete this requirement.

Tecumseh stated that engine and equipment manufacturers already adhere to voluntary noise standards associated with specific test procedures.[152] They said they do so because the public demands it, and they believe that their desire to be responsive to the public will assure that noise levels do not become problematic after this rulemaking becomes effective.

4.4.3 EPA's Response to the Comments

While EPA does believe that engine noise should be controlled, it has not promulgated noise control regulations in this rulemaking for three reasons: (1) it needs more information concerning noise impacts from small SI engines before imposing noise standards, (2) it did not propose a test procedure to be used for determining compliance with any noise standards it might set, and (3) as noted previously, the industry is already self-regulating to a degree.

While it is aware that some noise standards for specific equipment exist such as the European Economic Community's noise standards for lawnmowers, EPA lacks the necessary information to determine whether it is reasonable at this time to impose engine noise regulations without regard to the type of equipment in which the engines will eventually be used. For example, the fact that Europe is regulating lawnmowers rather than engines indicates that noise may be mostly equipment-specific. Continuing with the example of lawnmowers, it appears that the majority of the noise may be from the blade and other non-engine components of the equipment.

Moreover, EPA has recognized that it would not be sufficient for it to simply establish a requirement that noise not increase without providing some standardized procedure for making such a demonstration. The Agency did not provide a test procedure for assessing noise in the NPRM. Because no opportunity for comment on a specific test procedure for noise was given, EPA recognizes that promulgating a regulation requiring such a test would not be appropriate in the Phase 1 rule.

Nevertheless, EPA strongly supports engine and equipment noise controls. It commends the efforts at self-regulation already undertaken by manufacturers; however, if EPA becomes aware of noise increases in conjunction with the entry of Phase 1 engines into use, it may address this issue in a future regulatory action.

4.5 Safety Implications

4.5.1 Summary of the Proposal

The Agency made no proposal regarding safety (except as related to noise control, discussed above).

4.5.2 Summary of the Comments

ECHO commented that the impact of the proposed regulations on product safety was not yet clear[153]. PPEMA pointed out that several safety standards apply to many handheld products[154] and asked EPA to consider the safety implications of the Phase 1 regulations before promulgating them.

4.5.3 EPA's Response to the Comments

The Agency encountered no information in its investigations that indicate to it that negative implications for safety will arise as a result of promulgating these regulations. No comments offered any substantiation supporting the idea that there may be problems related to safety arising

from this rulemaking. If EPA finds evidence that safety may be compromised by this action, it will reopen the issue.

4.6 Retention of Certification Engine

4.6.1 Summary of the Proposal

The proposal was silent regarding the manufacturer's responsibility to maintain any test engine used for data submittal after the certification process has been completed.

4.6.2 Summary of the Comments

PPEMA requested that EPA allow manufacturers to retain the original certification engine for running change testing.[155]

4.6.3 EPA's Response to the Comments

The Agency does not require engine manufacturers to maintain test engines after a certificate has been granted. However, EPA agrees that the manufacturer may find it useful to retain certification engines for future data showings to EPA, especially in back-to-back testing to support approval of running changes.

4.7 CO Standard

4.7.1 Summary of the Proposal

EPA proposed the CO emission level of 402 g/kWh for Classes I, II and V.

4.7.2 Summary of the Comments

The CO emission levels for Classes I, II and V were objected to by several associations due to technical feasibility for some classes of engines to meet the proposed standards.

EMA/OPEI recommended that the CO levels for Classes I and II be raised from 402 g/kWh to 469 g/kWh based on the argument that it is not technologically feasible for a significant percentage of the market to meet the more stringent standard. Air to fuel ratios required cause in-use performance problems, according to the comments; EMA/OPEI supplied a lengthy rationale for raising the CO standard for engines marketed to the mass merchant (see Preamble discussion).

PPEMA requested that the CO level for class V engines be changed from 402 g/kWh to 603 g/kWh based on technical feasibility of reaching the standard without excessive temperatures that create product durability problems.

4.7.3 EPA'S Response to the Comments

In response to EMA/OPEI's recommendation, EPA has changed the CO level from 402 g/kWh to 469 g/kWh for Class I and Class II. EPA chose to change the CO level from 402 g/kWh for Class II even though the only available data in the RIA/RSD for Class II (Table 1-15) showed that the engines in Class II currently are below the proposed CO level. This is based on confidential information from one engine manufacturer which illustrated that there is a wide spread of emission results due to engine to engine variability. Their experience, from a much larger number of tests, showed that there are still a large number of emission results above the CO standard. Research is underway to optimize cylinder cooling designs and to improve fuel distribution which could allow further CO reduction without overheating engines in the future. However, based on the amount of work shown to have been done on improvements to date, EPA has determined that insufficient time is available to advance fuel system and cooling system technologies to achieve the proposed CO emission levels. An increase in the CO emission standard will not impact the feasibility of the HC+NOx standard. This is based on the fact that changes in CO emission levels are directly related to the operating A/F ratio of the engine alone. There are a number of HC and NOx emission control strategies available, such as optimized combustion chamber design, which are independent of CO emission levels.

For Class V handheld engines, EPA has published data in Table 1-19 in the RIA/RSD which shows that approximately 20 to 30 percent of these engines (Class V) meet the 402 g/kWh CO standard through enleanment of the engine. However, four pieces of information (out of the eight that showed emission levels below 402 for CO) are from four production engines of the same engine design from one manufacturer. EPA has considered submitted comments from PPEMA and reviewed the information in Tables 1-16 and 1-17 in the Phase I RIA/RSD.

EPA has no data to support the required higher reduction in per engine CO emission levels proposed for Class V engines than for Classes III and IV. The present CO standard of 804 g/kWh for Class IV engines results in a reduction of 3.7 percent from the average of baseline Class IV engine emission levels in Table 1-16 (Data from the one Class III engine already meets the CO standard). The proposed CO level of 402 g/kWh for Class V engines results in a 42 percent reduction from the average of baseline emission levels in Table 1-17, much higher than the 3.7 percent reduction required from Class IV engines. By changing the CO level to 603 g/kWh, EPA would bring the Class V reduction (now 13 percent) in line with the CO reductions in Class IV

engines. This change provides a more level playing field, by providing similar reductions across Class IV and V engines. The adjusted CO levels provide reasonable emission standards which the manufacturers can achieve and thereby minimize the concerns with operation at much leaner levels at this time. Phase II emission standards will address the possibilities of further enleaned engines across all engine classes. PPEMA has not requested the same change in CO level from CARB due to the fact that nearly all of the equipment in this class of engines is exempted from CARB regulations due to the definition of farm and construction equipment.

The impact on the decreased CO emission benefits, based on alterations in the CO levels for Classes I and V, are included in the table below. (Additional changes to the model have been made and therefore the emission benefits cannot be directly related to those values published in the RIA for the Phase I NPRM.) The total change in CO emission inventory from baseline is 2.3 percent with changes to Class I and Class V. The difference in emission benefits for Class V is small compared to the change from Class I due to the fact that the sales volume in Class V is significantly less than the sales in Class I. Therefore, the 201 g/kWh increase for Class V is less of an impact than the 67 g/kWh increase for Class I.

CO EMISSION INVENTORY CHANGE (yr 2020)

	NPRM			FINAL RULE		
	BASELINE	W/ CONTROL	% BENEFIT	BASELINE	W/ CONTROL	% BENEFIT
CLASS I only	12,995,551	11,168,720	14.4	12,995,551	11,405,697	12.2
CLASS II only	12,995,551	11,168,720	14.4	12,995,551	11,850,062	8.8
CLASS V only	12,995,551	11,168,720	14.4	12,995,551	11,212,098	13.7
CLASS I, II & V	12,995,551	11,168,720	14.4	12,995,551	12,130,398	6.66

4.8. Class V Compliance Margin Language

4.8.1 Summary of the Proposal

EPA proposed that the 402 g/kWh CO standard is feasible for Class V because test data indicates that approximately 20 to 30 percent of Class V engines already achieve average CO levels of eight percent below the standard. (see Table 1-19 in the RIA/RSD for Phase I Small SI Engine Regulation).

4.8.2 Summary of the Comments

PPEMA states that the 8 percent compliance margin suggested by EPA does not provide adequate statistical assurance that all engines will meet the standard. The variability inherent in the production process requires an average compliance margin that is substantially higher than 8 percent, according to PPEMA. PPEMA argues that EPA underestimates the number of engine models that must be brought into compliance.

4.8.3 EPA'S Response to the Comments

No additional data was supplied by PPEMA to change the compliance margin from that calculated from the available data. Since EPA's NPRM was published, a large number of California engine models have been certified. Although Class V engines are largely exempted in California, the new Class III and IV emissions data provide important information on just how large a safety margin manufacturers are certifying to in order to ensure the entire engine model will stay below the CO standards in production. These data would suggest a larger margin than the 8 percent provided by the proposed CO standard is needed. EPA's action to change the proposed CO standard from 402 g/kWh to 603 g/kWh for Class V engines will result in a higher compliance margin.

4.9 HC + NOx Standard

4.9.1 Summary of the Proposal

The Agency requested comment on two proposals for setting Class I and II HC and NOx standards. Option 1 consists of setting a combined standard for emissions of HC and NOx for Class I and II engines. Under option 2, EPA would set separate HC and NOx emission levels for Class I and II engines.

4.9.2 Summary of the Comments

CARB stated that if EPA sets separate standards, CARB encourages the choice of standards to reflect CARB standards of 12 g/bhph and 10 g/bhph for Class I and II engines respectively, thus allowing manufacturers to market a single engine family nationwide.

Onan is opposed to separate standards. If separate standards are promulgated, a substantial amount of testing will need to go into determining the appropriate levels of the two exhaust constituents.

NRDC supports separate standards and at a minimum requests a requirement of separate reporting.

Wisconsin accepts the combined standard with reservations for Phase I only, and wants separate reporting of HC and NOx emissions in all Phase I testing and compliance programs.

Tecumseh supports combined standards.

STAPPA supports a combined standard for Phase I only and requests a separate reporting of HC and NOx. STAPPA saw an environmental benefit of separate standards since such a structure would limit interpollutant trading with a separate NOx standard.

4.9.3 EPA'S Response to the Comments

EPA has considered all of the comments and has decided to keep the HC+NOx standard and add the requirement of separate emission value reporting for HC and NOx. This will serve two purposes in allowing the manufacturers the flexibility in using technologies to reduce emissions from small engines and provide states with the detailed information needed for modeling of pollutants and SIP planning.

The combined HC+NOx standard for Phase I is in harmony with CARB. EPA does not consider the combined HC+NOx standard a precedent for use in Phase II small SI engine regulations. In addition, this measure is only effective for a short number of model years before Phase II would come into effect.

4.10 Stringency of Standards

4.10.1 Summary of the Proposal

EPA believes that the proposed Phase 1 emission standards are the lowest standards for Class I-V engines achievable by the 1996 model year.

4.10.2 Summary of the Comments

Onan stated that if the proposed Phase 1 emission standards are the lowest standards for Class I-V engines by the 1996 model year, then the emissions limits should be higher than those proposed by 20 percent or so. Manufacturers will set their production emission limits well below the standard to assure that their products meet the standard, given manufacturing tolerances.

NRDC stated that the statutory requirements and language for nonroad engine standards at section 213(a)(3) of the Act are comparable in stringency to the section 202(a)(3)(A) motor vehicle emissions standards, which also require standards that achieve "the greatest degree of emissions reduction achievable." Thus the Act requires EPA to determine the "degree of reduction" for nonroad engines based on its comparable standards for onroad motor vehicles, and to consider the stringency and lead-time of onroad standards as the basis for establishing standards under section 213.

4.10.3 EPA'S Response to the Comments

In response to manufacturer comments with respect to production tolerances and their impact on emission standards, EPA is well aware of the need for what has come to be known as "headroom." This is the level the standards must be set at to allow engine models to be built reliably in compliance. EPA has proposed an appropriate effective date that would allow engine manufacturers to make the technical changes that allow their engines sufficient headroom to meet the emission standards.

EPA acknowledges that automobile engines have been made to achieve greater degrees of emission reductions than are presently required by this rulemaking. However, since this is the first requirement for small engine manufacturers to reduce emission levels, EPA has split the emission reductions required into two phases with the second phase of emission regulations to come after the first phase. The first phase of regulations will require moderate to extensive improvements in engine designs with some catalyst usage possible. The second phase of regulations may require more advanced technologies which are currently under development for application on a majority of these classes of engines.

EPA has decided to adopt most of the standards as proposed with changes to only the CO standards for Classes I and V (see response to comments on this issue).

4.11 Regulating HC vs. VOC

4.11.1 Summary of the Proposal

The Phase I NPRM stated that volatile organic compounds (VOCs) are compounds containing carbon and hydrogen in combination with any other element with a vapor pressure equal to or greater than 1.5 pounds per square inch under actual storage conditions. HCs therefore, are a subset of VOCs. Based on the testing indicating that HC emissions represent VOCs from small SI engines that cause or contribute to ozone nonattainment concentrations, EPA proposed an HC, rather than a VOC standard.

4.11.2 Summary of the Comments

Onan stated that it supports regulating HC based on the fact that present emission measuring equipment is not capable of measuring VOC and appropriate equipment is a sizeable cost to small engine manufacturers. SwRI has shown that 99 percent of VOCs emitted from engines covered by this NPRM are HCs and CARB regulates HC (harmonization).

EMA and OPEI support this aspect of EPA's proposal. EMA stated that HCs make up more than 99 percent of the VOCs emitted from small engines. Inasmuch as the types of controls used to reduce HC emissions likewise will reduce emissions of other VOCs, setting emission limits for HC emissions should essentially accomplish the same reduction in VOC emissions as would be achieved by setting limits for VOCs.

4.11.3 EPA'S Response to the Comments

EPA is setting standards for HC regulation.

SECTION 5: TEST PROCEDURES AND EQUIPMENT

5.1 Certification Test Fuels

5.1.1. Summary of the Proposal

The proposed rule allowed for the use of one test fuel for certification, the parameter specifications and tolerance levels were specified in an Appendix to Subpart D.

5.1.2. Summary of the Comments

The Kohler Company stated concerns that the proposed fuel specifications were too tight and the fuel would not be readily available. Kohler suggested that the Agency relax the tolerances so that recognized certification fuels such as Indolene Clear would be acceptable.

Onan Corporation questioned what fuel was being specified. Onan suggested that the Agency add language that would allow future California and Federal on-highway certification fuels be used for small engine certification.

The Portable Power Equipment Manufactures Association (PPEMA) stated that the proposed fuel tolerances were too stringent. They voiced concerns regarding fuel availability, particularly in foreign countries. PPEMA suggested the Agency's rule be consistent with CARB and SAE J1088, and asked that EPA allow the use of Indolene Clear. PPEMA also suggested that EPA allow the use of comparable, commercially available fuels in foreign countries where the engine is manufactured and tested for certification.

5.1.3. EPA's Response to the Comments

The fuel specified in the proposed rule was meant to represent typical commercially available gasoline available in the U.S.A. After publishing the proposal the Agency discovered the fuel tolerances specified in fact were too stringent. The tolerances have been increased and the Agency believes the fuel can be purchased from many refineries in the U.S. Because of the importance of fuel parameters to emissions testing, the Agency does not believe commercially available fuels in foreign countries are acceptable for certification testing unless the fuel meets the specifications in the regulation. In addition, the Agency has added an additional fuel as a possible certification fuel. The Agency has added the specifications for the certification fuel used for on-highway gasoline fueled light-duty vehicles, specified in 40CFR 86.1313-94(a). This fuel is commonly referred to as Indolene Clear.

5.2 Service Accumulation Fuel (or Break-In Fuel)

5.2.1. Summary of the Proposal

The proposal specifies that the Service Accumulation Fuel must be representative of commercially available fuel. The proposal also states that the Reid Vapor Pressure of the fuel be typical of fuel in use for the time of year the engine is tested.

5.2.2. Summary of the Comments

The Kohler Company and Onan Corporation requested that certification fuel be allowed for use as the service accumulation fuel as an alternative to commercially available fuel.

Onan also commented that it would be more appropriate for the RVP of the fuel to be typical of a summertime grade fuel, since most small engines are used in the summertime.

Echo Corporation suggested that the service accumulation fuel requirements be altered to include fuel which is characteristic of the country's motor fuel because U.S. fuel is difficult to import into foreign countries.

5.2.3. EPA's Response to the Comments

The Agency specified a commercially available fuel as an alternative to the certification fuel as a method of lowering manufacturers cost due to the generally high cost of certification fuel. However, the regulation has been changed to include the certification fuel as an option for the service accumulation fuel. The RVP specifications have also been altered to allow the use of a summertime fuel. For foreign manufacturers, the Agency is not proposing that the service accumulation fuel must be from a U.S. refinery, only that the fuel be representative of fuel commercially available in the U.S.

5.3 Power Measured During the Idle Mode

5.3.1. Summary of the Proposal

The proposal required that power measured during the idle mode of the proposed test cycles should not be included in the calculation of the weighted brake-specific emission rate.

5.3.2. Summary of the Comments

Onan Corporation suggested that the Agency should include the windage power measured during the idle mode. Onan stated that to not include the windage power would be to unjustifiably increase the mode weighted emission values.

The Echo Corporation proposed that the Agency should allow the use of idle power in the weighted calculations only if the piece of equipment the engine is used in produces work while idling.

PPEMA requested that the Agency remove the idle mode completely from Cycle C, the handheld test cycle. If the Agency decides to leave the idle mode, manufactures should be allowed to include the power measured during the idle mode in the emission calculations.

5.3.3. EPA's Response to the Comments

The Agency has based the form of the emission standards for this rule and other engine rules in terms of brake-specific emission rates, ie. mass of emissions per unit time per unit power. The rationale behind this is to base the standard in terms of the amount of useful work performed

by the engine. During the idle mode an engine is producing the amount of work necessary to maintain idle speed, therefore no external work is generated. For this reason, any power measured during the idle mode portion of the test is a result of a load applied to the engine from the power measuring device and should not be included in the calculations of the weighted brake-specific emission rates. The manufacturer always has the option of disconnecting the engine from the dynamometer for the idle mode. For these reasons the Agency will not be altering the final rule in response to this comment. The Agency will not be removing the idle mode from test Cycle C.

5.4 Differences between the proposed Federal test procedure and the Society of Automotive Engineers (SAE) Recommended Procedure J1088.

5.4.1. Summary of the Proposal

The proposed test procedure is based primarily on the heavy-duty gasoline engine test procedure detailed in Title 40 of the Code of Federal Regulations, Part 86, Subpart D. 40CFR86 Subpart D is a certification test procedure for heavy-duty diesel and gasoline on-highway engines.

5.4.2. Summary of the Comments

The Onan Corporation stated that the Agency must demonstrate a lack of uniformity between test laboratories or the proposed changes from established test practices should be considered arbitrary and capricious. Onan mentioned an industry sponsored correlation program run by the Engine Manufacture Association (EMA) which showed good correlation between four engine manufactures, one component manufacture, EPA, and the University of Michigan.

PPEMA stated that the Agency's proposed modifications to SAE J1088 do not meaningfully increase the measurement precision or confidence in the prediction of emission reductions. Furthermore, PPEMA contends that given the demonstrable accuracy of the SAE J1088 procedure, the Agency's proposed changes only increase the cost to manufactures and are not justified.

5.4.3. EPA's Response to the Comments

The Agency has very little data with which to compare small engine manufacturer test laboratories. There are over thirty engine manufacturers who sell engines in the U.S. who may want to certify engines to this rule if they wish to continue selling engines. To use the data from a single round-robin test program which only included four out of at least thirty engine manufactures does not appear responsible to the Agency.

No engine manufacturer submitted data or information on the "demonstrable accuracy" of the J1088 procedure, or on the incremental costs to manufacturers which may be attributed to the differences between the SAE J1088 procedure and the proposed rule.

The burden is not on the Agency to disprove a recommended test procedure. EPA did not use the J1088 procedure as a starting point for the proposed test procedure. The test procedure is based primarily on existing EPA certification test procedures for other engines which are currently regulated, primarily heavy duty diesel and gasoline on-highway engines. The SAE J1088 is a recommended test procedure which by itself the Agency does not feel is appropriate for certification testing.

5.5 Unconditioned Air Supply, Humidity Measurement

5.5.1. Summary of the Proposal

In §90.310 of the proposal, there is a requirement that engines with humidity conditioned air supplies must measure the humidity of the air in the engine's intake air system.

5.5.2. Summary of the Comments

The Onan Corporation suggested the paragraph be revised to allow the measurement of the test cell humidity for those engines which don't have humidity conditioned air supplies.

Echo Corporation suggested the paragraph be deleted, since small engine manufactures don't pre-condition the intake air going into the engine.

5.5.3. EPA's Response to the Comments

The final rule has been altered to allow the measurement of test cell humidity for engines which do not use humidity conditioned air supplies.

5.6. Test Conditions, Test Engine Orientation

5.6.1. Summary of the Proposal

The proposal required that Class I and II engines must be level during the emission test.

5.6.2. Summary of the Comments

Onan Corporation suggested changing the requirement so that all engines must be tested at their design angle.

5.6.3. EPA's Response to the Comments

The suggestion made by Onan is appropriate for small engines, since many small engines are not designed to operate in a level position. The final rule has been modified accordingly.

5.7. Ambient Test Conditions and f-parameter Specifications

5.7.1. Summary of the Proposal

The proposed regulations require that the test cell temperature (T) and dry barometric pressure (P_S) are used in the calculation of a "f-parameter" according to the following formula

$$f = \frac{101.3}{p_s} \times \left(\frac{T}{298}\right)^{0.7}$$

In order for a test to be valid the value of the f-parameter must fall between the values of 0.98 and 1.02. In addition, the regulations require that the ambient test cell temperature be maintained between 20° and 30° C.

5.7.2. Summary of the Comments

Onan Corporation commented that both the formula and the limits for the f-parameter are too restrictive and the dry barometric pressure standard of 101.3 kPa in the formula for "f" is too high. Upon request, Onan submitted additional data containing daily dry barometric pressure minimum and maximum values for their laboratory from September 1991 to December 1993. This data shows that if the standard pressure is set at 101.3 kPa, Onan would be unable to perform a valid test approximately 85% of the year, if the standard pressure is set at 99 kPa Onan would be unable to test on approximately. 10% of the year, and if the standard pressure were changed to 97 kPa, Onan would be able to test every day. These calculations assume test cell temperature can be varied between the proposed limits of 20° and 30° C. Onan requested that the Agency either eliminate the f-parameter requirement or change the limits or the standard pressure to allow manufactures to test on the majority of the year.

PPEMA requested an ambient test cell range of 15-30 C. PPEMA stated that the f-parameter serves only as a correction factor for potentially different test conditions. Temperature and barometric pressure are considered in engine power corrections. PPEMA requested the proposed f-parameter restrictions be removed.

5.7.3. EPA's Response to the Comments

In a preliminary draft of the test procedure, for which EPA requested a technical review by the SAE Small Engine and Powered Equipment Committee in July of 1993, the f-parameter standard pressure was 99kPa, not 101.3kPa. In the comments from one of the SAE reviewers, EPA was requested to change the standard pressure to 101.3kPa to be consistent with the standard

pressure used for volumetric flow rate calculations in the regulations. Since that time the Agency has received verbal comment from the SAE reviewer stating that they made an error in their review and would prefer that the standard pressure for the f-parameter calculation be set to 99kPa. This correction has been made to the final rule.

The purpose of the f-parameter for this rulemaking is to insure that all manufacturers perform the certification test under a set of restrained ambient conditions. The Agency does not have any information at this time regarding the effects of barometric pressure and temperature on small engine emission performance. If in the future scientific data are produced which show the relationship between ambient cell temperature, barometric pressure and emission performance, the Agency would consider issuing a technical amendment to the regulations altering the f-parameter and ambient cell temperature limits appropriately. The Agency is also aware of the burden placed on manufacturers by what may be unnecessarily stringent f-parameter tolerances. The proposed allowable tolerance band was ± two percent, the Agency has increased the allowable tolerance band for the final rule to ± four percent, from 0.96 to 1.04.

5.8 Oxygen Interference Check - Frequency of Check

5.8.1. Summary of the Proposal

The proposal states that an oxygen interference check must be performed as part of the hydrocarbon analyzer calibration in §90.316. The calibration frequency for the oxygen interference check is not spelled out.

5.8.2. Summary of the Comments

Onan Corporation requested information on when and how often the oxygen interference check must be performed.

5.8.3. EPA's Response to the Comments

In Table 2 of Appendix A of Subpart D, the calibration frequency for the hydrocarbon analyzer, which includes the oxygen interference check, is monthly. The regulation has been changed to explicitly spell out this requirement in §90.316(d).

5.9 Carbon Monoxide Analyzer Interference Check.

5.9.1. Summary of the Proposal

The proposal requires that manufacturers periodically (within one month prior to the certification test) perform a check on the response of the carbon dioxide NDIR analyzer to water

vapor and carbon dioxide. The method was described in the proposal, and it involves bubbling a mixture of CO_2 and nitrogen gases through water which is then read by the analyzer.

5.9.2. Summary of the Comments

Onan Corporation requested that manufacturers be allowed to perform a dry carbon dioxide interference check, or at the very least, allow the mixture to be introduced into the sample prior to the water trap.

5.9.3. EPA's Response to the Comments

The purpose of this interference check is to examine the analyzers response to both carbon dioxide and to water vapor. The Agency's experience led to the development of the procedure described in the proposal, and this language was not altered for the final rule.

5.10 Calibration Frequency

5.10.1. Summary of the Proposal

The proposal states that calibrations for several instruments must be performed monthly.

5.10.2. Summary of the Comments

Onan Corporation suggests that EPA should only require calibration intervals with respect to certification or audit equipment. In addition, Onan suggested that instead of requiring monthly calibrations on instruments, the requirement should be that the instrument must have been calibrated within one month prior to the certification test.

5.10.3. EPA's Response to the Comments

The Agency agrees with Onan's suggestion regarding calibration frequency. The proposed language was taken from on-highway certification test procedure documentation where manufacturers are performing certification tests routinely throughout the year. If a manufacturer does not run certification tests throughout the year, for instance the tests are run during a six month period, it would not be necessary for the manufacturer to perform monthly calibration on instruments which are not used for the remaining six months of the year. This would place a burden on the manufacturer which has no technical benefit. The regulation language has been changed from requiring a monthly calibration frequency to requiring calibration within one month of the certification test.

5.11 Test Procedure Overview, Dynamometer Requirement

5.11.1. Summary of the Proposal

The proposal requires a dynamometer be used as the engine loading device for the certification test.

5.11.2. Summary of the Comments

Onan Corporation requested that EPA change the requirement that a "dynamometer" must be used as the engine loading device for the engine test cycle to an "engine load measuring device."

5.11.3. EPA's Response to the Comments

The Agency agrees with Onan's suggestion. It is not necessary to use a dynamometer if another instrument which can perform the same function is available. The final rule has been changed to allow the use of an engine load measuring device to perform the engine test cycle, as long as the alternative device meets the necessary speed and torque accuracies specified in the rule.

5.12 Recorded Information, Explanation of Terms

5.12.1. Summary of the Proposal

The proposed rule requires manufacturers to record the "date of most recent analytical assembly calibration" under the general test records section.

5.12.2. Summary of the Comments

Onan Corporation requested that EPA give a definition of what the "date of most recent analytical assembly calibration" refers to.

5.12.3. EPA's Response to the Comments

The proposed language was not clear on what the analytical assembly referred to; the final rule has been changed to read "date of most recent analyzer bench calibration."

5.13 Humidity and temperature measurement of engine intake air

5.13.1. Summary of the Proposal

The proposal requires the measurement of engine intake air temperature, and the measurement of intake air humidity for those engines whose intake air humidity is pre-conditioned.

5.13.2. Summary of the Comments

Onan Corporation suggested that intake air humidity and temperature measurements should not be required. Onan suggested that ambient test cell conditions should be allowed instead, particularly for humidity.

5.13.3. EPA's Response to the Comments

The Agency believes that engine intake air temperature should be a simple measurement for manufacturers to make. Measurement of engine intake air humidity is only required for engines with pre-conditioned intake air, otherwise the ambient test cell humidity measurement is sufficient.

5.14. Engine service accumulation time determination

5.14.1. Summary of the Proposal

In §90.408, the proposal provides the manufacturer with two options regarding service accumulation on the certification engine. First, the manufacturer can make a determination, for each engine family, the appropriate service accumulation time necessary for the stabilization of emissions, but this time may not exceed 12 hours. As an alternative, the manufacturer can use 12 hours as the service accumulation duration without conducting an engineering determination. However, in §90.118, the second option is not mentioned.

5.14.2. Summary of the Comments

Onan Corporation stated that the engine manufacture should be allowed to choose any break-in procedure they choose. PPEMA believes the Agency's proposed 12 hour break in time is unnecessarily long. Echo Corporation requested that if a manufacturer can demonstrate that an engine emissions are not stable but are decreasing, the manufacturer should be allowed to test the engine at that point.

5.14.3. EPA's Response to the Comments

EPA believes that at least part of the misunderstanding regarding this subject was the discrepancy between §90.408 and §90.118. Section §90.118 has been changed to match §90.408. A manufacturer can choose to make the service accumulation time determination or they may use 12 hours as a default, but the self determination time may not exceed 12 hours. The final rule has also been modified to accept the suggestion by the Echo Corporation regarding engines with decreasing emissions. If a manufacturer can demonstrate that an engine family's emissions, including all regulated pollutants, are decreasing from some initial time (greater than zero but less

than 12 hours) out to 12 hours, the manufacturer will be allowed to stop the service accumulation at the time where emissions begin to decrease.

5.15 Effect of emission measuring equipment on engine performance

5.15.1. Summary of the Proposal

The proposal requires the manufacturer to run the test engine at a single speed and torque point both before and after the emission sampling equipment is installed. The engine's power, and for raw gas sampling, fuel consumption, are measured in both instances and should agree within approximately five percent.

5.15.2. Summary of the Comments

Onan Corporation requested that manufacturers should be allowed to perform this check after the certification test, if at all. Manufacturers should not have to perform this on every certification test; demonstration on similar or worst case setups should be adequate.

5.15.3. EPA's Response to the Comments

Manufacturers are required to perform this check prior to the certification test so that if a problem is found it can be corrected before the certification test is run. This test should not be confused with the service accumulation and should be done after the service accumulation is complete. The Agency does not believe it is a significant burden for manufacturers to run this simple, two mode test, one prior to and one after the emission sampling equipment is installed. This test only requires the measurement of at most three parameters, engine speed, torque and fuel consumption.

5.16 The use of observed vs. corrected torque in power calculations

5.16.1. Summary of the Proposal

The proposal requires manufacturers to use observed torque in the calculation of engine power.

5.16.2. Summary of the Comments

Onan Corporation requested that EPA use corrected torque, not observed.

5.16.3. EPA's Response to the Comments

It has been the Agency's practice to require the use of observed torque in the calculation of break-specific emissions in several past engine emission regulations, see for example §86.340-79(c)(3)(ii), §86.341-79(d)(7), §89.407-96(c)(8). At this time the Agency is not considering dropping this practice.

5.17 Engine stabilization - thermal stability requirement

5.17.1. Summary of the Proposal

The proposal required manufacturers to run the test engine at each mode speed and torque set point for a sufficient amount of time to achieve thermal stability, with a minimum requirement that engine cylinder head temperature remain constant for three minutes at ± 5° Celsius.

5.17.2. Summary of the Comments

Onan Corporation requested that manufacturers be allowed to make their own determination of how long an engine needs to run before it is stabilized. PPEMA stated that a three minute stabilization time may be too long a time period for the wide open throttle mode for some Class III, IV, and V engines without possible engine damage. PPEMA requested that manufacturers be allowed to make their own determination of stabilization time. Kubota requested that oil temperature measured in the oil pan be an alternative to cylinder head temperature.

5.17.3. EPA's Response to the Comments

The final rule has been modified from the proposal to take into consideration the comments on this topic. The Agency agrees that more than one criterion can be used to determine thermal stability for the purposes of emission measurement, including, but not limited to, cylinder head temperature and oil temperature. The tester now has two options, one is to determine and document the appropriate criterion for thermal stability for each engine family. If the manufacturer does not want to make this determination, they can use the requirement that cylinder head temperature must remain within a 10°C bandwidth for three minutes.

5.18 Data Sampling Period and Frequency

5.18.1. Summary of the Proposal

The proposal requires manufacturers to record the emissions and engine data for at least four minutes once the engine is stabilized, and to sample the data at a minimum rate of 1Hz.

5.18.2. Summary of the Comments

The Agency received essentially the same comment from Onan Corporation, Echo Incorporated, Kubota, and PPEMA. In every case the comments did not mention the 1Hz sampling rate as a problem, but each commenter requested the Agency decrease the sampling time. Manufacturers requested a two minute sampling time for two reasons, to harmonize with the CARB Utility, Lawn and Garden engine regulation, and because two minutes should be a sufficient sampling time because thermal stability has already been achieved.

5.18.3. EPA's Response to the Comments

The Agency agrees with the comments received. An examination of several sets of EPA small engine test data showed that once thermal stability is achieved, doubling the sampling period from two to four minutes resulted in less than a one percent change in the average values of engine speed, torque, total hydrocarbon concentration, and oxides of nitrogen concentration. Based on this information and the comments received from manufacturers the Agency has changed the final rule to require a minimum sampling period of two minutes for each mode.

5.19 Averaging of speed and torque data for power calculation

5.19.1. Summary of the Proposal

The proposal required that a manufacturer calculate the power for each mode by averaging the individually calculated power values during the mode.

5.19.2. Summary of the Comments

Onan Corporation suggested that a manufacturer be allowed to calculate the average power for each mode from the average speed and the average torque.

5.19.3. EPA's Response to the Comments

The correct formula for calculating the average power during a mode is

$$\text{Average Modal Power} = \frac{\sum_{i=1}^{n} \frac{2\pi}{60,000} \times speed_i \times torque_i}{n}$$

Onan's suggestion would change the formula to be

$$\text{Average Modal Power} = \frac{2\pi}{60,000} \times \text{average speed} \times \text{average torque}$$

These two equations are not identical and would not produce the same result. For this reason, the Agency will leave the calculation as proposed; average power must be calculated from the average of each individually calculated power value.

5.20 Emission Bench Calibration Information

5.20.1. Summary of the Proposal

The proposal contained a paragraph under the data logging section stating "For purposes of this section, calibration data includes calibration curves, linearity curves, span-gas responses, and zero-gas responses."

5.20.2. Summary of the Comments

The Onan Corporation commented that this paragraph required that information be logged during the test that is typically not recorded as part of the actual test data logging information. Onan suggested that this paragraph does not belong in this section.

5.20.3. EPA's Response to the Comments

The Agency agrees with Onan's comment. This paragraph does not deal with the subject of this section, which is data logging during the test. This paragraph has been removed from the final rule.

5.21 Automatic Data Collection Of Continuous Analyzer Response

5.21.1. Summary of the Proposal

The proposal required manufacturers to maintain for long term storage the average value of the continuous analyzer response.

5.21.2. Summary of the Comments

The Onan Corporation requested that manufacturers be allowed to maintain for long term storage the individual data points from a continuous analyzer which could be averaged as necessary.

5.21.3. EPA's Response to the Comments

The Agency agrees with the comment. If a manufacturer wanted to maintain individual data points from a continuous analyzer response instead of storing the average value this would not affect the Agency's ability to request the average response value. The final rule has been modified to allow for this option.

5.22 Engine Cooling Fan For Air Blowers/Pumps

5.22.1. Summary of the Proposal

The proposal required that all engines be tested with the cooling fan installed.

5.22.2. Summary of the Comments

PPEMA and Echo Inc. commented that for certain engine types, such as engines used in air blowers, the engine's cooling fan absorbs 90-98 percent of the engine's power, so the engine would not be capable of performing the engine test cycle with the cooling fan installed. Both comments stated that the Agency must give some consideration for these types of engines.

5.22.3. EPA's Response to the Comments

The Agency agrees that special provisions must be made for these types of engines. The engine test cycle would not be performed if the engine cooling fan absorbs such a large portion of the engine's power. The final rule has been altered to allow for the removal of the original cooling fan and the addition of an external cooling fan for engines whose cooling fan serves a dual purpose.

5.23. Analytical Gases - Pure Gases

5.23.1. Summary of the Proposal

The proposed rule requires that manufacturers use "pure" gases, defined by specific tolerances stated in the proposal, for use as zero gases, calibration and span gas diluents, and FID fuel.

5.23.2. Summary of the Comments

PPEMA commented that pure gases are not necessary for raw gas sampling if the fuel flow method is used.

5.23.3. EPA's Response to the Comments

The Agency disagrees with PPEMA regarding this item. Regardless of which testing method a manufacturer uses, raw gas or constant volume sampling, manufacturers must use pure gases for the zeroing of analyzers, the FID fuel, and the diluent for gas dividers. The final rule has no changes in it from the proposal regarding this topic.

5.24. Analytical Gases - Diluent for Hc-Fid Zero, Span and Calibration Gases

5.24.1. Summary of the Proposal

The proposal had language under the calibration and span gas section listing propane/nitrogen mixture as well as a propane/zero air mixture, but the language did not have an explanation of when it would be appropriate to use the two different mixtures as FID span and calibration gases.

5.24.2. Summary of the Comments

PPEMA stated that purified nitrogen should be the zero gas and the diluent for the HC-FID analyzer span and calibration gases to avoid potentially explosive mixtures of very high propane concentrations with synthetic air.

5.24.3. EPA's Response to the Comments

It was the Agency's intent to allow the manufacturers to choose what zero gas and diluent to use for the HC-FID analyzer in the proposal. Additional language has been added to the final rule to clarify this point, as well as to make manufacturers aware of the possible dangers of mixing high propane concentrations with synthetic air.

5.25. Analyzer Calibration - Step Calibration Requirement

5.25.1. Summary of the Proposal

The proposal requires manufacturers to calibrate each analyzer on each range used by performing a multi-point step calibration procedure.

5.25.2. Summary of the Comments

PPEMA commented that the step calibrations are unnecessary because analyzer calibrations are performed by the instrument manufacturer and should not be the responsibility of the engine manufacturer.

5.25.3. EPA's Response to the Comments

The Agency disagrees with PPEMA's comment. The Agency has found that analyzer calibration curves are not static and do change overtime. The stability of analyzer calibration curves varies between analyzer manufacturers as well as between the different types of analyzers (HC, CO, CO2, NOx). Currently, the only method known to the Agency to be certain that analyzer calibration curves have not changed is to perform periodic multi-step calibrations. The final rule has not been changed as a result of this comment.

5.26. Oxides of Nitrogen Measurement, Accuracy and Instrumentation

5.26.1. Summary of the Proposal

The proposal requires that engine manufacturers use a chemiluminescent oxides of nitrogen (NOx) analyzer with a measurement accuracy of two percent.

5.26.2. Summary of the Comments

PPEMA commented that a two percent accuracy requirement on NOx was unnecessarily stringent for two-stroke engines, because two-stroke engines emit NOx levels well below the standard. In addition, PPEMA asked the Agency whether or not a UV-NDIR NOx analyzer would be acceptable for testing.

5.26.3. EPA's Response to the Comments

The Agency does not believe the accuracy requirements of the test procedure should be dependent on how close to an emission standard a particular type of engine is and the final rule was not altered regarding that comment.

In the past EPA has had some experience with UV-NDIR NOx analyzers and has not found them to be as accurate as the chemiluminescence type. However, the proposed regulations do allow for the use of other analyzers, as long as the manufacturer can show the analyzer shows equivalent results to the required type, and this language remains in the final rule. Section 90.313(b) of the final rule states that "Other types of analyzers and equipment may be used if shown to yield equivalent results and if approved in advance by the Administrator."

5.27. Testing Mode Intervals

5.27.1. Summary of the Proposal

The proposal requires that a delay of more than one hour between the end of one mode and the start of a second mode would void a test.

5.27.2. Summary of the Comments

PPEMA commented that EPA should not limit the duration between one test mode and the next.

5.27.3. EPA's Response to the Comments

The Agency believes that the certification test should be a single test performed on a single day with as few interruptions as possible. The Agency is concerned that allowing manufacturers to run the different test modes on different days or with large gaps of time between modes would pose questions of repeatability and possible gaming by the engine manufacturer. The test cycle which most PPEMA members will be responsible for performing is Cycle C, the two-mode cycle. Once the first mode is completed, the amount of time necessary to complete the second mode, including stabilization and sampling time, should not be more than 10 or 15 minutes. The Agency does not believe this will impose any significant burden on the engine manufacturers and the final rule will not be altered because of this comment.

5.28. Mixing Chamber Requirements - Helmholtz Frequency Requirement

5.28.1. Summary of the Proposal

The proposal's description of the optional mixing chamber was taken from the SAE J1088 recommended procedure.

5.28.2. Summary of the Comments

PPEMA requested that an additional requirement be added to the language regarding the mixing chamber, specifically, that the Helmholtz frequency of the mixing chamber not exceed 1/10 of the engine's firing frequency.

5.28.3. EPA's Response to the Comments

The Agency used the language from the SAE J1088 recommended procedure to describe the optional mixing chamber. Without further explanation of why the description of the mixing chamber should be different from the SAE description, EPA will not alter the proposed language.

If PPEMA can demonstrate that a technical error has been made, the Agency would consider making a Technical Amendment to the final rule at that time.

5.29. Acceptance of the Micro-Dilution Tunnel Testing Method

5.29.1. Summary of the Proposal

The proposal described three acceptable emission testing methods, raw gas sampling with air and fuel flow measurement, raw gas sampling with fuel flow measurement, and constant volume sampling.

5.29.2. Summary of the Comments

PPEMA requested that the Micro-Dilution Tunnel (MDT) testing method developed by one of its members be included as an acceptable method of emission sampling.

5.29.3. EPA's Response to the Comments

Due to time and resource constraints, the Agency has not been able to perform a complete analysis of the MDT method. The final rule has not been altered to include the MDT method. However, as proposed, the final rule does allow for manufacturers to propose alternative test methods which could be deemed acceptable by the Administrator.

5.30. Air Flow Measurement for Two-Stroke Engines

5.30.1. Summary of the Proposal

The proposal described three acceptable emission testing methods: raw gas sampling with air and fuel flow measurement, raw gas sampling with fuel flow measurement, and constant volume sampling (CVS).

5.30.2. Summary of the Comments

PPEMA commented that air flow measurement should not be required for two-stroke engines.

5.30.3. EPA's Response to the Comments

The Agency does not specify which of the three sampling methods a manufacturer must use to comply with the rule. No manufacturer is forced to use the raw gas method (RGM) with air and fuel flow measurement; both the RGM with only fuel flow or the CVS method are acceptable. In

addition, as in the proposal, the final rule allows manufacturers to propose alternative test methods which could be deemed acceptable by the Administrator.

5.31 Catalyst Durability Cycle: Change to Test Requirements

5.31.1. Summary of the Proposal

The notice proposes the evaluation of catalyst durability by means of thermal stress testing. Such testing involves the use of heated air for preconditioning and aging catalysts and the use of synthetic exhaust gas for determining catalyst conversion efficiency.

5.31.2 Summary of the Comments

The comments that were submitted by the Manufacturers of Emission Control Association (MECA) proposed the adoption of an optional hydrothermal stress test and recommended an increase in the concentration of CO_2 in the synthetic exhaust gas.

5.31.3 EPA's Response to the Comments

The MECA comments noted that the proposed hydrothermal stress test, which involves exposure in a 90 percent nitrogen/10 percent steam environment at a temperature in excess of 850°C, has been adopted by the industry for evaluating catalyst washcoat durability. This procedure is based on information which shows that water is the component of actual exhaust gas which can cause an undesirable reduction in the surface area of a washcoat that does not have adequate stability. In response to the MECA proposal, the use of a 90 percent nitrogen/10 percent water vapor environment has been adopted as an alternative to an air environment during catalyst preconditioning and aging. The resultant availability of alternative procedures, thermal stress testing with air and hydrothermal stress testing with the nitrogen/water mixture, will allow the optional use of the catalyst durability evaluation procedure that is most appropriate for specific engine applications.

Prior to the publication of the NPRM, MECA had recommended the use of a synthetic exhaust mixture which contains 3.8 volume percent CO_2. The recommendation in the MECA comments for an increase in this value to 9 percent or 10 percent is based on information which shows that the concentration of CO_2 in the exhaust gases emitted by small nonroad engine ranges from 9 percent to 12 percent for 4-stoke engines and 2 percent to 10 percent for 2-stoke engines. In response to the MECA recommendation, the CO_2 concentration has been raised from 3.8

percent to 9 percent to make the synthetic exhaust gas mixture more representative of actual exhaust gas mixtures that are emitted by the kinds of engines that are covered by the Part 90 regulations.

5.32 Exhaust Gas Composition for Testing of Three-Way Catalysts

5.32.1 Summary of the Proposal

The composition of the synthetic exhaust gas mixture that is specified in the proposal is comparable to compositions of synthetic exhaust gas mixtures currently used by catalyst manufacturers for testing related to the kinds of engines covered by the proposal.

5.32.2 Summary of Comments

MECA commented that if the catalyst manufacturer specifies that a catalyst is designed for three-way control, the manufacturer should have the options of using HC+NOx combined conversion as a basis for determining durability and of using a rich synthetic exhaust evaluation gas with either 4650 ppm HC or 1.2 percent CO rather than 4000 ppm HC and 1 percent CO which are parameters for a stoichiometric mixture.

5.32.3 EPA'S Response to the Comments

EPA allows the use of HC+NOx combined conversion as a basis for determining durability where the standard is also expressed as HC+NOx (for Classes I and II only). NOx conversion requires that a slightly rich exhaust mixture be present. We expect engines designed to meet Phase 1 emission standards to operate on the rich side of the stoichiometric mixture. Therefore, using a stoichiometric gas mixture would not be representative of the exhaust gas the three way catalyst will see in actual use. Therefore, EPA has changed the final rule to allow manufacturers to utilize 4650 ppm HC or 1.2 percent CO.

5.33 Deterioration Limits

5.33.1 Summary of the Proposal

The agency proposed a fixed catalyst efficiency loss limit of 20 percent for HC, CO and NOx. This was proposed based on EPA's on-highway experience and the absence of information at the time regarding the conversion efficiencies that will be used with small engines.

5.33.2 Summary of Comments

MECA submitted the following comments:

1. Require only demonstration of hydrocarbon conversion durability.

2. If demonstrations of CO and NOx conversion durability are also required, the following options are recommended:

a. The catalyst manufacturer can designate catalysts as two-way (HC and CO control) or three-way (HC, CO and NOx control).

b. A two-way designation would eliminate the need for the demonstration of NOx conversion durability.

3. Failure to comply with the CO conversion deterioration limit would not preclude the certification of a two-way catalyst that is intended for use on engines with low engine-out CO emissions.

5.33.3 EPA'S Response to the Comments

The Agency has decided that catalysts should not be accountable for pollutants which they were not designed to reduce/oxidize. Therefore, the engine manufacturer must specify the pollutants that the catalyst will be converting and submit data on only that pollutant.

For catalysts that convert CO on an already low CO emitting engine (ie: CO levels are below the standards enough such that if the catalyst is removed or deteriorates to 0% efficiency on conversion of CO, then the engine will still emit CO emissions below the CO standards), the catalyst manufacturer of the two way catalyst will not have to meet the CO conversion deterioration limit.

5.34 Purpose of Catalyst Durability Cycle

5.34.1 Summary of the Proposal

While the conversion efficiency for catalysts for small engines are expected to be less than those for on-highway, EPA is concerned that durable catalysts are utilized on the small engines. The purpose of the durability cycle for catalysts is to "ensure that durable catalysts are used on small engines while avoiding excessive requirements that could discourage the development of very promising catalyst technology."

5.34.2 Summary of Comments

Three sets of comments were received on this proposal.

EMA/OPEI stated that the requirement for durability demonstration by the catalyst manufacturer should not be included in the final rule because of disharmonization with CARB and federal regs and because EPA's cost estimates regarding the use of catalysts did not take into account the additional costs the industry would incur if such catalyst must first be certified for durability.

EMA/OPEI stated that the issue of whether the engine or catalyst manufacturer should be responsible for the durability demonstration should be addressed through the Phase II Regulatory Negotiation.

The comments that were submitted by the Portable Power Equipment Manufacturers Association (PPEMA) expressed uncertainty about whether the proposed durability testing of low efficiency catalysts would be sufficient to ensure emissions compliance.

PPEMA also stated that EPA should specify that catalysts manufacturers will be responsible for any noncompliance with applicable emissions standards due to design or manufacturing defects in catalysts.

STAPPA stated that such a requirement is merely a screening tool designed to identify those profoundly inadequate catalysts and that it does not necessarily constitute a thorough demonstration of expected catalyst efficiency durability. Nor does such a requirement provide information related to the in-use emissions of the overall engine-aftertreatment system.

5.34.3 Response to the Comments

The catalyst durability requirement in this rule is compatible with CARB since California does not preclude use of catalysts demonstrated by the catalyst manufacturer on the proposed durability demonstration procedure. In addition, CARB requires a two year warranty on all emission related components and the durability procedure provides a mechanism for engine manufacturers to assure they are receiving components which will be in compliance. EPA desires also to assure that a catalysts used on a small engine will be durable for a significant portion of the engine's useful life and not just for the dynamometer certification test.

EPA would consider including the cost estimates for catalyst certification if it was thought to be a significant cost overall to the use of catalysts. Catalyst manufacturers have recognized the importance of such a requirement to ensure that all catalysts used in the marketplace are of at least a baseline quality. This provides a level playing field in the marketplace. The demonstration procedure focuses only on thermal aging thus allowing lower cost oven aging and less complexity over an engine aging procedure. However, no cost information has been given to EPA by engine and catalyst manufacturers. EPA believes the costs of catalyst certification for small engines will be small.

The issue of whether the engine or catalyst manufacturer should be responsible for the durability demonstration will be addressed in application to Phase II standards during the Phase II Regulatory Negotiation. The amount of reduction expected by the Phase II small engine catalysts will likely be significantly more than that expected for Phase I and greater definition of what would constitute adequate durability will be warranted.

PPEMA's uncertainty regarding the adequacy of the proposed catalyst durability evaluation procedure for ensuring emissions compliance is based primarily on the expectation that Phase 1 catalysts will have low efficiencies. PPEMA has provided no data or engineering rationale as to why low efficiency catalysts would be more poorly represented on the proposed durability procedures than other catalysts. EPA's technical judgment is that both low and high efficiency catalysts that survive the proposed durability procedures and meet certification test requirements will perform, as expected for a reasonable period in-use.

The PPEMA comment emphasizes the need for clarification of the purpose of the required catalyst durability evaluation. The purpose of such testing is to identify catalysts which are so inadequately designed and fabricated that they fail to meet the minimum standards that are recognized within the industry. The durability evaluation procedure is not intended to guarantee compliance with the applicable emission standards for the full useful life of the affected engines. Such compliance is dependent on a number of variables, some of which, such as the engine-out emissions, are not directly related to the condition of the catalyst. Such variables will be more effectively evaluated by considering the overall emission control system durability. This will be at issue in the Phase II regulations.

Finally, PPEMA commented that EPA should specify that catalyst manufacturers will be responsible for any noncompliance with applicable emissions standards due to design or manufacturing defects in catalysts. EPA holds the engine manufacturer responsible for the final engine system it tests. It is not the Agency's intent, nor its responsibility, to determine the actual cause of noncompliance should it occur. That responsibility remains with the engine manufacturer even when it chooses to use a catalytic converter as part of its emission control system.

5.35 Worst Case Emitter

5.35.1 Summary of the Proposal

EPA proposed to use the criteria of highest weighted brake-specific fuel consumption (BSFC) over the appropriate engine test cycle to determine that engine configuration within an engine family which will be selected as the certification test engine. EPA believes that an engine configuration with high BSFC will generally emit higher levels of hydrocarbons and carbon monoxide than a second configuration in the same engine family which has a lower BSFC. EPA solicited comments on the appropriateness of weighted BSFC as the criteria to be used for selecting the worst case emitter.

EPA considered leaving the selection of the worst case emitter up to the engine manufacturer with the guideline that the engine manufacturer must test that engine configuration

within an engine family which is most likely to exceed any emission standard. EPA solicited comment on the appropriateness of this approach for selection the worst case emitter.

5.35.2 Summary of the Comments

Onan recommended that the method for selecting the specific engine in a family that will be certified should be that which is used in CARB's Tier I rule. Onan questioned the ability to establish a relationship between BSFC and weighted exhaust emissions by the EPA. Onan stated that EPA should leave the selection of the worst case emitter up to the engine manufacturer. This would essentially be the same as the CARB Tier 1 rule which would promote harmonization as well as provide representative emission certification data.

5.35.3 EPA'S Response to the Comments

EPA has decided that the manufacturer should make the selection based on its technical judgment or evaluation of the emission performance of the vehicles remaining in the engine family. EPA does not expect manufacturers to conduct an extensive program to determine worst-case engines, nor does EPA intend to challenge manufacturers' selections unless EPA suspects that a manufacturer is purposefully subverting the intent of these regulations. If suspected, then the engine manufacturer will be requested to provide justification for the choice of worst case emitter to the Administrator. The Administrator will then have the opportunity to review the documents and require additional documentation or changes in the choice of the engine chosen.

SECTION 6: SELECTIVE ENFORCEMENT AUDITING

6.1 Attached Equipment During An SEA

6.1.1 Summary of the Proposal

As described in the proposal, EPA typically would select SEA engines from a point of final engine assembly, from a storage or shipping facility, or in the case of imported engines, at a port of entry. Most often, this selection point would be at the end of the engine assembly line, where no further quality control procedures happen and where no additional parts would be installed on the engines. SEA engines could not receive any additional inspections or quality control other than that of normal production engines and pre-test safety checks. Engines would be tested in the same

order as they were selected. In the NPRM, EPA requested comment on the feasibility of selecting equipment, then removing the engine for audit testing.

6.1.2 Summary of Comments

PPEMA stated that some handheld products, such as string trimmers, blowers and pumps, incorporate a built-in load.[156] For purposes of minimizing audit costs, PPEMA believes that manufacturers should have the option of conducting emissions testing on the equipment itself, using rated power and rated speed as specified in the certification application, rather than removing the engine and conducting dynamometer testing.

In response to EPA's request for comments, Kohler expressed objections to the possibility of including equipment as part of the audit process, stating that this would be an unnecessary burden on engine and equipment manufacturers.[157] Kohler explained that it manufacturers engines which are sold to equipment manufacturers through a distribution system, so it does not have ready access to production equipment. Kohler objected to EPA's proposed program, saying that it would either require a customer to remove engines or to ship the equipment to Kohler to have the engine removed, test and reinstalled, a program which would be time consuming, costly, and without justification.

6.1.3 EPA's Response to the Comments

Because SEA testing is an enforcement tool used to verify that production engines comply with emissions standards and that production engines are assembled in all material respects as described in the manufacturers application for certification, EPA will not grant broad permission for manufacturers to use such alternative test methods. EPA is not prepared to permit SEA emission testing of equipment. Equipment may contribute to the load experienced by the engine which could affect emissions. In addition, this rule specifically regulates engines, not equipment. Manufacturers' voluntary assembly line testing programs (ALT) may utilize alternative test methods to provide whatever level of confidence the manufacturer so desires, and manufacturers have the opportunity to propose alternative test programs for phase two regulations for small SI engines. Manufacturers may individually propose alternative test methods and provide data to demonstrate that the alternative test method generates emission levels representative of the prescribed test procedures.

6.2 Additional Parts Necessary For An SEA

6.2.1 Summary of the Proposal

The Agency's proposed rule states that SEA engines would typically be selected from a point of final engine assembly or from a storage or shipping facility. Most often, this selection

point would be at the end of the engine assembly line, where no further quality control procedures happen or parts would be installed on the engines.

6.2.2 Summary of the Comments

ONAN and EMA explained that many small engine manufacturers ship their engines without mufflers and/or air cleaners.[158] The SEA test procedure would have to allow these and other OEM/customer supplied parts to be added to the engine prior to SEA testing.

6.2.3 EPA's Response to the Comments

EPA has experienced similar situations conducting SEAs of on-highway engine manufacturers. Certain manufacturers ship engines without "dress parts" to their facilities in distant locations. During an SEA, EPA allows time for manufacturers to make provisions to have the necessary parts shipped from other facilities. This liberty will be extended to manufacturers covered under this regulation. It may be necessary for EPA to oversee the selection of additional parts, depending on the part.

6.3 Annual Limit Of SEAs

6.3.1 Summary of the Proposal

EPA proposed an annual limit of two SEAs for each manufacturer with projected annual production of less than 100,000 engines. For manufacturers with annual production of 100,000 or more engines the proposed annual limit would be the greater of either two or the number determined by dividing the number of engine families certified in that model year by five, and rounding to the nearest whole number.

6.3.2 Summary of the Comments

Onan stated that the number of SEAs allowed per year would be burdensome.[159] Due to the complexity of its product line, Onan projects it would be forced to run three or more SEAs in a given model year. Although Onan would prefer dividing the number of families by eight rather than five, it feels that limiting the number of SEAs to one or two per year is best, especially given the fact that the EPA could run as many SEAs as it deemed necessary if EPA decided that non-compliance was occurring.

Onan commented that the Administrator should not have the authority to exceed the annual limit of SEAs without good cause.

NRDC opposed EPA's proposal to set an annual limit on the number of SEAs per manufacturer and emphasized that in the early stages of the program, special enforcement efforts

will be needed to ensure compliance by small engine manufacturers that may be confronting an EPA air emissions regulation for the first time.[160] NRDC believes that a self-imposed limit of four audits annually does not further the objectives of the SEA program - to ensure that manufacturers take steps necessary to ensure that all engines rolling off the assembly line are built to the same standards as the certification engine.

In its comments, EMA stated that EPA should revise its basis for determining the number of SEAs each manufacturer could receive annually.[161] EMA believes that the proposed annual limits would impose an undue burden on all small SI engine manufacturers and therefore encourages EPA to limit to no more than two the number of SEAs each manufacturer could receive annually in the absence of exceptional circumstances.

6.3.3 EPA's Response to the Comments

EPA believes that it is reasonable to assure manufacturers that they will not be overburdened by SEAs by providing annual limits. However, with respect to manufacturers with projected annual sales of over 100,000 engines and a large variety of engine families, each SEA can only check a small portion of the manufacturers' production. EPA believes that relating the annual limit to the number of engine families as proposed will allow EPA to check a reasonable portion of a manufacturer's production. With respect to manufacturers with projected annual sales of less than 100,000 engines, an annual limit of one would not allow EPA to have the flexibility to return to a manufacturer that had passed an SEA early in the model year and subsequently implemented changes in its production process that could increase engine emissions. Therefore, EPA believes that the proposed annual limit system is appropriate for Phase I regulations for small SI engines.

6.4 Number Of SEAs Per Day

6.4.1 Summary of the Proposal

EPA proposed that engine manufacturers with projected United States annual sales of 7,500 or greater must complete a minimum of two engine tests per day during an SEA. Engine manufacturers with projected United States annual sales of less than 7,500 would be required to complete a minimum of one engine test per day during an SEA.

6.4.2 Summary of the Comments

Onan believes that the requirement that manufacturers complete two tests per day is onerous.[162] Onan explained that if the engine selected for audit has a service accumulation period of more than a few hours and the manufacturer does the service accumulation and SEA test on the same dynamometer (not an unusual practice; it saves set up and removal time), then only a single

SEA test could be performed per day unless more than one test cell/dynamometer was used. Making two test cells available during an SEA could be a tremendous burden on manufacturers who may only have a few cells that are capable of measuring emissions. Onan suggested that the EPA waive any requirement for a minimum number of SEA tests per day and instead require that the manufacturer make a good faith effort to complete as many tests as possible per day. At worst, Onan believes, a minimum of one test per day should be required of all manufacturers.

6.4.3 EPA's Response to the Comments

EPA may permit fewer tests per day if a manufacturer is making a good faith effort to complete testing expeditiously. Because manufacturers have indicated a preference for self auditing EPA expects that manufacturers will have several test cells for new engine compliance testing, either for voluntary testing or for ARB compliance testing. Consequently, EPA expects that test cells will be available for occasional SEA testing.

6.5 Sampling Plans

6.5.1 Summary of the Proposal

The total number of engines tested in an SEA would be dictated by the statistically acceptable pass/fail decision within the sampling plan applied, as described. EPA proposed a sequential sampling plan for small SI engine SEAs. These sampling plans were designed to meet a 40 Acceptable Quality Limit (AQL) and to ensure low statistical risks of incorrect pass/fail determinations. The maximum theoretical percentage of failing engines for passing an SEA was proposed to be 40 percent AQL for the small SI engine SEA program.

6.5.2 Summary of the Comments

EMA believes that EPA should allow manufacturers to submit alternative sampling plans.[163] In its comments, EMA recommended that EPA make alternative sampling plans available for use at the manufacturer's discretion as optional methods for audit testing at any level of engine family production volume. EMA requested that alternative sampling plans be structured so that manufacturers are required to run fewer tests, but face a somewhat increased risk of false failure. EMA would also like EPA to allow engine manufacturers to choose whether to accept the increased risk -- weighed against the cost savings -- from reduced sampling.

According to EMA's comments, the California regulations allow manufacturers to propose and rely on alternative sampling plans provided they demonstrate that the alternative procedure will provide an equivalent assurance of compliance. EMA suggests that this same approach should be taken by EPA in allowing manufacturers to conduct reduced sampling with increased risk.

6.5.3 EPA's Response to the Comments

EPA has found that the sampling plans offered under the current on-highway program adequately balance manufacturer burden with both manufacturer and EPA risk. EPA has not had sufficient discussions with manufacturers and therefore is not prepared to offer an alternate sampling plan at this time. However, EPA may consider requests by manufacturers to terminate testing early during SEAs of low production families when the audit results are significantly and consistently below each applicable standard, and selection of additional engines would be difficult or cause a delay in shipment of customer-ordered engines, or the manufacturer's test facility does not have sufficient capacity to expeditiously conclude the SEA. An alternate sampling plan may be offered under Phase 2.

6.6 SEA Self-Auditing

6.6.1 Summary of the Proposal

The SEA program described in the NPRM strives to encourage manufacturers to perform self-auditing and promptly remedy the emission noncompliance it discovers. As proposed, EPA would consider reducing the number of audits conducted by the Agency, minimizing audits of engine families which are unusually burdensome to audit, or both options, if the manufacturer provided substantial data to demonstrate conformity of actual production engines with the applicable emission standards.

6.6.2 Summary of the Comments

EMA's comments encouraged EPA to adopt a voluntary self-audit program in lieu of SEA testing.[164]

EMA expressed concern that nowhere in the proposed regulation itself did any language appear that would assure credit would be given to manufacturers for self-audits.

Internal audit programs conducted by manufacturers should be relied on by EPA as a legitimate substitute for the use of SEAs, according to EMA, and not just as an alternative that may prompt EPA to consider reducing or minimizing a manufacturer's annual SEA limit.

It is EMA's belief that the consequences of failure to pass an SEA audit are sufficient incentive for engine manufacturers to develop thorough and reliable internal audit procedures to ensure that engines will be designed to pass a possible SEA audit.

Under EMA's described voluntary self-audit program, manufacturers would be required to submit their audit data to EPA. If EPA questioned the credibility or reliability of a manufacturer's audit data or procedures, EPA could focus on the particular questionable aspect of the

manufacturer's self-audit program and impose SEAs where the data provided were insufficient or evidenced an uncorrected failure.

EMA and Onan both argued that EPA should allow manufacturers to submit the data generated to meet their obligations to CARB under its quality-audit test procedures as an alternative to SEA testing.[165]

As an option, EMA and Onan expressed interest in submitting ISO-9000 series registration data in lieu of SEA testing.[166] Registration under 9001, 9002 would demonstrate that a manufacturer has a quality system in place that would assure products are made as intended. Such registration is recognized worldwide as a quality indicator and should be a reliable basis for reducing or eliminating SEA liability.

In addition, EMA did not support EPA's proposal to conduct spot checks of manufacturer self-audits as discussed in the NPRM, and if EPA were to perform such spot checks, such checks must be credited to an engine manufacturer's annual SEA limit.

PPEMA's understanding from the proposal was that EPA may reduce the number of SEAs to which a manufacturer may be subject based upon the manufacturer's self-audit system.[167] PPEMA requested clarification as to whether engine manufacturers are obligated to conduct or report on self-audits.

6.6.3 EPA's Response to the Comments

EPA has discovered cases where a manufacturer submits assembly line test data that is in compliance with the applicable emission standards, however an SEA on the same configuration shows noncompliance. Sometimes this discrepancy is caused by manufacturers who opt to truncate parts of the Federal Test Procedure to expedite the self-auditing process. Therefore it is necessary to have the SEA program in addition to self-auditing. It is not a requirement of this rule for manufacturers to conduct assembly line test or submit the test data, however, EPA strongly recommends a self-auditing program and may reduce the number of SEAs to which a manufacturer may be subject.

6.7 Audit from Engine Family or Configuration?

6.7.1 Summary of the Proposal

EPA proposed that nonroad SEAs be conducted by sampling engines from within an engine family.

6.7.2 Summary of the Comments

EMA stated that EPA should select only a single engine configuration from an engine family for audit testing.[168]

EMA and OPEI objected to EPA's plan to make an entire engine family subject to an audit by reserving the option to select all engine configurations within an engine family for an SEA.[169] Instead, they believe the final rule should provide that only a single engine configuration from an engine family may be selected for audit testing, as is currently done for on-highway engine auditing.

To facilitate testing, EMA and OPEI recommended that EPA evaluate a single engine configuration in each compliance test, or at most a single cylinder number and arrangement.

6.7.3 EPA's Response to the Comments

EPA believes that making an entire small engine family subject to an audit would lead manufacturers to use extra care when grouping engines in a family.

6.8 SEAs and Manufacturer Production Schedules

6.8.1 Summary of the Proposal

To minimize the burden on manufacturers, EPA's proposal stated that the Agency would consider requests by manufacturers to exclude particular engines or engine configurations from a test sample. Justification for such requests could be to avoid a delay in shipment of urgent customer-ordered engines or to minimize test cell set-up time by selecting engines of similar physical configurations.

6.8.2 Summary of the Comments

Onan offered the following additional justifications for excluding particular engines or configurations from a test sample: no such engines or configurations in stock or committed for customer delivery before they are again scheduled for production.[170] Onan believes that the regulation should contain explicit language making it clear that a manufacturer would not be required to modify its production or delivery schedule in order to accommodate SEA.

6.8.3 EPA's response to the Comments

As with the on-highway program, EPA will do its best not to disrupt a manufacturer's production schedule while conducting an SEA. EPA, however, will not add specific language which states that a manufacturer does not have to modify its production to accommodate an SEA. EPA believes that it may be necessary, at certain times, for a manufacturer to alter its production to

accommodate an SEA. If the regulation specifically stated that a manufacturer does not have to alter its production, then it would be possible for a manufacturer to postpone an SEA indefinitely.

6.9 Port Selection for Imported Engine SEA Testing

6.9.1 Summary of the Proposal

EPA proposed to include ports of entry or storage locations in the United States as locations for EPA selection of foreign-produced small SI engines for SEA emission testing at laboratories in the United States. The location of these selections could be designated by the manufacturer to minimize disruption and shipping costs.

6.9.2 Summary of the Comments

Honda objected to EPA's intention to adopt the port-of-entry as the SEA selection point for foreign produced small SI engines,[171] and noted that it had spoken to this issue previously with regard to automobiles. In that correspondence, Honda maintained that such a method would result in a significant increase in the cost and administrative burden on manufacturers. In its comments on this proposal, Honda continued to maintain this position for reasons it explained in more detail under the following topics: 1. Availability of Emissions Test Laboratory, 2. Cost Estimate, 3. List of Potential Port Problems, 4. Diagnosis and Repair, 5. Consequences of a Testing Failure.

EMA stated that EPA should allow, but not mandate, port of entry selection of foreign-produced engines.[172] EMA explained that EPA's proposed port-of-entry selection for foreign-produced small SI engines for SEA emission testing at U.S. laboratories presents problems of considerable potential expense to engine manufacturers. Engines produced overseas may enter the U.S. as loose engines, crated with other engines, or already installed in equipment required to have certified engines. Those engines that arrive already installed in equipment must not be subject to removal by EPA for testing at ports of entry. If EPA wishes to test such engines, it must do so before they are installed in equipment. Any other method would expose engine and equipment manufacturers to unnecessary additional costs and delays.

EMA also expressed concern that even testing so-called "loose engines" may create similar disruptions. Because engines are often crated together in amounts of 10-20 engines in a single shipping container, removing one engine from a multi-engine shipping container for testing would create substantial additional charges. EMA and OPEI recommended that EPA not mandate but allow engine manufacturers the option to choose port-of-entry selection of foreign-produced engines for testing at port facilities.[173]

6.9.3 EPA's response to the Comments

Port selection would result in less expensive audits for EPA, and a more even distribution of audits among non-domestic and domestic vehicles and engines each year. It would enable EPA to respond more quickly to reports of nonconformity and, since the selection and testing would take place in the U.S., audits would not be affected by outside interference and would not require the prolonged absence of EPA personnel necessary for overseas audits. EPA's quick response to a report of nonconformity benefits manufacturers in the long term because if an SEA failure occurs, the manufacturer would have introduced less engines into commerce and therefore will be required to recall fewer engines. As with the on-highway SEA program, EPA will consider a manufacturer's concerns about shipping disruptions and the removal of superfluous equipment before engine testing. EPA will try to minimize disruptions while upholding the integrity of the SEA program. In addition, manufacturers could designate selection location in order to minimize disruption and shipping costs.

6.10 In-Use Testing For Phase 2 Versus Sea Auditing

6.10.1 Summary of the Proposal

In the NPRM, EPA acknowledged its responsibility to achieve enforceable reductions of in-use emissions and plans to develop such measures in its long-term Phase 2 program.

6.10.2 Summary of the Comments

Onan stated that "since no in-use enforcement program is being proposed for small SI engines, SEA provides the only opportunity for EPA to determine the compliance of production engines."[174] Onan wondered what this would mean if in-use enforcement is used in Phase 2. Would EPA support the discontinuation of the SEA requirement or would the Agency demonstrate why the two are not redundant, but are actually both necessary for enforcement?

6.10.3 EPA's Response to the Comments

EPA believes that SEA and in-use are different and separate programs both of which are necessary for the most effective enforcement program. SEA is a new engine compliance program which helps identify and encourages manufacturers to identify and correct noncomplying and marginally complying engines prior to their introduction into commerce. In-use enforcement helps to identify noncomplying engines in-use and provides incentive to manufacturers to build more durable engines. EPA will further address this issue in the context of developing the Phase 2 rule.

6.11 Designating Official Data

6.11.1 Summary of the Proposal

Whenever the Administrator conducts a test on a test engine or the Administrator and manufacturer each conduct a test on the same test engine, the results of the Administrator's test will comprise the official data for that engine.

6.11.2 Summary of the Comments

Onan expressed confusion about the wording "designating official data," and found the wording of this section to be vague and ambiguous or, at the very least, confusing.[175]

6.11.3 EPA's Response to the Comments

This statement means that the Administrator has the option to test an SEA engine at the Administrator's facility. The results of the Administrator's test would comprise the official data for the SEA, even if the manufacturer conducted its own test on the same engines. Generally, SEAs are conducted at the manufacturer's facility with EPA monitoring, so this provision is rarely applicable.

6.12 EPA May Specify SEA Governor Set Speeds

6.12.1 Summary of the Proposal

Small engines equipped with adjustable parameters must comply with all requirements of this subpart for any specification within the physically available range.

6.12.2 Summary of the Comments

Onan pointed out what it believed to be a section reference error. Onan also stated that the governor of an engine should not be considered an adjustable parameter under the definition of section 90.112, and therefore, the Administrator should not be allowed to specify the governor set speeds during an SEA.[176]

6.12.3 EPA's Response to the Comments

The regulatory provision cited in this section should have been section 90.112(c). If the governor cannot be easily adjusted by the customer then the Administrator will not consider it an adjustable parameter. However, if the customer can adjust the governor then the Administrator will consider it an adjustable parameter and can specify the set speeds during an SEA.

6.13 Duration of the SEA

6.13.1 Summary of the Proposal

As described in the NPRM, the total number of engines tested in an SEA would be dictated by the statistically acceptable pass/fail decision within the sampling plan applied. A test engine's pass or fail determination would be made by comparing final test results to the applicable federal emission standard.

6.13.2 Summary of the Comments

PPEMA requested clarification of the potential duration of any selective enforcement audit.[177]

6.13.3 EPA's Response to the Comments

It is difficult to state the duration of an SEA, since the duration of an SEA is determined by many factors. Some of those factors include the number of failures, test lab availability, and the sampling plan used.

6.14 Dealers Involved in SEAs/Recordkeeping

6.14.1 Summary of the Proposal

As stated in the preamble, the manufacturer of any new nonroad engine subject to any of the provisions of this subpart shall establish, maintain, and retain the following adequately organized and indexed records: (1) General records, and (2) individual records.

6.14.2 Summary of the Comments

NAEDA expressed concern that wording of the NPRM regulatory text indicated that dealers might be expected to meet as-of-yet unspecified EPA record keeping and information gathering requirements.[178]

6.14.3 EPA's Response to the Comments

Under section 90.505(d) only manufacturers would be responsible for complying with the recordkeeping requirements.

SECTION 7: IN-USE TESTING

Summary of the Proposal

The Agency proposed a program to assure that manufacturers build engines that continue to emit below the emission standards they are certified to after such engines are introduced into commerce. EPA did not, however, propose an in-use emissions standard that engines would be required to meet over their useful life. Section 213(d) authorizes EPA to enforce emission standards in-use; however EPA proposed to decide upon a useful life period and an in-use enforcement program in the Phase 2 regulations. For Phase 1, EPA proposed only a program for requiring manufacturers to test engines in-use without a mandatory recall program to enforce such testing or enforce compliance with emissions standards in-use.

Within this proposed program, a manufacturer would be encouraged to evaluate in-use emissions deterioration and durability for purposes of refining its Phase 1 technology and by gathering the in-use testing data better prepare themselves for an in-use program which may exist under the Phase 2 regulations. Specifically, the proposed program included the following: (a) A conditional certification concept in which the manufacturer would propose an in-use test program at the time of its new engine certification by EPA, with subsequent manufacturer performance of the in-use testing and reporting fulfilling the condition on the certificate; (b) Specific criteria would be applied to the manufacturer's proposed in-use test program, including what number of engines would need testing, criteria for selecting test engines, and required elements in collecting and testing in-use engines (including appropriate maintenance history, age of engine, and specifications for the actual testing); and (c) An annual in-use test program reporting requirement to insure adequate fulfillment of the above requirements.

Summary of the Comments

Comments on the in-use testing program were varied. Several commenters suggested that EPA would be foregoing its legal obligation under the Clean Air Act if it did not promulgate, at minimum, the program proposed. Several commenters suggested revisions to the program to make it less burdensome on manufacturers. The remainder of comments focused on the alleged inappropriateness of any in-use program during Phase 1 of the regulations and argued that conditional certificates were unjustified.

Those commenters that supported EPA's proposed program included the Natural Resources Defense Council (NRDC) which argued that without any in-use compliance obligations, emission standards for new engines at the time of certification would not have much value in the real world of actual use.[179] NRDC also argued that both section 213 and section 207 of the Clean Air Act required an in-use program in Phase 1 and that such a program would be critical to the success of a more complete in-use program under Phase 2.[180] NRDC and STAPPA/ALAPCO supported the concept of manufacturer self-testing, as opposed to joint testing by manufacturers or

manufacturers with EPA, as a necessary step towards improving emission performance and gaining knowledge of engine performance in a wide variety of in-use conditions.[181] NRDC also supported EPA's proposal to make a certificate of conformity conditional on manufacturer in-use testing. One commenter proposed an option whereby a collective gathering of in-use engines could be conducted but individual manufacturers would still be responsible for self-testing.

Several comments received either suggested revisions to the proposed program or opposed the program and suggested revisions as a second option. Tecumseh proposed an alternative in-use program whereby the manufacturer would conduct the testing in-house but the engines and equipment would remain the property of the engine manufacturer and thus avoid the burden of collecting equipment from consumers.[182] PPEMA proposed to allow manufacturers to use test camps to procure equipment or to perform bench testing after accumulating engine use at an accelerated rate.[183] STAPPA/ALAPCO suggested that two distinct types of in-use testing be conducted by manufacturers, an up-front accelerated service bench testing and a testing of engines in actual use to determine any correlation and to determine real life in-use performance.[184]

Finally, several commenters either opposed the in-use program as a first option or were not in favor of it at all. Because the proposal for the Phase 2 regulations would soon follow the proposed effective date of Phase 1, these commenters felt that no in-use data from Phase 1 could be used to determine the useful life of engines for Phase 2 and therefore was not a reasonable justification for the collection of in-use data.[185] Additionally, some commenters suggested that the Phase 1 regulations were intended to mirror California's tier 1 regulations and exclude immediate implementation of any federal enforcement programs. In contrast to those commenters who argued that an in-use program was necessary to insure emission performance throughout useful life, commenters opposed to the program noted that, absent a stated useful life, mandatory in-use testing is not justified.[186] EMA argues that there is no justification for conditioning certificates on the completion of in-use testing.[187] Several commenters were concerned that an in-use testing requirement would impose unnecessary administrative and economic burdens on manufacturers.[188] One commenter suggested that a voluntary cooperative program between industry and EPA should be developed in place of a mandatory program to develop meaningful data.

EPA's Response to the Comments

EPA has decided to allow a voluntary in-use testing program modeled on the testing program it proposed in the NPRM. EPA is not requiring an in-use testing program to be conducted by manufacturers. However, EPA anticipates that such testing and data gathering will be beneficial for EPA's Phase 2 program. Should a manufacturer choose to run an in-use testing

program, it may do so without EPA approval and set up its program as it chooses and may use the testing program described in the NPRM as a model.

EPA agrees with the commenters that noted that an in-use testing program is necessary to insure that new engines continue to meet emission standards for new engines at time of certification. Assuring that manufacturers build engines that continue to meet emission standards beyond the certification and production stages is important. However, EPA is not establishing a useful life time period or an in-use standard that engines must comply with within this phase 1 rulemaking. Because no useful life time period or in-use standard has been established, EPA believes, as argued by some commenters, that conditional certificates and mandatory in-use testing are unjustified at this time.

EPA agrees with the one commenter that suggested that a voluntary in-use testing program be established. The purpose of the voluntary in-use compliance testing program allowed for by this rulemaking is not to establish a mandatory in-use recall requirement based on an engine's useful life and in-use standard. Instead of a mandatory in-use testing recall requirement, EPA hopes that any voluntary in-use testing will allow manufacturers to take appropriate steps to avoid or remedy in-use emission problems discovered and establish a database to utilize for phase 2 testing.

Should a manufacturer chose to conduct a voluntary phase 1 in-use testing program, such program may permit issues associated with a variety of maintenance and use conditions, testing or other issues to be identified and resolved prior to any phase 2 testing which may occur.

Therefore, EPA has decided to make manufacturer in-use testing voluntary and no annual reporting will be required.

As noted in the preamble to today's final rule, EPA is suggesting that those manufacturers who voluntarily choose to conduct in-use testing use the model proposed by EPA within the NPRM as a model. Manufacturers may choose to conduct testing on accelerated-aged engines or make other modifications as they find appropriate and may choose to follow the suggestions made by STAPPA/ALAPCO in its comments. EPA will be available for any suggestions or guidance.

SECTION 8: DEFECT REPORTING AND VOLUNTARY RECALL

8.1 Definition of Emissions-related Defect

8.1.1 Summary of the Proposal

The rule defines an emission-related defect as a defect in design, materials, or workmanship in a device, system, or assembly described in the approved Application for Certification. Emission-related defects are to be determined by using procedures established by the manufacturer to determine safety or performance-related defects.

8.1.2 Summary of the Comments

The Portable Power Equipment Manufacturers Association (PPEMA) stated that the proposed definition of an emission-related defect was unclear and suggested a revised definition which limited the reporting scope to those defects which result in an emissions nonconformity. PPEMA requested clarification on the meaning of a performance defect. Kohler requested a listing of emission-related components affected by this rule.

8.1.3 EPA's Response to the Comments

Defect reporting regulations serve as an element of the Agency's in-use surveillance network. The purpose of the defect reporting regulations is to determine those defects which have a high probability of affecting emissions. EPA does not want to overburden the manufacturers with reporting on defects which are not likely to affect emissions. Therefore, the definition of an emissions-related defect will be expanded to include conditions which indicate a high probability of the defect affecting the emission performance of an engine. The Agency believes that such conditions are met when the defect affects any parameter or specification enumerated in Appendix VIII of 40 CFR Part 85. This additional language should screen out those defects which are not likely to affect emissions.

The definition provided in the proposed regulation has been expanded to read as follows: emissions-related defect means a defect in design, materials, or workmanship in a device, system, or assembly described in the approved Application for Certification which affects any applicable parameter or specification enumerated in 40 CFR Part 85, Appendix VIII. Appendix VIII may eventually be revised to include a section dedicated to small nonroad spark-ignition engines.

The components described in the approved Application for Certification will serve as a dynamic listing of components affected by this rule. Using an emission-component listing based on the Application for Certification will provide the flexibility necessary to handle yearly changes in components that are due to technology advances for example. It is for these reasons that the Agency does not compile a generic yet static listing of emission components affected by this rule.

While the manufacturers retain the determining function of emissions-related defects, EPA must be given an opportunity to assess the emissions impact of these defects. As a result, PPEMA's proposal for submitting defect reports based solely on the manufacturers' determination of an emission exceedence cannot be accepted.

The Agency is further attempting to minimize the burden placed on manufacturers by having manufacturers use existing methods and procedures for determining defects. Two examples of existing methods currently in place are those for tracking safety and performance defects. In the Agency's view a performance defect would be a defect which adversely affects engine performance to a level discernible to the owner, and as such would result in an owner complaint or service request. Other comments received from the industry suggest that other types of customer feedback as well as engineering performance tests may also be valuable sources of information that can be used to determine the presence of defective components.

8.2 The 25 Engine Trigger

8.2.1 Summary of Proposal

Manufacturers are required to submit a defect report when an emissions-related defect is confirmed to exist in 25 or more engines of a given engine family manufactured in the same certificate or model year.

8.2.2 Summary of Comments

Many manufacturers commented that the trigger of 25 engines is too low for requiring a defect report. Manufacturers were concerned that the engines affected by the defect could often represent a percentage of the whole engine family that was too small to demonstrate the existence of a true defect within the family. Manufacturers have suggested that the minimum trigger be raised to at least 75 engines, or the greater of 25 engines or two percent of the engine family's production. In addition, some manufacturers have requested the searching scope be reduced from engine families to engine models.

8.2.3 EPA Response to Comments

From experience with the on-highway program, most defects involve significantly more than the 25 engines required to trigger a defect. If a defect is confirmed in 25 engines, a significant portion of the engine families involved are probably affected as well, except in the case of misbuilds which often affect only a small portion of production.

It is expected that an emissions-related defect would cut across engine models. By definition, engines categorized and certified as engine families have similar emission performance and durability characteristics. The same emission components will most likely be used within the various models that comprise an engine family. Furthermore, in certifying an engine family, the

manufacturer assumes responsibility for integrity of the family's emission components as well as its emission performance.

The reporting scope of the current on-highway defect reporting regulations are broader than this rule in that a defect report is required when 25 engines (or vehicles) for a given model year, not engine family, are affected. Based on the Information Collection Request (ICR) document which supports this regulation and uses the broader on-highway scope, it is estimated that each manufacturer of nonroad engines, 19 kW and below, will file two defect reports per calendar year. The Agency does not believe such a reporting rate is excessively burdensome to the manufacturers. However, the Agency is willing to revisit the number 25 in the future, if warranted by information developed during practical application.

8.3 Appropriateness of Voluntary Recalls

8.3.1 Summary of the Proposal

The proposed rule requires that manufacturers submit a voluntary emission recall report to the Agency when a manufacturer initiates a campaign to remedy an emissions-related defect. This proposed defect reporting rule defines a voluntary emission recall as a repair, adjustment, or modification program voluntarily initiated and conducted by a manufacturer to remedy any emission-related defect for which notification of engine owners has been provided. The preamble refers to this portion of the rule by stating that EPA is proposing that individual manufacturers establish, when appropriate, voluntary emission recall programs.
The preamble requested comments on how such a voluntary program might be effectively structured.

8.3.2 Summary of Comments

Some manufacturers stated that no recall program, even voluntary, should be included in the phase 1 rule, while others commented that a voluntary program is acceptable as long as it does not serve as the basis for a mandatory program in the phase 2 requirements. The Agency was requested to clarify when a voluntary recall program is considered appropriate.

8.3.3 EPA Response to Comments

This rule does not require manufacturers to conduct voluntary emission recalls but only specifies the reporting requirements when a manufacturer chooses to do so.

The intent of the voluntary emission recall reporting (VERR) requirements is to have manufacturers send EPA specific information on repair campaigns conducted voluntarily by manufacturers to remedy emissions related defects. Specifically, when a manufacturer determines that a defect exists, decides that the defect needs to be remedied, and chooses to contact the owners of the affected engines to notify them of the need for the remedy, then and only then are manufacturers required to submit a VERR under this rule. However, it is the practice of on-highway manufacturers to send the Agency a VERR when a manufacturer decides for any reason to conduct a voluntary emission recall program.

The Agency recognizes that under this rule the manufacturers may have the option of choosing other remedial methods in lieu of recall campaigns and it is recognized that these methods may also be acceptable in the case of voluntary recalls conducted to remedy emission-related defects.

The notice of final rulemaking provides that when a manufacturer chooses to notify engine owners of a manufacturer initiated campaign to remedy an emissions-related defect, that manufacturer must submit a Voluntary Emissions Recall Report.

8.4 Description of Method for Notifying Owners

8.4.1 Summary of the Proposal

Manufacturers, when conducting a voluntary emissions recall as defined by the defect reporting requirements, must provide a description of the method by which the manufacturers will notify engine owners.

8.4.2 Summary of Comments

Manufacturers commented that this requirement should be eliminated because, unlike the on-highway industry, the small spark-ignition segment of the nonroad industry does not have an owner registration infrastructure. Furthermore, registration as a condition of warranty is not permitted under Magnuson-Moss Act.
As a result, the manufacturers contend that it is extremely difficult to locate the end users of their products.

8.4.3 EPA's Response to Comments

This rule does not specify the method a manufacturer must use to notify owners, only that the manufacturer provide a description of the notification method chosen by the manufacturer. The Agency recognizes that, in general, manufacturers affected by this rule do not presently have in place an extensive owner registration infrastructure.

However, the Agency trusts that the manufacturers can devise creative, viable alternatives to the owner registration process for notifying owners affected by manufacturer initiated recalls designed to remedy emission-related defects. As examples, the manufacturers could use their dealer networks as a resource in locating owners or manufacturers could advertise through the mass media as is currently done with safety related recalls.

While the Agency understands that owner registration as a condition of warranty is not permitted under the Magnuson-Moss Act, manufacturers could provide incentives for owners to register their engines with the manufacturers. Streamlining the current registration process to be less burdensome to the engine owner may improve the percentage of owners who return their registration cards.

Finally, manufacturers, as mentioned earlier, may have the option of choosing other remedial methods in lieu of voluntary recall campaigns conducted to remedy emission-related defects. Obviously, there would be no need for owner notification in these situations.

8.5 The Five Year Reporting Period

8.5.1 Summary of the Proposal

The proposal states that manufacturers are required to report emission-related defects affecting a class or category of engines for five years from the end of the calendar year in which the engines were manufactured.

8.5.2 Summary of Comments

General concern was expressed that the five year reporting requirement was too long and should be reduced to no longer than the two year warranty period.

8.5.3 EPA's Response to Comments

The Agency understands that after the required two year warranty period expires, manufacturers will no longer be able to rely on warranty claim data as a method for detecting emission related defects. However, the Agency believes there are viable alternatives for detecting defects after the warranty period does expire, such as tracking data on part returns for safety and/or performance concerns. While these alternatives may not yield the volume or quality of data compared to warranty claims, the data should be sufficient in detecting egregious defects occurring outside of the engine's warranted life.

Furthermore comments received from the Engine Manufacturers Association and the Outdoor Power Equipment Association indicated that component, field, engineering performance

and emission testing programs conducted by manufacturers, could provide valuable information for detecting emission-related defects outside the emission warranty period.

8.6 Extension of 15 Day Reporting Deadline

8.6.1 Summary of Proposal

Manufacturers are required to submit defect reports to the Agency not more than 15 working days after a confirmed emissions-related defect is found to affect 25 or more engines of a given engine family manufactured in the same certificate or model year.

8.6.2 Summary of the Comments

Manufacturers have requested the submittal period be extended from 15 days, to 20 or 30 days, to allow the manufacturers to properly confirm and process defect information, and prepare and transmit the reports.

8.6.3 EPA Response to the Comments

The period for submitting a defect report starts once the manufacturer has confirmed that a defect exists. Therefore, the activities performed during this period should be limited to transforming existing information into the form required by this regulation and mailing out the report.

The activities to be performed by the non-road manufacturers during this proposed 15 day submittal period should not differ significantly from those undertaken by the on-highway manufacturers. The on-highway manufacturers have not expressed concern with this reporting period over the nearly 20 years that they have been subject to defect reporting requirements. The Agency has not been made aware of any requirements unique to this industry which warrant an extension of the submittal period. As such, the submittal period will not be extended beyond the 15 day proposal.

8.7 Usefulness of Warranty Data

8.7.1 Summary of the Proposal

Manufacturers are required to submit a defect report when an emissions-related defect is confirmed to exist in 25 or more engines of a given engine family manufactured in the same certificate or model year.

8.7.2 Summary of Comments

The Engine Manufacturers Association (EMA) and the Outdoor Power Equipment Association (OPEI) stated that defect reporting regulations are not necessary because, even in the absence of these requirements, manufacturers are motivated to search for defects. Customer satisfaction requirements as well as the requirements of other Agency programs provide this motivation.

It was stated by EMA and OPEI that manufacturers will be able to determine defects, in the absence of defect reporting regulations, based on customer feedback, component testing, field test programs, EPA Selective Enforcement Audits, engineering performance and emission tests as well as a number of other information sources. Furthermore, EMA and OPEI state that these sources will be much more likely to detect true defects than warranty data alone, that warranty data is inaccurate, and that the process of screening the data to be more reliable is burdensome and not cost effective. EMA and OPEI doubt EPA can provide guidelines to help ease this screening burden.

Defects caught by the manufacturers will be repaired as early in the life of the engine as possible, long before any emission recall would be instituted.

Finally, the EMA and OPEI contend that many emission-related defects which cause an increase in emissions are not perceivable to the owner, and therefore will not be caught by warranty.

8.7.3 EPA's Response to the Comments

As stated previously, the manufacturers retain the defect determining function, not EPA. The Agency is not requiring that warranty data be used as the sole means for identifying defects, and encourages methods which have served the manufacturers well in the past. This is the reason why the rule provides for manufacturers to determine defects by using procedures previously developed for safety and performance related-defects.

The Agency encourages the use of as many methods as possible for determining the existence of emission-related defects. The Agency only requires that when a manufacturer confirms the existence of an emission-related defect through one of these procedures, that the manufacturer provide the Agency with a defect report. Based on the comments received, the defect report should merely be a compilation and formatting of information generated through normal business practices.

Manufacturers are encouraged to use warranty data to the extent possible; EPA believes there are other valuable uses for the data besides filing defect reports. The Agency would expect that manufacturers currently perform some sort of screening of warranty claims, once they reach a certain level, to verify the validity of the claims, determine the cause of the problem, and feed this

information into the product development cycle. Additionally, screening warranty data can be made less burdensome by using sampling plans for determining the existence of defects. Sampling plans minimize the scope of the warranty data that needs to be screened.

The Agency advocates the detection and repair of emission-related defects as early as possible in the engine life-cycle. Furthermore, the agency wishes to promote manufacturer initiated remedial campaigns. For this reason, the Agency concentrates its attention on those emission-related defects for which a manufacturer remedy has not been initiated. The Agency only requires that when the manufacturer, in accordance with this rule's definition of an emission-related defect, determines that a defect exists and chooses to remedy the problem through direct owner notification, that the Agency receive a defect report and voluntary emission recall report.

The Agency recognizes that some emission related-defects are not discernible to the owner and therefore are less likely to be detected through warranty claim data. In these instances, the previously mentioned component, field, engineering performance and emission testing programs conducted by manufacturers, will provide valuable information for such detecting defects.

8.8 Dealer Concerns

8.8.1 Summary of the Proposal

The rule requires that, at a minimum, manufacturers determine the existence of emission-related defects using procedures established by the manufacturer to determine either safety or performance-related defects.

8.8.2 Summary of Comments

The North American Equipment Dealers Association (NAEDA) stated that dealers are well positioned to identify defects in equipment in the field, but are concerned that the defect reporting regulations could be interpreted to transfer liability to the dealers if they do not report such defects. Dealers need instructions on how to release defective equipment for which owners refuse to pay for repairs. NAEDA also stated that if dealers are to be used for tracking and reporting defects, recall and tracking systems must be in place before the regulations take effect.

8.8.3 EPA Response to the Comments

The use of dealers in determining and remedying defects would be a business agreement between the manufacturers and the dealers, as would the development of any tracking, reporting, or repair systems. The Agency would generally support such an alliance and may provide advice if requested.

However, the manufacturer, as the holder of the certificate of conformity, is solely liable under the defect reporting regulations for determining and remedying any emission-related defects.

During the first two years of the defect reporting period, any emission-related defect would also be covered by the two-year emission warranty requirements. Therefore, any repairs to remedy an emission-related defect would be performed free of charge to the owner. Owners would be unlikely to refuse such repairs.

Since engines will be outside of the emission warranty for the final three years of the defect reporting period, owners will be required to pay for any repairs performed to correct emission-related defects. Owners do have the right to refuse repairs, and if then choose to do so, the dealer will not be held liable for releasing the product without the repairs being performed.

When a manufacturer decides to remedy an emissions-related defect through a voluntary recall program, the Agency will assure, through the voluntary emission recall report, that the remedy corrects the defect and any emission nonconformity it causes, that the remedy does not result in engine performance problems, and that the remedy is easily performed by technicians in the field. Requiring such conditions helps to avoid service-related returns and develops long term consumer confidence that corrective repairs, in general, do not adversely affect engine performance. This in turn should reduce the percentage of engine owners who are motivated to refuse such repairs.

8.9 Emission Defect Warranty Requirements

8.9.1 Summary of the Proposal

The NPRM proposed that the emission defect warranty would be provided by engine manufacturers for the first two years of engine use. EPA proposed to adopt the two year warranty period from California's lawn and garden regulations to reduce the burden of manufacturers having to administer two different warranty programs. EPA solicited comments on the option for basing the warranty period on hours of engine use instead of years. Employing such an option would require testing to determine the equivalency of hours to years and would require the installation of a metering device to track the hours of engine use.

8.9.2 Summary of the Comments

Comments were received from EMA, OPEI, Kubota, Kohler, and ECHO suggesting that the warranty period begin from the date of first sale to the ultimate purchaser, rather than from the date the engine is first put into use. EPA understands that the date of first purchase by an ultimate consumer is not necessarily synonymous with the date the engine is first put to use. Hence, it was

EPA's intention that the warranty period would begin on the date of first sale to the ultimate purchaser, not from the date the engine is first put into use, and extend for two years from the date of such purchase.

Comments were also received from EMA and OPEI in favor of basing the warranty on hours of use for equipment where it would be most practical. EMA and OPEI submitted data on two surveys conducted to determine the annual average hours of operation of walk behind and ride mowers, and their average lifespan. The results of the OPEI study conducted in 1990 show that walk behind mowers were operated on an average of 22.4 hours per year with an average product lifespan of six years. In addition, ride mowers were operated on an average of 39.8 hours per year with an average product lifespan of seven years. The results of the second survey, conducted in 1993 by another industry group, show that walk behind mowers were operated on an average of 20 hours per year with an average product lifespan of five years. Ride mowers were operated on an average of 34.5 hours per year with an average product lifespan of six years.

EPA feels that these studies alone do not provide enough data to determine the equivalency between years from purchase and hours of use. In addition, it does not appear that the hours of operation for commercial use equipment were taken into consideration when determining these numbers. Since, at this time, there is no readily available method for distinguishing residential use equipment from commercial use equipment, EPA's decision for Phase 1 of these regulations is to base the warranty period on years from date of purchase by the ultimate consumer, and not on hours of use. This matter will be researched further in Phase 2.

PPEMA feels that a two year warranty period is too long for commercial equipment and recommended a six month warranty period. As mentioned above, the two year warranty period was adopted from California's lawn and garden regulations. CARB had determined the average product lifespan of residential and commercial utility equipment and, from that data, determined that two years is an appropriate warranty period for both types of equipment since two years is well below the average lifespan of most utility equipment. Once again, since there is no readily available method for distinguishing residential use equipment from commercial use equipment, EPA's final decision for Phase 1 is to employ only one warranty period for both types of equipment.

Other comments received from PPEMA and ECHO suggest that the owner of a small SI engine, subject to these regulations, be required to show proof of purchase when making a warranty claim, that warranty claims arising from use of non-OEM replacement parts or equipment abuse should be excluded, and that engine manufacturers should be able to indicate acceptable replacement parts. PPEMA, Kubota, Kohler, and ECHO commented that warranty repairs should be performed by authorized dealers only. Finally, PPEMA requested that EPA ~~to~~ publish a list of parts subject to warranty in the final rule.

8.9.3 EPA's Response to the Comments

All of the issues raised by the commenters are addressed in EPA's existing warranty policy for on-highway vehicles and apply to small nonroad engines accordingly as discussed below.

EPA understands that, given the distribution system of small nonroad equipment, it is difficult to track the purchase dates of such equipment. However, EPA does not agree that, under every circumstance, owners should be required to show proof of purchase when making a warranty claim. As a means of resolving this issue, we encourage manufacturers to stress the importance of filling out and submitting warranty/registration cards that are provided at the time of purchase. If, when making a warranty claim, the owner does not have proof of purchase, and a warranty/registration card was not submitted by the owner, the manufacturer should use the equipment manufacture date to reasonably determine if the engine could still be within the warranty period.

The manufacturer may not require the use of any specific brand of parts in the maintenance of a nonroad engine. However, if the owner of a nonroad engine uses replacement parts that are not of equal quality to the original parts, and the replacement part causes another emission control or emission related part to fail, the manufacturer would have a reasonable basis for denying emission warranty coverage. In addition, a manufacturer may deny warranty coverage if there is evidence that the failure resulted from engine abuse, tampering or improper maintenance. Warranty coverage may not be denied on the basis that add-on parts have been used, unless the add-on parts caused the failure.

When seeking repairs under the emissions warranty, owners of a nonroad engine must take the engine to an authorized dealer. If the owner has a valid warranty claim, he or she may not be charged for any costs associated with the repair or replacement of the parts, including diagnosis of the problem, labor charges, parts and miscellaneous items that are necessary to perform the repair.

If the owner is denied warranty coverage by an authorized dealer, but still believes he or she has a valid warranty claim, he or she may take the engine to an independent facility to have the repairs performed. In turn, the owner may seek reimbursement from the manufacturer if he or she did in fact have a valid warranty claim.

Consistent with emission control and emission related parts on EPA's July 15, 1991, parts list for motor vehicle warranty coverage, and CARB's warranty parts list for utility and lawn and garden equipment, EPA provides the following parts list for design and defect warranty coverage:

(1) Fuel Metering System

(i) Carburetor and internal parts (or fuel injection system).

(ii) Air/fuel ratio feedback and control system.

(iii) Cold start enrichment system.

(2) Air Induction System

(i) Controlled hot air intake system.

(ii) Intake manifold.

(3) Ignition System

(i) Spark Plugs.

(ii) Magneto or electronic ignition system.

(iii) Spark advance/retard system.

(4) Exhaust Gas Recirculation (EGR) System

(i) EGR valve body and carburetor spacer if applicable.

(ii) EGR rate feedback and control system.

(5) Air Injection System

(i) Air pump or pulse valve.

(ii) Valves affecting distribution of flow.

(iii) Distribution manifold.

(6) Catalyst of Thermal Reactor System

(i) Catalytic converter.

(ii) Thermal reactor.

(iii) Exhaust manifold.

(7) Particulate controls

(i) Traps, filters, precipitators, and any other device used to capture particulate emissions.

(8) Miscellaneous items used in the above systems

(i) Vacuum, temperature, and time sensitive valves and switches.

(ii) Electronic controls.

(iii) Hoses, belts, connectors, and assemblies.

Each manufacturer shall provide a copy of the above parts list to the ultimate consumer, using those portions of the list applicable to the engine.

8.10 Independent Commercial Importer (ICI) Program

8.10.1 Summary of the Proposal

The Agency proposed options of having an ICI program paralleling that of the on-highway program, and having no ICI program in the final rule.

8.10.2 Summary of the Comments

The Agency received comments from three parties: PPEMA, ECHO and CARB. All commenters supported EPA's second option of not including an ICI program in the final rule, and no comments were received suggesting that an ICI program be promulgated.

8.10.3 EPA's Response to the Comments

EPA is therefore not promulgating an ICI program in the final rule.

8.11 Tampering

8.11.1 Summary of the Proposal

EPA believes that an engine is more likely to continue to meet the applicable emissions standards in use if the engine maintains its certified configuration. Therefore, the NPRM proposed anti-tampering provisions which would make it illegal for any person to tamper with any emission control or emission related component, or system, installed on or in a small SI engine subject to these regulations.

8.11.2 Summary of the Comments

Comments were received from EMA and OPEI which suggested that EPA adopt CARB's approach with regard to making adjustable engine parameters tamper resistant.

8.11.3 EPA's Response to the Comments

EPA agrees that emission control components, emission related components, and adjustable engine parameters should be made tamper resistant to the extent possible. This will help ensure that engines meet the applicable emissions standards in use.

SECTION 9: ECONOMIC EFFECTS

Summary of the Proposal

The proposal estimated that, on average, the cost to engine manufacturers to install the necessary emission control technology would be approximately $0.80 to $1.13 per engine for nonhandheld equipment and approximately $2.05 to $2.20 per engine for handheld equipment, assuming catalysts were not required. Should catalysts actually be used on some portion of production, EPA estimated that the additional variable hardware costs would be $1.09 per nonhandheld engine and $0.10 per handheld engine, with an additional $0.24 per engine for equipment modifications and $0.20 per engine for potential heat shielding. These additional costs are averaged across the entire production of either handheld or nonhandheld engines, including those not needing catalysts.

The increase in retail price was estimated to be $2.35 for nonhandheld equipment and $4.04 for handheld equipment, assuming no use of catalysts. When fuel reductions and lowered maintenance costs were considered, the lifetime consumer cost impact was estimated to be even less, with nonhandheld equipment actually realizing a net lifetime savings for the consumer.

Summary of the Comments

Comments were received from engine and equipment manufacturers, dealers, and their organizations, as well as one City government. Manufacturers and their organizations generally felt that the estimates were too low or that some costs had been overlooked. In general, however, these commenters did not supply their own estimates for the questioned values. Chicago commented on the impact of the costs rather than the costs themselves, indicating that the costs could unduly burden local government entities that must purchase large quantities of equipment for city maintenance.[189]

Specifically, PPEMA commented that the $4.04 consumer cost increase for handheld equipment was extremely optimistic, and ignored redesign and production realities. They also commented that CARB's projection was higher.[190] OPEI also commented that retooling costs and supplemental label costs were not considered.[191] Onan agreed that some costs were overlooked, commenting that, "The EPA must also consider the development costs (both labor and infrastructure), the costs of retooling, changing software, changing product literature, testing, and reporting as required by the regulations."[192] EMA also felt that the projected costs were too low, as did NAEDA, Tecumseh, and ECHO.[193],[194],[195],[196] Tecumseh and Onan felt that the catalyst costs were especially off the mark. NAEDA argued that the cost estimates should include changes to lifestyle prompted by equipment changes. Like Chicago, they commented that the cost impact of the regulations on governmental agencies that must purchase and use large quantities of lawn, garden and utility equipment should be considered.

EPA's Response to the Comments

The cost estimates, which are provided below and in more detail in the RSD, have been slightly revised since publication of the proposal. Revisions were made to include supplemental label costs, which were indeed overlooked, and to reflect changes in the final rule that affect average costs, such as the added flexibility in the implementation date and the loosening of standards applicable to two-stroke lawnmowers and two-stroke snowthrowers. In general, however, the Agency has retained its cost estimates, largely because they were based on industry submittals of the net cost increases industry expected to incur due to this regulation, for which commenters did not provide alternative estimates in their later comments on the proposal.

Commenters are mistaken that certain costs, such as those for retooling, were not included in the estimates. In fact, as detailed in the RSD, the Agency has considered all of the costs mentioned by commenters, except for supplemental label costs, which have now been added, and changes in product literature and software. The EPA sees no reason that product literature and software would incur net increases in cost, as these are regularly updated. Additionally, these categories were not included in the confidential cost submissions from manufacturers used in developing EPA's estimates, and EPA is not in a better position than the manufacturers to estimate them or claim that they would be net increases. For other costs, commenters stated that EPA's estimates were too low but, unfortunately, did not provide revised estimates. Since EPA's values in the proposal were based on cost estimates submitted by the industry itself prior to the proposal, and since no revised estimates were later provided, the EPA is not in a position to revise its estimates. Please refer to the RIA for a detailed listing of all costs considered in analysis of the emission standard levels.

The Agency does not agree with NAEDA that this rule would cause negative consequences to lifestyle that should be assigned a cost value. The Agency does not expect product utility to be decreased by this regulation, nor are consumers required to make any changes whatsoever to their current equipment, to replace equipment, or to reduce their use of these products. In fact, there should be some lifestyle improvements for the equipment user, as fuel use and equipment maintenance needs are expected to improve as a result of the technology changes prompted by this rule. The public as a whole is also expected to enjoy lifestyle improvements rather than detriments due to air quality improvements. The only lifestyle impact the Agency can envision NAEDA as referring to is the change from two-stroke to four-stroke engines in some types of equipment. While some would view this as an overall negative, others would view it as positive, even regardless of the air quality improvements of such a change, so that the net result on lifestyle is unclear; in any case, the Agency has no information with which to place a dollar value on the effects of such a change.

The Agency is sympathetic to comments from Chicago and NAEDA that the impacts of such changes on governmental entities should be considered. In fact, the Agency considered the monetary effects on all users when setting standards and developing the provisions of the rule. It was clearly necessary, given the mandates of the CAA and the results of the Nonroad Study, to regulate the emissions from these engines. The Agency has done so in this Phase 1 rule very cost-effectively. In fact, the cost-effectiveness of this rule is significantly better than that of many other mobile source programs, such as additional requirements on automobiles, which are also purchased by governmental entities. The Agency continues to believe that the requirements of this rule are very cost-effective, with the gains to the public worth the very small marginal cost to governmental units and other consumers of small engines. Finally, as described below, the fuel use and equipment maintenance improvements engendered by this rule should be of significant benefit to governmental entities using large quantities of such equipment.

The total national average annual cost of this rule is estimated to be approximately $70 million. If catalysts become necessary, the average annual cost is estimated to be approximately $87 million. The net present value of pollution control capital costs is estimated by EPA to be approximately $28 million. Energy impacts are expected to be positive, freeing up approximately $8 million for other uses in the economy.

The following summary presents aggregate costs broken down by engines used in nonhandheld and those used in handheld equipment. For greater detail of expected cost impacts, see the RSD.

Industry will bear pollution control costs that are moderate: roughly six percent for handheld and two percent for nonhandheld equipment relative to current production costs. The level of pollution control costs is largely due to the high levels of pollution emitted by these engines, especially two-stroke engines, and the relatively outdated state of the technology compared to on-highway engines. However, the costs are still small in absolute terms, and it is anticipated that these costs will be passed through to consumers in higher product prices.

The Agency estimates that there will be no long run negative impacts on employment as a result of this rule, as costs can be recovered through increased prices. Any potential decreases in employment that might occur due to obsolescence of product line should be offset by increased production of engines meeting emission standards. Total demand for these products has traditionally been relatively inelastic and, thus, industry sales volume is not expected to decrease.

On average, the cost to the engine manufacturer to install the necessary emission control technology will be approximately $2 per engine used in nonhandheld equipment and $3.50 per engine used in handheld equipment. This includes variable hardware and production costs, assuming that catalytic converters will not be needed to comply with proposed standards. However, engine manufacturers may voluntarily decide to use catalysts on a percentage of engines

at risk of only marginally complying. Should this occur, EPA estimates that the additional variable hardware costs will be about $4 per catalyst-equipped engine used in nonhandheld equipment and $3 per catalyst-equipped engine used in handheld equipment. Since catalysts are not expected to be used much, the overall sales-weighted average increase due to catalyst usage is estimated to be about $1 for engines used in nonhandheld equipment and marginal for engines used in handheld equipment. It should be noted that the costs between manufacturers will likely vary.

Consumers will find small increases in retail prices for most equipment powered by these engines. The initial purchase price to the consumer will, however, be partially or, in some cases, completely offset by savings in fuel and maintenance costs. Thus, over time, environmentally friendly equipment will become less costly to consumers.

The retail price of equipment that uses nonhandheld engines ranges from $90 to $9,000, and the retail price of equipment that uses handheld engines ranges from $60 to $1,000. The sales-weighted average increase in retail cost to the consumer due to the rule in 2003 is estimated to be about $5 for nonhandheld equipment and $7 for handheld equipment. If catalysts are necessary, the values in 2003 are about $7 for both nonhandheld and handheld equipment. The retail price effects for a specific engine will likely be more or less these values, depending on the technology of the engine; these are average, sales-weighted costs, not indicative of the price increase specific to any particular manufacturer's engine or equipment.

This rule is expected to decrease fuel consumption significantly. The average sales-weighted engine is expected to experience a 26 percent decrease in fuel consumption for nonhandheld equipment and a 13 percent decrease in fuel consumption for handheld equipment. These decreases are translated into small discounted lifetime sales-weighted fuel savings of approximately $3 for nonhandheld equipment and marginal for handheld equipment.

EPA expects that the engines produced to meet the proposed emission standards will be of higher quality than current engines: the parts and raw materials will be more durable and less likely to malfunction, as discussed in the RSD. This will result in equipment that is operational a higher percentage of the time and that lasts longer, although EPA is unable to quantify the attendant decrease in consumer cost or increase in useful life at this time. EPA requested comments on the potential decrease in maintenance costs and increase in useful life, but none were received that shed light on this topic.

Considering that the fuel savings offset the average increase in retail price per engine, the average sales-weighted lifetime increase in cost will be about $6.50 per handheld engine, while nonhandheld engines will realize a lifetime savings of about $2.50 per engine. This does not include the lifetime savings in maintenance costs, which will further benefit the consumer.

Based upon the costs and benefits described above, EPA has prepared a cost-effectiveness analysis and has performed a Regulatory Impact Analysis (RIA) for this proposal, which is

contained in the RSD. Presented here is a summary of the cost-effectiveness of the small SI engine Phase 1 program, assuming catalysts are not used. In addition, these cost-effectiveness numbers are based on the assumption that manufacturers of engines used in snowthrowers and ice augers will opt to certify such engines to meet the applicable HC standards. To the extent that this does not occur, estimated cost impacts to both industry and conumers would be slightly reduced, and the cost-effectiveness of the program as a whole would not be significantly changed, if at all.

If all program costs are allocated to HC, this rule has a cost-effectiveness of $266 per ton of HC reduced. Alternatively, if all program costs are allocated to CO, the cost-effectiveness is $107 per ton of CO reduced. If the costs of the program are equally split between HC and CO, the cost-effectiveness is $133 per ton of HC reduced and $54 per ton of CO reduced. These cost-effectiveness numbers are significantly lower than costs per ton of other available control strategies. The cost-effectiveness estimates, underlying quantitative methodology, and comparisons to other available control strategies are explained further in the RSD.

In summary, the cost-effectiveness of the rule is favorable relative to the cost-effectiveness of several other control measures required under the Clean Air Act. To the extent that cost-effective nationwide controls are applied to small SI engines, the need to apply more expensive additional controls to other mobile and stationary sources of air pollution may be reduced in the future.

SECTION 10: ADMINISTRATIVE REQUIREMENTS

10.1 Small Entities

10.1.1 Summary of the Proposal

In its proposal, EPA determined that this rule will have an impact on small entities and, therefore, tailored this rule to minimize cost burdens on smaller engine manufacturers by minimizing their certification, SEA, and in-use testing requirements.[197] The Agency also dramatically limited the requirements on equipment manufacturers utilizing small SI engines by making the use of non-certified engines a prohibited act (with its attendant penalties) rather than requiring equipment manufacturers to report to EPA that they are using certified engines.

The Agency considered, but rejected, the notion of exempting small manufacturers from enforcement programs or from the regulation entirely. It determined that a more proportionate sharing of cost burden is more appropriate. The pollution emitted by each of these engines not

only contributes to ambient air quality problems, but also has health impacts on the user of the equipment who is in close proximity to the exhaust emissions. (See the Regulatory Support Document for a discussion of the health impacts of the related exhaust pollutants.)

10.1.2 Summary of the Comments

Certain manufacturers of equipment incorporating small engines of the types regulated in this action described themselves in their comments as "captives" of the small engine manufacturers, since the equipment manufacturers buy engines from the small engine manufacturers to build their equipment. These commenters argued that, as captives of the regulated industry and as small businesses, the options analysis should be extended to cover their needs, including consideration for exemption from the rule. Their primary concern was the potential for the elimination of their two-stroke engine source. In particular, they feared that the engine manufacturer would choose to not invest in upgrading the two-stroke engines used in augers to meet the emission standards, since they are produced at low volume.

10.1.3 EPA's Response to the Comments

The Agency rejected the interpretation of the small entities provisions as extending to buyers of the covered engines as "captives," since in most cases the equipment manufacturers have the option of switching to engines which can comply with the new standards; nevertheless, EPA did consider their position in its deliberations concerning the final rule. The two-stroke auger engines are also used in two-stroke snowthrowers. Given that EPA is allowing both two-stroke snowthrowers and one-person augers to use engines that meet the handheld CO standards, these engines will continue to be produced in sufficient volume to make them economically viable. Moreover, the Agency is extending the exemption for snowthrowers from the requirement to certify to HC standards to ice augers, since both of these products are used exclusively during the winter when ozone concentrations do not present as much of an environmental concern. EPA expects, however, that manufacturers of engines used in snowthrowers and ice augers will generally opt to certify to HC standards, due to the availability of complying technology and the market advantages of "green marketing." The Agency believes that the revisions to the rule allowing two-stroke snowthrowers and one-person augers to meet the handheld CO standards and not requiring snowthrowers and ice augers to certify to HC standards adequately address the concerns of the commenters.

10.2 Reporting Burden

10.2.1 Summary of the Proposal

In the Information Collection Requests developed to support the NPRM, the Agency estimated that a typical manufacturer may expect to spend 6,100 hours annually to comply with the testing, record keeping, and reporting requirements proposed in the rulemaking. This estimate of the hours spent by a manufacturer on information collection activities in any given year is highly dependent upon manufacturer specific variables, such as the number of engine families, production changes, and emission defects.

10.2.2 Summary of the Comments

Some manufacturers commented that the estimated public reporting burden of 6,100 hours per year is a large burden for a "typical" manufacturer. They argued that if the defect reporting, production quality audit reporting and in-use test reporting remain as proposed the impact will be greater than estimated. These manufacturers suggested that harmonization with CARB should minimize the burden. [Tecumseh Products Co., 8/5/94, Docket No. A-93-25, IV-D-28 and Onan, 8/16/94, Docket No. A-93-25, IV-D-34]

10.2.3 EPA's Response to the Comments

The Agency shares the commenters' concerns and recognizes that the burden associated with the testing, record keeping, and reporting requirements is not trivial. In developing this rulemaking, the Agency drew on more than twenty years of experience with the on-highway programs to identify the most critical items for inclusion in these requirements. The Agency made every effort to minimize the burden while assuring that the resulting regulatory program will be implementable, overseeable, and enforceable. With respect to the burden estimates, as a general rule where there was uncertainty the Agency tried to over estimate the burden so the analytical results represent the upper range of the potential burden. Finally, the Agency concurs with the comment regarding harmonization with CARB and to the extent practical, the Agency has done so.

10.5 Health Effects/Air Toxins

10.5.1 Summary of the Proposal

The Agency requested additional information on the effects of air toxics and CO exposure associated with the use of small SI engines.

10.5.2 Summary of the Comments

In its comments, PPEMA argued that no existing studies show that operation of handheld products has resulted in negative health effects. STAPPA requested that EPA devote time to study the health effects and in the meantime to err in the direction of increased operator health protection.

10.5.3 EPA's Response to the Comments

The Agency appreciates the commenters concerns. The Agency did not receive additional information on the effects of air toxics and CO exposure associated with the use of small SI engines, and accordingly retains the position taken in the proposed rule.

10.6 Modeling

10.6.1 Summary of the Proposal

EPA presented calculations of emission benefits from the Phase 1 regulation based on nationwide sales.

10.6.2 Summary of the Comments

NAEDA suggested subtracting the benefits from the CARB rulemaking along with the cost of the CARB rulemaking. If however, the costs of CARB studies are to be removed to satisfy the estimation of Phase 1 costs, then too, the benefits derived from CARB rules should be removed from the measurement of Phase 1 benefits.

10.6.3 EPA's Response to the Comments

EPA had subtracted costs in the NPRM cost/benefit analysis due to the work that engine manufacturers will have done before this rule is finalized. The emission benefits from CARB's rule had not been subtracted in the NPRM cost/benefit analysis. For the Final Rule, EPA has subtracted emission benefits for CARB's small engine rulemaking based on documented California sales estimates (as published in CARB's Technical support document) applied to the EPA inventory model.

10.7 Estimate of Use of Fixed Jet Carburetors for Class V

10.7.1 Summary of the Proposal

The Phase I RIA/RSD for Small SI engines assumes that 50 percent of Class V engines will use fixed jet carburetors as engines use the technology of enleanment to meet emission standards.

10.7.2 Summary of the Comments

PPEMA stated that 7.5 percent, not 50 percent, of Class V engines will use fixed jet carburetors. EPA's assumption that 50 percent of Class V engines will use fixed jet carburetors to

avoid the need to use limiter caps is unrealistic because performance and emissions requirements of professional handheld equipment requires some flexibility in the air/fuel mixture, thus eliminating widespread use of fixed jet carburetion.

10.7.3 EPA'S Response to the Comments

Based on this comment EPA agrees to change the estimate of Class V engines which will use fixed jet carburetors to 7.5 percent from 50 percent.

SECTION 11: ADDITIONAL ISSUES

11.1 Absence of Averaging, Banking and Trading Programs

11.1.1 Summary of the Proposal

The Agency did not propose an averaging, banking, and trading program (ABT) for new small SI engines. Such market-based incentive programs can reduce the cost of controlling emissions, and have been utilized increasingly by EPA in recent rulemakings. For example, EPA does allow ABT in its on-highway heavy-duty engine program and in the new nonroad large CI engine program, because it believes that ABT programs provide manufacturers necessary flexibility in meeting the emission standards.

However, EPA did not propose an ABT program for new small SI engines due to the uncertainties surrounding projected in-use emission levels. The Agency explained that, unless all engine families deteriorate at the same rate, EPA must have data on the in-use emission characteristics of specific small SI engine families in order to determine how ABT credits and standards should be set. The lifetime emissions of engine families must be averaged together in order to compute the average emission level of a manufacturer's product line. Knowledge of lifetime emissions is necessary because it may be the case that the emissions of one type of engine deteriorate at a higher rate than another type, or a smaller engine may deteriorate at a higher rate than a larger engine of the same type, with the result that lifetime emissions may vary in ways not predictable from data on new engines alone.

The Agency stated in the proposal that it is not in a position to determine what in-use emission levels presently are, let alone what they would be under this Phase 1 regulation. The Agency's initial assessment was that the emissions of these engines deteriorate somewhat over time and likely deteriorate at different rates between engine families, but that more research is necessary.

The limited information available to EPA at this time is primarily derived from engines currently on the market that may not adequately predict deterioration of the emissions of engines modified to meet Phase 1 standards.

11.1.2 Summary of the Comments

The Agency received four comments in support of EPA's proposal to not include ABT and three in favor of implementing ABT for small SI engines. Comments jointly submitted by EMA and OPEI maintained that the advantages of an ABT program recognized by EPA in the preamble outweigh concerns about uncertainties regarding in-use emission characteristics.[198] They pointed out that an ABT program is a means to preserve availability of certain engines that would have difficulty meeting the standards and which are not easily replaceable in some specialty applications. Their comments described an outline for a small SI engine ABT program, consisting of (1) family emission limits for each exhaust constituent, (2) no averaging, banking, or trading across classes, (3) credit based on certification data only, with the assumption that all small SI engines deteriorate at the same rate within each class, (4) early banking, (5) trading between manufacturers, and (6) Phase 1 credits transferable to Phase 2, or if Phase 2 did not employ ABT, credit expiration after Phase 1.

Like EMA and OPEI, PPEMA supported an ABT program as being advantageous, even in the light of EPA's concerns over the uncertainties regarding in-use emissions; however it proposed a different program than that outlined by EMA and OPEI.[199] PPEMA characterized its proposal as being similar to the one adopted in EPA's rulemaking on nonroad CI engines over 39 kW (50 hp).[200] The PPEMA proposal for an optional ABT program would include: (1) corporate-wide averaging, (2) family emission limits, with caps for the highest permissible family emission limits, (3) limited credit life, and (4) an option to establish a phased decrease in corporate-wide emissions, requiring that a manufacturer reduce its total calculated emissions by specified percentages over a set timetable.

Briggs & Stratton submitted a report by National Economic Research Associates, Inc. (NERA) it had commissioned in conjunction with its request that EPA add an ABT program to the small SI engine rulemaking.[201] The NERA report illustrates the potential gains of averaging, and how they can be extended through banking and trading. This illustration showed how a manufacturer seeking to reduce its product lines' aggregate emissions by a given target percentage would be able to do so either with or without averaging, but that the target percentage could be achieved at a lower cost under an averaging regime. For example, a manufacturer could choose to attain a given percentage reduction in its aggregate fleet emissions by accounting for all the reductions among those engine families least costly to control, and not having to control the rest of its engine families. Briggs & Stratton argued that this would allow the same percentage of

aggregate fleet emissions reduction to be attained as could be achieved if each engine family had to individually accomplish that percentage reduction, but at a lower cost. Briggs and Stratton also cited the success of other ABT programs. It stated that, without ABT, the company might not be able to continue production of its full product line, and as a consequence, may have to reduce its workforce. Finally, it maintained that it had no reason to believe that emission factors would be biased one way or the other, and absent any bias to overstate emissions, an ABT program should be workable.

One industry association, MECA, commented in support of EPA's position on ABT.[202] It agreed with EPA's view that an effective ABT program cannot be developed given the uncertainty about in-use emissions, especially in the absence of any in-use provisions. While MECA expressed concerns about the general effectiveness of ABT programs, it indicated it would be appropriate for EPA to consider ABT in the context of Phase 2.

In its comments, CARB supported EPA's contention that an ABT program is not necessary for Phase 1, because the relative stringency of Phase 1 standards is such that use of significantly advanced or costly technologies will not be required for manufacturers to achieve compliance.[203] Despite having been petitioned to include averaging in its small nonroad engines program, CARB has declined include it. Because EPA seeks consistency with CARB's regulations whenever it seems appropriate and practicable, CARB's reluctance to employ ABT at this time reinforces EPA's decision not to incorporate ABT in Phase 1.

A very strong argument against incorporating ABT from STAPPA/ALAPCO made five points: (1) questions concerning the certification test's ability to differentiate between various technologies without bias, (2) the variability of small engine emissions, even when new, (3) uncertainties regarding the rate, shape and level of deterioration of current engines, (4) uncertainties regarding the rate, shape and level of deterioration of Phase 1 engines, and (5) the absence of in-use enforcement.[204]

Moreover, NRDC pointed out that incorporating an ABT program would necessitate adjustment of the standards to more stringent levels if the projected emissions decreases were to be realized.[205] It argued that adding ABT without revising the standards would allow the aggregate emissions to increase over levels projected for small SI engines in the absence of ABT.

11.1.3 EPA's Response to the Comments

It is EPA's experience that some proportion of engine families will exhibit emission levels lower than what is necessary to establish a "safety margin" that allows for test-to-test and engine-to-engine variability. Therefore, when all engine families must individually meet the standard, the averaged emissions will lie at some point below the level corresponding to the averaged safety margin. However, when engine families need only meet the standard in the aggregate, fleetwide

average emissions may lie at levels as close to the standards as possible (even taking into account that there is still a safety margin below each family emissions limit that prudent manufacturers will maintain). This consideration is not problematic in and of itself; the problem arises when ABT is incorporated only after settling upon appropriate standards. Because adding ABT without revising the standards effectively weakens the standards, EPA decided against including such a program in this rulemaking. If EPA were to opt to include ABT as a feature of the Phase 2 rule, the Phase 2 emission standards would be determined taking this factor into account.

While it is possible that an ABT program would encourage manufacturers to bring forward technological advancements in emission control for the purpose of garnering credits, NRDC has argued that no one has produced analytical support for this position.[206] No manufacturer has given any firm indication that it would implement specific technological advancements sooner if EPA adopts ABT in this rulemaking than it would otherwise.

Even if it had no concerns regarding the potential for increased emissions, EPA would not consider it appropriate to approve an ABT program for new small SI engines at this time, because EPA has not encountered evidence that would convince it that approximately equal rates of deterioration occur in use across engine families. The argument advanced by PPEMA that uncertainties concerning in-use emissions "did not prevent EPA from adopting an AB&T program for new nonroad diesel engines over 50 hp"[207] is not convincing, because much more is known about in-use emissions of the large CI (diesel cycle) engines covered by that rulemaking than is known about the in-use emissions of small SI engines. Many of the engines covered by the nonroad large CI engine rule are the same or very similar to those currently regulated under the ongoing certification program for heavy-duty engines and vehicles; therefore, PPEMA's comparison between EPA's approach to nonroad large CI engines and its approach to nonroad small SI engines is not an apt one.

These uncertainties will be resolved as part of the Phase 2 regulatory negotiations. Phase 2 will directly assess in-use emission characteristics of engine families and incorporate enforcement of in-use emission levels. Once in-use emission levels are known with more confidence, EPA expects that market-based programs such as ABT will be viewed more favorably by the regulatory negotiation committee during policy development.

Finally, in response to Briggs & Stratton's contention that ABT could produce the same aggregate emissions reductions achievable without the program, EPA points out that its program was not set up the same way as Briggs & Stratton's example, and is not easily adaptable to it. The Agency's standards are defined in terms of discrete emission limits, rather than percentage reductions in emissions. To allow averaging within a scenario involving emissions standards, family emission limits could be designated such that the fleets would have to meet the standard only in the aggregate. As described in the preceding paragraphs, the nature of an averaging

scheme is such that aggregate emissions are expected to be higher in such a scenario than when each engine family must individually meet the standard. If EPA were to adopt more stringent standards to compensate for this, or change to percent emissions reductions on the aggregate scheme like that proposed by Briggs & Stratton, it would have to generate a supplemental proposal and allow comment on this fundamentally different approach to regulating nonroad small SI engines. Again, EPA does not wish to delay promulgation of the Phase 1 standards unnecessarily, but will consider these arguments if raised during deliberations for the Phase 2 regulations. If EPA were to opt to include ABT as a feature of the Phase 2 rule, the Phase 2 emission standards would be determined taking this factor into account.

11.2 Administrative Procedure Act

11.2.1 Summary of the Proposal

EPA stated in the proposal that the proposed regulatory language was not included as part of the Federal Register notice, but was available for free on computer diskette, via an electronic bulletin board, or at the EPA Air Docket. The NPRM provided explicit directions to aid the public in obtaining the regulatory language from any one of these sources.

11.2.2 Summary of the Comments

Holliday Environmental Services submitted comment that EPA's failure to publish the regulatory text for the NPRM contravenes the Administrative Procedures Act.[208]

11.2.3 EPA's Response to the Comments

EPA has determined that regulatory text for an NPRM does not have to be published in the Federal Register in order to meet the requirements of the Administrative Procedures Act or the Clean Air Act. 5. U.S.C. § 553(b) requires that general notice of proposed rulemaking be published in the Federal Register, which shall include either the terms or substance of the proposed rule or a description of the subjects and issues involved. Where EPA publishes a notice of proposed rulemaking that describes the subjects and issues involved it is not required to publish the proposed rule text. Moreover, today's rule is subject to the procedural requirements of Clean Air Act section 307(d), not the Administrative Procedures Act. 42 U.S.C. § 7607(d)(1)(R). That provision requires EPA to publish notice of proposed rulemaking, accompanied by a statement of its basis and purpose, but does not require EPA to publish proposed regulatory text. Id., 7607(d)(3).

11.3 SIP Credits

11.3.1 Summary of the Proposal

The proposal did not discuss this issue, but in the California Federal Implementation Plan (FIP) the Agency allows States to include credits in their attainment State Implementation Plans (SIPs) from yet to be promulgated regulations establishing national nonroad engine emission standards.

11.3.2 Summary of the Comments

The Natural Resources Defense Council (NRDC) commented that "...Supplying hypothetical "credits" to States can not ensure that areal reductions (sic) will occur. Instead, such policies impede attainment by allowing States to include unquantifiable and unenforceable measures in their implementation plans, instead of actual regulations that can deliver quantifiable pollution reductions..."[209]

11.3.3 EPA's Response to the Comments

The Agency acknowledges that for the national nonroad regulatory program and the small engine and marine pleasure craft programs in particular, the projected benefits are not exact since in both cases they depend on public comment to proposed rules and in the case of the small engine standards, they will also depend in part on the outcome of the regulatory negotiation process (for Phase II). However, the promulgation of most of these rules is imminent and all are legally compelled by specific dates. The range of uncertainty with regard to the benefits of the final rules is small, especially in comparison to the total emissions inventory. Consequently, the potential error in inventory estimates and therefore, the potential error in the required stringency for all other control measures in the nonattainment areas, is small.

It is EPA's position, with respect to national programs and given certain conditions are met, that states may take an approach in their SIPs that is similar to that allowed in the California FIP. The fact that these nonroad rules are required Federal rules, and indeed with court-ordered deadlines, creates special circumstances that allow EPA to consider them enforceable SIP elements, provided states also commit to adopt gap-filling measures to account for any shortfalls, identified later, between currently anticipated and actual final rule benefits. These gap-filling measures do not necessarily have to be in the same inventory category as the rule for which they are meant to account. States must also be aware that implementation of additional programs within the nonroad category to compensate for any shortfalls in final federal nonroad engine rules may be very difficult. States may, therefore, wish to discount credits for these programs in their SIPs as a safety margin against potential shortfalls when these rules are finalized.

The Agency has concluded that this policy of authorizing SIPs to take credit for reductions from Federal measures is consistent with the overall scheme of the Clean Air Act ozone nonattainment provisions, as well as the relevant provisions by their terms. Congress anticipated that attainment of the ozone primary national ambient air quality standard would result from a combination of State and Federal actions. As a result, the reductions from Federal measures are an integral part of Congress's blueprint for attainment. Therefore, SIPs should be allowed to account for those reductions. In particular, the attainment demonstration provisions of sections 183(b)(1)(A)(i) (Moderate areas) and 182(c)(2)(A) (Serious and higher classified areas); as well as the rate-of-Progress (ROP) provisions of sections 182(b)(1)(C) (initial 15 percent required reductions) and 182(c)(2)(B) (subsequent 3 percent per year required reductions) may be read to assume the creditability of reductions from Federal measures (other than those specifically identified in the ROP provisions as noncreditable). Further, denying SIP credit for reductions from Federal measures would unduly burden the States because States would be obliged to develop and begin to implement SIP measures to assure the full amount of reductions needed for ROP and attainment, but they could subsequently retract those SIP provisions when the Federal measures are promulgated and begin yielding reductions. Further information and guidance on this issue may be found in the Air Docket; specifically, refer to documents numbered A-93-25, IV-J-01 and IV-J-02.

11.4 Metric

11.4.1 Summary of the Proposal

Metric units are used throughout the proposed rule without English equivalents. This was done in compliance with the Metric Conversion Act of 1975, as amended, and Executive Order 12770, July 25, 1981, which directs all federal agencies to use metric as the primary unit in regulations by September 30, 1992 and to only provide English equivalents when the affected party(s) uses English as the primary unit.

In the NPRM, EPA solicited comments on the impact of using only metric units or the need for including the English equivalent.

11.4.2 Summary of the Comments

In its comments, NAEDA expressed concern that although manufacturers may use metric without English equivalents, equipment dealers and users usually use English as the primary unit[210]. NAEDA requested that equipment specifications be stated in English for the United States marketplace.

11.4.3 EPA's Response to the Comments

EPA has decided to retain metric measurements for the final rule. This does not preclude the additional use of English equivalents by manufacturers to provide clarity for equipment dealers and users.

11.5 Service Information

11.5.1 Summary of the Proposal

There was no mention of service information in the NPRM.

11.5.2 Summary of the Comments

A comment was received from NAEDA expressing concern over the availability of necessary service information and suggesting that EPA address this topic in the forthcoming regulations.[211]

11.5.3 EPA's Response to the Comments

Service information requirements were not proposed in this NPRM. They are outside the scope of this action and cannot be included in the FRM.

11.6 Consumer/Commercial Terminology

11.6.1 Summary of the Proposal

EPA proposed to adopt a "class" structure for the Phase 1 regulation. In the NPRM, EPA explained that this rule proposed two broad use categories--nonhandheld and handheld. Nonhandheld engines would be required to meet either Class I or Class II standards while handheld engines would have to meet either Class III, IV, or V emission standards. Once the applicable use category is determined, the engine class would be selected on the basis of engine displacement as measured in cubic centimeters (cc).

As stated in the NPRM, Class I engines are overwhelmingly found in lawnmowers. Class II engines primarily include engines used in generator sets, garden tractors, and commercial lawn and garden equipment. Only engines used in equipment defined as handheld would be allowed to meet Class III, IV, or V emission standards. Class III includes engines used in consumer handheld products, such as small string trimmers, edgers, and brush cutters. Class IV encompasses engines used in both residential and commercial settings and includes large trimmers,

edgers, blowers, and chain saws. Class V includes a majority of engines utilized in commercial chain saws.

This proposed engine classification approach for Phase 1 harmonized federal small engine regulations with California's lawn and garden regulations.

11.6.2 Summary of the Comments

NAEDA objected to the equipment classifications EPA used throughout the preamble, RIA and RSD.[212] NAEDA's concern is that use of the terms "residential," "consumer," or "professional" could cause dealers to be liable in court if, for example, they sold a "professional" piece of equipment to a residential consumer who subsequently was injured. As an alternative, NAEDA suggested that all equipment be classified using terms such as "Light Duty" or "Heavy Duty" that do not require the dealer to determine the fitness of the buyer to use the equipment.

11.6.3 EPA's Response to the Comments

The Agency appreciates NAEDA's comments on equipment terminology, and recognizes the dealers' concerns about potential liability. However, it is EPA's understanding that the terms "residential," "consumer," and "professional" are the terms that have traditionally been used in the field, and therefore EPA will not change the terminology for the purposes of the Phase 1 rule.

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[1] U.S. Environmental Protection Agency. "Nonroad Engine and Vehicle Emission Study." EPA Air Docket #A-91-24, item II-A-10, November 1991. EPA publication number 21A-2001. Available from the National Technical Information Service, referenced as document PB 92-126960.

[2] Portable Power Equipment Manufacturers Association. ""Comments of the Portable Power Equipment Manufacturers Association." EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 3-5.

[3] Natural Resources Defense Council. "Comments of the Natural Resources Defense Council." EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 5.

New York State Department of Environmental Conservation. "Comments on Proposed Emission Standards for New Nonroad Spark-ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-31, August 4, 1994, p. 1.

Northeast States for Coordinated Air Use Management. "Comments on Emission Standards." EPA Air Docket #A-93-25, item IV-D-23, August 5, 1994, p. 1.

State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, pp. 5-7.

State of Wisconsin Department of Natural Resources. "Notice of Proposed Rulemaking: 40 CFR Part 90, Control of Air Pollution; Emission Standards for New Nonroad Spark-Ignited Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-18, August 3, 1994, p. 1.

[4] Ibid.

[5] Natural Resources Defense Council. "Comments," EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 5.

State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments," EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, pp. 5-7.

State of Wisconsin Department of Natural Resources. "Notice," EPA Air Docket #A-93-25, item IV-D-18, August 3, 1994, p. 1.

[6] Black & Decker Corporation. "Comments of the Black & Decker Corporation Concerning EPA's Proposed Rulemaking on the Control of Air Pollution; Emission Standards for New Nonroad Spark-ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-05, July 11, 1994, pp. 2-3.

State of California Air Resources Board. "Reference no. Z-94-15." EPA Air Docket #A-93-25, item IV-D-30, August 5, 1994, p. 4.

State of Louisiana Department of Environmental Quality. "Comments." EPA Air Docket #A-93-25, item IV-D-10, August 2, 1994, p. 1.

State of Tennessee Department of Environment and Conservation. "Proposed 40 CFR Part 90." EPA Air Docket #A-93-25, item IV-D-04, June 29, 1994, pp. 2-3.

[7] State of California Air Resources Board. "Reference," EPA Air Docket #A-93-25, item IV-D-30, August 5, 1994, p. 4.

[8] State of Louisiana Department of Environmental Quality. "Comments," EPA Air Docket #A-93-25, item IV-D-10, August 2, 1994, pp. 2-3.

[9] Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute." EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 13-16.

Kohler Company. "Re: EPA Docket No. A-93-25." EPA Air Docket #A-93-25, item IV-D-21, August 3, 1994, p. 2.

Machinery and Electrical Products, Inc. "Proposed Phase I Emissions Regulations." EPA Air Docket #A-93-25, item IV-D-12, August 2, 1994, p. 2.

Tecumseh Products Company. "EPA Phase I NPRM Comments." EPA Air Docket #A-93-25, item IV-D-28, August 5, 1994, p. 1.

[10] Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 13-14.

[11] Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 14-16.

[12] ECHO. "Attn: Docket A-93-25." EPA Air Docket #A-93-25, item IV-D-32, July 6, 1994, p. 2.

Portable Power Equipment Manufacturers Association. "Comments of the Portable Power Equipment Manufacturers Association." EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, p. 8.

[13] Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 9-10.

[14] Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 7-9.

[15] STIHL. "Additional Comments on the legislation for Non-Road Engines up to 19 kW (Par. 90.103) - Effective Date." EPA Air Docket #A-93-25, item IV-D-__, September 23, 1994, pp. 1-3.

[16] Auger and Power Equipment Manufacturers Association. "Comments on NPRM 40 CFR Part 90." EPA Air Docket #A-93-25, item IV-D-13, August 4, 1994, p. 5.

[17] Ibid.

[18] ECHO. "Attn," EPA Air Docket #A-93-25, item IV-D-32, July 6, 1994, p. 2.

[19] ECHO. "Attn," EPA Air Docket #A-93-25, item IV-D-32, July 6, 1994, p. 5.

Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 34-35.

Natural Resources Defense Council. "Comments," EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 11.

Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, p. 24.

State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments," EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 12.

[20] Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, p.24.

[21] Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 34-35.

[22] Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 7-9.

[23] Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute." EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 12-13.

[24] Portable Power Equipment Manufacturers Association. "Comments of the Portable Power Equipment Manufacturers Association." EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, p. 10.

[25] Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 10-12.

[26] Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, p. 12.

[27] Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 12-13.

[28] Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, p. 13.

[29] State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 3.

[30] State of California Air Resources Board. "Reference no. Z-94-15." EPA Air Docket #A-93-25, item IV-D-30, August 5, 1994, p. 3.

[31] Natural Resources Defense Council. "Comments of the Natural Resources Defense Council." EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 8.

[32] State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-Ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 3.

[33] State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-Ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 3.

[34] Natural Resources Defense Council. "Comments of the Natural Resources Defense Council." EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 9.

[35] State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials. "Comments on the U.S. Environmental Protection Agency's

Proposed Rulemaking on Emission Standards for New Nonroad Spark-Ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 3.

36 State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-Ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 3.

37 Natural Resources Defense Council. "Comments of the Natural Resources Defense Council." EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 9.

38 Machinery and Electrical Products, Inc. "Attn: Docket Number A-93-25." EPA Air Docket #A-93-25, item IV-D-12, August 2, 1994, p. 3.

39 Natural Resources Defense Council. "Comments of the Natural Resources Defense Council." EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 9.

40 State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-Ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 4.

41 State of California Air Resources Board. "Reference no. Z-94-15." EPA Air Docket #A-93-25, item IV-D-30, August 5, 1994, p. 3.

42 Natural Resources Defense Council. "Comments of the Natural Resources Defense Council." EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 9.

43 State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-Ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 4.

44 Kubota Corporation. "Attention: Docket Number A-93-25." EPA Air Docket #A-93-25, item IV-D-16, August 4, 1994, p. 1.

45 General Equipment Company, "Attention: Docket Number A-93-25." EPA Air Docket #A-93-25, item IV-D-15, August 1, 1995, p. 1.

46 Machinery and Electrical Products, Inc. "Attn: Docket Number A-93-25." EPA Air Docket #A-93-25, item IV-D-12, August 2, 1994, p. 2.

47 Auger and Power Equipment Manufacturers Association. "Comments on NPRM 40 CFR Part 90." EPA Air Docket #A-93-25, item IV-D-13, August 4, 1994, p. 4.

48 Ibid.

49 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 19-21.

50 Outdoor Power Equipment Institute. "Supplemental Comments." EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, pp. 6-7.

51 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 23-27.

52 Tecumseh Products Company. "Attention: Docket Number A-93-25, EPA Phase NPRM Comments." EPA Air Docket #A-93-25, item IV-D-28, August 5, 1994, p. 2.

53 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute." EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp.27-30.

54 Portable Power Equipment Manufacturers Association. "Comments of the Portable Power Equipment Manufacturers Association." EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. ***xx***

55 Snapp, Lisa, U.S. Environmental Protection Agency Office of Mobile Sources, Memorandum: "Meeting with Tecumseh re; Hover Mowers and CO Standards," EPA Air Docket #A-93-25, item D-IV-***X***, December 19, 1994.

56 Portable Power Equipment Manufacturers Association. "Comments of the Portable Power Equipment Manufacturers Association." EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 15-16.

57 California is preempted by section 209 of the Clean Air Act from imposing standards on earth augers because they are included as farm and construction equipment. See the following paragraph.

58 This is only a partial list of the equipment preempted from separate regulation in California. See California Code of Regulations, Title 13, Appendix to Section 2450 for a complete list, which is subject to revision.

59 The Agency is aware that concrete/cutoff saws are sometimes attached to carts for extended or heavy-duty cuts. This occasional use does not negate their overall status as handheld equipment. The Agency agrees with the comment that cutoff saws are often used multipositionally, and thus fall into the general handheld category. Thus, the 14 kg weight limit does not apply.

60 For augers, this break point is 20 kg.

61 Lisa M. Snapp, U. S. Environmental Protection Agency Office of Mobile Sources, Memorandum: "Small Nonroad Spark-Ignition Engines -- Determination of Handheld Definition Weight Limit," EPA Air Docket #A-93-25, item IV-D-*X*, February 17, 1995.

62 Additionally, the use of lawnmowers and, similarly, three- and four-wheeled edgers on hillsides is not considered to be multipositional use and, hence, they do not qualify as handheld equipment.

63 Kubota Corporation. "Attention: Docket Number A-93-25." EPA Air Docket #A-93-25, item IV-D-16, August 4, 1994, p. 1.

64 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute." EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 32.

Toro Company. "Comments of the Toro Company." EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 1, 18-23.

65 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 31.

Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 1.

66 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 3, fn. 5.

67 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 4-6.

68 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 4, 7-9.

69 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 4.

70 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 4-5, 10-15.

71 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 16-18.

[72] Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 16.
[73] Ibid.
[74] Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 17.
[75] Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 18-23.
[76] Dunaway & Cross. "Re: The Toro Company." EPA Air Docket #A-93-25, item IV-D-__, November 21, 1994, p. 1.
[77] North American Equipment Dealers Association. "EPA - 40 CFR Part 90 Emission Standards, New Nonroad SI Engines At or Below 19 KW." EPA Air Docket #A-93-25, item IV-D-02, June 15, 1994, p. 2.
[78] Ibid.
[79] State of California Air Resources Board. "Reference no.ä Z-94-15." EPA Air Docket #A-93-25, item IV-D-30, August 5, 1994, p. 3.
[80] Ibid.
[81] Id.
[82] Natural Resources Defense Council. "Comments of the Natural Resources Defense Council." EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, pp. 9-10.

State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 4.
[83] State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments," EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 4.
[84] Ibid.
[85] Id.
[86] Natural Resources Defense Council. "Comments," EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 10.

State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments," EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, pp. 4-5.
[87] Ibid.
[88] State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments," EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 5.
[89] Ibid.
[90] Dunaway & Cross. "Re: The Toro Company," EPA Air Docket #A-93-25, item IV-D-__, November 21, 1994.

Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994.
[91] Dunaway & Cross. "Re: The Toro Company," EPA Air Docket #A-93-25, item IV-D-__, November 21, 1994, p. 2.

Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 4.
[92] Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 2-3.

93 Dunaway & Cross. "Re: The Toro Company," EPA Air Docket #A-93-25, item IV-D-__, November 21, 1994, p. 4.
94 Dunaway & Cross. "Re: The Toro Company," EPA Air Docket #A-93-25, item IV-D-__, November 21, 1994, p. 10.
95 Ibid.
96 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 9-10.
97 Ibid.
98 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 10, 18, 20.
99 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 10.
100 Dunaway & Cross. "Re: The Toro Company," EPA Air Docket #A-93-25, item IV-D-__, November 21, 1994, p. 12, fn. 6.
101 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 27.
102 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute." EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 27.
Outdoor Power Equipment Institute. "Supplemental Comments." EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, p. 6.
Tecumseh Products Company. "EPA Phase I NPRM Comments." EPA Air Docket #A-93-25, item IV-D-28, August 5, 1994, p. 2.
Toro Company. "Comments of the Toro Company." EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 23.

103 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 27.
104 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 23.
105 Tecumseh Products Company. "EPA Phase I," EPA Air Docket #A-93-25, item IV-D-28, August 5, 1994, p. 2.
106 U.S. Environmental Protection Agency. "Nonroad Engine and Vehicle Emission Study." EPA Air Docket #A-91-24, item II-A-10, November 1991. EPA publication number 21A-2001. Available from the National Technical Information Service, referenced as document PB 92-126960.
107 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 27.
Outdoor Power Equipment Institute. "Supplemental Comments," EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, p. 6.
Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 25.
108 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 28-29.
Outdoor Power Equipment Institute. "Supplemental Comments'" EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, pp. 6-7.
Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 25-27.
109 Ibid.

110 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 29-30.

Outdoor Power Equipment Institute. "Supplemental Comments," EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, p. 6.

Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 28-29.

111 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 29.

Outdoor Power Equipment Institute. "Supplemental Comments," EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, p. 6.

Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 28.

112 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 30-31.

Outdoor Power Equipment Institute. "Supplemental Comments," EPA Air Docket #A-93-25, item IV-D-25, August 5, 1994, p. 7.

Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 29.

113 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 29.

Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 28.

114 Ibid.

115 Toro Company. "Comments," EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, p. 29.

116 Ibid.

117 Natural Resources Defense Council. "Comments of the Natural Resources Defense Council." EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 9.

State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 4.

118 Ibid.

119 Id.

120 Outdoor Power Equipment Institute. "Supplemental Comments," EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, attachment entitled Single-stage Snowthrowers.

121 Power Systems Research, Engindata North America and Parts Link Aftermarket, 1992, St. Paul-Minneapolis, Minnesota, EPA Air Docket #A-93-25, item #II-K-15.

122 Drachand, Don, California Air Resources Board. Letter to Richard Wilson, U.S. Environmental Protection Agency, EPA Air Docket #A-93-25, item #IV-D-30, August 5, 1994, p. 1.

123 59 FR 55930.

124 Portable Power Equipment Manufacturers Association. "Comments of the Portable Power Equipment Manufacturers Association." EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 16-17.

125 Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 10-13.

Toro Company. "Comments of the Toro Company." EPA Air Docket #A-93-25, item IV-D-22, received August 5, 1994, pp. 5-6.

126 Natural Resources Defense Council. "Comments of the Natural Resources Defense Council." EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 10.

State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-ignition Engines At or Below 19 Kilowatts." EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 5.

State of California Air Resources Board. "Reference no. Z-94-15." EPA Air Docket #A-93-25, item IV-D-30, August 5, 1994, p.5.

127 Engine Manufacturers Association and Outdoor Power Equipment Manufacturers Institute. "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute." EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp. 16.

Outdoor Power Equipment Institute. "Supplemental Comments." EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, pp. 1-4.

128 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 17.

Outdoor Power Equipment Institute. "Supplemental Comments," EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, pp. 4-5.

129 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 16.

130 General Equipment Company. "Comments to the Docket Proposal." EPA Air Docket #A-93-25, item IV-D-15, August 1, 1994, p. 1.

131 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 37.

Outdoor Power Equipment Institute. "Supplemental Comments," EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, pp. 7-8.

132 Tecumseh Products Company. "EPA Phase I NPRM Comments." EPA Air Docket #A-93-25, item IV-D-28, August 5, 1994, p. 3.

133 ECHO. "Attn: Docket A-93-25." EPA Air Docket #A-93-25, item IV-D-32, July 6, 1994, p. 2.

Engine Manufacturers Association and Outdoor Power Equipment Institute, "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 17.

Onan Corporation. "Attention: Docket A-93-25." EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, pp. 4-5.

Outdoor Power Equipment Institute. "Supplemental Comments," EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, pp. 1-6.

Tecumseh Products Company. "EPA Phase I," EPA Air Docket #A-93-25, item IV-D-28, August 5, 1994, p. 2.

134 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p. 17.

135 State of Tennessee Department of Environment and Conservation. "Proposed 40 CFR Part 90." EPA Air Docket #A-93-25, item IV-D-04, June 29, 1994, p. 1.

136 Auger and Power Equipment Manufacturers Association. "Comments on NPRM 40 CFR Part 90." EPA Air Docket #A-93-25, item IV-D-13, August 4, 1994, p. 5.

137 Machinery and Electrical Products, Inc. "Proposed Phaseä I Emissions Regulations." EPA Air Docket #A-93-25, item IV-D-12, August 2, 1994, p. 2.

138 Natural Resources Defense Council. "Comments," EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p. 10.

State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officers. "Comments," EPA Air Docket #A-93-25, item IV-D-08, August 4, 1994, p. 5.

139 Tecumseh Products Company. "EPA Phase I," EPA Air Docket #A-93-25, item IV-D-28, August 5, 1994, p. 3.

140 North American Equipment Dealers Association. "EPA - 40 CFR Part 90 Emission Standards, New Nonroad SI Engines At or Below 19 KW. EPA Air Docket #A-93-25, item IV-D-02, June 15, 1994, p. 2.

141 Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute." EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp.32-33.

142 Kohler Co. "Re: EPA Docket No. A-93-25," EPA Air Docket #A-93-25, item IV-D-21, August 3, 1994, pp. 3-4.

143 Tecumseh Products Company. "EPA Phase I," EPA Air Docket #A-93-25, item IV-D-28, August 5, 1994, p. 3

144 Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, pp. 3-4.

145 Onan, Kohler, EMA and OPEI.

146 Kohler, OPEI

147 EMA and OPEI, Tecumseh

148 Letter to Debbie Wood, U.S.Environmental Protection Agency, from Engine Manufacturers Association, 11/29/94.

149 Thrift, Michael, U.S. Environmental Protection Agency Office of General Counsel, Memorandum of telephone conversation with Ralph Hovnanian, EPA Air Docket #A-93-25, item IV-D-19, November 5, 1994.

150 Public Law 95-574, October 27, 1992, as amended by Public law 95-609, November 8 1978.

151 ECHO. "Attn: Docket A-93-25." EPA Air Docket #A-93-25, item IV-D-32, July 6, 1994, p. 3.

152 Some of the most common-used standards include ANSI B71.5 (a voluntary US standard, with a measurement and rating procedure, adhered to by OPEI members), EEC Council Directive 84/538/EEC (an EEC regulation dealing with permissible sound power levels of lawnmowers), ISO 11094 (an international standard relating to mowing equipment).

153 ECHO. "Attn: Docket A-93-25." EPA Air Docket #A-93-25, item IV-D-32, July 6, 1994, p. **xx**.

154 Portable Power Equipment Manufacturers Association. "***Comments***," EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 35-36.

155 Portable Power Equipment Manufacturers Association. "***Comments***," EPA Air Docket #A-93-25, item #IV-D-22A, August 5, 1994, pp. ***xx***.

156Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22 (part 2 of 2), August 5, 1994, p.26.

157Kohler Co. "Re: EPA Docket No. A-93-25," EPA Air Docket #A-93-25, item IV-D-21, August 3, 1994, p.4.

158Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, p.26; Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of

the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p.50.

[159]Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, p.5.

[160]Natural Resources Defense Council. "Comments," EPA Air Docket #A-93-25, item IV-D-27, August 5, 1994, p.11.

[161]Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p.43.

[162]Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, p.28

[163]Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p.45

[164]Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p.46

[165]Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p.46?; Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, p.26

[166]Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p.46?; Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, p.26

[167]Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22 (part 2 of 2), August 5, 1994, p.26

[168]Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p.48.

[169]Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp.??

[170]Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, p.26

[171]Honda Motor Co., Ltd. "Comments," EPA Air Docket #A-93-25, item IV-D-25, August 5, 1994, p.1.

[172]Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p.49

[173]Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and The Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, p.??

[174]Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, p.25.

[175]Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, p.27.

[176]Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, August 4, 1994, p.27.

[177]Portable Power Equipment Manufacturers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-22 (part 2 of 2), August 5, 1994, p.xx

[178]North American Equipment Dealers Association. "Comments," EPA Air Docket #A-93-25, item IV-D-02, June 15, 1994, p.5.

[179] Natural Resources Defense Council, "Comments of the Natural Resource Defense Council Regarding Proposed Emission Standards for New Nonroad Spark Ignition Engines at or below 19 Kilowatts." EPA Air Docket A-93-25, item IV-D-27, August 5, 1994, p. 8.

[180] Id. at p. 8.

[181] NRDC, item IV-D-27, STAPPA/ALAPCO, "Comments of the ... on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-Ignition Engines At or Below 19 Kilowatts." EPA Air Docket A-93-25, item IV-D-08, August 4, 1994, p. 9-10.

[182] Tecumseh Products Company, "EPA Phase 1 NPRM Comments." EPA Air Docket A-93-25, item IV-D-28, August 5, 1994, p. 2-3.

[183] Portable Power Equipment Manufacturers Association, "Comments of the Portable Power Equipment Manufacturers Association." EPA Air Docket A-93-25, item IV-D-22, August 5, 1994, p. 30

[184] STAPPA?ALAPCO at p. 10.

[185] Kohler, Letter to Docket Clerk. EPA Air Docket A-93-25, item IV-D-21, August 3, 1995, p. 3. Engine Manufacturers Association, "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute." EPA Air Docket A-93-25, item xxx, August 5, 1994, p. 51.

[186] Id.

[187] EMA at p. 52

[188] PPEMA, and EMA.

[189] City of Chicago. "RE: Proposed Rules for Emission Standards for New Nonroad Spark-Ignition Engines at or Below 19 Kilowatts - 59 Fed. Reg. 25399." EPA Air Docket #A-93-25, item IV-D-26, July 19, 1994, pp. 1-2.

[190] Portable Power Equipment Manufacturers Association. "Comments of the Portable Power Equipment Manufacturers Association." EPA Air Docket #A-93-25, item IV-D-22A, August 5, 1994, pp. 48-51.

[191] Outdoor Power Equipment Institute. "Supplemental Comments," EPA Air Docket #A-93-25, item IV-D-20, August 5, 1994, pp. 5-8.

[192] Onan Corporation. "Comments," EPA Air Docket #A-93-25, item IV-D-34, p. 6.

[193] Engine Manufacturers Association and Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute." EPA Air Docket #A-93-25, item IV-D-07, August 5, 1994, pp.63-64.

[194] North American Equipment Dealers Association. "EPA -- 40 CFR Part 90 Emission Standards, New Nonroad SI Engines At or Below 19 KW." EPA Air Docket #A-93-25, item IV-D-02, June 15, 1994, p. 3.

[195] Tecumseh Products Company. "EPA Phase I," EPA Air Docket #A-93-25, item IV-D-28, August 5, 1994, p. 3.

[196] ECHO. "Attn: Docket A-93-25." EPA Air Docket #A-93-25, item IV-D-32, July 6, 1994, pp. 5-6.

[197] For more discussion on the impact on small entities, see section VII. C. of the preamble, "Impact on Small Entities;" see also the corresponding section in the preamble to the NPRM at 59 FR 25399, 25430 (May 16, 1994).

[198] Engine Manufacturers Association/Outdoor Power Equipment Institute. "Statement of the Engine Manufacturers Association and the Outdoor Power Equipment Institute," EPA Air Docket #A-93-25, item #IV-D-07, August 4, 1994, pp. 61-63.

199 Portable Power Equipment Manufacturers Association. "***Comments***," EPA Air Docket #A-93-25, item #IV-D-22A, August 5, 1994, pp. 22-24.

200 59 FR 31306 (June 17, 1994).

201 Briggs & Stratton Corporation. "Re: Docket No. A-93-25," letter and attachment. EPA Air Docket #A-93-25, item # IV-D-33, August 18, 1994.

202 Manufacturers of Emission Controls Association. "Re: Emission Standards for New Nonroad Spark-Ignition Engines at or below 19 Kilowatts, Docket No. A-93-25," letter and attachment. EPA Air Docket #A-93-25, item # IV-D-29, June 21, 1994, pp. 3-4.

203 Drachand, Don, California Air Resources Board. Letter to Richard Wilson, U.S. Environmental Protection Agency, EPA Air Docket #A-93-25, item #IV-D-30, August 5, 1994, p. 5.

204 STAPPA/ALAPCO. "Comments of the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officers on the U.S. Environmental Protection Agency's Proposed Rulemaking on Emission Standards for New Nonroad Spark-Ignition Engines at or below 19 Kilowatts," EPA Air Docket #A-93-25, item #IV-D-08, August 4, 1994, pp. 10-11.

205 Natural Resources Defense Council. "Comments of the Natural Resources Defense Council," EPA Air Docket #A-93-25, item #IV-D-27, August 5, 1994, pp. 6-8.

206 Natural Resources Defense Council. "Comments of the Natural Resources Defense Council," EPA Air Docket #A-93-25. item #IV-D-27, August 5, 1994, p. 7.

207 Portable Power Equipment Manufacturers Association. "***Comments***," EPA Air Docket #A-93-25, item #IV-D-22A, August 5, 1994, p. ***xx***.

[208]Holliday Environmental Services. Written submission to EPA Air Docket #A-93-25, item IV-D-01

[209]NRDC, 8/25/94, Docket No. A-93-25, IV-D-27, p.**xx**.

[210]North American Equipment Dealers Association. Written submission to EPA Air Docket A-91-21, item II-D-02, December 10, 1991, p.2.

[211]North American Equipment Dealers Association. Written submission to EPA Air Docket A-91-21, item II-D-02, December 10, 1991, p.

[212]North American Equipment Dealers Association. Written submission to EPA Air Docket A-91-21, item II-D-02, December 10, 1991, pp.1, 10.