SUMMARY AND ANALYSIS OF COMMENTS

Phase 2 Emission Standards for New Nonroad Spark-Ignition Nonhandheld Engines At or Below 19kW

March 3, 1999

U.S. Environmental Protection Agency
Office of Air and Radiation
Office of Mobile Sources
Engine Programs and Compliance Division

TABLE OF CONTENTS

Section 1: Introduction

On January 27, 1998, the US 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). The purpose of the small SI engines NPRM, as required by 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 judgement, cause or contribute to air pollution in areas that failed to attain the National Ambient Air Quality Standards (NAAQS) for ozone or carbon monoxide.

The Agency held a public hearing on this proposal on February 11, 1998 in Ypsilanti, Michigan. Eight 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 (EPA Air Docket A-96-55, Item IV-F-01).[1] The public comment period during which the Agency accepted written comments on the proposal was closed on March 13, 1998. The Agency received submissions regarding the NPRM from 22 commenters including engine or equipment manufacturers or manufacturer associations, emission controls manufacturer associations, state organization, environmental groups and others.

After the close of the comment period EPA determined that it was desirable to get further details regarding the technological feasibility, cost and lead time implications of meeting standards more stringent than those contained in the base proposal in the NPRM. For the purpose of gaining additional information on feasibility, cost and lead time implications, and potential impact on equipment manufacturers of more stringent standards, EPA had several meetings, phone conversations, and written correspondence with specific engine and equipment manufacturers, with industry associations representing those manufacturers, and with representatives of state regulatory associations. Summaries of those meetings, phone conversations, and written correspondence were placed in the docket for this rulemaking. Additionally, EPA received numerous comments on the NPRM requesting closer harmonization with the compliance program provisions adopted by the State of California. In some cases, EPA also discussed these harmonization issues with manufacturers to improve the Agency's understanding of the needs and benefits to the industry of such harmonization; when applicable, these conversations are also noted in the meeting documentation provided to the docket. EPA published a Notice of Availability on December 1, 1998 (63 FR 66081) which highlighted these additional meetings held and items received by the Agency between February and October of 1998. In response to all of the comments and new information, EPA decided to separate the adoption of Phase 2 standards for nonroad SI engines into two separate final rulemakings (FRMs), the first rule dealing with nonhandheld engines, the second rule dealing with handheld

[1]The docket items referenced in this document are contained in EPA Air Docket A-96-55, unless otherwise noted in the text.

engines.

How to use this document

The purpose of this document is to summarize and respond to the comments submitted by the public on issues that affect nonhandheld engines. Included in the document are responses to the issues raised at the public hearing and in the written and oral comments received by EPA during the development of the rule. 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 January 27, 1998 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 and after the comment period are contained in EPA's Statements of Principles for Nonroad Phase 2 Small Spark-Ignited Engines Docket (EPA Air and Radiation Docket, Docket Number A-96-55). Tables 1 and 2 list those commenters who expressed their views to EPA regarding the NPRM for nonroad SI engines at or below 19 kW (both handheld and nonhandheld engines). Table 3 and 4 list those conversations held after the close of the NPRM regarding the nonhandheld rulemaking only.

TABLE 1
List of Commenters on the Phase 2 Small SI Engine NPRM
(EPA Air Docket A-96-55)

Organization	Item #
Academy of Model Aeronautics/International Miniature Aircraft Association	IV-D-07
American Honda Motor Company	IV-D-16
American Suzuki Motor Corporation	IV-D-17
Ardisam	IV-D-03
Auger & Power Equipment Manufacturers	IV-D-09
Autonnic Research, Inc.	IV-D-02
Briggs & Stratton	IV-D-20
Charles Machine Works	IV-D-05
Engine Manufacturers Association (EMA)/Outdoor Power Equipment Institute (OPEI) (represented by Neal Gerber & Eisenberg)	IV-D-12

Kohler Company	IV-D-11
Machinery & Electric Products Company (MEPCO)	IV-D-06
Manufacturers of Emission Controls Association (MECA)	IV-D-13
Maurdyne Industries	IV-D-04
North American Equipment Dealers Association (NAEDA)	IV-D-01
Pace, J. (private citizen)	IV-D-14
Pennsylvania Department of Environmental Protection	IV-D-22
Pioneer Eclipse (represented by Hunton & Williams)	IV-D-19
Portable Power Equipment Manufacturers Association (PPEMA) (represented by Dunaway & Cross)	IV-D-21
Ryobi North America	IV-D-18
State & Territorial Air Pollution Program Administrators (STAPPA)/ Association of Local Air Pollution Control Officials (ALAPCO)	IV-D-15
Tecumseh Products Company	IV-D-08
Westerbeke	IV-D-10

TABLE 2
Additional Comments Received After the Comment Period
(EPA Air Docket A-96-55)

Organization	Item #
Academy of Model Aeronautics/International Miniature Aircraft Association	IV-G-10
Angelico, S. (private citizen)	IV-G-14
Autonnic Research, Inc.	IV-G-13
California Air Resources Board	IV-G-05, IV-G-06, IV-G-07
Casey, H. (private citizen)	IV-G-23
Combs, R. (private citizen)	IV-G-12

Delaware Valley Radio Control Club	IV-G-11
Dolmar	IV-G-28
Engine Manufacturers Association (EMA) (represented by Neal Gerber & Eisenberg)	IV-G-26
Envirocan, Inc.	IV-G-01
Euromot	IV-G-04
Feldmann Engineering & Manufacturing Company, Inc.	IV-G-20
Glover, C. (private citizen)	IV-G-17
High Sierra Radio Control Club	IV-G-19
Hutch Bunch Radio Control Club	IV-G-21
Manufacturers of Emission Controls (MECA)	IV-G-03
National Miniature Pylon Racing Association	IV-G-08
Prop Floppers Radio Control Club	IV-G-15
Propkickers Model Airplane Club	IV-G-16
Spady, K. (private citizen)	IV-G-18
Strauch, M. (private citizen)	IV-G-02
Tanaka	IV-G-27
Wahl, S. (private citizen)	IV-G-09
Worldwide	IV-G-22

TABLE 3
Category IV-C: EPA Correspondence to Persons Outside the Agency After the NPRM

Document Number	Date Rcvd in Docket	Commentor, Addressee, Title or Description, etc.	Date of Document
IV-C-01	10-9-98	R. Larson, EPA, to R. Gault, Tecumseh Products/P. Hotz, Briggs & Stratton, re outline of FRM program	9-16-98

IV-C-02	10-9-98	R. Larson, EPA, to R. Gault, Tecumseh Products/P. Hotz, Briggs & Stratton, re clarifications to written reply	9-21-98
IV-C-06	10-19-98	R. Perciasepe, EPA, to J. Emerson/co-signers Dingell, Whitfield & Sensenbrenner, House of Representatives	9-14-98
IV-C-07	10-27-98	B. McCabe, EPA, to colleagues re small SI engine phase 2 NPRM	12-24-97
IV-C-08		R. Larson, EPA, to S. Arey, PYROTEK	12-17-98

TABLE 4
Category IV-E: EPA Memoranda of Meetings/Telephone Conversations with Outside Persons After the NPRM

Document Number	Date Rcvd in Docket	Commentor, Addressee, Title or Description, etc.	Date of Document
IV-E-02	3-13-98	C. Caffrey, EPA, re phone call with various test laboratories, Summer 1997	2-12-98
IV-E-03	3-13-98	J. Guy, EPA, re phone call with Kohler Company	3-4-98
IV-E-04	4-16-98	W. Charmley, EPA, re phone call/e-mail with T. Carpenter, Tecumseh Products Company	4-6-98
IV-E-05	5-19-98	C. Caffrey, EPA, re 3-5-98 meeting with Honda	4-28-98
IV-E-06	6-16-98	W. Charmley, EPA, re 4-24-98 meeting with Wisconsin-Robin	5-20-98
IV-E-07	9-24-98	C. Caffrey, EPA, re 9-3-98 meeting with Boswell Energy Systems	9-14-98
IV-E-08	9-24-98	Attendees list from Boswell Energy Systems meeting	9-3-98
IV-E-15	10-19-98	R. Larson, EPA, re 5-26-98 meeting with EMA	9-30-98
IV-E-16	10-19-98	R. Larson, EPA, re 6-11-98 telephone call with R. Gault, Tecumseh Products	10-8-98
IV-E-19	10-19-98	R. Larson, EPA, re 6-22-98 meeting with T. Bingham, Honda	10-8-98

IV-E-22	10-19-98	R. Larson, EPA, re 9-17-98 telephone call with J. Grumet, NESCAUM	10-8-98
IV-E-24 revised	10-27-98	C. Caffrey, EPA, re talk with Honda, American Suzuki Motor & Tecumseh Products, on CC cutoff for additional NHH class	10-19-98
IV-E-25	10-27-98	C. Caffrey, EPA, re talk with Kohler on technology to reduce emissions on their OHV engines	10-19-98
IV-E-27	10-27-98	R. Johnson, EPA, re telephone call with B. Obert, Broyhill	10-21-98
IV-E-28	10-27-98	R. Johnson, EPA, re telephone call with R. Hlaves, Tru-Cut	10-21-98
IV-E-29	10-27-98	R. Johnson, EPA, re telephone call with D. Lodge, Stone Construction Equipment	10-21-98
IV-E-30	10-27-98	R. Johnson, EPA, re telephone call with A. Sarlo, Sarlo Power Mowers	10-21-98
IV-E-31	10-27-98	R. Johnson, EPA, re telephone call with J. Greeson, Palmor Products	10-21-98
IV-E-32	10-27-98	R. Johnson, EPA, re telephone call with S. Groban, Groban Supply Company	10-21-98
IV-E-33	10-27-98	R. Johnson, EPA, re telephone call with R. Hitchcock, PECO	10-21-98
IV-E-34	10-27-98	R. Johnson, EPA, re telephone call with T. Hastings, Yard Marvel Manufacturing Company	10-21-98
IV-E-35	10-27-98	R. Johnson, EPA, re telephone call with R. Lloyd, Suzuki	10-21-98
IV-E-36	10-27-98	R. Johnson, EPA, re telephone call with B. Guerry, OPEI/J. Nelson, Garden Way	10-21-98
IV-E-37	10-27-98	R. Johnson, EPA, re telephone call with J. Nelson, Garden Way	10-21-98
IV-E-38	10-27-98	R. Johnson, EPA, re telephone call with G. Head, Southland Mower Company	10-21-98
IV-E-39	10-27-98	R. Johnson, EPA, re telephone call with J. Bracken, Simplicity Manufacturing	10-21-98

IV-E-41	10-27-98	C. Caffrey, EPA, re talks with G. Brereton, Michigan State University, & S. Arey, Pyrotek	10-20-98
IV-E-42	10-27-98	C. Caffrey, EPA, re 6-16-98 meeting with Pyrotek	10-20-98
IV-E-44	11-12-98	R. Larson, EPA, re 7-27-98 talk with P. Hotz, Briggs & Stratton	10-30-98
IV-E-45	11-12-98	R. Larson, EPA, re 8-3-98 talk with R. Gault, Tecumseh Products	10-30-98
IV-E-46	11-12-98	R. Larson, EPA, re 8-4-98 talk with R. Gault, Tecumseh Products	10-30-98
IV-E-48	11-12-98	R. Larson, EPA, re 8-5-98 talk with R. Gault, Tecumseh Products	10-30-98
IV-E-49	11-12-98	R. Larson, EPA, re 8-6-98 talk with P. Hotz, Briggs & Stratton	10-30-98
IV-E-52	11-12-98	R. Larson, EPA, re 8-18-98 talk with T. Bingham, Honda	10-30-98
IV-E-53	11-12-98	R. Larson, EPA, re 8-31-98 talk with P. Hotz, Briggs & Stratton	10-30-98
IV-E-54	11-12-98	R. Larson, EPA, re 8-31-98 talk with R. Gault, Tecumseh Products	10-30-98
IV-E-55	11-12-98	R. Larson, EPA, re 9-1-98 talk with B. Guerry, OPEI	10-30-98
IV-E-57	11-12-98	R. Larson, EPA, re 8-13-98 talk with P. Hotz, Briggs & Stratton	10-30-98
IV-E-58	11-12-98	R. Larson, EPA, re 9-4-98 talk with B. Guerry, OPEI	11-3-98
IV-E-59	11-12-98	R. Larson, EPA, re 9-8-98 talk with R. Gault, Tecumseh Products	11-3-98
IV-E-60	11-12-98	R. Larson, EPA, re 9-14&15-98 talk with R. Gault, Tecumseh Products	11-3-98
IV-E-61	11-12-98	R. Larson, EPA, re 9-16-98 talk with T. Cackette, California Air Resources Board	11-3-98

IV-E-63	11-12-98	R. Larson, EPA, re 9-18-98 talk with R. Gault, Tecumseh Products	11-3-98
IV-E-64	11-12-98	R. Larson, EPA, re 9-21-98 talk with R. Gault, Tecumseh Products	11-3-98
IV-E-68		R. Larson, EPA, re 9-22-98 meeting with Tecumseh Products, Briggs & Stratton, Latham & Watkins	12-23-98
IV-E-69		C. Caffrey, EPA, re 12-15-98 call with D. Wahl, Wahl Brothers Racing re Boswell Energy System	12-21-98
IV-E-70		C. Caffrey, EPA, re 12-98 & 1-11-99 calls with R. Alsip, Suzuki American	1-11-99

Section 2: Engine Classes, Standards, Useful Life and Related Provisions

2.1 Small Displacement Nonhandheld Engine Class

2.1.1 Summary of the Proposal

Section 90.103 of the proposed rule contained emission standards for five engine Classes (Classes I-V). EPA's NPRM discussed these standards at 63 FR at 3953-55, 3958-68. EPA did not propose to add an additional small displacement class for nonhandheld engines in the NPRM on the assumption that the proposed emission averaging program would be sufficient to facilitate compliance of these engines with the proposed Class I standards. The proposed rule did request comment on the need for a new small displacement class, in particular whether the proposed average Class I standard is sufficient to cover smaller displacement engines (see 63 FR at 3997-98). The Agency requested comment on the displacement cutoff (75cc), standard (72.4 g/kW-hr), and useful lives (125 and 250 hours) suggested by an ANPRM commenter (see Docket A-96-55, Item II-D-07).

2.1.2 Summary of the Comments

Suzuki commented that averaging will not work for them because they do not believe they will have sufficient emissions credits to offset the expected higher emissions (Item IV-D-17, p. 3). Therefore, Suzuki recommended the addition of a small displacement nonhandheld class of 100cc and less, arguing that OHV engines in this size have difficulty meeting the Phase 1 HC+NOx standards because of large combustion chamber surface-to-volume ratios. The new class will allow the use of lightweight 4-strokes in applications that require mobility but do not qualify as multi-positional under the handheld classification. The useful life standard should be 40g/kW-hr, with the same durability classes and in-use programs as proposed for Class 1 engines.

EMA requests the creation of a new class of small displacement nonhandheld engines (Class I-A), in order to fill the void in the equipment market left by products that will no longer be able to utilize two-stroke engines if the Phase 2 standards are adopted as proposed (Item IV-D-12, pp. 86-87). They stated that production of some four-stroke SV engines under 76 cc was discontinued with the advent of Phase 1 standards due to practicality, and that with Phase 2, even greater numbers of these engines would be eliminated from the market. EMA also mentioned that California had proposed an HC+NOx standard of 72 g/kW-hr for all engines below 60 cc, recognizing that engines below 60 cc are designed for functionally different sorts of equipment than those above 60 cc.

Honda commented that EPA should add a Class I-A category with the emission level harmonized at the limits of the new California 0-60cc category (Item IV-D-16, p.4-5). Honda states that the Phase 1 and Phase 2 standards for Class I are not appropriate for the smallest engines in the class and a separate class for these engines must be established. One technical limit of emission reduction ability is the decreasing displacement of an engine. The EPA Marine rule uses a curve to describe the emission limits with the limits increasing as the horsepower (and engine displacement)

decreases. The same technical situation occurs with small off-road engines. The standards should be the same as the California standards for engines less than 60cc (72 g/kW-hr).

Tecumseh commented that if there is a need for 4-stroke engines in the 50-100cc range, the engines will not meet the proposed Class I in-use standard (Item IV-D-08, p. 8). An additional class below 225cc is needed and Tecumseh suggests a 40g/kW-hr std for 50-100cc, or "perhaps just below the 100cc cut point."

2.1.3 EPA Response to the Comments

EPA is not yet in a position to finally adopt standards for a small displacement nonhandheld Class, and so is not doing so in this nonhandheld rulemaking. As discussed in the preamble to the NPRM, although EPA has considered establishing a new class for the smallest nonhandheld engines, such a class and separate standards for the class were not proposed. Rather, EPA requested comment on the need for such a class and what size engines should be included. Comments and additional information were received on this issue, as listed above, on engines similar in size to handheld engines and those nonhandheld that are less than 100cc, but EPA needs further information and time to analyze the information in order to be able to make final decisions regarding a small displacement nonhandheld class. EPA believes that the appropriate standards for these smallest nonhandheld engine classes should be considered through an additional notice and comment rulemaking and therefore will address the issues through the planned supplementary proposal for handheld engines. The comments received to date in response to the January 1998 NPRM will be considered as part of the supplemental proposal and final rulemaking process for handheld engines.

2.2 Lead Time

2.2.1 Summary of the Proposal

Table 2 of Section 90.103 of the NPRM listed the proposed implementation dates for the Phase 2 standards (see 63 FR at 4010). The proposed dates were 2001 for Class I, 2001-2005 for Class II engine families. The Phase I standards came into effect in model year 1997 for all nonhandheld engines.

2.2.2 Summary of the Comments

MECA commented that EPA should give appropriate lead time necessary to apply the more stringent California Tier 2 standards nationwide (Item IV-D-13, p. 1).

EMA/OPEI commented that the Class I standards are the most stringent as can be achieved in the lead time provided (Item IV-D-12, p. 10). They suggested waiting for completion of the OHV Demonstration Program designed to investigate the potential for increasing penetration of OHV

technology into the Class I engine market, discussed at 63 FR at 3954, before considering more stringent Class 1 standards (p. 15). EMA/OPEI also commented that the feasibility of the Class II standards is dependent upon the proposed five year phase-in period (p. 15)

2.2.3 EPA Response to the Comments

EPA's response to these comments are set forth in the following two sections on HC+NOx Emission Standard Feasibility for each Class (2.3 for Class I and 2.4 for Class II).

2.3 Class I - HC+NOx Emission Standard Feasibility

2.3.1 Summary of the Proposal

Section 90.103(a) Table 2 of the NPRM contains the proposed in-use standards for Class I. See 63 FR at 4010. The HC+NOx proposed standard for Class I engines was 25 g/kW-hr, effective in 2001. Averaging, banking and trading was proposed to be available for HC+NOx emissions. EPA discussed the proposed standards at 63 FR 3953-55, 3958-68. EPA requested comment on a number of items in the NPRM for the Class I standards.

First, EPA requested comment on the market concerns expressed by engine manufacturers on the potential impact on lead time associated with more stringent Class I standards and the potential for delay in at least the near term emission reduction benefits available from Class I engines if more stringent standards were adopted. See 63 FR at 3960-61. Second, EPA requested comment on whether the application of emission control technologies being considered at that time by the California ARB are appropriate for a federal program at this time, on the level of emission control expected from application of these technologies, and on what adjustment to the proposed federal program might be necessary to accommodate standards which would require such widespread application of OHV and catalyst technology[2]. Id. Third, EPA requested additional supporting information regarding this issue to be made available to the Agency through public comments on the proposed rule in order to supplement that which informed EPA's analysis of California ARB's proposed levels and EPA's cost estimates of converting Class I engines to OHV. Id. Lastly, the Agency requested comments on all aspects of the proposed Class I standards. Id.

2.3.2 Summary of the Comments

EMA/OPEI commented on the potential for Class I standards to be based on OHV levels (Item IV-D-12, p. 10-15). They commented that manufacturers simply do not have the OHV technology that can be applied to Class I engines within the time frame of the proposal (model year

[2]Note that the modifications to MSC 98-02 made available at California's the March 26, 1998 public hearing, contain only "OHV level" standards for Class I and Class II, and not the "Tier 3" "catalyst-level" standards (see Item IV-G-07).

2001), and that achieving such levels would require substantial capital investment. If OHV is required with no change in implementation date, manufacturers would have to adopt interim technology, such as catalyst, which would require two changes in equipment re-design (first catalyst, then OHV), they claimed. If a standard were based on OHV for Class I it should be 16.1 g/kW-hr, EMA argued.

Tecumseh submitted comments that the proposed Class I standards are feasible and cost-effective (Item IV-D-08, p. 4). If EPA were to propose a Class I level based on 100 percent OHV engines, the in-use standard should be 16.1 g/kW-hr, not the 15.0 value EPA suggested, Tecumseh claimed.

Briggs & Stratton commented that they supported EMA's comments regarding Class I (Item IV-D-20, p. 1). Several factors limit the ability of engine manufacturers to meet a Class I standard based on 100 percent OHV in the time frame of the NPRM, they argued. Principally, the capital costs that manufacturers would have to make would cause market shortages and disruptions and prolonged service life for existing engines and equipment, decreasing any possible emission benefits and resulting in unwarranted cost increases for new Class I engines, they claimed. This position was supported by several pages of more detailed information.

STAPPA/ALAPCO commented that the Class I standards are severely lacking (Item IV-D-15, pp. 4-5). They claimed that Class I levels should be based on requiring OHV engines and/or use of a catalyst. The incremental difference between the estimated costs of improving SV compared to conversion to OHV is small, they argued, and may be outweighed by fuel savings costs. They stated that EPA should tighten Phase 2 standards, or, at a minimum, commit to a technology review and potential Phase 3.

MECA submitted comments that the EPA should adopt California ARB standards (Item IV-D-13, p. 1). The basis for this comment was the California ARB February, 1998 Staff Report that discussed whether Tier 2 levels are feasible and cost effective. Catalyst are cost effective options, and standards should be based on catalysts, MECA argued. Information in support of this position was presented in MECA's comments and is summarized below.

MECA states that developments since the SOP was signed in May 1996 clearly indicate that significantly greater emission reductions are feasible and cost effective, and can be met far sooner than called for in EPA's proposal. EPA should reconsider catalysts as a feasible technology. Specifically, MECA recommends that EPA promulgate final standards which align more closely to California's proposed Tier 2 standards, allowing appropriate lead time for implementation of the California standards nationwide. In support of this, MECA stated "The ARB Staff report (page 25) identified six non-handheld engine families that have certified at levels which meet or approach the 3.2 g/bhp-hr HC+NOx level ARB originally adopted for its Tier 2 non-handheld engine standards. Even assuming the highest engine deterioration rates cited by engine manufacturers, these engines would emit well below EPA's proposed non-handheld engine Phase 2 standards."

MECA also states "cost effective catalyst technology is available for both side valve and

overhead valve engines to achieve additional HC+NOx reductions of 40-50% reduction beyond the engine levels achieved in meeting the proposed standards. Application to nonhandheld engines has been demonstrated. In Europe, nearly 100,000 catalyst equipped lawnmowers have been sold. In the U.S., over 80,000 catalyst-equipped lawnmowers have been sold to assist in meeting California Tier I and Federal Phase 1 standards and that number could reach 150,000 bye the end of 1998. In addition, over 25,000 small four stroke engines used on equipment indoors have been equipped with catalysts to meet OSHA requirements.

MECA disagrees with EPA's analysis regarding catalyst durability on nonhandheld engines. Catalysts designed for use on engines certified to meet EPA's Phase 1 standards must pass a rigorous thermal aging evaluation. In addition, engine manufacturers typically subject catalysts to severe mechanical durability tests. MECA submitted one durability illustration of an HC optimized catalyst on a Class I 5.5 hp engine which shows modest deterioration of HC emissions over 100 hours.

Lastly, MECA acknowledges that EPA must consider changes to the engine that are necessary in order to achieve reasonable catalyst efficiencies for the regulated useful life of the engine. Engine changes from the current nonhandheld engine design are required to achieve catalyst efficiencies of 40%-50% at the end of a non-handheld engine's regulatory useful life. Design improvements such as lowering scavenger losses, improved combustion efficiency, leaner engine settings and improved fuel delivery are possible strategies. The addition of air will also be part of the control strategy, but this can be achieved by using a pulse valve or even a simple opening. Also, the muffler must be designed to house a properly sized catalyst. Production tolerances likely would need to be improved, for example, to better control for oil consumption, and possibly more durable parts employed, but these types of improvements likely will occur in any event as engines are required to meet tighter emission standards for their useful lives. The types of changes needed are principally design and product improvements.

2.3.3 EPA Response to the Comments

At the time of the NPRM, EPA believed that Class I engine manufacturers would have to incorporate engine improvements in order to meet the proposed Phase 2 standards for Class I. However, several things have happened since the publication of the NPRM. First, a review of the most up-to-date certification database (September 1998)[3] for Class I engines reveals that only one engine manufacturer would not be expected to already meet the proposed Class I standard (given

[3] Engine families, Phase 1 certified new engine levels and assumed deteriorated emission levels can be found in the Final Regulatory Impact Analysis Phase 2: Emission Standards for New Nonroad Nonhandheld Spark-Ignition Engines At or Below 19 Kilowatts, Appendix B. The analysis also included confidential production estimates which cannot be disclosed.

current certification values and an assumed deterioration based on data submitted by industry)[4]. Secondly, since the time of publication of the NPRM, the California ARB has adopted more stringent standards for Class I engines which are based on only OHV technology (Item IV-G-07). Thirdly, industry's comments have included statements that "if ...EPA determines that further emission reductions from Class I engines might be cost-effective, the Agency always can initiate a rulemaking under which manufacturers would be provided sufficient leadtime to achieve those reductions" (IV-D-12, p.15).

In light of these actions, EPA met with manufacturers of Class I engines on a number of occasions since the NPRM regarding the feasibility of the federal program to require the Class I engines to meet the California ARB level standard (16.1g/kW-hr HC+NOx at the appropriate useful life) including time line, cost and marketplace impacts (see Items IV-E-15, IV-E-46, IV-E-48, IV-E-55, IV-E-57, IV-E-58, IV-E-59, IV-E-60, IV-E-64). The technology discussed was the conversion of Class I engines to OHV design. ABT was also discussed in terms of expanding the program to allow cross class averaging across both classes now that the Class I standard was more stringent.

Based on the discussions with the industry, noted above, and an updated cost analysis[5], EPA is determining that more stringent standards than EPA proposed are feasible and cost effective, if manufacturers are provided additional lead time in this rulemaking to achieve the lower emission standards. EPA is finalizing an standard of 16.1g/kW-hr for HC+NOx for Class I engines, to be phased in, by requiring that any new models introduced after August 1, 2003, meet the HC+NOx standard of 16.1g/kW-hr, and that all engines meet the standard by August 1, 2007, along with a cross class ABT program. The time line has been determined based on discussions with the two major engine manufacturers that this final standard will impact the most, Briggs & Stratton and Tecumseh (Item II-E-15). The long time line is rationalized based on the high volumes of engines found in this class (7.2 million SV engines, 53% of Class I engines, 43% of all nonhandheld engines) and the capital cost required to convert to OHV engine design[6]. In addition, the engine manufacturers that will need to do major improvements to meet this Class I standard will also need to be incorporating changes to their Class II engine families, which further supports providing an extended lead time period.

The minimum useful life for the Class I standard is raised to 125 hours from the NPRM stated 66 hours. This is more consistent with the number of hours required by the California ARB

---

[4] Final Regulatory Impact Analysis Phase 2: Emission Standards for New Nonroad Nonhandheld Spark-Ignition Engines At or Below 19 Kilowatts, Chapter 3 pp. 3-8, and Item II-D-11

[5] Final Regulatory Impact Analysis Phase 2: Emission Standards for New Nonroad Nonhandheld Spark-Ignition Engines At or Below 19 Kilowatts, Chapter 7.

[6] Final Regulatory Impact Analysis Phase 2: Emission Standards for New Nonroad Nonhandheld Spark-Ignition Engines At or Below 19 Kilowatts, Chapter 4.

and is supported from several data sources including a report sponsored by ARB and another by OPEI. The report sponsored by ARB was completed by Booz, Allen and Hamilton (Docket A-93-25, Docket Item II-I-02.) which included estimates of usage rates and life spans for several categories of nonroad equipment powered by small engines. For Class I residential use lawnmower engines, the report stated that residential lawnmower average lifespan use was 141 hours (20 hours per year at 7.04 years per average lawnmower). From the 1992 OPEI Residential Phone Survey (Docket A-96-55, Item II-D-13), the hours at which 50% of the most populous equipment type in this class, lawnmowers, from one model year are no longer in service, was 100 hours (20 hours per year at 5 years per average lawnmower).

Comments have been received to set standards based on OHV+catalyst on nonhandheld engines. The final standards for Class I and II are stringent and therefore this offers an opportunity for catalysts to compete with other technologies for the nonhandheld market. The standards have not been set based on OHV with any conversion efficiency catalyst due to current estimates of the resultant cost of compliance to Phase 2 standards for low cost residential engines/equipment. In addition to the cost of the catalyst and related hardware, MECA's comments also included improvements to the engine that are needed in regards to the ability of the catalyst to maintain high conversion efficiency in the environment of small engines. The cost effectiveness of adding catalysts on top of requiring conversion from SV to a clean OHV (assuming this would solve MECA's concerns) would, based on current estimates, push the cost of complying with the Phase 2 standards considerably higher. An opportunity does exist for catalyst manufacturers in the area of OHV engines, for a number of OHV engines must be emissions improved in order to allow the "all OHV" engine manufacturers to comply with the Phase 2 standards.

2.4 Class II - HC+NOx Emission Standard Feasibility

2.4.1 Summary of the Proposal

Section 90.103(a) Table 2 of the NPRM contains proposed in-use standards for Class II engines. The HC+NOx proposed standard for Class II engines is a declining standard from 18 g/kW-hr to 12.1 g/kW-hr beginning in 2001 to 2005. EPA discussed the proposed standards at 63 FR 3953-55, 3958-68. Class II SV engine families under 1000 in production could meet an HC+NOx standard of 24 g/kW-hr. Averaging, banking and trading could be used in this program for HC+NOx.

For Class II, the Agency requested comment on all aspects of the proposed Class II standards, especially data, analyses and other information on the expected emission performance capabilities of Class II engines designed for in-use operating lives of 500 hours and 1000 hours (63 FR 3963-3964).

2.4.2 Summary of the Comments

Tecumseh submitted comments that EPA correctly observed that the current Class II market

contains many side valve engines but there is a significant trend to OHV and the phase in time provided will assure that this trend continues in a logical and cost effective manner. The agency also correctly proposed a phase in schedule for the Class II engines to meet the extremely tight 12.1 gr/kw-hr standard (IV-D-08, pp.2-3).

EMA comments are contained in Item IV-D-12, pp. 15-20. EMA commented that the Class 2 proposed standards are feasible and the most stringent standards available considering the lead time. For Class II standards to be based on OHV plus a catalyst, EMA states several technical and practical challenges would exist. First, EMA describes an analysis performed by NERA, using industry supplied data, on the cost effectiveness of this option (catalysts) being $22,533/ton which is more than 6 times as expensive as the most expensive regulation in the 1990's. In addition, there are other concerns with the use of catalysts including extreme temperatures, oil carryover rates, limited space for converter, and the physical location of the converter relative to the engine all contribute to make durability a significant technical challenge for small engine applications. Also, given the lead time of the rulemaking, engine and equipment manufacturers will need the time in order to meet the proposed Phase 2 standards by making significant capital investments, modifying facilities, and expand capacity to produce new, lower-emitting engines on a nationwide basis. Equipment manufacturers must redesign and integrate the engines into their equipment. The 12.1 level is the most stringent standard and many models are not yet certified with higher emission levels which would have effected EPA's analysis and resulted in a higher standard.

STAPPA and ALAPCO commented (IV-D-15, pp.4-5) that they applaud EPA's decision to adopt standards for Class II nonhandheld engine that promote the conversion to superior overhead valve (OHV) engines. STAPPA and ALAPCO also "urge EPA to tighten the Phase 2 standards or, at a minimum, commit to a technology review for Class I and II engines and to promulgating appropriate Phase 3 standards for these categories in a similar time frame to that proposed for handheld engines. Consistent with the approach taken in California, we believe that EPA should assess both the shift to OHV technology for Class I engines and the viability of catalysts to further lower engine emissions from both Class I and II engines."

EPA received one data point on emission deterioration from a Class II engine aged out to 1000 hours that the commenter requested be treated confidentially.

MECA's comments (Item IV-D-13) on more stringent standards can be found in section 2.3.2.

2.4.3 EPA's Response to the Comments

EPA, industry and states agree that the Class II emission level is the most appropriate considering time line, technical feasibility and cost. Standards are not based on conversion to clean OHV plus a catalyst based on the reasoning given in 2.3.3. While the cost per engine is not as significant as that for a low cost consumer engine, the applicability of catalysts to all application types is still in question, as well as the deterioration characteristics of higher conversion efficiency catalysts. The standards do anticipate clean OHV technology and engine manufacturers may choose

to utilize catalysts as part of their low emissions package.

2.5 Nonhandheld Engine Standards and Durability at Longer Useful Lives

2.5.1 Summary of the Proposal

Table 1 in 90.104(g)(1) of the proposed rule contains assigned HC+NOx and NMHC+NOx deterioration factors for nonhandheld Phase 2 OHV engines without aftertreatment. The factors are 1.3 for all three useful lives for Classes I and II. EPA's NPRM discusses this topic at 63 FR 3963-3964.

2.5.2 Summary of the Comments

Tecumseh commented (Item IV-D-08, p.4) "we do agree that the engines designed for 500 and 1000 hour life periods will deteriorate at a lower rate per hour than the engines designed for 250 hour life period. ... the standards as proposed assume that the engines designed for 500 hour life will have an equivalent DF of 1.15 at 250 hours and the engines designed for 1000 hours will have an equivalent DF of 1.075 at 250 hours. None of the industry or EPA in-use data to date supports this assumption."

EMA commented (Item IV-D-12, pp.57-58) that the deterioration factor for Class II engines should be 1.4 for category B and 1.5 for category A, with an appropriate change in the standard (e.g. category A = 14.0). In addition, they state that the proposal makes the standard more stringent and no industry or EPA in-use data supports the 1.3 df at 1,000 hours. "The deterioration data that has been generated and EPA's understanding of the emission performance of small gasoline engines precludes it from assigning a 1.3 df for Categories A and B". Staying with a 1.3 df is an impediment to the voluntary certification of engines to longer useful lives.

STAPPA/ALAPCO (Item IV-D-15) commented that they do not support higher deterioration factor or higher standards for longer useful life categories.

2.5.3 EPA's Response to the Comments

The data supplied by the industry does include at least one data point that shows that more commercially geared equipment can have deterioration rates lower than the 1.3 df at 1000 hours. Additional data submitted during the comment period that was requested to be treated confidentially supports this 1.3 df. Engines designed for commercial use and larger useful hours have design features which enhance their emission durability (hardened valve seat, added piston rings, etc.) which substantiate the ability to comply with the same numeric standard even at higher useful life hours. Engines designed for residential use have shown that 1.3 is too low, however the lower useful life categories are for their use and therefore 1.3 is appropriate.

Reconsideration of the industry data received after the SOP's, ANPRM and NPRM revealed

that the deterioration factors for SV and OHV engines are similar in Class II and thereby do not lend support to an assigned df for OHV engines. The data does consistently show that OHV engines have lower new engine emissions and therefore are a preferred technology over the SV engine design. EPA has therefore restructured the certification program in order to allow manufacturers to determine their own FEL's at all useful lives for all engine technology types. This step is in harmony with California ARB standards and engine manufacturers can now use testing performed for California ARB certification as part of their compliance with EPA's Phase 2 requirements.

2.6 CO Standard and the CO Reporting Requirements

2.6.1 Summary of the Proposal

Section 90.103 Table 2 contains the proposed standards for nonhandheld engines. The CO proposed standard is 610 g/kW-hr for Classes I and II. EPA's NPRM discusses this topic at 63 FR 3967-3968. EPA requested comment on the following: "CO emissions from small engine swill likely continue to decrease as manufacturers improve production quality (reduce tolerances and variability) and improve durability to meet the more stringent HC+NOx standards proposed for Phase 2. To the extent that this does occur, and Phase 2 engines are shown to clearly achieve the Phase 2 CO emission standards, the proposal would allow EPA the flexibility to waive the reporting of CO emission in the future, thereby decreasing the compliance costs associated with the program as it transitions to one more focussed on HC+NOx emissions."

2.6.2 Summary of the Comments

EMA commented (Item D-16, pp. 21-22) that "Engine and equipment manufacturers support EPA's overall proposal concerning the Phase 2 CO standard. In particular, they urge the Agency to finalize - and thereafter exercise - its proposed authority to waive future reporting of CO emissions." The compliance responsibilities are extensive and any relief of burden will be seen as necessary and a cost savings.

2.6.3 EPA Response to Comments

The CO standards are a cap for all classes and nearly all engine families will likely fall well below the cap for Phase 2 based on a calculation of current Phase I certification values and an assumed deterioration. In addition, the technology expected to be used to meet Phase 2 emission levels, such as enleanment and engine redesign, will likely result in better fuel consumption and thereby lower CO emissions. However, EPA is still requiring that manufacturers report CO through Phase 2 for EPA is of the opinion this data is very useful in assuring no increase in emissions. Recording and reporting CO is only a minimal burden to the industry for manufacturers are currently measuring and recording CO in order to assure test validity, and they are currently reporting CO for Phase I.

2.7 Class I&II Category C (66 hour/250 hours)

2.7.1 Summary of the Proposal

Section 90.105(a)(2) Table 1 lists the proposed useful life categories for nonhandheld engines. The proposed useful life categories for Class I engines are 66, 250 and 500. The proposed useful life categories for Class II are 250, 500 and 1000 hours. EPA's NPRM discusses this topic at 63 FR 3968-3970.

2.7.2 Summary of the Comments

EMA commented (IV-D-12, pp. 24-25) that it supports EPA's proposal that the lowest useful life category for Class I engines should be 66 hours, and the lowest useful life category for Class II should be 250 hours.

2.7.3 EPA's Response to the Comments

As a result of discussions held with Briggs and Stratton and Tecumseh on alignment of EPA's Class I standards with the small engine standards set by the California ARB, it was agreed that the Class I minimum useful life hours for certification would be 125 hours. This would better harmonize the California and EPA programs, and possibly streamline the certification burden for manufacturers selling engines in California and other states. No design changes are anticipated to be necessary to meet the 125 hour standard compared to a 66 hour standard.

Table 2-2
USEFUL LIFE CATEGORIES

CLASS I				
EPA	125	250	500	--
ARB	125	250	500	--
CLASS II				
EPA	--	250	500	1000
ARB	125	250	500	--

2.8 Selection of Useful Life Category

2.8.1 Summary of the Proposal

Section 90.105(a) of the proposed rule states that manufacturers shall declare the applicable

useful life category for each engine family at the time of certification as outlined in this section. Unless otherwise approved by the Administrator, guidelines include that the category shall be the category which most closely approximates the actual useful lives of the equipment into which the engines are expected to be installed. Manufacturers shall retain data appropriate to support their choice of useful life category for each engine family. Such data shall be sufficient to show that the majority of engines or a sales weighted average of engines of that family are used in applications having a useful life best represented by the chosen category. The rule then lists data that shall be furnished to the Administrator upon request. EPA's NPRM discusses this topic at 63 FR 3970-3971.

2.8.2 Summary of the Comments

EMA commented (IV-D-12, pp.25-28)that the selection of the useful life category is to be solely at the discretion of the engine manufacture, as stated in the SOP. EPA failed to propose this, which undermines the SOP process. The nonhandheld industry is not vertically integrated, and therefore manufacturers do not know where their engines are going. It is unlikely that a consumer would purchase an engine designed for commercial use, and vice-versa, but, it could happen. The market place will properly take care of a manufacturer who tries to game the system. Retaining records will be a significant burden on the industry. Any requirements for the manufacture to justify their selection is unnecessary and not cost-effective.

Honda commented (Item IV-D-16, pp.3-4) that they interpret the proposal to mean the useful life equals product of equipment life times engine sales, summed for every model in an engine family and divided by total sales. The Agency's proposal for useful life categories are, at best, very rough estimates. Problems with the proposal include: (1) nonhandheld engine-equipment industry is non-integrated, (2) the engine manufacturer has limited information on engine usage, (3) the basic problem with existing data is that no one really knows how long engines are used in the market place. The Agency should allow the market to compel manufacturer's to choose the appropriate category

2.8.3 EPA's Response to the Comments

EPA proposed that the engine manufacturers would be responsible for assuring that the correct useful life was used for certification demonstration and labeling purposes. Specific criteria were proposed which the manufacturers would have had to evaluate and use in documenting their determination of useful life category selection. Comments received suggested such a requirement was overly rigid and unnecessary. EPA remains very concerned that the manufacturers select the most appropriate useful life category for each engine to assure it is properly evaluated during certification and to assure that any averaging, banking and trading program which allows the exchange of emission credits across engine families in different useful life categories is also fair and environmentally neutral. However, so as not to add potentially unnecessary burden on the industry, these rules adopt a less rigid methodology for determining useful life categories. Rather than mandating a fixed set of criteria, these rules rest the responsibility with the industry to make their best, most conscientious selection. EPA expects that manufacturers of Class I and II engines will

have a good idea of the types of equipment in which their engine is typically used and, from their marketing information, a reasonably accurate projection of the relative volumes in such typical applications. While these final rules leave that responsibility to the manufacturer, EPA expects to periodically review the manufacturers' decisions to assess whether this regulation is being properly implemented or if modifications to these rules are appropriate. EPA notes that this approach results in the same regulatory requirement as the State of California, eliminating any extra burden in this regard due to federal rules.

2.9 Useful Life Hours on Engine Label

2.9.1 Summary of Proposal

Section 90.114(c)(11) of the proposed rule states "For nonhandheld Phase 2 engines, the useful life category as determined by the manufacturer pursuant to section 90.105. Such useful life category shall be shown by one of the following statements to be appended to the statement required under paragraph (c)(7) of this section: (i) "EMISSIONS COMPLIANCE PERIOD: [useful life] HOURS": or (ii) "EMISSIONS COMPLIANCE PERIOD: CATEGORY [fill in C, B or A as indicated and appropriate from the chart in section 90.105], REFER TO OWNER'S MANUAL FOR FURTHER INFORMATION";. Paragraph (f)(1) of this section states "Manufacturers electing to use the labeling language of paragraph (c)(11)(ii) of this section must provide in the documents intended to be conveyed to the ultimate purchase, the statement: The Emissions Compliance Period referred to on the label entitled "Important Engine Information" indicates the number of operating hours for which the engine has been shown to meet Federal emission requirements. For engines less than 225cc displacement, Category C=66 hours, B=250 hours and A=500 hours. For engines of 225cc or more, Category C=250 hours, B=500 hours and A=1000 hours."

EPA requested comment in the preamble on whether allowing a manufacturer to instead designate the useful life by using Category [A, B or C] on the engine's label, with information on the emissions compliance period in hours in the owners manual, is an effective substitute to achieve the goals of educating consumers. EPA requested comment on an option for handheld engines which would allow handheld engine manufacturers to use a label statement which would include a useful life category code (such as A, B, or C) and referencing the owner's manual to determine what the code means. EPA's NPRM discusses this topic at 63 FR 3968-3970.

2.9.2 Summary of Comments

EMA submitted comments (Item IV -D-12, pp. 28-29) that engine and equipment manufacturers discussed this issue at length with EPA during the SOP process. Requiring that useful life number be put on the engine label could be misleading and could cause confusion in the marketplace because consumers will think the number means something that it does not (i.e.: "useful life" for emissions certification may be taken as the life of the equipment, or take emissions performance as product performance). Yet, because it is a number and appears to be understandable, consumers will not take the time to investigate further its true meaning. That is an

unacceptable result. EPA should finalize in its rule the option that manufacturers label their products as Category C, B or A and refer the purchaser to the owner's manual for a full description of the meaning of the emission compliance period. The letter category designations will not automatically confuse consumers. Indeed, consumers will be directed to a place where a full explanation can be provided.

NAEDA commented (Item IV-D-01) that EPA should know that a buyer would not know the meanings of Category A, B, or C prior to purchase of the equipment for the information would be in the manual that the consumer receives upon purchase. Also, EPA should require that all manuals explain information on emission compliance period.

2.9.3 EPA's Response to Comments

Given the comments provided on this issue, EPA has decided to require that, for Phase 2 engines, the useful life category shall be shown by one of the following statements: (i) "EMISSIONS COMPLIANCE PERIOD: [useful life] HOURS"; or (ii) "EMISSIONS COMPLIANCE PERIOD: CATEGORY [fill in C, B or A as indicated and appropriate from the tables in §90.105], REFER TO OWNER'S MANUAL FOR FURTHER INFORMATION". Manufacturers electing to use the labeling language of (ii) must provide in the documents intended to be conveyed to the ultimate purchaser, the statement: For nonhandheld engines: The Emissions Compliance Period referred to on the label entitled "Important Engine Information" indicates the number of operating hours for which the engine has been shown to meet Federal emission requirements. For engines less than 225 cc displacement, Category C= 125 hours, B= 250 hours and A = 500 hours. For engines of 225 cc or more, Category C = 250 hours, B = 500 hours and A = 1000 hours. The manufacturer must provide, in the same document as the statement, a statement of the engine's displacement or an explanation of how to readily determine the engine's displacement. The Administrator may approve alternate language to the statement provided that the alternate language provides the ultimate purchaser with a clear description of the number of hours represented by each of the three letter categories for the subject engine's displacement.

Section 3: Certification Averaging, Banking, and Trading

EPA proposed a comprehensive certification averaging, banking and trading (ABT) program for nonhandheld engines in tandem with the proposed standards (see 63 FR at 3971-3976). The currently effective Phase 1 requirements for small SI engines do not include a certification ABT program. The primary features of the proposed program were as follows: Credits generated from nonhandheld engines certified to the proposed standards would have an unlimited credit life; credits would be available for complying with the proposed HC plus NOx standards; there would be no discounting of credits; and credits would be calculated on a sales-weighted average maximum modal power basis. EPA proposed to allow early generation of credits if a manufacturer's entire nonhandheld engine product line in a given class met the proposed 2001 standards. EPA also proposed to allow limited cross-class trading of credits from Class II engines to Class I engines if the manufacturer meets the OHV emission performance (OEP) phase-in schedule for Class II engines. Finally, EPA proposed to allow the use of certification ABT credits to address in-use noncompliance problem under certain circumstances. For a detailed discussion of the proposed ABT program and the rationale for the proposal, see the proposal preamble beginning at 63 FR 3971.

The following is a summary of the comments EPA received on the various aspects of the proposed certification ABT program and EPA's analysis and response to those comments.

3.1 General Comments

3.1.1 Summary of the Proposal

In an effort to provide manufacturers with an incentive for the early introduction of clean technologies and flexibility in meeting the proposed standards, EPA proposed the first certification ABT program for small nonroad SI engines.

3.1.2 Summary of the Comments

EPA received two comments on the general nature of the certification ABT program for nonhandheld engines. STAPPA/ALAPCO (IV-D-15, page 6) supported the ABT program, while one individual (IV-G-02, page 3) seemed to question whether a certification ABT program was an "unduly burdensome" compliance program.

3.1.3 EPA Response to Comments

EPA continues to believe a certification ABT program for nonhandheld engines is appropriate given the stringency of the final Phase 2 standards, and the Agency is adopting an ABT program in order to help ensure the achievability of the new Phase 2 standards. The ABT program should provide an incentive for early introduction of clean technologies and should also aid manufacturers in complying with the new standards. Because the ABT program is a voluntary

program, EPA does not believe that it creates an unduly burdensome program for manufacturers. EPA has developed a program that is simple and straightforward for the engine manufacturers while providing adequate assurance that the environmental benefit of the new standards will not be compromised.

3.2 Use of Sales-weighted Power in Credit Calculations

3.2.1 Summary of the Proposal

In determining the number of certification credits an engine family could generate or would need to use, EPA proposed that manufacturers use the sales-weighted maximum modal power for all of the configurations within an engine family. See 63 FR at 3973-3974. EPA noted in the proposal that it assumed manufacturers knew the general power characteristics of all engine configurations within an engine family and that, therefore, determining the power information necessary for calculating ABT credits would not place any additional testing burden on manufacturers. EPA requested comment on this assumption.

3.2.2 Summary of the Comments

EMA and OPEI (IV-D-12, pages 30-32) and Tecumseh (IV-D-08, page 5) argued that EPA's proposed requirement to determine the sales-weighted average maximum modal power across all configurations in a family would represent a standard that is unduly burdensome and provide negligible, if any, environmental benefit. They noted that manufacturers do not routinely generate maximum modal power data for every available engine configuration. They suggested that the power value used in the credit calculations should be the maximum modal power of the certification test engine as measured during the official certification test. They also commented that if an individual manufacturer desired to use modal-specific power and sales to determine ABT credits, it should have the option to do so.

3.2.3 EPA Response to Comments

In reviewing the comments, EPA investigated the number of engine families that contain multiple configurations. Of the roughly 200 Class I and Class II engine families certified for the 1998 model year, approximately 25% contained more than two engine configurations. Because manufacturers are not required to test every engine configuration in a given engine family for emissions certification purposes (they are required to test only the worst case engine configuration), for a large number of families, manufacturers would have to significantly increase the amount of testing they perform in order to determine the power information necessary for the ABT credit calculations as proposed. EPA agrees with the manufacturers that such a requirement in the Phase 2 Small SI nonhandheld engine ABT program would create a heavy burden in many instances for little or no benefit. Although the number of credits used or generated by an engine family based on the maximum modal power of the certification engine will be different than if the credits were based on a sales-weighted maximum modal power of all engine configurations within that family, EPA

believes that the overall credit balance, factoring both credits generated and credits used, would not be greatly affected. Any impact on credit generation should be offset to a similar degree when determining credit usage. If credits from the small SI nonhandheld engine ABT program were allowed to be used outside the small SI nonhandheld engine category, then allowing manufacturers to base credit calculations on the maximum modal power from the certification test engine could be problematic. This would especially be true if the other credit program calculated credits differently from the small SI nonhandheld engine ABT program. However, EPA is not allowing the use of credits from the small SI nonhandheld engine ABT program to be used outside of the small SI engine category and therefore the Agency is not concerned about the use of the maximum modal power based on only the certification test engine. For all of these reasons, EPA is revising the credit calculation equation to require the use of the maximum modal power from the certification engine instead of the sales-weighted maximum modal power for all configurations in that family. EPA believes it is important to make this the requirement for all engine families instead of allowing the manufacturers to choose which way they would like to calculate their credits. Allowing manufacturers the option of using the maximum modal power of the certification engine or the sales-weighted maximum modal power of all engine configurations would allow a manufacturer to game the system to pick the maximum modal power value most favorable to their situation (i.e., the bigger power value for credit generation or the smaller power value for credit usage). In contrast, establishing one methodology assures equitable treatment for all manufacturers.

3.3 Use of Sales Estimates in Credit Calculations

3.3.1 Summary of the Proposal

In determining the number of credits an engine family could generate or would need to use, EPA proposed that manufacturers use the number of Phase 2 engines sold in the United States based on the point of first retail sale, excluding those engines subject to California regulations. See 63 FR at 3973. Exported engines would not be included in the sales number unless such engines were reimported into the United States. Due to manufacturer concerns regarding the difficulty in tracking retail sales for the nonroad small SI market, EPA requested comments on alternative methods for determining sales.

3.3.2 Summary of the Comments

EMA and OPEI (IV-D-12, pages 32-34) commented that because the small SI nonhandheld engine market is, for the most part, not integrated, engine manufacturers have little or no ability to track the sales of loose engines once they leave the manufacturer's distribution facility. Therefore, they recommended that EPA should allow manufacturers to use the number of engines produced for the 50 states, minus the engines projected to be produced for use in California and excluding the number of engines identified by the first level of distribution as intended for export. They argued that allowing manufacturers to use production-based accounting rather than sales-based accounting would be consistent with the requirements for the State of California's quality audit program, would ease the administrative burden on industry, and would have no adverse consequences to the

environment. Honda (IV-D-16, pages 7-8) commented that engine imports and exports to the United States and California sales cannot be accurately assessed without worldwide knowledge of OEM sales. Instead, they recommended that EPA should accept the engine manufacturer's best effort to estimate its 49-state sales as long as consistent methods are being used for both credit generation and credit use. One individual (IV-G-02, page 3) commented that EPA should allow manufacturers to include engines produced to meet the California emission standards in their sales estimates for the ABT program. He did not understand why manufacturers would have to exclude such clean engines from the ABT program.

3.3.3 EPA Response to Comments

EPA agrees with manufacturers that the small SI nonhandheld market is not integrated, unlike other mobile source industries such as motor vehicles or other nonroad industries. In most cases, engine manufacturers sell their engines to nonhandheld equipment makers who install the engines in nonroad equipment. The equipment manufacturers sell their nonhandheld equipment either to distributors, who in turn distribute the equipment to the retail level, or directly to the retail level. Finally, consumers purchase the equipment at the retail level. Requiring an engine manufacturer to accurately track retail sales of nonhandheld equipment using its engines would be very difficult. EPA believes that allowing small SI nonhandheld engine manufacturers to estimate the number of engines sold in the United States, excluding engines sold in California or exported out of the United States, based on production estimates should provide an appropriately accurate estimate of sales. Therefore, EPA will allow manufacturers to estimate sales based on 49-state production estimates for credit calculation purposes. This will address the unique difficulties the small SI nonhandheld engine manufacturers would face if forced to track engines to the point of first retail sale.

In response to the comment regarding the inclusion of engines sold in California, EPA believes it would be inappropriate to include such engines in the federal ABT program for nonhandheld engines, since doing so could ultimately reduce the emissions benefit of the federal program. California has its own requirements for small SI engines that manufacturers must meet, including a certification ABT program. If a manufacturer wishes to generate or use credits for engines sold in California, the manufacturer must apply under the California program. If a manufacturer were allowed to calculate credits under the federal ABT program for engines sold in California, then the manufacturer could potentially direct all low-emitting engines to California and sell higher-emitting engines outside of California, without selling any lower-emitting engines in the 49 states to offset the dirtier engines.

3.4 Determining Credits based on Quality Audit Report Compliance Margins

3.4.1 Summary of the Proposal

To determine the number of credits an engine family could generate or would need to use, EPA proposed that manufacturers establish a family emission limit (FEL) for engine family. The

FEL is the level to which the manufacturer is held responsible for compliance purposes instead of the emission standard.

3.4.2 Summary of the Comments

Tecumseh (IV-D-08, page 5) commented that manufacturers should be allowed to calculate credits based on the compliance margin as demonstrated in the quarterly quality audit reports as calculated from the appropriate FEL, supporting what the California ARB had proposed as part of its program for small SI engines.

3.4.3 EPA Response to Comments

EPA does not believe that any change is necessary to the ABT program to allow manufacturers to determine credits based on the compliance margin as demonstrated in the quality audit reports. Under the ABT program adopted by EPA, a manufacturer is allowed to establish its own FEL for each family. If a manufacturer wishes to change its FEL for a given family, either lowering or raising the FEL, it is allowed to do so. Therefore, if a manufacturer believes that the results from quality audit reports required by the California ARB warrant a lower FEL, then it may officially submit a running change to the certification for its engine family and determine subsequent ABT credits based on the revised FEL.

3.5 Small Volume Manufacturer and Small Volume Engine Family Flexibility

3.5.1 Summary of the Proposal

In order to help small volume engine manufacturers and small volume engine families meet the proposed standards, EPA proposed several compliance flexibilities for engine manufacturers. See 63 FR at 3973-3974 and 3992-3996. Two of these flexibilities had implications for the nonhandheld engine ABT program. First, EPA proposed that small volume Class II engine manufacturers (defined as manufacturers that produce less than 10,000 engines per year) could defer compliance with the Class II standards until the last year of the phase-in. In exchange, such manufacturers would have to certify to an HC plus NOx standard of 24.0 g/kW-hr during the 2001 through 2004 model years and would be excluded from the ABT program. In other words, manufacturers would not need to use credits to certify such engines. They could, however, generate credits from such engines against the corporate average emission standard if they declared FELs below the applicable corporate average emission standard. Starting in model year 2005, small volume Class II engine manufacturers would need to comply with the proposed Phase 2 standards.

Second, EPA proposed that small volume Class II side-valve engine families with annual sales of less than 1,000 units per year would have to comply with an HC plus NOx cap of 24.0 g/kW-hr starting in the 2005 model year. During the 2001 through 2004 model years, small volume Class II side-valve engine families could also certify to the 24.0 g/kW-hr HC plus NOx level and would not require the use of ABT credits if they were certified at less than 24.0 g/kW-hr. However,

if an engine were certified above 24.0 g/kW-hr HC plus NOx, the manufacturer would need to use credits down to the applicable corporate average emission standards for that model year.

3.5.2 Summary of the Comments

EMA (IV-D-12, pages 41-43) commented that the proposal should be revised such that Class II small volume engine families would be subject to the 24.0 g/kW-hr HC plus NOx standard, not the proposed Phase 2 standards, during the transition years. EMA believes the proposed provisions create an inexplicable inequity in the marketplace inasmuch as engine manufacturers certifying their engines above the 24.0 g/kW-hr standard would be required to use up large numbers of credits, but those certifying at 24.0 g/kW-hr and less would be eligible for exclusion from the ABT program. Under EMA's suggestion, engine families certified to FELs above the 24.0 g/kW-hr standard would only need credits to offset emissions against the 24.0 g/kW-hr level and not the more stringent declining corporate average emission standard.

3.5.3 EPA Response to Comments

As described in Section 6, EPA is revising the flexibility provisions for small volume engine manufacturers and small volume engine families. Because of those changes, EPA is revising the ABT program to accommodate those changes. Under the revised flexibility provisions, small volume engine manufacturers and small volume engine families may comply with Phase 1 standards up through the 2009 model year. Such engines are excluded from the ABT program. The proposed provision for Class II side-valve engine families with sales of 1,000 units or less are superseded by these new flexibility provisions up through the 2009 model year. Therefore, EPA is dropping the proposed requirements for Class II side-valve engine families during the transition years (i.e., 2001 through 2005) and up through the 2009 model year. Beginning with the 2010 model year, EPA is retaining the 24.0 g/kW-hr HC+NOx cap for Class II side-valve engine families with production of 1,000 units or less. Such engine families are excluded from the ABT program.

3.6 Credit Use Restrictions

3.6.1 Summary of the Proposal

In order to assure the proposed ABT program fulfilled its intended function of encouraging a transition to cleaner, more durable technology for both classes of nonhandheld engines, while maintaining the expected environmental benefits of the proposed standards, EPA proposed limitations on the cross-class exchange of credits. See 63 FR at 3975. For those manufacturer's whose Class II engine production meets or exceeds the assumed OEP production phase-in schedule, EPA proposed that such manufacturers would be allowed to exchange credits from credit generating Class II engines to credit using Class I engines. However, due to competitive concerns, EPA proposed that no manufacturers would be allowed to exchange credits from credit generating Class I engines to credit using Class II engines.

EPA also proposed to allow the use of certification ABT credits to remedy in-use noncompliance under limited circumstances. See 63 FR at 3975-3976. In the case of a failure under the PLT program or a failure under the SEA program, EPA proposed that manufacturers would be able to cover subsequent production of the engines if the manufacturer recertified the engine family to a higher FEL. For past production of engine identified through a PLT failure, EPA proposed that manufacturers would be allowed to use certification credits to offset limited emission shortfalls. Specifically, EPA proposed that a manufacturer could retroactively use credits if the manufacturer fails PLT testing for only one engine family in a given model year, or more than one engine family as long as the combined production of those families is less than ten percent of the manufacturer's sales. For past production of engines identified through an SEA failure, EPA proposed that manufacturers would not be allowed to use certification credits except that the Administrator could allow such a use of ABT credits if it is one component of a multi-part remedy. Finally, EPA proposed to allow manufacturers to use ABT credits to offset emission shortfalls from Class II OHV engines that arise as a result of an adjustment to manufacturers' deterioration factors originally determined through good engineering judgement.

3.6.2 Summary of the Comments

EMA (IV-D-12, page 38) supported EPA's proposal on the cross-class exchange of credits. With regard to the use of credits to remedy a past production nonconformance, EMA argued that such limits are unnecessary and would provide no environmental benefit. EMA (IV-D-12, pages 39-40) and Tecumseh (IV-D-08, page 6) commented that EPA should eliminate the proposed restrictions on the retroactive use of credits for both PLT and SEA nonconformance.

3.6.3 EPA Response to Comments

Because EPA is adopting tighter Class I standards than originally proposed, EPA is eliminating the restrictions on the cross-class exchange of credits. EPA originally proposed the restriction on using Class I credits to demonstrate compliance for Class II engines because of competitive concerns. Because the originally proposed Class I standards were relatively less stringent than the proposed Class II standards, EPA had a number of concerns regarding cross-class credit exchanges. One concern was that a manufacturer could generate credits against the relatively less stringent Class I standards and use the credits to delay compliance with the more stringent Class II standards. However, because EPA is adopting new standards for Class I engines that are similar in stringency to the Class II standards, EPA does not believe the originally proposed restrictions are necessary and is dropping the proposed restrictions.

With regard to the limitations on the retroactive use of credits to remedy in-use nonconformance, EPA believes that such limits are still necessary for the PLT and SEA programs. EPA believes that without the restrictions, manufacturers may be encouraged to be less careful in setting accurate FELs knowing that they could later make up the difference with ABT credits, with adverse consequences for the emissions benefits of the Phase 2 program. At the same time, EPA expects that the need for manufacturers to change an engine family's FEL as a result of PLT or SEA program failures should be rare to nonexistent. Therefore, EPA is retaining the provisions under the

PLT program to allow one such adjustment per year regardless of the sales volume of the engine family, or more than one adjustment provided that the multiple families do not represent more than ten percent of that manufacturer's yearly 49-state U.S. production. EPA is also retaining the proposed provisions regarding the use of ABT credits to address SEA noncompliance. These provisions encourage the accurate setting of FELs and still provide manufacturers with flexibility to correct limited in-use nonconformances through the use of certification ABT credits.

With regard to the issue of using credits to cover emission shortfalls from Class II OHV engines that arise as a result of an adjustment to manufacturers' deterioration factors originally determined through good engineering judgement, EPA is dropping that provision from the final rule. As described in the preamble for this final rule, EPA is revising the requirements for determining deterioration factors. One of these change involve eliminating the option for manufacturers to determine their Class II OHV deterioration factors through good engineering judgement. Therefore, EPA is dropping the provision described above from the final regulations.

3.7 Credit Reporting and Recordkeeping Requirements

3.7.1. Summary of the Proposal

Under the proposed ABT program, manufacturers would be required to submit preliminary information at the time of application for certification and final information at the end of the year. See 63 FR at 4017-4018. The information a manufacturer must submit includes the FEL for the engine family, all of the other values needed to calculate the number of credits generated or used by the family (including quarterly sales projections), the actual number of credits generated or used by the family, and specific information on what the manufacturer plans to do with any credits being generated or where the manufacturer plans to obtain credits needed to cover those families using credits. EPA also proposed that manufacturers would be required to maintain records of the information noted above, updated on a quarterly basis. Pursuant to a request from EPA, the manufacturer would be required to submit the information to EPA.

3.7.2. Summary of the Comments

Kohler Company (IV-D-11, page 2) commented that the manufacturer should only be required to maintain records on an annual basis instead of a quarterly basis. Kohler also commented that manufacturers should be allowed to establish a spreadsheet which shows each engine family and projected credits and the company credit balance at year end without specifically stating where credits are coming from or being used. They do not believe there is any need to explain specifically how and where credits are dispersed or deficits are met.

3.7.3. EPA Response to Comments

EPA believes it is important that certain pieces of information be documented by engine manufacturers (as detailed in the credit reporting and recordkeeping requirements for the ABT

program) in order to ensure the success and validity of the ABT program. In response to the comments described above, EPA believes that some changes to the proposed credit reporting and recordkeeping requirements can be made without compromising the benefits of the ABT program. With regard to the quarterly recordkeeping requirements, EPA is dropping the proposed quarterly requirements. While EPA believes it is important for the manufacturers to be tracking the number of engines covered by the ABT program on an ongoing basis throughout the year, EPA does not believe that such records are needed to verify compliance the small SI nonroad engine ABT program. Although not requiring quarterly records, EPA still believes frequent monitoring will help manufacturers guarantee they are not going to be caught short-handed at the end of the year without enough credits to cover the engines certified under the ABT program.

With regard to the comment on the use of a spreadsheet for submitting ABT calculations, EPA is revising the regulations to include such an option. However, EPA believes it is important to understand how a manufacturer expects to use or obtain credits in order to ensure compliance with the provisions of the ABT program. Therefore, the manufacturer would need to include such information in its ABT spreadsheet submittal to EPA.

3.8 Early Banking

3.8.1 Summary of the Proposal

Although the proposed Phase 2 standards were not scheduled to take effect until the 2001 model year, EPA proposed to allow manufacturer to bank early credits beginning in 1999 under certain conditions. See 63 FR at 3974-3975. As proposed, a manufacturer would only be allowed to earn early credits if its entire production in a given engine class met the proposed Phase 2 engine HC + NOx standards (i.e., 25.0 g/kW-hr for Class I and 18.0 g/kW-hr for Class II engines). If the manufacturer met this requirement, then it could earn early credits but only for those Class I engine families below 16.0 g/kW-hr or those Class II engine families below 12.1 g/kW-hr. For those engine families meeting the proposed cutpoints, the manufacturer would earn credits up to 25.0 g/kW-hr for Class I engine families and up to 18.0 g/kW-hr for Class II engine families. Once the proposed standard took effect in model year 2001, EPA proposed that manufacturers could only use early credits for their Class II engine families provided they complied with the OEP phase-in schedule.

3.8.2 Summary of the Comments

EMA (IV-D-12, page 37-38) supported EPA's proposal for early banking of ABT credits. There were no comments submitted objecting to the proposed approach.

3.8.3 EPA Response to Comments

In response to the tighter standards being finalized for Class I engines, EPA is revising the early banking provisions of the ABT program contained in the proposal. The early banking provisions will be applicable beginning with the 1999 model year.

For Class I engines, EPA is finalizing a new staggered standard (i.e., new engine families certified for the first time on or after August 1, 2003 must comply with 16.1 g/kW-hr HC plus NOx and all remaining engine families must comply with this level as of August 1, 2007). Therefore, manufacturers may generate early credits from Class I engines certified before August 1, 2003 with an FEL at or below 16.1 g/kW-hr. They may generate the early credits against a HC+NOx level of 20.5 g/kW-hr for as long as they continue to produce the engine family but no later than August 1, 2007. The 20.5 g/kW-hr level is based on the same assumption as the initial Class II phase-in standard that half of the engines are at the Phase 1 Class I standard and the other half are at the new Phase 2 Class I standard. (Any Class I engine family for which a manufacturer wishes to start generating credits for the first time after August 1, 2003, will not be eligible for early credits. Such families will be eligible to generate credits under the standard provisions of the ABT program against the Phase 2 standard of 16.1 g/kW-hr.)

For Class II engines, EPA is also modifying some of the early banking provisions. As proposed , manufacturers may generate early credits from those Class II engine families certified with FELs below the initial Phase 2 standard (i.e., 12.1 g/kW-hr for Class II engines or 11.3 g/kW-hr for Class II natural-gas fueled Class II engines). All early credits for Class II engines will be calculated against the initial Phase 2 HC+NOx standard of 18.1 g/kW-hr. EPA is dropping the requirement that a manufacturer would only be allowed to earn early credits if its entire Class II production met the Phase 2 engine HC + NOx standards. Based on the current certification levels of Phase 1 engines, EPA believes that all Class II manufacturers would already meet this requirement. EPA is also eliminating the limitation that would require manufacturers to meet the OEP phase-in schedule in order to use early credits in a given year. EPA believes that the production-weighted FEL caps being adopted for Class II engines (as described in section 3.10 of this document) will ensure that manufacturers transition their Class II production to OHV technology by the 2005 model year or shortly thereafter. Requiring manufacturers to meet transition year OEP phase-in targets is not as critical as ensuring that all Class II engines are transitioned to cleaner OHV technology by the 2005 model year or shortly thereafter.

3.9 Credit Life

3.9.1 Summary of the Proposal

EPA proposed that ABT credits would have an unlimited credit life (i.e., they would never expire). See 63 FR at 3974. However, EPA did note that it could reconsider the appropriate life of Phase 2 credits with any post-Phase 2 rulemaking.

3.9.2 Summary of the Comments

EMA (IV-D-12, pages 34-35) and Westerbeke (IV-D-10, page 3) supported unlimited life for ABT credits. EMA also argued that EPA cannot take away or discount credits already earned when it develops any post-Phase 2 standards.

3.9.3 EPA Response to Comments

EPA is retaining the unlimited lifetime for ABT credits as proposed. While EPA understands the concerns that manufacturers have with regard to EPA potentially reconsidering the appropriate lifetime of ABT credits with any post-Phase 2 rulemaking, EPA cannot guarantee that no changes would be contemplated in the future since that would prejudge a possible future program for which carrying over credits from Phase 2 might not be appropriate or necessary. Because the ABT program is new for small SI nonhandheld nonroad engines, EPA does not wish to limit its ability to address possible, unforseen conditions that arise as a result of the program in future rulemakings. Therefore, EPA would still be able to reconsider the appropriate life of Phase 2 emission credits, along with other aspects of the Phase 2 ABT program, in connection with any post-Phase 2 rulemaking.

3.10 Declining Caps

3.10.1 Summary of the Proposal

Due to concerns over the number of credits manufacturers could potentially generate from their currently certified engines and the potential to significantly delay implementation of the 2005 and later model year standard for Class II engines, EPA proposed to prohibit manufacturers from using the ABT program if certain conditions were not met. See 63 FR at 3974. Beginning in 2005, manufacturers would only be allowed to use ABT credits to certify their Class II engine families if they met a declining emissions cap for their engines. The proposed caps (calculated by sales-weighting the FELs for the manufacturer's engine families included in the ABT program) were 13.6 g/kW-hr for the 2005 model year, 13.1 g/kW-hr for the 2006 model year, and 12.1 g/kW-hr for 2007 and later model years.

3.10.2 Summary of the Comments

Although EMA (IV-D-12, pages 36-37) commented that it doesn't believe EPA's concerns regarding significant credit generation are well-founded, EMA also commented that EPA's use of the declining caps would be an appropriate means to solve such an issue.

3.10.3 EPA Response to Comments

Based on certification information of Phase 1 nonhandheld engines submitted by manufacturers to EPA and assumptions about typical deterioration factors and compliance margins, EPA remains concerned that some engine manufacturers have the potential to earn significant credits from the Class II engines prior to 2005, which could potentially allow a delay in converting to OEP technology in Class II engines. Therefore, EPA is retaining the declining cap requirements for Class II engines as proposed. EPA believes such a requirement will ensure that the transition to cleaner technology occurs roughly by the 2005 model year while still providing manufacturers with the flexibility they need to meet the new standards.

3.11 Upper Limits for the Family Emission Limits

3.11.1. Summary of the Proposal

Along with the proposed standards, EPA proposed upper limits on how high a manufacturer may set FELs under the ABT program. See 63 FR at 3973-3974. In no case would a manufacturer be allowed to certify engines above the proposed FEL upper limits.

3.11.2 Summary of the Comments

EMA (IV-D-12, pages 35-36) supported the FEL upper limits proposed by EPA. There were no adverse comments submitted on this issue.

3.11.3 EPA Response to Comments

EPA is retaining the FEL upper limits for Class I and Class II engines as proposed.

3.12 ABT Program for Handheld Engines

3.12.1 Summary of the Proposal

EPA proposed a certification ABT program for only small SI nonhandheld engines. Due to the levels of the proposed standards for handheld engines and based on discussions with handheld engine manufacturers, EPA did not propose a certification ABT program for handheld engines. See 63 FR at 3971-3972. EPA requested comments on its decision not to propose a certification ABT program for handheld engines.

3.12.2 Summary of the Comments

EPA received comments on this issue from two engine manufacturers. Noting that they produce both nonhandheld engines and handheld engines, Tecumseh (IV-D-08, page 6) commented that the ABT program proposed for the nonhandheld engines should be made available to the handheld engines as well. Ryobi (IV-D-18, page 8), a manufacturer of handheld products, also commented that EPA should adopt a certification ABT program for handheld engines since the California ARB had proposed such a program for handheld engines.

3.12.3 EPA Response to Comments

Because EPA is not finalizing standards for handheld engines in this final rulemaking, EPA is not addressing the issue of including handheld engines in the ABT program at this time. EPA plans to address the need for including handheld engines in the ABT program in the reproposal for handheld engines.

Section 4: Test Procedure

4.1 Steady-State Test Cycle for Phase 2

4.1.1 Summary of the Proposal

Section 90.410 of the proposed rule describes the six mode steady state cycles for nonhandheld engines. EPA's NPRM discusses this topic at 63 FR 3976-3977.

4.1.2 Summary of the Comments

STAPPA/ALAPCO commented that they support the continued use of a steady-state test cycle for Phase 2 (Item IV-D-15, p.6)

4.1.3 EPA's Response to the Comments

The Regulatory Negotiation Test Procedure Task Group investigated this item for nonhandheld engines and it was concluded that a steady state test procedure was sufficient for these engines and expected emission control technologies.

4.2 Nonhandheld Engine Test Cycles - Use of Speed Governor

4.2.1 Summary of the Proposal

Section 90.409 of the proposed rule states that Phase 2 Class I and Class II engines equipped with an engine speed governor must use the governor to control engine speed during all test cycle modes except for Mode 1. EPA's NPRM discusses this topic at 63 FR 3976-3977.

4.2.2 Summary of the Comments

EPA received one comment from EMA (Item IV-D-12, p.43-45) which stated that the proposal was not adequate. Items include the recommendation for higher speed point tolerances for low load test points, a concern that the California ARB may not accept the same changes, and a concern that the change in test procedure may jeopardize ability to meet Phase 2 levels. (pg. 43-44). EMA provides suggested alternative regulatory language for sections 90.409 and 90.410. For 90.409 (a)(3) ...."For Phase 2 Class I and Class II engines equipped with an engine speed governor, the governor must be used to control engine speed during all test cycle modes except for Mode 1 or Mode 6, and no external throttle control may be used that interferes with the function of the engine's governor. For Phase 2 Class I and Class II engines equipped with an engine speed governor, a controller may be used to adjust the governor setting for the desired engine speed in Modes 2-5 or Modes 7-10. For Phase 2 Class I and Class II engines, equipped with an engine speed governor, during Mode 1 or Mode 6, fixed throttle operation may be used to determine the 100% torque value....." For section 90.410 (b) ..."For Phase 2 Class I and Class II engines equipped with an engine speed governor, during, during Mode 1 or Mode 6, hold both the specified speed and load

within +/- five percent of point, during modes 2-3 or Modes 7-8, hold the specified load within +/- five percent of point, during Modes 4-5 or Modes 9-10, hold the specified load within the larger range provided by +/- 0.27 Nm (+/- 0.2 lb-ft), or +/- ten (10) percent of point, ...”

4.2.3 EPA's Response to the Comments

EPA's conclusion is to adopt EMA’s proposed changes for they are reasonable and would still capture the purpose of the proposed provisions which is to have a test procedure that is reflective of real world use of the engine.

4.3 Harmonization with ISO 8178 Test Procedure

4.3.1 Summary of the Proposal

The EPA proposed to continue the six mode steady state test cycle for nonhandheld engines with a change in the requirements to use the engine’s governor for conducting the emission test. EPA’s NPRM discusses these changes in 63 FR 3976-3977.

4.3.2 Summary of the Comments

EPA received one comment from Euromot (IV-G-04) asking EPA to consider adopting ISO 8178 in the interests of harmonization and less duplication of paperwork.

4.3.3 EPA's Response to the Comments

EPA is adopting the provisions as proposed. However, this decision does not prevent EPA from allowing ISO procedures to be used by manufacturers as alternate test procedures. Moreover, EPA continues to believe that the test procedures should be harmonized to the greatest extent possible and is committed to working with the ISO committee to address the outstanding issues. It is very possible that EPA and the ISO committee will be able to resolve these issues, and EPA may consider incorporating the ISO procedures by reference at some later date.

4.4 Phase 1 Alternative Test Procedures and Phase 2

4.4.1 Summary of the Proposal

Section 90.120 of the Phase 1 rule and the proposed Phase 2 contain provisions for special test procedures to be approved by the Administrator. This was not discussed in the preamble to EPA’s NPRM.

4.4.2 Summary of the Comments

Honda commented (IV-D-16, p.7) that optional procedures approved during Phase 1 should be carried over to Phase 2, specifically the winter only test procedure.

4.4.3 EPA's Response to the Comments

EPA agrees that it would be acceptable to carry over to Phase 2 optional procedures approved during Phase 1 as long as the approved alternate test procedures do not conflict with any of the changes adopted in the Phase 2 rulemaking. EPA will evaluate whether a manufacturer's approved Phase 1 optimal procedures can be carried over on a case by case basis.

4.5 Certification Fuel

4.5.1 Summary of Proposal

EPA proposed that certification test fuel requirements for the Phase 2 program would remain the same as in the Phase 1 program, as specified at 40 CFR 90.308(b). While California "Phase 2" reformulated gasoline is not a proposed certification test fuel, EPA believes that continuation of the Phase 1 program for Phase 2 would continue to provide a means of harmonizing the Federal and California programs. As described in the February 1997 Draft U.S. EPA Small Engine Certification Guidance, Section X "Certification Fuel", manufacturers have four options for choice of certification fuel for Phase 1[7]; EPA is proposing that these options would continue for this rule. This issue is discussed in EPA's NPRM at 63 FR 3976.

One of the four options was that manufacturers may request EPA approval for certification testing on fuels such as California "Phase 2" reformulated gasoline, which do not meet the requirements for "other fuels" under 40 CFR 90.308(b)(2) or (3). For this option, manufacturers would request EPA approval of an alternate test procedure (e.g., alternate test fuel) under 40 CFR 90.120(b)(1). Manufacturers may elect to use an alternative test procedure provided it yields results equal to the results from the specified test procedures (e.g., test fuels described at 40 CFR 90.308(b)), its use is approved by EPA, and the basis for equivalent results is fully described in the manufacturer's certification application (see 40 CFR 90.120(b)(1)). EPA would work with manufacturers to assist them in making the required technical demonstrations to show equivalency of the emission results.

4.5.2 Summary of Comments

PPEMA commented (IV-D-21, pp.17-18) that it is concerned that EPA's Phase 2 test fuel requirements are too restrictive. Although EPA allows the use of alternative fuels for Phase 2 emissions testing, such as California reformulated "Phase 2" fuel, EPA will continue to require

[7]See "U.S. EPA Small Engine Certification Guidance, Draft, February 19, 1997," available in EPA Air Docket A-96-55, Item #II-C-03.

engine manufacturers to demonstrate correlation with tests using indolene. In some cases, the correlation between California "Phase 2" fuel and indolene has already been demonstrated for Phase 1 engines. Absent a fundamental technology change, such as conversion to micro four-stroke, additional correlation is unnecessary and will only add to manufacturers' certification expenses. Accordingly, PPEMA requests that where emissions correlation has already been established between indolene and an alternative fuel with Phase 1 two-stroke engines, no additional correlation is necessary before conducting any emission testing of Phase 2 two stroke engines.

Also, PPEMA seeks confirmation that handheld engine manufacturers may use generally available retail gasoline not only for pre test service accumulation, but also for purposes of aging engines on the bench and in the field. EPA should also consider allowing manufacturers to use generally available retail gasoline for field/bench adjustment and in-use testing.

4.5.3 EPA's Response to Comments

This comment is related to alternative test procedures addressed in 4.4. As in 4.4, EPA's response is that this would be acceptable as long as the approved alternate test procedures do not conflict with any of the changes adopted in the Phase 2 rulemaking. However, as PPEMA notes in their comment, additional correlation may be necessary due to the fact that this rulemaking will likely result in a fundamental technology change. Therefore, EPA will need to evaluate individual cases as they arise under Phase 2.

In regards to using retail gasoline for pre test service accumulation and aging engines, EPA is of the opinion that retail gasoline will be a worst case gasoline and therefore manufacturers may choose to use this gasoline if they so choose.

4.6. Technical Amendments to Phase 1

4.6.1 Summary of Proposal

EPA did not address any of the Phase 1 Technical Amendments in the Phase 2 NPRM.

4.6.2 Summary of Comments

EMA commented (IV-D-12,pp.45 and Exhibit B) that engine manufacturers and EPA have resolved most of those test procedure issues brought to the agency by the engine manufacturers following the publication of the Phase 1 regulations. However, some issues remain that need to be resolved through an EPA rulemaking. Specifically, EPA should finalize those changes either through technical amendments to the Phase 1 rule or by including the revisions as part of the Phase 2 final rule. A list of the issues, including industry's understanding of the agreement reached with EPA, is set forth in Exhibit B. The final rule should incorporate the technical amendments referenced in Exhibit B.

EPA Phase 1 Technical Amendment Issues

ISSUE	EPA ACTION TO BE TAKEN
Catalyst Evaluation Procedure: Section 90.104(c)	EPA "Catalyst Evaluation Team" to address procedural issues in 90.427
Test Cycles: 90.119(a)(1)(i)	Revise regulatory language to allow manufacturers to certify constant speed and variable speed engine sin same engine family.
RGM Sampling Procedure 90.312	Option to use either zero-air or nitrogen to calibrate to be extended to RGM
Analyzer Side Leak Checks 90.324	Not required. Revise regulatory text to change requirement to recommended practice
Incorrect Figure Reg: 90.324(a)(3)	Correct figure reference to read "see Figure 1 in Appendix B to Subpart E."
CO2 Concentration: 90.329(b)(2)	Correct volume percent figure for carbon dioxide in the table to read "0" instead of "3.8".
Engine Pre Test Preparation: 90.408(b)(2)	Add language to allow option to perform check at end of test
Downstream Pressure for RGM: 90.409(c)(6)	Correct figure reference to read "see Figure 1 in Appendix B to Subpart E."
Fuel flow accuracy: 90.417	Revise accuracy from a minimum of 1% of full scale fuel rate to 2% for non-idle modes
Recording times: 90.418	Change from 4 to 2 minutes
CO2 reporting	No need to report a non regulated constituent

4.6.3 EPA's Response to Comments

EPA will address EMA's comments in a future notice and comment rulemaking, since EPA believes it is more appropriate to provide the public an opportunity to comment on any changes to Phase 2 than include them in a final rule whose proposal did not raise these issues.

Section 5: General Compliance

CERTIFICATION

The proposal would have required different requirements for manufacturers of nonhandheld and handheld engines (See 63 FR 3981). With respect to nonhandheld engine certification, manufacturers would have had to estimate the in-use deterioration of their engine families. The method for estimating this deterioration would have depended on the type of engine technology. For manufacturers of nonhandheld engines with side valves or aftertreatment, the proposal would have required that one engine from each engine family be either field aged or bench aged to its full useful life to demonstrate compliance. If a manufacturer were to choose the bench aging option, the emission results would have had to be adjusted using the field/bench adjustment program. The field/bench adjustment program was described in the proposal at 63 FR 3977. These results, either the field aged or adjusted bench aged, would have been used to calculate a deterioration factor which would then be applied to the results of testing done for the production line testing program. For manufacturers of nonhandheld engines with overhead valves, the proposal would have allowed manufacturers to use an industry-wide assigned deterioration factor for certification. If a manufacturer chose to use an assigned deterioration factor, the manufacturer would have been required to participate in an industry wide Field Durability and In-use Performance Demonstration Program. This program is described in the proposal at 63 FR 3989 and its purpose was to verify whether the assigned deterioration factors were appropriate. Manufacturers of overhead valved nonhandheld engines would have also been allowed under the proposal to establish their own deterioration factors by field aging a minimum of three engines per family to their full useful lives, provided they established deterioration factors for all of their engine families within a useful life category.

For manufacturers of handheld engines, the proposal would have required manufacturers to establish deterioration factors for each engine family based on an analysis of technically appropriate data. This data could have included results from the field/bench adjustment program, the in-use testing program, as well as other appropriate testing data.

5.1 Assigned Deterioration Factors for all Useful Lives

5.1.1 Summary of the Proposal

Subpart B, section 90.104(g)(1) of the proposed rule stated manufacturers could use assigned deterioration factors for HC+NOx emissions for all nonhandheld overhead valve engines without aftertreatment. For all useful lives, the assigned deterioration factor was 1.3

5.1.2 Summary of the Comments

EMA (EPA Air Docket A-96-55; IV-D-12; pg. 57) opposes the use of 1.3 for all useful lives.

They stated that using 1.3 for all useful lives results in a more stringent standard for engines with longer useful lives.

5.1.3 EPA Response to Comments

Based in part on industry's and EPA's desire to create a less complex certification program that harmonizes with CARB, EPA is not finalizing the assigned deterioration factors as proposed. Instead manufacturers of nonhandheld engines (including all technologies) must establish their own deterioration factors for each regulated pollutant for each engine family. Manufacturers can establish deterioration factors by using bench aging procedures which appropriately predict the in-use emission deterioration expected over the useful life of an engine or by an in-use evaluation which directly accounts for this deterioration. As is the case with many mobile source regulations, multiplicative deterioration factors may not be less than one. Additionally, where appropriate and with suitable justification, deterioration factors may be carried over from one model year to another and from one engine family to another. However, EPA's reanalysis of available data indicates appropriate assigned deterioration factors can be determined for use by small volume engine manufacturers who could particularly benefit from the lower compliance cost associated with an assigned deterioration factor. Assigned deterioration factors are being provided to small volume manufacturers.

5.2 Establishing Deterioration Factors with Bench Aging Procedures

5.2.1 Summary of the Proposal

Subpart B, section 90.104(h)(2) of the proposed rule stated that if a manufacturer elects to calculate its own deterioration factor, it must do so on field aged engines.

5.2.2 Summary of the Comments

Both EMA (EPA Air Docket A-96-55; IV-D-12; pg. 59) and Honda (EPA Air Docket A-96-55; IV-D-16) argued that manufacturers should have the option of using bench tests to establish deterioration factors for overhead valve engines. EMA suggested that the potential benefits of field aged tests would be outweighed by the costs. Honda stated bench tests would be more repeatable and consistent than field aged tests.

5.2.3 EPA Response to Comments

Based on industry comments as well as EPA's and industry's desire to create a less complex certification program that harmonizes with CARB, EPA is adopting a method by which manufacturers can establish deterioration factors by using field aging procedures or bench aging procedures. The procedures must appropriately predict the in-use emission deterioration expected over the useful life of an engine.

IN-USE TESTING

Summary

The proposal would have required manufacturers of nonhandheld engines manufactured with overhead valves to conduct up to a total of 24 emissions tests on engines that were field aged to their full useful lives. The primary function of these in-use tests was to verify that the industry-wide deterioration factors predicted for the overhead valve engines were appropriate. For manufacturers of handheld engines, the proposal would have required manufacturers to conduct in-use testing on a maximum of 25% of their engine families each model year. The proposal would also have allowed these handheld engine manufacturers to fulfill the in-use testing requirements by testing bench-aged engines, provided the manufacturer has successfully completed the Field/Bench Adjustment Program (manufacturers of nonhandheld engines using side valve or aftertreatment technology could also participate in this type of program to certify their engines, see 63 FR 3977). Finally under the proposal, handheld engine manufacturers would have been allowed to participate in an in-use averaging, banking, and trading program (see 63 FR 3991).

5.3 The Field/Bench Correlation Program

5.3.1 Summary of the Proposal

Subpart M, section 90.1207 of the proposed rule stated that manufacturers could participate in a field/bench correlation program. See 63 FR 3977. In this program, manufacturers could attempt to "correlate" tests of bench aged engines with tests of field aged engines to generate an adjustment factor. Manufacturers could then apply this adjustment factor to the test results of future bench aged test to approximate field aged results. This program would have been available to both manufacturers of handheld engines and nonhandheld side valve engines. Handheld engine manufacturers could have used the program prior to conducting testing for the in-use testing program (see 63 FR 3989) so that they could fulfill the requirements of that program with bench tests. Nonhandheld side valve engine manufacturers (as well as manufacturers of engines with aftertreatment) could have used the field/bench adjustment program prior to certification so that they could provide bench test results to obtain certification (see 63 FR 3981).

5.3.2 Summary of the Comments

EPA received a significant number of comments regarding the field/bench adjustment program from EMA (EPA Air Docket A-96-55; IV-D-12; pg. 45-54), PPEMA (EPA Air Docket A-96-55; IV-D-21; pg 11-14) , STAPPA/ALAPCO (EPA Air Docket A-96-55;IV-D-15), and Westerbeke Corporation (EPA Air Docket A-96-55;IV-D-10). Westerbeke Corporation argued that they do not have the testing facilities to conduct this type of program and that the program is life threatening to their company. EMA generally supported the field/bench correlation program due to the prohibitive costs of field aging engines. STAPPA/ALAPCO argued that field aged engines must be representative of typical consumer owned units and that the program must be performed under

EPA guidance. PPEMA argued that EPA allow adjustment factors to be less than one, if justified by the test results and had concerns about how often the adjustment program must be conducted.

5.3.3 EPA Response to Comments

Based on industry's arguments regarding the prohibitive costs of field aging engines, industry's desire to span the program across industry wide technology groups, and EPA's final evaluation of the program, EPA no longer believes that the field/bench adjustment program can be adopted such that industry would find it costs acceptable and at the same time produce statistically valid adjustment factors. EPA also has concerns about spending resources to review and approve manufacturers' testing plans and providing the necessary guidance and outreach to the industry for a potentially inaccurate statistical program.

Additionally, EPA has attempted to harmonize this final rule as closely as possible with CARB's Regulations for 1995 and Later Small Off-Road Engines, allowing industry to more efficiently comply with the final standards and requirements. Therefore, EPA is not adopting the field/bench adjustment program in today's final rule.

5.4 In-Use Emission Testing

5.4.1 Summary of the Proposal

For nonhandheld engine manufacturers, Subpart M, section 90.1250 of the proposed rule stated that prior to certification, each manufacturer would submit a schedule to the Agency describing its plans to conduct field aged in-use tests to validate the appropriateness of the assigned deterioration factors. Under the proposal, a manufacturer would not have to conduct more than 24 field aged engines each calendar year. Manufacturers would have had to conduct baseline emissions tests, field age the engines to their full useful lives, and finally, conduct the appropriate final emissions testing. See 63 FR 3989.

5.4.2 Summary of the Comments

EPA received a significant number of comments regarding the in-use testing programs from EMA (EPA Air Docket A-96-55; IV-D-12; pg. 67-74), PPEMA (EPA Air Docket A-96-55; IV-D-21; pg 14) , STAPPA/ALAPCO (EPA Air Docket A-96-55;IV-D-15), Westerbeke Corporation (EPA Air Docket A-96-55;IV-D-10), Suzuki Corporation (EPA Air Docket A-96-55;IV-D-17), Kohler Corporation (EPA Air Docket A-96-55;IV-D-11), and Tecumseh Corporation (EPA Air Docket A-96-55;IV-D-08). EMA argued that EPA does not have the authority to conduct an in-use testing program and that the number of field aged tests must be reduced. Suzuki Corporation also argued that the number of field aged engine tests is too high and is not realistic for a small volume manufacturer. Tecumseh argued that manufacturers be allowed to use controlled fleets for field aging engines. Kohler Corporation felt that the requirement of projecting sales and plans for 4 years would be a tremendous burden. Westerbeke Corporation argued that the high cost

of removing a field aged engine from the equipment or vessel for emissions testing would be prohibitive. STAPPA/ALAPCO thought the in-use testing program for handheld engines should be extended to nonhandheld engines. Finally, PPEMA suggested that EPA limit the aging requirements to 75% of the full useful life instead of the full 100%.

5.4.3 EPA Response to Comments

For nonhandheld engine manufacturers, EPA is not finalizing the option for manufacturers to use assigned deterioration factors. Instead, manufacturers must determine appropriate deterioration factors for each of their engine families (small volume manufacturers may still use assigned deterioration factors). The purpose of the proposed in-use demonstration program for nonhandheld engine families was to evaluate the appropriateness of the assigned deterioration factors. Based on the fact that the original purpose for the demonstration program is not being finalized and industry comments regarding the prohibitive costs of field aging engines, EPA is not finalizing the in-use testing program for nonhandheld engine manufacturers. EPA continues to believe, however, that section 213 of the Clean Air Act, in incorporating the authority of sections 206, 207, and 208, provides EPA the authority to require in-use testing to be performed by manufacturers subject to nonroad regulations.

While EPA disagrees with EMA over the Agency's authority to require manufacturer in-use testing, for nonhandheld engine manufacturers, EPA is finalizing a voluntary in-use testing program. This program allows manufacturers to optionally use a portion of their PLT resources to generate field aged emission data.

5.6 Alternatives to Recall

5.6.1 Summary of the Proposal

63 FR 3992 stated that EPA intends to allow a manufacturer to implement a reasonable alternative that meets specific criteria prior to the Agency making a determination of substantial nonconformity which would require the manufacturer to conduct a recall. One of the criteria would require that the alternative plan cost substantially more than foregone compliance costs. To provide assurance that the Agency would not require excessive projects, EPA discussed a cost cap of 75% above and beyond the foregone compliance costs adjusted to present value.

5.6.2 Summary of the Comments

EMA (EPA Air Docket A-96-55; IV-D-12; pg. 71) argued that EPA's proposal to subject alternatives to a cost cap of 75% above the foregone compliance cost is excessive and that a cost cap of 50% above is more appropriate.

5.6.3 EPA Response to Comments

Today's final rule contains no mandatory in-use testing programs. As a result, EPA is very concerned about the in-use performance of phase 2 engines. EPA believes that manufacturers should prove out the in-use durability of their designs carefully before certification and desires to apply the cost cap for alternative projects at a high enough level such that manufacturers will take measures to carefully evaluate in-use durability before certification. Without mandatory in-use testing, the Agency believes it should, to an even greater extent, rely on this cost cap to deter in-use problems. EPA believes that a cost cap of 50% would not provide enough incentive to assure in-use durability up front and that manufacturers would too easily address noncompliance only when in-use durability problems are detected. EPA believes that a cost cap of 75% would provide a more effective deterrent to in-use durability problems and is consistent with the principles inherent in the criteria for evaluating alternatives to recall. Therefore, EPA intends to apply a cost cap of 75% above and beyond the foregone compliance costs adjusted to present value when evaluating manufacturer alternatives submitted under this program.

PRODUCTION LINE TESTING

5.7 Flexibility in Determining Tests Conducted and Reported under CumSum

5.7.1 Summary of the Proposal

Subpart H, section 90.706(b)(9) of the proposed rule stated that manufacturers could elect to test additional engines. See 63 FR at 3985. However, additional engines, whether tested in accordance with the testing procedures specified in § 90.707 or not, could not be included in the Sample Size and Cumulative Sum equation calculations as defined in paragraph (b)(1) of this section and §90.708(a).

Subpart H, section 90.709(e) stated that within 30 days of the end of each quarter, each manufacturer would be required to submit a report which includes appropriate PLT data.

5.7.2 Summary of the Comments

Several issues were raised. First, EMA requested that manufacturers should be allowed to input more than two tests into the CumSum equation. Otherwise there's no incentive to do additional testing, they argued. Manufacturers should be required to inform the Administrator of this intent prior to testing such that a manufacturer cannot use a larger sample to "game" the system, EMA asserted. Secondly, EMA commented that EPA's proposal to require manufacturers to report PLT testing on a quarterly basis creates undue and unnecessary administrative burden on the industry. Manufacturers will retain records and that should be sufficient, they claimed. Tecumseh commented that the reporting burden may be significant depending on the ability of the Agency to develop in a timely manner the proposed electronic report format.

5.7.3 EPA Response to Comments

EPA does not believe that manufacturers should be allowed to input more tests than required in the CumSum program. Not allowing more tests will prevent a manufacturer from increasing the testing rate during a production period where emission levels and production variation are relatively low. Manufacturers may, however, elect to test additional engines as part of their own internal quality control programs. Although these extra tests may not be included in the CumSum sample, they may be used to help bracket poor production runs. In the finalized PLT program, manufacturers will be allowed to input between 2 and 30 tests, spread evenly throughout the model year, into the CumSum equation for an individual engine family each model year. The actual number will depend upon the mean and standard deviation of the test results. However, manufacturers may not input more than 30 tests into the CumSum equation for a family in one model year.

EPA disagrees that the reporting requirement will cause undue burden on the industry. Manufacturers will have to create, process, and retain this data throughout each model year. Additionally submitting this data to the Agency on a quarterly basis will require just a fraction of the resources required to actually create and process the data. Because production periods for the industry are distributed throughout the model year, EPA believes that receiving PLT reports on a quarterly basis is the most effective way to track the progress of the industry. Additionally, EPA will provide the industry with an electronic format for submitting the PLT results. This format will be available prior to January 1, 1999, giving the industry ample time to set up their own internal formats. Finally, EPA and CARB are harmonizing our PLT programs. Therefore, EPA is finalizing the quarterly reporting requirement. However, to reduce the burden of the reporting requirements, EPA is extending the deadline in which manufacturers need to submit the required information from 30 days to 45 days.

5.8 Numbers of Days to Report Noncompliance

5.8.1 Summary of the Proposal

Subpart H, section 90.709(d) of the proposal stated that if at any time during the model year, an engine family is determined to be in noncompliance, the manufacturer would have to notify EPA within two working days. See FR 63 at 3985. Subpart H, section 90.711(b) stated that EPA would not suspend the certificate of conformity for a noncomplying engine family prior to 30 days after the discovery of the nonconformity. See FR 63 at 3986.

5.8.2 Summary of the Comments

EMA commented that manufacturers should have a longer period of time in which to report and correct PLT failures. Two days following the occurrence and 30 days after the date of the last test for suspension or revocation of a certification is too soon, they argued. The time to report a noncompliance should be extended to 30 days and then 30 days after that the manufacturer's certificate could be suspended or revoked. Tecumseh requested that a clear contact and format must be available prior to beginning the CumSum program.

5.8.3 EPA Response to Comments

EPA agrees that manufacturers should have a longer period of time in which to report PLT failures. To provide additional time, EPA is changing the period for notifying the Agency of a noncomplying engine family from 2 days to 10 days. This will also align EPA's requirement with CARB's. EPA also agrees that manufacturers should have a clear contact in the event of PLT noncompliance. Therefore, EPA will include a contact person and address in the final rule so that a manufacturer will know exactly who to contact in the event of a noncompliance determination. However, the Agency does agree that a required reporting format for this initial notification is necessary and could unnecessarily constrain some manufacturers from notifying the Agency in an efficient manner. The manufacturer should use proper judgement in notifying the contact person about a noncomplying family. The period in which the Agency may suspend or revoke a certificate will remain at 30 days from the discovery of noncompliance. During these 30 days, the Agency will work with the manufacturer to avoid the need to halt engine production, if possible.

5.9 Criteria for Approving Alternative Procedures to CumSum

5.9.1 Summary of the Proposal

Subpart H, section 90.703(c) of the proposal stated that EPA may approve alternate methods to evaluate production line compliance as long as certain criteria are met. See 63 FR at 3984.

5.9.2 Summary of the Comments

EMA argued that the proposed criteria to allow alternatives to CumSum are too restrictive, and, as a result, manufacturers can only adopt CumSum.

5.9.3 EPA Response to Comments

EPA agrees that the criteria for approving alternate procedures is quite restrictive. However, EPA would not approve any production line testing program that did not have appropriate consumer and manufacturer risk. These risks are typically associated with a statistical program such as CumSum and describe the percentage of time a noncomplying family will go undetected (consumer risk) and a complying family will be incorrectly evaluated as a noncomplying family (manufacturer risk). EPA would also not approve any production line testing program that did not provide for continuous sampling, and include an appropriate mechanism for determining noncompliance. Therefore, EPA believes that the criteria for alternative production line testing programs must be at least as restrictive as those proposed.

EPA also believes that the CumSum procedure is an accurate and appropriate production line testing program for all manufacturers covered by the production line testing requirements. Additionally, EPA does not have the appropriate resources to evaluate and approve/disapprove a variety statistical methodologies. Therefore, in response to industry comments indicating that the

flexibility to obtain approval for alternate methods would be of little utility. EPA has eliminated the criteria altogether for the allowance of manufacturers to propose an alternative to CumSum, in favor of requiring the adopted CumSum procedure in all cases.

5.10 PLT or PLT and SEA

5.10.1 Summary of the Proposal

Subpart H, section 90.701(b) of the proposed rule stated that manufacturers of nonhandheld engine families could choose between the PLT program and the SEA program for all of their engine families. See 63 FR at 3984 and 3987.

5.10.2 Summary of the Comments

EMA commented that manufacturers support the option to conduct PLT themselves or remain subject to the SEA program. EMA stated that cost effectiveness for each engine family would be the deciding factor in deciding which option to choose. STAPPA/ALAPCO commented that all manufacturers should be required to participate in and comply with the PLT program proposed in the NPRM. Suzuki commented that it wants PLT as an option for small volume manufacturers.

5.10.3 EPA Response to Comments

Allowing manufacturers to choose the SEA option would obligate the Agency to conduct an appropriate numbers of audits on the engine families that remained eligible for SEAs to obtain similar fleet coverage as the CumSum program. Due to this obligation, EPA does not believe that allowing manufacturers to have the option of the PLT program or the SEA program will be significantly cost effective for manufacturers. To illustrate, the following table outlines the potential amount of emissions testing, for the first four years of the Phase 2 program, for which a typical manufacturer of eight engine families (2 small volume) could be responsible. Under the proposal, this typical manufacturer would have an annual limit of two SEAs or have to perform CumSum on the six larger volume families.

Minimum Number of Tests Required

Program	Year				Total Number of Tests
	1	2	3	4	
SEA	10	10	10	10	40
PLT	12	6	6	6	30

The number of tests required in the above table are based on engine families with perfect compliance (i.e. every engine passes). If the tested families had occasional noncompliance then the

number of tests required would appropriately increase for both the SEA and PLT programs. However, the maximum number of tests required per family for the PLT program is 30 tests while the SEA program could require up to 60 tests.

Additionally, the SEA program results in a manufacturer testing engines from an isolated production run while the PLT program results in testing throughout the model year. EPA believes that testing engines throughout the model year, under the PLT program, provides a better evaluation of a manufacturer's production than the "snapshot" evaluation generated by the SEA program. Also, due to the unannounced beginning of an SEA, manufacturer's must interrupt their typical day to day activities and free up testing resources, including test cells and staff, to conduct the SEA. The PLT program, on the other hand, allows the manufacturer to carefully plan for upcoming testing and more efficiently manage testing resources.

EPA believes that the PLT program may ultimately impose less burden than the SEA program, provides a more useful evaluation of a manufacturer's production, and requires significantly less Agency resources to administer. Therefore, EPA is not adopting the option allowing manufacturers to choose between the two programs. The final rule requires all manufacturers of Phase 2 engines to participate in the PLT program with the exception of small volume manufacturers and small volume engine families.

5.11 Number of Engines for Testing

5.11.1 Summary of the Proposal

Subpart F, section 90.503(f)(1) of the proposal stated that during a given model year, EPA will not issue more SEA test orders than a predetermined maximum annual limit. The maximum annual limit serves to restrict the maximum number of audits a manufacturer could receive each model year. See 63 FR at 3988.

5.11.2. Summary of the Comments

EMA commented that manufacturers oppose any proposal that would provide EPA with authority to conduct SEA testing in excess of that authorized under the Phase 1 program. More testing would be an additional cost burden and disruptive to manufacturer's production, they claimed. STAPPA/ALAPCO requested that EPA require a significantly higher percentage of production nonhandheld engines to be tested than proposed.

5.11.3. EPA Response to Comments

EPA agrees with EMA's comments limiting the number of SEA tests to that required under the Phase 1 program. Since EPA is requiring PLT of all engine families, the SEA program will only be used as a backstop to PLT. However, EPA is adopting the identical annual limits as in the Phase 1 program. EPA disagrees with STAPPA/ALAPCO's desire to require a higher percentage of tests

than proposed. EPA believes that requiring significantly higher percentages of engines to be tested does not necessarily improve the ability to statistically evaluate an engine family. EPA's proposal, a 30 test maximum per engine family, was selected after carefully evaluating tens of thousands of computer simulations which revealed that a 30 test maximum provided sufficient accuracy in evaluating the performance of an engine family, while not overburdening a manufacturer's testing resources. Therefore, EPA is adopting the 30 test maximum in today's final rule.

5.12 Exemption of PLT from Families 50% Below Standard or FEL

5.12.1 Summary of the Proposal

Subpart H, section 90.701(e) of the proposal stated that the PLT program is optional for engine families certified to a level 50% below the applicable HC + NOx standard or FEL.

5.12.2 Summary of the Comments

EMA argued that this proposal is not compatible with the ABT program for NHH and therefore does not make sense for NHH engines. It should be excluded from the final rule.

5.12.3 EPA Response to Comments

EPA is not adopting the proposed provision that PLT be optional for engine families certified to a level 50% below the applicable HC+NOx standard or FEL. Any engine family that is 50% below the applicable standard or FEL would be able to generate a relatively large number of credits in the ABT program. EPA believes a manufacturer should verify that an engine family should generate those credits by conducting PLT tests with that family. The manufacturer would most likely have to conduct only two tests for a new engine family and only one test for a carryover family to verify that the family was in fact 50% below the standard or FEL. Because all families are eligible to participate in the ABT program, EPA must require that all families, except those excluded by small volume flexibilities, participate in the PLT program.

5.13 Compliance Program Flexibilities

5.13.1 Summary of the Proposal

Subpart H, section 90.701(e) of the proposal states that the PLT program is optional for small volume engine manufacturers and small volume engine families.

5.13.2 Summary of the Comments

Westerbeke supports all flexibilities for small engine manufacturers. Suzuki states they may not able to absorb the cost for mandatory PLT which will put Suzuki at a competitive disadvantage,

and therefore requests PLT be an option for small volume manufacturers.

5.13.3 EPA Response to Comments

PLT will be optional for small volume manufacturers and small volume families. Therefore any manufacturer that meets the criteria for small volume would not be required to conduct the PLT testing.

5.14 PLT a Useful Life Standards

5.14.1 Summary of the Proposal

The proposal described the PLT program as the primary program for ensuring the emission performance of production engines.

5.14.2 Summary of the Comments

Kohler commented that PLT does not show that an engine meets the emission levels through its useful life for it is a spot check on new engines.

5.14.3 EPA Response to Comments

EPA agrees that the PLT program does not show that an engine meets emission standards through its useful life. The PLT program is designed to verify that an engine manufacturer has successfully taken a preproduction certification engine and transferred that design onto the production line where it is mass produced.

5.15 Hours of break-in for PLT

5.15.1 Summary of the Proposal

Subpart H, section 90.707(c) of the proposal states that, "Unless otherwise approved by the Administrator, prior to performing exhaust emission production line testing, the manufacturer may accumulate on each test engine a number of hours of service equal to the greater of 12 hours or the number of hours the manufacturer accumulated during stabilization in the certification process for each engine family. For catalyst-equipped engines, the manufacturer must accumulate a number of hours equal to the number of hours accumulated to represent stabilized emissions on the engine used to obtain certification."

5.15.2 Summary of the Comments

PPEMA states that the engine must be run for the greater of 12 hours or the number of

service accumulation hours for certification testing. Handheld engine manufacturers do not run near 12 hours for it is too burdensome. The language should state 12 hours or less, specifically manufacturers should be able to do PLT at anytime after the engine has stabilized.

5.15.3 EPA Response to Comments

To better clarify how much service accumulation is required, the final language will state, "Unless otherwise approved by the Administrator, prior to performing exhaust emission production line testing, the manufacturer may accumulate up to 12 hours of service on each test engine. For catalyst-equipped engines, the manufacturer must accumulate a number of hours equal to the number of hours accumulated to represent stabilized emissions on the engine used to obtain certification."

Section 6: Flexibilities

6.1 Small volume engine manufacturer definition

6.1.1 Summary of the Proposal

Section 90.3 of the proposal would define a small volume nonhandheld engine manufacturer as a manufacturer with a total production of 10,000 units or less. The flexibilities offered to small volume engine manufacturers include the waiver of PLT unless a nonconformity is discovered (90.701(e)) (note: still subject to SEA) and delay of standard implementation to the last year of phase-in. EPA's NPRM discusses this flexibility at 63 FR 3992-3995.

6.1.2 Summary of the Comments

EMA and OPEI commented (IV-D-12 pp.75-77) that they support having flexibilities for small volume engine families and small volume engine manufacturers. "However, EPA's proposed program will not provide a real or meaningful opportunity for engine manufacturers to take advantage of the intended flexibility. In addition, the proposed definition of small volume engine manufacturer may present an unfair disadvantage to those engine manufacturers with slightly larger overall annual productions that also produce small volume engine families. Flexibility is needed to avoid manufacturers of small volume, specialized equipment having to redesign those products to accommodate OHV Class II engines..... EPA seeks to avoid imposing unnecessary costs on small volume equipment applications by providing for flexibilities for small volume engine manufacturers. However, the nature of the industry is such that there may not be any manufacturers that meet the definition of small volume. Thus EPA's approach would fail to address the very real problem that it has identified. ..there may be manufacturers meeting the definition of small volume, (that) compete against larger volume manufacturers selling engines to the same small volume equipment manufacturer. EPA must allow a level playing field for all such engine manufacturers. Manufacturers recommend that EPA provide the flexibility needed to resolve the potential inequity of an unlevel playing field by eliminating the definition of small volume engine manufacturer and by redefining the small volume engine families to be engine families of 5,000 units or less."

6.1.3 EPA's Response to the Comments

Some engine manufacturers do fall under the definition of small engine manufacturers. These include manufacturers of propane equipment who must retrofit existing engines to use propane and therefore become engine manufacturers. For the larger manufacturers that produce engines for small volume equipment manufacturers, section 90.1003(b)(6)(IV) allows engine manufacturers to provide engines to small volume equipment companies. On the point of small volume engine families, EPA agrees that we must allow a level playing field for all engine manufacturers and therefore is adopting EMA's and OPEI's proposed cutoffs of 5,000 engines. This is expected to have a very minimal impact on the emissions inventory as discussed in the RIA to this rulemaking.

6.2 Small volume engine family definition

6.2.1 Summary of the Proposal

Section 90.3 of the proposal would define a small volume engine family for nonhandheld engines as a family with a total production of 1000 units or less. The flexibilities are listed in 90.701(e) and include PLT testing as an option (but subject to SEA) and reduced in-use testing (see section below on compliance testing). EPA discusses these flexibilities at 63 FR 3993-3995.

6.2.2 Summary of the Comments

EMA and OPEI commented (IV-D-12, pp.75-77) that EPA should redefine the small volume family to less than 5,000 units as based on their comments in the discussion on small volume engine manufacturers.

Tecumseh submitted comments (IV-D-08, pp.7-8) that as a large engine manufacturer, the flexibility to engine families with an annual volume of 1000 or less will not fill all needs of small business customers. Tecumseh suggests 1000 engines per year or 1% of manufacturer total production, whichever is greater. To assure validity of program, equipment an engine manufacturer must be involved with EPA in Phase 1 program.

6.2.3 EPA's Response to the Comments

The flexibilities in this final rulemaking for small volume engine families have been updated to be the same as for small volume engine manufacturers. The flexibilities include optional PLT (but subject to SEA) and delay of implementation until the last year of the applicable phase-in. A flexibility for decrease in in-use testing is not necessary for all mandatory in-use testing requirements have been removed. This final rulemaking includes a voluntary in-use program.

The proposed definition for nonhandheld engine families (1,000) units was based on the Class II example that SV engine families of 1,000 or less units can meet a higher emission standard. As based on the September 1998 compilation of the Phase 1 certification database, a cutoff of 1,000 may result in 0.29% (33,000 of 12 million) of the engines and 36% of the 204 engine families for Classes I and II combined. A cutoff of 5,000 units per engine family would result in 1.15% (134,000 of 12 million) of production and 57% of the 204 engine families in Class I and II combined. EPA has decided to raise the limit of the small volume engine family to 5,000 since PLT will still be conducted on the families which account for almost 99% of the engine production. It is more advantageous for the industry to focus their efforts on those production lines which account for the bulk of the emission contribution from this industry than those multiple small pieces which have minimal impact on the overall inventory. In addition, it is likely that many of the small volume engine families are produced on the same assembly line with the same tooling and assembly techniques as the larger engine families on which PLT will be performed.

6.3 Compliance Flexibilities

6.3.1 Summary of the Proposal

The following are flexibilities EPA proposed for small volume engine manufacturers and small volume engine families. EPA's NPRM discusses these flexibilities at 63 FR 3990-3991 and 3993-3995.

1) Section 90.103(a)(9) - The standards shown in Table 2 notwithstanding, small volume engine manufacturers as defined in this part may, at their option, certify Phase 2 Class II engines to an HC+NOx (NMHC+NOx) standard of 24.0 g/kW-hr (22.0 g/kW-hr) through the 2004 model year. Such engines shall not exceed this standard and are excluded from the averaging, banking and trading program through the 2004 model year.

2) Section 90.701 paragraph (e), of Subpart H - Manufacturer Production Line Testing Program, states that "The procedures described in this subpart are optional for small volume engine manufacturers and small volume engine families as defined in this part, and for engine families certified to a level at least 50% below the applicable HC+NOx (NMHC+NOx) standard (FEL if applicable). Engine families for which the manufacturer opts not to conduct testing under this subpart pursuant to this paragraph shall be subject to the Selective Enforcement Auditing procedures of Subpart F of this part."

3) Under Section 90.1203 (e)(2) on Manufacturer in-use testing program, "For small volume engine families for the identified model year or for small volume engine manufacturers, a minimum of two (2) engines per family provided that no engine fails any standard. For each failing engine, two more engines shall be tested until the total number of engines equals ten (10)."

6.3.2 Summary of the Comments

Suzuki commented (IV-D-17) that the small volume manufacturer in this market should be able to choose PLT as option. Suzuki is not able to absorb the cost for a mandatory PLT program and if no break is given it will put Suzuki at competitive disadvantage.

PPEMA commented (IV-D-21, pp.18-19) that it supports the flexibilities for small volume engine families including the PLT exemption.

Westerbeke commented (IV-D-10) that it supports all flexibilities for small engine manufacturers including PLT. Westerbeke also stated that marine manufacturers need 'additional flexibility' due to the difficulty of meeting the steps in the durability demonstration.

6.3.3 EPA's Response to the Comments

While the final program for this Phase 2 rulemaking does include mandatory PLT testing for all engine manufacturers, it allows small volume engine manufacturers to opt out of this testing.

EPA believes that Westerbeke currently does fall under the definition of small volume engine manufacturer and therefore would not have to conduct a PLT program. EPA also believes that based on the September 1998 certification database, Suzuki does not fall under the definition of a small volume engine manufacturer and therefore they would be expected to conduct a PLT program. However, Suzuki would not have to perform PLT on engine families that would fall under the definition of small volume engine family (5,000 units) and therefore their burden would be reduced. This analysis is based on EPA preliminary review, and does not constitute final agency conclusions regarding either Westerbeke's or Suzuki's eligibility to be treated as small volume manufacturers. Such conclusions can be reached only after a company makes a thorough submission when this rule becomes effective.

The certification and in-use demonstration for the rulemaking have been modified from the NPRM. The finalized certification program consists of bench aging one engine per engine family. Small volume engine manufacturers are allowed to utilize an assigned df for certification as listed in the table below to the new engine emission value as tested on the federal test procedure of this rulemaking. The finalized in-use program consists of optional field aging of a number of engines within an engine family in exchange for reduced PLT testing. While these flexibilities are available, a manufacturer may choose to do the finalized program of bench aging (specifically if they need to do it to comply with the California ARB program) and in-use field aging (an EPA program).

Assigned DF's for All Useful Lives Per Class

Class and Technology	Assigned DF HC+NOx	Assigned DF CO
Class I SV	2.1	1.1
Class I OHV	1.5	1.1
Class II SV	1.6	1.1
Class II OHV	1.4	1.1
Catalyst for NHH	Calculation depends on catalyst efficiency and/or amt converted*	Oxidation catalyst: Calculation depends on catalyst efficiency and/or amt converted Reduction cat: 1.1

For additional technologies/engine designs contact the Administrator.

*For catalysts, the df needs to be calculated given the amount that is converted plus some engine deterioration. NE = new engine emission levels. The factor

$$DF = \frac{(NE\ w/o\ cat * Edf) - (CC * F)}{NE\ w/o\ cat - CC}$$

where:

DF = deterioration factor

NE = new engine emission levels PRIOR to the catalyst (g/kW-hr)

Edf = deterioration factor for engines without catalyst as shown in Table above
CC = amount the catalyst converted at new (g/kW-hr)
F = 0.80 for HC (NMHC) and F = 0.0 for NOx (Air Docket A-96-55, Item IV-D-13)
F = 0.80 for CO for all classes of equipment.

The FRM has been updated to include more stringent standards for nonhandheld engines in Class I over a longer lead time. For Class I, new engine families are to meet the standard after August 1, 2003 and by August 1, 2007 all manufacturers are to meet the standard. For small volume manufacturers in Class I, the flexibility is that they must meet the standard in 2010 for all engine families. Based on the September 1998 certification database, there is only one Class I small volume engine manufacturer, and EPA already believes that it may meet the Phase 2 standard based on the fact that they produce an OHV engine using propane, regulated for very low CO, for indoor use.

6.4 Small volume equipment manufacturer production volume cutoffs

6.4.1 Summary of the Proposal

Section 90.3 of the proposal would define a small volume nonhandheld equipment manufacturer as any equipment manufacturer that produces 2,500 units or less. The flexibilities to the equipment manufacturers include the temporary exemption for a manufacturer to use Phase 2 engines (90.l003(b)(6)(i)), if no suitable engine is available, through 3 years after the last phase in date, and a delay impact on models which can use Phase 1 engines through Phase 2 (90.1003(b)(6)(ii)) given certain conditions. EPA's NPRM discusses this definition and flexibilities at 63 FR 3995-3996.

6.4.2 Summary of the Comments

EMA and OPEI commented (IV-D-12, p.77-80) that production caps are irrelevant and EPA should broaden the definition of small-volume equipment manufacturers to the SBA definition (i.e., < 500 employees). Also, EMA/OPEI commented that if EPA does decide to keep a production cap, that the threshold for nonhandheld engines should be raised to 5,000 units which was the same as the production cap proposed for handheld equipment manufacturers.

6.4.3 EPA's Response to the Comments

Based on the available data to EPA at the time of the NPRM, the cap of 2,500 units was appropriate for the nonhandheld equipment industry. OPEI's membership represents primarily the larger equipment manufacturers and therefore the cap is not relevant to them. In EPA's study of the equipment industry, it was found that some businesses with less than 500 employees are part of other parent companies which have large annual incomes or themselves had large annual incomes and produced large volumes of equipment, and therefore EPA has decided, that a cutoff of 500 employees is not appropriate, since it would provide relief for companies who are not expected to

suffer relatively as great a financial impact under the rule as are companies who meet the 2500 unit cap.

6.5 Small Volume Equipment Model

6.5.1 Summary of Proposal

Section 90.3 defines a small volume equipment model, for nonhandheld equipment, as any unique model of equipment whose production subject to regulations under this part or powered by engines regulated under this part, does not exceed 500 pieces for a given model year or annual production period, excluding that equipment intended for introduction into commerce for use in a state that has established its own emission requirements applicable to such equipment or engines in such equipment, pursuant to a waiver granted by EPA under section 209(e) of the Clean Air Act.

The flexibility provided for small volume equipment models is the ability to use Phase 1 engines throughout Phase 2.

6.5.2 Summary of Comments

EMA/OPEI commented (IV-D-12, pp.77-80) that EPA should modify its definition of a "small volume equipment model" to one with "5,000 or less units produced per year for both nonhandheld and handheld equipment." Such a modification would result in de minimis ambient air quality impacts, but would provide much needed relief and cost savings to the equipment manufacturing industry. They refer to their discussion on small volume engine families as listed in this document in 6.1.2.

6.5.3 EPA Response to the Comments

Calculating the cutoff for small volume equipment models is more difficult than determining the size of a small volume engine model, since the equipment manufacturers do not need to certify equipment models with EPA. The best database that EPA has access to is the 1997 PSR OELINK database (to estimate small volume models) and the Phase 1 certification database (to estimate all engines sold/year - this analysis assumes engines sold/year is the same as equipment sold/year). From the PSR database, a cutoff of 500 for Class I and II small volume equipment models means that 0.70% of the engine sales will benefit from this flexibility. If EPA were to increase this number to 5,000 then the rule would allow 3.86% of all engine sales to utilize this flexibility, which EPA believes would result in too great a loss of the emissions benefits of the Phase 2 program.

The EPA also received late comments from OPEI to Margo Oge on November 5, 1998, several months after the close of the comment period. In this letter, OPEI states that the distribution system for nonhandheld equipment was a very non-integrated process. It continues to say that "manufacturers of price-sensitive, consumer equipment report that the additional cost of segregating products for a particular state (such as California) exceed the tight profit margin on many products. For this reason, it is critical that certified engines that comply with California emission standards

and labeling requirements can be sold on a national basis." Since California does not have any flexibilities for small volume manufacturers, then one may assume that equipment manufacturers of small and large models will utilize Phase 2 engines regardless of the model size. In addition, although some equipment manufacturers do not sell in California, an equipment manufacturer may not know where the product will actually be used, once it is out of their hands, and therefore may conservatively choose to use engines that comply with the Phase 2 standards.

EPA is not changing the small equipment model definition because EMA and OPEI did not supply data to support their claims in their comments to the NPRM. Therefore, EPA must rely on the available information it has. It is likely that equipment manufacturers will use certified engines based on the fact that they do not have control over where engines are distributed, and California ARB does not have any flexibilities for small volume equipment manufacturers.

6.6 Hardship provision

6.6.1 Summary of the Proposal

EPA's NPRM discusses the hardship provision at 63 FR 3995-3996. Section 90.1003 paragraphs (b)(6)(iii)-(b)(6)(iv) of the proposal states "An equipment manufacturer which is unable to obtain suitable Phase 2 engines and which can not obtain relief under any other provision of this part, may, prior to the date on which the manufacturer would become in noncompliance with the requirement to use Phase 2 engines, apply to the Administrator to be allowed to continue using Phase 1 engines, through the 2002 model year for Class I engines and through the 2006 model year for Class II engines, subject to the following criteria:

(A) the inability to obtain Phase 2 engines is despite the manufacturer's best efforts and is the result of an extraordinary action on the part of the engine manufacturer that was outside the control of and could not be reasonably foreseen by the equipment manufacturer; such as canceled production or shipment, last minute certification failure, unforeseen engine cancellation, plant closing, work stoppage or other such circumstance; and

(B) the inability to market the particular equipment will bring substantial economic hardship to the equipment manufacturer resulting in a major impact on the equipment manufacturer's solvency.

(iv)The written permission from the Administrator to the equipment manufacturer shall serve as permission for the engine manufacturer to provide such Phase 1 engines required by the equipment manufacturers under this paragraph (b)(6) of this section. Such engines are excluded from the nonhandheld certification, averaging, banking and trading program. As Phase 1 engines, these engines are exempt from Production Line Testing requirements under subpart H of this part and in-use testing requirements under subpart M of this part."

6.6.2 Summary of the Comments

EMA/OPEI comment (IV-D-12, pp.80-81) that in principle, EMA and OPEI support EPA's proposed "hardship" relief provision. However, they believe that the proposed requirement to

demonstrate the "inability to sell the subject equipment will have a major impact on the company's solvency" would establish "an extremely high and potentially impossible hurdle for companies to jump; it could potentially foreclose the possibility of relief to manufacturers that (due to no fault of their own) are prevented from meeting the implementation schedule for a specific equipment model, thereby losing market share, simply because lost sales associated with the product would not result in insolvency or bankruptcy."

"Rather than making insolvency a condition precedent of obtaining a variance, the final rule should provide that manufacturers that can demonstrate a substantial negative economic impact or loss market share associated with their inability to sell the subject equipment would be eligible for a variance, regardless of their overall solvency, provided that the other criteria set forth in the proposed rule are satisfied."

6.6.3 EPA's Response to the Comments

EPA is of the opinion that the other flexibilities being offered will provide relief to those manufacturers experiencing the problems described by EMA/OPEI. The hardship provision was designed primarily as an *in extremis* measure that would be available where other flexibilities did not adequately address severe burdens, and should therefore require demonstration of a major impact on company solvency. Short of a manufacturer making such a demonstration, EPA would not be inclined to provide this type of relief at all. Moreover, this provision is consistent with similar relief that EPA has provided under the Phase 1 rule for nonhandheld manufacturers who prove that they do not have the ability to use 4-stroke engines, in certain situations. In addition, for the conversion of SV to OHV, OHV engine designs are available today and it is possible that equipment manufacturers may plan ahead of time to avoid any market share loss.

6.7 Record keeping on Phase 1 Engines Produced During Phase 2

6.7.1 Summary of the Proposal

EPA's NPRM discusses the Phase 1 engine availability in 63 FR 3996. Section 90.1003(b)(5)(iii) of the proposal states that "The engine manufacturer retains records of the engine purchasers and the makes and models of equipment for which the engines are sold. Such records shall be made available to the Administrator upon request and shall be sufficient to enable the Administrator to determine the quantities of engines being applied to different makes and models of equipment." Section 90.1003(b)(iv) states "The engine manufacturer submits a written report to EPA, within 90 days of the end of each model year in which any uncertified replacement engines, or engines certified to an earlier model years standards, were sold describing the numbers of such engines sold during the model year;"

6.7.2 Summary of the Comments

EMA/OPEI commented (IV-D-12, p.82) that "to prevent abuse, EPA proposes that equipment manufacturers procuring engines for use under the flexibility programs provide written

assurance to the supplying engine manufacturers that such engines are being procured for that purpose." "EPA should not require engine manufacturers to retain records concerning the engines they produce for the purpose of making Phase 1 engines available for the equipment manufacturer flexibilities. Such a requirement would be unnecessary in that it essentially would call for the retention of duplicate records. EPA should not place that kind of needless administrative burden on manufacturers."

6.7.3 EPA's Response to the Comments

EPA continues to believe that recordkeeping is necessary to track usage of non-conforming engines sold. Without this recordkeeping requirement, EPA would not be able to assure itself that the flexibility was being properly implemented.

6.8 Table of FRM Flexibilities

The table below lists the flexibilities finalized in this FRM

SECTOR	CUTOFF	FLEXIBILITY
Small Volume Engine Manufacturer/ Small Volume Engine Family	10,000/5,000	1. Allowed to be "Phase 1" engines until 2010 model year. Excluded from ABT until 2010. 2. Can opt out of PLT; SEA still applicable. 3. Can certify using assigned deterioration factors.
Class II SV Engine Family	1,000 and less	24 g/kW-hr for HC+NOx throughout Phase 2
Small Volume Equipment Manufacturer	5,000	Can use a Phase 1 engine, and manufacturer can supply this engine if no Phase 2 engine is available for existing equipment, for up to three years beyond last date of phase-in of standard. These dates are... Class I: Aug 1, 2010 Class II: 2008 MY
Small Volume Equipment Model	500	Can use Phase 1 engines throughout Phase 2 if they demonstrate no Phase 2 compliant engine is available for existing model (if the equipment is "significantly modified" then this exemption ends)
Any Equipment Manufacturer	ALL	Any equipment manufacturer which demonstrates substantial economic hardship if required to use a Phase 2 engine may use a Phase 1 engine for one year beyond last implementation date of the applicable Phase 2 standard.

Section 7: Nonregulatory Programs

EPA discussed three nonregulatory programs in the preamble to the NPRM: a voluntary "green" labeling program for nonhandheld and handheld engines, a voluntary fuel spillage and evaporative emission reduction program for nonhandheld and handheld engines, and a particulate matter and hazardous air pollutant (HAP) testing program for handheld engines.

7.1 Voluntary "Green" Labeling Program

7.1.1 Summary of the Proposal

EPA discussed the concept of a voluntary program for labeling engines with superior emission performance as a way of providing public recognition and also allowing consumers to easily determine which engines have especially clean emission performance. EPA discussed a threshold of around 50 percent of the proposed standard (e.g., around 12.5 g/kW-hr for Class I engines) as the level below which engines would qualify for "green" labeling. EPA requested comment on all aspects of the program, as well as indication of interest on the part of consumer groups, engine and equipment manufacturers, and others in working with the Agency to develop and implement the program.

7.1.2. Summary of the Comments

Several commenters supported the concept of a "green" labeling program, and offered recommendations for various aspects of the program. Maurdyne Industries, Inc. , recommended that a "green" label recognize two levels of emissions below mandated standards: emissions in the range of 40 to 60 percent of the standards would qualify for "low emissions" labeling, and emissions below 40 percent of the standards would qualify for "ultra-low emissions" labeling, and that such a program begin as soon as possible, but at least by 1999. Maurdyne also suggested that the labeling and promotional benefits of such as program be available not just to engine manufacturers, but also to aftermarket suppliers of emission reduction systems (provided they meet durability requirements).

MECA supported EPA's goals of promoting the manufacture, sale, and use of low emission lawn and garden equipment, and recommended that EPA establish voluntary "Blue Sky Engine Series" low emission standards such as the Agency has proposed for nonroad CI engines above 19 kilowatts. MECA recommended a 3- tier system of Blue Sky Engine Series standards based on ARB's proposed Tier 2 and Tier 3 standards (or some fraction of those standards). The program could be implemented in the 1999 model year. In addition, MECA recommended that all lawn and garden equipment be required to provide emission information, and not just those engines that are low emitting; such information should enable the consumer to readily understand the relative emission performance of a given product compared to similar equipment.

STAPPA and ALAPCO supported participation in a green labeling program, and expressed

concern that a program not confuse or mislead consumers, in particular in the interface between a green labeling program and the ABT program proposed for nonhandheld engines. STAPPA and ALAPCO proposed a mandatory comprehensive labeling program for nonhandheld engines with ABT which would identify both those engines whose emissions are significantly below and above the corporate average emission level, since the emission benefits of "clean" engine families are used to offset the excess emissions from "dirty" engine families. Because no ABT program was proposed for handheld engines, STAPPA and ALAPCO supported a voluntary labeling scheme that identifies those engines with emissions significantly below the certification standards. STAPPA and ALAPCO also supported the Blue Skies Engine Series low-emission standards program for small nonroad engines.

Honda supported programs that are effective in reducing emissions by either encouraging the manufacturer to produce engines certified below the existing standard or by providing incentives to encourage consumers to purchase cleaner engines/products. Honda commented that the criteria of 50 percent cleaner than the standard is a significant challenge and instead suggested two levels of green labeling, one that would apply to the 50 percent cleaner engine as proposed, and the second that would apply to an engine that meets the more stringent California standard and is sold in all 50 states.

EMA/OPEI recommended that EPA not propose a "green" labeling program for nonhandheld engines, expressing concerns about the lack of detail of the program, the issue of whether green labeling is appropriate for engines participating in an ABT program, unresolved issues of when a label should be placed on the engine and when it should be placed on the equipment, and potential inequities and administrative burdens such a program might create for engine manufacturers.

Tecumseh Products Company commented that a green labeling program is not consistent with the ABT program, which is integral to the overall program, assuming green labeling would be a program where a manufacturer would forfeit credits generated from the family in question (otherwise the use of these credits to offset higher emitting engines would destroy benefit of the sale of the lower emitting engine).

7.1.3 EPA Response to Comments

EPA remains committed to promoting clean technology, and interested in developing a green labeling program for small SI engines in a way that does not confuse consumers or undermine environmental goals of the Phase 2 regulations. In the design of a program, it would be necessary to review appropriate levels for a green label, given the increased stringency of Class I standards in the final program, as well as consider the appropriate interface between a green labeling program and the ABT program that is being finalized for nonhandheld engines. EPA intends to continue to pursue the development of voluntary green labeling program for small SI engines as a nonregulatory program, but is not adopting such a program as part of today's final rule.

7.2 Voluntary Fuel Spillage and Evaporative Emission Reduction Program

7.2.1 Summary of the Proposal

In the preamble to the NPRM, EPA discussed interest in involving stakeholders in the design of a voluntary fuel spillage and evaporative emission reduction program specifically for the small engine industry and its customers. EPA requested comment on the concept of a voluntary partnership program, and indication of interest in participating in the partnership.

7.2.2. Summary of the Comments

Comments on this concept included both disappointment that EPA has not done more in these areas (STAPPA and ALAPCO), as well as a willingness on the part of several commenters (STAPPA and ALAPCO, EMA/OPEI, and PPEMA) to work with EPA.

In addition, Honda commented that engines supplied with fuel tanks that emit significantly less diurnal evaporative emissions (than inventory baseline) should be allowed to apply that hydrocarbon reduction to the total of the exhaust emissions (either the manufacturer would test evaporative emissions in a SHED, or the burden would be on the manufacturer to demonstrate correlation with a SHED if using another evaporative test).

PPEMA commented that a voluntary spillage reduction program is worthwhile and should be pursued, but its effectiveness would depend on the participation of all the necessary parties, including handheld and nonhandheld engine manufacturers, equipment manufacturers, gasoline can and spout manufacturers, equipment dealers, and state and regional air quality authorities.

7.2.3 EPA Response to Comments

The final rule does not itself include a voluntary spillage reduction program. In addition, the final rule does not allow an exchange between evaporative emission reductions and exhaust emission requirements, as suggested by Honda, due to the difficulties associated with evaporative emissions measurement, issues of evaporative emissions over the life of the equipment, and the absence of an enforceable spillage reduction program in the rule. Moreover, EPA is not at this time persuaded that Honda's suggestion would be appropriate to incorporate on a rule in which EPA is required to establish standards achieving minimum reductions through available technology. Following Honda's suggestion, a manufacturer might continue to use archaic engine technology, which is counter to the purpose of Section 213 of the Clean Air Act. However, EPA is interested in pursuing programs that would provide incentives for use of fuel tanks that emit lower evaporative emissions, and EPA remains committed to developing voluntary programs to address fuel spillage and evaporative emission reductions.

7.3 Particulate Matter and Hazardous Air Pollutant Testing Program for Handheld Engines

7.3.1 Summary of the Proposal

The NPRM discussed a test program to be conducted by PPEMA, in cooperation with EPA, to evaluate and quantify emissions of PM and HAP, to be conducted on Phase 2 technology handheld engines representing the range of new basic technologies used to comply with Phase 2 small engine standards. The information generated by the program would be useful in informing any future discretionary implementation of section 213(a)(4) regarding small SI engines.

7.3.2 Summary of the Comments

PPEMA commented that they are ready to begin planning of this test program as soon as feasible after EPA's promulgation of final Phase 2 emission regulations. STAPPA and ALAPCO commended PPEMA and EPA for the planned test program, which should help verify the hypothesis that hydrocarbon standards will serve to simultaneously reduce emissions of toxins. They urged EPA to utilize these data in assessing the need for emission standards for PM and HAP during a Phase 3 rulemaking, and to incorporate these data into future assessments related to the health effects associated with exposure to urban air toxics.

7.3.3 EPA Response to Comments

As discussed previously, EPA intends to address the Phase 2 control program for handheld engines in a supplement proposal. EPA also expects to solicit further information regarding toxic and PM emissions from handheld engines as part of that process. EPA continues to support the agreed upon PM/HAP testing program for handheld engines, and anticipates that the range of technologies used to comply with Phase 2 small handheld engine standards would be included in the testing program. The Agency would expect to use these data, as well as HAP data generated on nonhandheld engines, in the Agency's broader air toxics assessment efforts, as well as any future implementation of section 213(a)(4) regarding small SI engines.

Section 8: General Provisions and Recommendations

In the NPRM for the Phase 2 program, EPA discussed a number of general provisions impacting Phase 2 engines, including: model year definition and annual production period flexibilities, definition of handheld engines, small displacement nonhandheld engine class, liquefied petroleum gas fueled indoor power equipment, dealer responsibility, engines used in recreational equipment, engines used in rescue and emergency equipment, and replacement engines. EPA received comments on several of these issues, as well as recommendations on other general issues. These general provisions and other recommendations and issues are discussed in this section of the Summary and Analysis of Comments.

8.1 Model Year Definition and Annual Production Period Flexibilities

8.1.1 Summary of the Proposal

EPA proposed that the model year definition from the Phase 1 rule would remain the same in the Phase 2 program, and that the programs for nonhandheld and handheld engines would be effective beginning with the 2001 and 2002 model years, respectively. In addition, in order to provide additional lead time for the implementation of the program for nonhandheld engines, EPA proposed to adopt similar flexibilities for the beginning of the Phase 2 program for nonhandheld engines as were available for the Phase 1 program (see 63 FR 3997).

The proposed annual production period flexibility would allow nonhandheld engine manufacturers to certify to Phase 1 standards during an annual production period beginning prior to September 1, 2000, provided that annual production periods beginning prior to September 1, 2000 did not exceed 12 months in length. In effect, all nonhandheld engine families would be required to be certified to the Phase 2 program by September 1, 2001. EPA did not propose these provisions for handheld engines for which the proposed program had both a later phase-in date as well as a phase-in of the Phase 2 program based on percentage of engine sales.

8.1.2 Summary of the Comments

EMA/OPEI supported the use of the Phase 1 definition of model year for the Phase 2 program, and also recommended that EPA provide flexibilities for the beginning of the Phase 2 program comparable to those that were available for the Phase 1 program (IV-D-12; p. 85).

8.1.3 EPA's Analysis and Response

EPA agrees that the definition of model year in effect for the Phase 1 program is appropriate for the Phase 2 program, and is finalizing that definition in this rule.
EPA also continues to believe that flexibilities for the beginning of the Phase 2 program comparable to those that were available for the Phase 1 program are appropriate for Class II nonhandheld engines, and these flexibilities will be available to Class II engines in this final rule. However,

given the changes in standards and the extended effective dates from the NPRM program for Class I nonhandheld engines contained in this rule (discussed at section 2.3 of this document), these flexibilities are no longer necessary for Class I engines, and will not be available for Class I engines in this final rule. The additional lead time combined with a specified applicability date for Class I standards, provides sufficient flexibility to accommodate production schedules for engine manufacturers.

While EPA is finalizing the model year definition in effect for the Phase 1 program for the Phase 2 program, and is also finalizing flexibilities similar to those in Phase 1 for the start-up of the Phase 2 program for Class II engines, EPA is also clarifying in this final rule the standards to which Class II Phase 2 engine would be subject at the start-up of the program. Under the final rule, Class II engine families are required to be certified to the Phase 2 program by September 1, 2001. In addition, engine families first certified to the Phase 2 program on or before August 31, 2001, and designated as "2001 model year" families, are required to meet the 2001 emission standards (e.g., 18.0 g/kW-hr HC+NOx). These engine families are also required to re-certify for the 2002 model year by January 1, 2002. Engine families first certified to the Phase 2 program on or before August 31, 2001, and designated as "2002 model year" families, are required to meet the 2002 model year standards (e.g., 16.6 g/kW-hr HC+NOx).

8.2 Definition of Handheld Engines

8.2.1 Summary of the Proposal

EPA proposed no changes to the Phase 1 criteria at 40 CFR 90.103(a)(2) for determining whether engines could be classified as handheld (Class III, IV or V) (see 63 FR 3997). The NPRM preamble included discussion of an ANPRM comment that the Phase 1 definition of handheld restricts the replacement of 2-strokes by significantly cleaner 4-stroke engines, as well as the EPA belief that the current interpretation of the criteria addresses the commenters concerns: provided the 4-stroke engines are capable of performing the same intended functions as 2-stroke engines used in similar handheld applications, then EPA would likely determine that the 4-stroke engine also meets the criteria for applicability of the Class III, IV or V standards.

8.2.2 Summary of the Comments

Ryobi requested that EPA eliminate the definition of "handheld" and replace it with "engine displacement size of 60 cc and smaller", and thereby eliminate the reliance on a mix of qualitative and quantitative criteria used to define "handheld" in the current regulations (IV-D-18; p. 8).

Honda commented that within the Phase 1 handheld definition, EPA has a weight limit with two different values that depend on the product, and suggested that the Agency use the 20 kilogram value consistently for all products. In addition, Honda recommends that if EPA does not finalize a Phase 2 program with a small displacement nonhandheld class, then the definitions in handheld will need to be broadened to allow for the products that several manufacturers have brought to the

Agency's attention because they are unable to find a certified power source, or their previous power source cannot be certified for use in the product because of the definition (IV-D-16; p. 5).

Tecumseh argued that using a displacement cutpoint for defining handheld engines would be a great improvement from using subjective criteria that both the manufacturer and the Agency need to review, and recommended that EPA use the proposed California ARB 60 cc cutpoint, but with provisions for the Agency to make exceptions for products which were considered handheld by the Agency in Phase 1, including, at a minimum, augers, hover mowers, and compact snow blowers (IV-D-08; p. 8).

8.2.3 EPA's Analysis and Response

The California ARB has finalized a displacement cutoff of 65 cc above which engines would meet the more stringent "nonhandheld" standards, and below which engines would meet the less stringent "handheld" standards. The California ARB was able to do this because the California ARB is preempted from regulating engines used in farm and construction applications, which include the larger displacement "handheld" applications. However, EPA does regulate these larger displacement "handheld applications (such as chainsaws, brushcutters, augers, etc.). Thus, while EPA agrees with commenters that a displacement cutoff could be a more objective criterion for determining which engines would be allowed to meet less stringent standards, if used for the federal program this system would necessitate a number of exceptions, which would likely be judged by the same type of criteria EPA is using in the Phase 1 program. Thus, EPA is not finalizing a displacement cut-off as a definition of handheld. EPA continues to believe that the current criteria for determining whether engines could be classified as handheld have worked well in the implementation of the Phase 1 program, and will continue to work for the Phase 2 program.

In response to comments from Honda and others, in a separate regulatory action, EPA intends to propose modifications to criteria for determining whether an engine could be classified as handheld that, if finalized, would be applicable for the remainder of Phase 1 and also apply for the Phase 2 program. The expected proposed modification would permit a manufacturer to exceed the weight limits (14 kg for generators or pumps, or 20 kg for one-person augers) in cases where the manufacturer could demonstrate that the extra weight was the result of using a four-stroke engine or other technology cleaner than the otherwise allowed two-stroke.

8.3 Small Displacement Nonhandheld Engine Class

EPA is not yet in a position to finally establish a small displacement nonhandheld class in this rulemaking. EPA expects to take further action on this issue as part of the supplemental proposal for handheld engines. See discussion of this issue at Section 2.1 of this document.

8.4 Liquefied Petroleum Gas Fueled Indoor Power Equipment

8.4.1 Summary of the Proposal

EPA proposed no special provisions for LPG fueled indoor power equipment. However, EPA noted in the preamble to the NPRM that, in the proposed program, those manufacturers of LPG fueled indoor power equipment who produce 10,000 or fewer units annually would be considered small volume engine manufacturers, and would thus qualify for the proposed flexibilities for small volume engine manufacturers, which include the ability to produce Class II engines meeting a "Phase 1 equivalent standard" (24 g/kW-hr) until the 2005 model year, the ability to opt out of PLT, and the potential to qualify for carry-over certification from one year to the next (see 63 FR 3998).

8.4.2. Summary of the Comments

Pioneer Eclipse Corp. commented that Pioneer should not be subject to regulation under the Phase 2 rules because it is a manufacturer of equipment which is used solely indoors, and which is already subject to regulations under OSHA. Pioneer requested that EPA exempt from regulation small manufacturers of propane-powered spark-ignited engines used solely for indoor applications and subject to OSHA indoor air quality standards. Pioneer objected to EPA's assertion of jurisdiction over the propane-powered floor burnisher industry because these devices operate exclusively indoors and emit solely to the internal areas of buildings, and not into the ambient air (arguing that the only type of emission standards for nonroad engines which the Clean Air Act empower EPA to promulgate is an emission standard for a pollutant "emitted into or otherwise enter[ing] the ambient air"). Pioneer requested that, if they are not exempted from the final regulations, that EPA simplify the testing and data reporting procedures of the rule by allowing constant load testing with measurement in ppm (which would allow for the collection of data for certification and auditing as is currently done by Pioneer), and by allowing reporting of test data in ppm (Pioneer noted that they could report 100 percent of production in ppm). Finally, Pioneer acknowledged and supported the relief from the PLT program as provided for small volume engine manufacturers (IV-D-19).

Honda noted that EPA policy (under Memorandum 1-A) allows a converter of gasoline certified engines to an alternative fuel to test an engine to assure that the changes to the engine do not affect engine compliance with the standard, however Memorandum 1-A and Agency policy do not require the converter to put any additional label on the engine identifying who has done the conversion, the new useful life hours, the new fuel, or any maintenance changes necessary to assure that the engine will be free of defects in materials and workmanship for the stated hours. Honda argued that without identification of the converter, it is unclear from whom the customer should expect warranty coverage, it may not ever be possible for the Agency to determine that the converter has performed the necessary compliance testing. Honda urged the Agency to require engine converters to implement the basics of emission labeling, maintenance instructions, and warranty responsibility (IV-D-16; p. 8).

EMA/OPEI supported providing added flexibility for indoor LPG-fueled power equipment engines, yet recommended that EPA should maintain the current level playing field between

converters of engines to operate indoors on LPG-fuel and manufacturers of engines to operate indoors on LPG-fuel. EMA recommended that EPA require both engine converters and engine manufacturers to meet the same requirements, and allow both, where applicable, to have the flexibilities appropriate for small volume engine families. In particular, EMA recommended that for the Phase 2 program: i) all manufacturers of indoor LPG-powered equipment engines should be allowed to certify their engines to the Phase 1 standards until 2005; ii) the PLT program for Phase 2 should be applicable in year 2001 to help prevent an unfair competitive advantage to companies converting gasoline powered engines to LPG fuel as their method of manufacturing LPG engines; iii) EPA should allow indoor LPG-fueled engine manufacturers the compliance flexibilities available to small volume engine families (up to 5,000 units); and iv) EPA should exempt indoor LPG-fueled power equipment manufacturers from the requirement to bench or field test engines for their useful lives (as proposed for engines with aftertreatment). Finally, EMA recommended that EPA clarify that converters of engines to operate indoors on LPG-fuel are engine manufacturers for purposes of compliance with EPA's regulatory program and that the engine converter, and not the original engine manufacturer, is an engine manufacturer and is accountable for all aspects of compliance with the emission standards (IV-D-12; pp. 87-90).

8.4.3. EPA's Analysis and Response

First, in response to Pioneer Eclipse, OSHA does not set equipment emission standards; EPA has that responsibility. Additionally, the emissions from this equipment can be effectively controlled through the EPA regulations being adopted today. Therefore, EPA is not exempting indoor LPG- fueled equipment from the Phase 2 regulation. While many of the manufacturers of propane-powered spark-ignition engines are small volume manufacturers, the regulations being adopted today also minimize the regulatory burden on these manufacturers.

Pioneer Eclipse based it's jurisdictional argument on its interpretation of the definitions of "emission standard" and "air pollutant" under sections 302(k) and 302(g) of the Clean Air Act, asserting that standards under section 213(a)(3) are "emission standards" governing "air pollutants" as those terms are defined in section 302. Focusing on the latter term, Pioneer Eclipse argued that EPA's nonroad regulations can only apply to pollution "which is emitted into or otherwise enters the ambient air." Pioneer Eclipse also observed that EPA's regulations define "ambient air" to mean "that portion of the atmosphere, external to buildings, to which the general public has access." 40 CFR 50.1(e). Since their products do not directly emit into the ambient air, Pioneer Eclipse argued, EPA may not regulate them.

However, in adopting regulations for nonroad engines under section 213(a)(3), EPA notes that these defined terms do not apply, since they are not used in the statutory text governing nonroad regulations. Instead, combined with section 213(a)(2), section 213(a)(3) directs EPA to adopt "regulations containing standards applicable to emissions from those classes or categories of new nonroad engines and new nonroad vehicles ... which in the Administrator's judgment cause, or contribute to, [ozone or carbon monoxide concentrations in more than 1 area which has failed to attain the national ambient air quality standards for ozone or carbon monoxide]." Pioneer Eclipse's reliance on sections 302(k) and 302(g) and 40 CFR 50.1(e) to support it's interpretation is therefore

incorrect. Pioneer Eclipse's products are part of the larger class or category (small SI engines) which EPA has determined cause or contribute to ozone or CO non-attainment concentrations.

Moreover, even if those terms did apply to section 213(a)(3) regulations, EPA notes that Pioneer Eclipse focused on the "emitted into" language in the 302(g) definition in claiming their products should be exempt, while the term also reaches pollution that "otherwise enters" the ambient air. EPA has already generally concluded that emissions from small SI engines cause or contribute to ozone or CO non-attainment concentrations, and there is no reason to conclude that the pollution from Pioneer Eclipse's indoor products does not "otherwise enter" the ambient air and contribute to such concentrations, even though it is initially emitted indoors. Therefore, EPA would have authority to regulate Pioneer Eclipse's products even if the section 302(k) and 302(g) definitions applied to section 213 regulations, which they do not.

Second, in response to the Pioneer Eclipse request to be allowed to measure and report test data on a concentration basis (in ppm) rather than on a mass basis, EPA understands that measurement of concentration of emissions can be less expensive than mass emissions, and that at least some manufacturers of propane-powered spark-ignition engines are already using concentration measurement equipment to check the performance of their engines after they have been converted to run on propane. However, while concentration measurements can give an indication of the emission performance of an engine, it is a far less adequate test than the mass-based emission test adopted with the Phase 1 rules and being continued with today's action. It should be noted that the provisions of 90.120 allow a manufacturer, with advance approval by EPA, to elect to use an alternate test procedure provided that the manufacturer demonstrates that it yields results equal to the results from the test procedure in Subpart E of the regulations and provided that the basis for equivalent results with the specified test procedure is fully described in the manufacturer's application. Thus, if manufacturers could show equivalent results between testing on a concentration basis (e.g., in ppm) and testing on a mass basis (in g/kW-hr) as required under Subpart E, then this could be an option for these manufacturers. However, even if such equivalent results could not be established, manufacturers of LPG fueled indoor power equipment would likely be able to carry-over certification test results from year to the next, would likely qualify for assigned dfs in the certification process, and would likely have the option to not perform PLT testing. Thus, in most cases, these manufacturers would only be required to perform one engine test per engine family for the first year of certification.

Third, modifications to small volume flexibilities in the final program should address the EMA/OPEI concerns regarding a level competitive playing field between converters and OEMs. In the final rule these flexibilities will be available for both small volume engine manufacturers and for small volume engine families, and will include a provision to continue to certify these Class II engines under the Phase 1 program until the 2005 model year, an option to use an assigned df for certification, and an option to opt out of PLT (see discussion of these compliance flexibilities in Section 6 of this document).

Fourth, regarding the issue of the status of converters as manufacturers, existing converters have two options under the small SI provisions. First, they may certify their products on alternative

fuels; in this case, they become "engine manufacturers" for the purpose of these regulations, and are responsible for all manufacturer requirements under the CAA and 40 CFR Part 90. The second option for parties that intend to convert engines to operate on a fuel other than that with which it was certified, is to follow EPA's Tampering Enforcement Policy as contained in Memorandum 1A of June 25, 1974 (Memo 1A). Under Memo 1A, the converter must demonstrate that the particular engine will meet all applicable emission standards for its useful life. Memo 1A provides the different bases upon which this demonstration can be made. Any party that demonstrates compliance with Memo 1A would not be subject to liability under the tampering prohibition of the Section 203(a) Clean Air Act. Unlike the engine manufacturer, converters are not required to label or provide maintenance instructions or emissions warranty for such engines under Memo 1A. It should be noted that any party that installs such conversion systems or in any way causes the conversion of engines to an alternative fuel, including the manufacturing or marketing of conversion systems, could be subject to tampering liability if not done in accordance with the above EPA policy. While sympathetic toward the original engine manufacturer's concern of potentially increased warranty burden, EPA is retaining the policy of allowing modifications to certified engines so long as the modifier has good reason to believe such modifications do not increase emissions. Under such a policy, no emission increase should occur. Requiring the modifier to recertify, in this case, would have no expected emission benefit but would add greatly to the burden on the modifier.

8.5 Dealer Responsibility

8.5.1 Summary of the Proposal

The Phase 2 proposal contained no new constraints or responsibilities for dealers and repair facilities beyond the Phase 1 rule. While all persons, including dealers and repair shops, are prohibited from tampering or causing tampering, they are not prohibited from working on tampered engines, and they are not expected to restore tampered products to their originally certified and functioning configuration unless a repair is to the tampered system or a component of the tampered system. In such a case, the dealer or repair facility would restore the system to a certified and properly functioning condition, but need not conduct emission testing to verify compliance with emission standards.

8.5.2 Summary of the Comments

EMA supported the EPA proposal on dealer responsibility.

8.5.3 EPA's Analysis and Response

As in the NPRM, the final rule contains no new constraints or responsibilities for dealers and repair facilities beyond those contained in the Phase 1 rule.

8.6 Engines Used in Recreational Vehicles and Applicability of the Small SI Regulations to Model Airplanes

8.6.1 Summary of the Proposal

EPA did not propose any changes to the provision in the Phase 1 rule that engines used in recreational vehicles would not be subject to the small SI engine regulations. These engines are defined at 40 CFR 90.1(b)(5), in part, as having a rated speed greater than or equal to 5,000 RPM and having no installed speed governor. EPA did clarify in the NPRM (see 63 FR 3999) that EPA continues to believe snowmobiles should not be covered under the small engine rule, including snowmobiles designed for use by children which may in fact have a "speed governor" installed for safety purposes.

8.6.2 Summary of the Comments

EMA/OPEI recommended that EPA not just issue a clarification, but rather revise 90.1 to make clear that engines used in snowmobiles are not covered by the rule, and that EPA further acknowledge that it may not yet have identified all products using small engines. EMA/OPEI suggested that Agency should provide itself sufficient authority to similarly exclude engines from the rule without a further rulemaking (IV-D-12; pp. 90-91).

EPA received numerous comments from the model airplane community, arguing that model airplane engines should not be included in this rule (IV-D-07; IV-G-08 through IV-G-12; IV-G-14 through IV-G-19; IV-G-21; IV-G-23, and IV-G-24).

8.6.3 EPA's Analysis and Response

EPA is not adopting as part of today's final rule any revisions to the provisions relating to engines used in recreational vehicles established in the Phase 1 program. No revisions were proposed by the Phase 2 NPRM. EPA has addressed recreational vehicle issues in a separate regulatory action, which considers the applicability of the small SI regulations to engines used in model airplane applications. EPA has proposed to consider engines that serve "only to propel a flying vehicle...through air" to be recreational engines provided they also meet the other existing criteria that apply to that term. (See 64 FR 5251, February 3, 1999.) As "recreational" engines they would be effectively excluded from the small SI program, if this change is finally adopted. Today's final rule is not final action on that proposal which is still pending a final decision.

8.7 Engines Used in Rescue and Emergency Equipment

8.7.1 Summary of the Proposal

EPA proposed a provision that, for the remainder of Phase 1 as well as for Phase 2, would

exempt engines which are used exclusively in emergency and rescue equipment from compliance with any standards if the equipment manufacturer can demonstrate that no certified engine is available to power the equipment safely and practically.

8.7.2 Summary of the Comments

EPA received no comments on this provision.

8.7.3 EPA's Analysis and Response

EPA is finalizing this provision as proposed.

8.8 Replacement Engines

8.8.1 Summary of the Proposal

EPA proposed to continue replacement engine provisions from the August 7, 1997 rulemaking (62 FR 42638), which amended the Phase 1 rule to allow engine manufacturers to sell uncertified engines for replacement purposes subject to certain controls designed to prevent abuse. These controls require that the engine manufacturer ascertain that there is no currently certified engine that will fit in the equipment, that the engines be labeled for replacement purposes only, and that the engine manufacturer or its agent take ownership and possession of the old engine. EPA also proposed to amend the replacement engine provisions to permit uncontrolled engines to be sold for pre-regulatory equipment, and Phase 1 engines to be sold for equipment built with Phase 1 engines, subject to the above constraints.

In addition, the Phase 2 proposal contained additional safeguards and reporting and record keeping requirements to further ensure against abuse, including: i) that manufacturers follow specific guidelines when ascertaining that no certified engine is available (proposed 90.1003(b)(5)(i)); ii) that old engines be destroyed (proposed 90.1003(b)(5)(ii)); iii) that the manufacturer retain records of the engine purchasers and the makes and models of equipment for which the engines are sold (proposed 90.1003(b)(5)(iii)); iv) that the manufacturer submit an annual report to EPA describing the numbers of replacement engines sold during the model year (proposed 90.1003(b)(5)(iv)); and v) that the manufacturer document that the engine being replaced was no older than 10 years or 10 model years (proposed 90.1003(b)(5)(v)).

8.8.2 Summary of the Comments

EMA/OPEI commented that the proposed recordkeeping requirements are designed to fix a problem which does not exist, that is, the abuse of existing replacement engine rules. EMA/OPEI argued that industry cannot comply with certain of the proposed recordkeeping requirements, and that others are unduly burdensome and provide no environmental benefit. In particular, manufacturers do not retain records of engine purchasers and the makes and models of equipment

for which engines are sold, and they do not retain records of the age of the engine being replaced. In addition, to be required to follow guidelines in determining that a certified engine is not available negates the expected benefit of the program. EMA/OPEI anticipate a negative impact on consumers due to added costs for recordkeeping, and they claim the universe of engines likely to be replaced would be so small as to not be cost-effective or necessary to protect the environment. EMA/OPEI requested that EPA require only that an annual report be submitted giving the numbers of replacement engines sold during the previous model year, and that no further recordkeeping requirements for replacement engines be adopted. In the event that EPA, in the future, felt that it became necessary to collect more information, EMA/OPEI commented that EPA could then propose a recordkeeping requirement (IV-D-12; pp. 91-93).

Kohler commented, first, that the engine manufacturer should not be forced to search for a certified engine before using an uncertified replacement engines, having neither the data nor the capability to do so. Second, retaining records of the engine purchasers and the makes and models of equipment for which the engines are sold is not possible, as the records are at the dealers' offices, and it is unreasonable to expect the manufacturer to keep duplicate records. Moreover, low volume of replacement engines Kohler expects to make may not be worth the added administrative effort to continue supplying them. Third, EPA should not have 10 year limit on uncertified replacement engines, because some expensive equipment may be used 20 years, and the consumer should be able to use an uncertified engine, if available. Fourth, the documentation requirements of the sale of uncertified engines is burdensome and will add administrative costs at all levels of sale. Tracking sales to the ultimate consumer, recording names, equipment, etc. at the factory level is impossible (the engine manufacturer would have to rely on the installer of the replacement engine to return this data this data to them, and Kohler thinks that won't happen). Finally, engine manufacturers can report annual sales of non-compliant product, but not the equipment model or consumer names, nor can they guarantee destruction of old engines (IV-D-11; pp. 5-6).

The Charles Machine Works, Inc. commented that the proposed replacement engine regulations are burdensome with no environmental benefit, and add administrative costs at all levels of sale which are eventually passed to the end user. EPA should remove burden associated with the proposed replacement engine regulations (IV-D-05; p. 2).

8.8.3 EPA's Analysis and Response

The final Phase 2 program for replacement engines goes beyond the August 7, 1997 rule in one area. It includes the amendment which permits uncontrolled engines to be sold for pre-regulatory equipment, and Phase 1 engines to be sold for equipment built with Phase 1 engines, subject to the above constraints (see 90.1003(b)(5)(iv)). The final rule does not include other provisions from the Phase 2 proposal that were added to the August 7, 1997 rule. Based on comments from manufacturers, and an assessment that eliminating these provisions will result in no loss of environmental benefits, EPA has decided to not adopt these other requirements in the interest of reducing the recordkeeping and reporting burden on manufacturers. Note that EPA has proposed minor modifications to the replacement engine regulations in a separate regulatory action in order to clarify the responsibilities of importers. (See 64 FR 5251, February 3, 1999.)

8.9 Recordkeeping and Information Requirements

8.9.1 Summary of the Proposal

The proposed rule included an estimate that the public reporting burden for the collection of information required under the rule would average approximately 6702 hours annually for a typical engine manufacturer (see 63 FR 4007).

8.9.2 Summary of the Comments

Tecumseh commented that production line testing burden alone is more than EPA's 6702 hour estimate, and that the hours required for field correlation data collection, the OHV field durability program, in-use performance demonstration, certification testing and documentation, ABT information for pre-certification, production period, and year-end reporting will add to the total. Tecumseh estimates it expends 26,000 man-hours per year for combined California ARB Tier 1 and EPA Phase 1 compliance (IV-D-08; pp. 8-9).

The Charles Machine Works, Inc. requested that EPA keep the testing and paper work burden of the rule upon the engine manufacturer to a minimum, including allowing in-use testing on test stands, not field testing, and allowing a manufacturer to extrapolate test results of similar configurations, rather than test and record every configuration. In addition, they urged EPA to construct requirement such that the burden of compliance remains with the engine manufacturer, and not with the equipment manufacturer (IV-D-05; pp. 1-2).

Kohler requested that EPA take a careful look at the proposed regulation and make it more "user friendly" by eliminating unnecessary recordkeeping and reporting requirements. Kohler specifically identified concerns with requirements regarding useful life, ABT, PLT, replacement engine, and in-use testing, at sections 90.105, 90.208, 90.209, 90.210, 90.704, 90.707, 90.709, 90.1003, 90.1250 of the proposed regulations (IV-D-11; pp. 1-4).

8.9.3 EPA’s Analysis and Response

The ICRs have been revised for this final rule and estimate the public reporting burden for the collection of information required annually for a typical engine manufacturer. In addition, as discussed in Section 5 of this document, EPA has significantly streamlined the compliance program requirements for the final rule. The specific concerns raised by Kohler are addressed in the sections of this document that address the useful life, ABT, PLT, replacement engine, and in-use testing requirements of the small SI Phase 2 programs.

8.10 Engine Labeling Provisions

8.10.1 Summary of the Proposal

EPA proposed that the Phase 1 labeling provisions would carry over into the Phase 2 program, with the addition of the indication of the engine's emissions compliance period on the label. EPA proposed two alternatives for indicating the engine's emissions compliance period on the label: (1) simply state the useful life hours or (2) use a designator of useful life hours (A, B, or C), and then adding words on the label to direct the consumer to the owner's label for an explanation of the meaning of A, B and C. This latter option was proposed only for nonhandheld engines and was based on the concern expressed by nonhandheld engine manufacturers during the development of the Statement of Principals for these engines that consumers could be confused by the meaning of the useful life period if the specific number of hours was included on the label. No such option was proposed to be provided to handheld engine manufacturers as they had not raised the concern for potential consumer confusion. However, as indicated in the preamble to the NPRM, EPA was concerned that an "A, B, C" designation may not provide the same useful information to the consumer as directly including the useful hours on the label and specifically requested comment on this issue.

8.10.2 Summary of the Comments

Honda commented that the engine emission label for Phase 1 is too large to fit in most locations on an engine, and with the additional requirement for an hours or category statement the label will become very difficult to place in a visible and non-vulnerable location. Honda requested that EPA work with the California ARB to harmonize the engine label requirement to allow an engine to be labeled for different standards levels and different classes. Finally, Honda requested that EPA allow several more options for information to appear in other locations on the engine (for example, "refer to owner's manual" could be put on another label such as on a safety label) (IV-D-16; p. 6).

PPEMA urged EPA and the California ARB to harmonize labeling requirements in order to permit handheld engine manufacturers to use a 50-state label (IV-D-21; p. 16).

EMA and OPEI indicated they remained concerned that consumers might believe the emissions compliance period could mean something else, for example, the expected life for which the engine would provide satisfactory product performance to the consumer. EMA and OPEI asserted "(c)onsumer purchasers are not sophisticated enough to understand the difference between the EPA term of art "useful life" and the expected time of ownership of their newly purchased lawnmower. Nor will they understand the difference between emission performance and product performance." Therefore, they recommended adopting an option whereby the engine manufacturer could indicate A, B, or C on its required engine label, make reference to the owner's manual for additional explanation and explain in the owner's manual the meaning of A, B, and C where it would be easier to provide an adequate explanation of the meaning behind an emission performance period (IV-D-12; pp. 28-29).

In contrast, the North American Equipment Dealers Association (NAEDA) commented that a buyer would not know the meaning of useful life designations such as A, B, or C prior to the purchase of the equipment since the explanation of these designations would only appear in the

owner's manual which is not normally accessible to the consumer prior to purchase (IV-D-01; p. 2).

8.10.3 EPA's Analysis and Response

EPA is adopting the Phase 1 labeling provisions for the Phase 2 program, including provisions under Phase 1 that allow EPA to consider requests by manufacturers for a common California and federal label to indicate compliance with California and federal regulations.[8] In addition, EPA is adopting the proposed Phase 2 requirement that the emission compliance period be indicated on the label. As indicated in the preamble to the NPRM, EPA believes inclusion of the number of hours of emission compliance for which the engine is properly certified would provide an important tool to consumers in making their purchase decisions between competing engines. EPA anticipates manufacturers will use the useful life hours of the engine as a marketing tool. For example a manufacturer might advertise that an engine family is certified as emissions durable to 1000 hours. Thus, inclusion of meaningful useful life hours would have the potential of providing a market place mechanism regarding manufacturers who design engines for longer useful life periods.

EPA remains concerned that an "A, B, C" designation of useful life may not be as informative of the expected emission performance period as a direct listing of the certified hours. Especially in light of NAEDA's comment, EPA is concerned consumers may be less able to use such designations to make informed purchase decisions if their only source of explanation is the owner's manual. However, it is also not clear that including the hours listing directly on the label is the optimum alternative since, as suggested by EMA and OPEI comments, manufacturers believe their customers may not fully understand the meaning of the emissions performance useful life hours listing and could instead, for example, believe the hours refer to perhaps a parts warranty period for the equipment in which the engine is installed. EPA is also aware of labeling options being considered by California that would allow removing the actual hours of operation from the engine label and including additional information on the product, perhaps not permanently affixed to the engine, which would satisfy the need to properly inform consumers. Allowing such labeling would also serve the goal of harmonization as supported by Honda and PPEMA.

Therefore, EPA is finalizing regulations which, as proposed, allow the manufacturer to use an engine label which includes the actual emissions period useful life as certified by the engine manufacturer or a label which includes an "A, B or C" designation and refers to the owners manual for further information. Based on conversations with both EMA and OPEI representatives, EPA also expects to work in partnership with the industry in developing consumer outreach material to better inform consumers of the emission improvements available through purchase of equipment

[8]The Phase 1 engine labeling provisions at 90.114(c) require a manufacturer to include certain types of information on the engine label. Under the authority of 90.114(e) to modify the engine label requirements contained in 90.114(c), EPA has approved requests by manufacturers for a common California and federal label to indicate compliance with California and federal regulations.

using Phase 2 engines. EPA expects such outreach material will better serve the informational needs of consumers than just relying on either of these labeling options.

Additionally, as indicated above, at 90.114(e) the rules allow other labeling options which the Administrator determines satisfies the information intent of the label. This option is intended to allow for the nationwide use of the California labeling system. In evaluating the adequacy of an alternative label, EPA would consider the extent to which the manufacturer's alternative engine label combined with other readily accessible consumer information adequately informs the consumer of the emission performance of the engine.

8.11 Warranty Provisions

8.11.1 Summary of the Proposal

EPA proposed that the 2 year warranty period from Phase 1 would continue for the Phase 2 program. EPA also proposed, at 90.1103(b)(2), that "The manufacturer of each new Phase 2 small SI engine must warrant to the ultimate purchaser and each subsequent purchaser that the engine is designed, built, and equipped so as to conform *for its designated useful life* with applicable regulations under section 213 of the Act, and is free from defects in materials and workmanship which cause such engine to fail to conform with applicable regulations for its warranty period." (Emphasis added).

8.11.2 Summary of the Comments

PPEMA commented that the proposal is confusing about distinguishing between warranty period and useful life, and asked that EPA clarify the distinction. PPEMA also requested that the warranty period for 300 hour handheld engines be 1 year (IV-D-21; p. 17).

Honda commented that the assertion in 90.1103(b)(2) that the engines are warranted for their useful life is not reasonable, because neither the operator nor the manufacturer will know the engine hours. Honda argued that the Agency cannot require the equipment manufacturers to install tamper proof hour meters in these engines. Honda suggests that EPA continue the Phase 1 warranty policy for defects in materials and workmanship for a period of two years as the only practical warranty for these engines (IV-D-16; p. 7).

8.11.3 EPA's Analysis and Response

Rather than finalize the NPRM's warranty language, EPA will make no changes from Phase 1 in the basic warranty requirement, which will remain two years. EPA has seen no evidence during the implementation of the Phase 1 program that manufacturers experienced higher than expected warranty claims because of the two year warranty coverage period. EPA intends to address the request by PPEMA to consider a shorter warranty period for some handheld engines in the supplementary proposal for the Phase 2 program for handheld engines.

EPA agrees that the proposed Phase 2 warranty language quoted above referring to useful life periods was confusing. The final rule language at 90.1103(b) will be modified as follows: "The manufacturer of each new Phase 2 small SI engine must warrant to the ultimate purchaser and each subsequent purchaser that the engine is designed, built, and equipped so as to conform *at the time of sale* with applicable regulations under section 213 of the Act, and is free from defects in materials and workmanship which cause such engine to fail to conform with applicable regulations for its warranty period." (Emphasis added). The final provisions specifying what manufacturers must warrant, therefore, remains unchanged from the existing rule.

8.12 Defect Reporting Requirements

8.12.1 Summary of the Proposal

EPA proposed no changes in the defect reporting requirements from the Phase 1 program, in which defect reporting is triggered at 25 defective engines.

8.12.2 Summary of the Comments

EMA/OPEI requested that EPA revise the defect reporting requirements to be the greater of 25 engines or 5 percent of the production for a single engine family manufactured in the same model year (IV-D-12; pp. 94-95).

8.12.3 EPA's Analysis and Response

EPA is making no changes in the defect reporting requirements for the final rule. EPA has seen no evidence during the implementation of the Phase 1 program that manufacturers need a higher number, and 25 is consistent with other EPA programs. Moreover, adopting the requested change would have benefitted large manufacturers at the comparative expense of smaller manufacturers by essentially imposing a lower threshold for smaller companies.

8.13 Aftermarket Provisions

8.13.1 Summary of the Proposal

There was no discussion aftermarket provisions in the Phase 2 proposal.

8.13.2 Summary of the Comments

Maurdyne commented that it intends to market its emission reduction system as an aftermarket kit consisting of a secondary air injection system and a combined catalytic converter/muffler to replace an engine's original muffler, or a secondary air injection system only. The kit would be sold to and installed by equipment manufacturers, equipment dealers, and

equipment customers. Maurdyne requested that EPA amend Memorandum 1-A to clearly specify the recordkeeping requirements with which an aftermarket supplier would have to comply in order to assure its customers that installation of its emissions reduction system will not result in any tampering liability, as well as records necessary to demonstrate the aftermarket system's durability (IV-D-04).

8.13.3 EPA's Analysis and Response

EPA is not modifying Memorandum 1-A, as Memorandum 1-A already has an attachment that lists the necessary information for compliance with Memorandum 1-A which EPA believes adequately addresses the commenters concerns.

8.14 High Altitude Compensation

8.14.1 Summary of the Proposal

There was no discussion of operation of small SI engines at high altitude in the proposal.

8.14.2 Summary of the Comments

Tecumseh requested that EPA provide guidance on the application of altitude compensation so dealers can be supplied information that will assure they are not considered tampering. In this guidance, EPA should provide dealers that service in these high altitude areas the authority to install and adjust carburetor jetting that is most appropriate for these extreme areas (IV-D-08; pp. 9-10).

8.14.3 EPA's Analysis and Response

EPA is taking the request for guidance under advisement, and will consider providing guidance in the future if needed to address the issue of high altitude compensation.

8.15 Crankcase Breathers and Provisions for Engines Used in Wintertime

8.15.1 Summary of the Proposal

The Phase 2 proposal would not have made any changes to several provisions from Phase 1 regarding crankcase breathers and engines used in wintertime, including: the provision at 90.103(a)(5) that engines used exclusively in wintertime may optionally be excluded from HC+NOx (NMHC +NOx) requirements; the requirement at 90.109(a) that an engine's crankcase must be closed; and provisions at 90.109(c) that allow for open crankcases for engines used exclusively to power snowthrowers based upon a demonstration that total CO from crankcase and exhaust are below the CO standard.

8.15.2 Summary of the Comments

EMA/OPEI requested that EPA allow operators of equipment powered by non-wintertime only engines to open the crankcase breathers on all small SI engine-powered equipment during operation below 32 degrees Fahrenheit without tampering liability in order to address the problem of engine failures due to carburetor icing or frozen breather connections (IV-D-12; p. 94).

Similarly, Honda recommended that EPA provide flexibility for the Administrator to approve a device that opens the crankcase at low ambient temperatures, and owner's manual instructions that allow the removal of the crankcase vent tube when operating the engine in cold weather (IV-D-16; p. 7).

Tecumseh commented that EPA should allow opening the crankcase breather on all products operated below 32 degrees Fahrenheit, arguing that the cost of installing systems to provide for intake air and breather heating is not warranted, and that conversion kits would lead to more significant tampering than a simple description of the potential solution in the owner's manual. Tecumseh also commented that EPA should eliminate the requirement to adjust CO emissions for open crankcase breathers on winter exclusive engines at 90.109(c), because the factor is less than the required instrument accuracy and under any level of repeatability of the measurement (IV-D-08; p. 9).

Kohler suggested that opening the crankcase in the winter should be allowed on any equipment used in wintertime operation which have problems with icing in the carburetor or breather hose. Kohler also requested that EPA expand the provisions at 90.105(a)(5) to include any equipment that is used in the winter if it is prone to carburetor and breather icing problems experienced by snowthrowers and ice augers (examples of other equipment which would be excluded from the wintertime HC+NOx standards include lawn and garden tractors that are operated with a snowthrower attachment, welders, and generators). Finally, Kohler does support regulations requiring that engines used in this equipment meet the applicable HC+NOx (NMHC+NOx) standards and have a closed breather when operated during other seasons of the year (IV-D-11; p. 6).

8.15.3 EPA's Analysis and Response

EPA is retaining the provisions regarding crankcase breathers and engines used in wintertime from Phase 1 for the Phase 2 program. EPA is retaining the requirement at 90.109(a) that an engine's crankcase must be closed, as well as the exception to this requirement at 90.109(c) that allows for open crankcases for engines used exclusively to power snowthrowers based upon a demonstration that total CO from crankcase and exhaust are below the CO standard. In response to Tecumseh's comment regarding the provisions at 90.109(c), several manufacturers have submitted information to EPA demonstrating that the total amount of CO emissions in the crankcase and exhaust are below the standard. At this time, however, industry has not supplied EPA with enough supportive data to demonstrate that the adjustment factor is less than the required instrument accuracy or under the level of repeatability of the measurement.

Further, regarding the request that owners be allowed to open the crankcase on equipment used in the wintertime that is prone to problems with carburetor or breather hose icing, EPA is hesitant to allow manufacturers to provide instructions for opening the crankcase in the winter. EPA is concerned that if crankcases were opened on engines used in wintertime, they would not be re-closed during summer operation, thus venting both CO as well as HC and NOx emissions to the atmosphere. EPA is concerned about the loss of environmental benefits such a situation could create.

Finally, EPA is not expanding the exclusion from HC+NOx (NMHC +NOx) standards at 90.103(a)(5) beyond engines used exclusively to power products which are used exclusively in the wintertime. The Agency feels that Kohler's suggestion that equipment such as lawn and garden tractors with a snowthrower attachment be excluded from the HC+NOx requirements in the winter, but not in the summer, would be impractical from an enforcement perspective.

However, EPA does understand that engines with closed crankcases may experience problems with icing in the carburetor or breather hose. EPA welcomes further information on the topic of crankcase breather icing, and will consider the points raised by comments in a separate regulatory action, as warranted.

8.16 NOx Converter Placement for Engine Testing

8.16.1 Summary of the Proposal

The Phase 1 rule requires, at 90.313(a)(5)(i)(b), that if an ice bath is used during engine testing, that it be located after the NOx converter. The Phase 2 proposal contains no changes from this Phase 1 requirement.

8.16.2 Summary of the Comments

Tecumseh commented that EPA should revise its requirement for the NOx converter to be placed prior to water bath condensing unit, as industry testing over a wide variety of engine conditions showed that the influence of the converter location had little if any affect on the NOx levels reported from these engines. Tecumseh recommends that EPA revise the regulation to allow the converter in either location for SI engines as NOx levels are not influenced by this condition (IV-D-08; p. 9).

8.16.3 EPA's Analysis and Response

Under the final Phase 2 program, the NOx converter placement requirements will continue as in Phase 1, as proposed. EPA disagrees with Tecumseh that the location of the converter has little effect on NOx results. Manufacturer testing to date has indicated that under the range of conditions included in the testing, under some conditions the location of the water both appears to make little difference, while under other conditions the location of the water bath upstream of the

NOx converter resulted in consistently lower NOx reading (see docket item IV-B-01). In addition, EPA believes that as the standards for NOx emissions get more stringent in Phase 2, the placement of the NOx converter becomes more important.

8.17 Usage meters

8.17.1 Summary of the Proposal

The proposal for Phase 2 contained no requirements for meters to monitor the number of hours that an engine is used (usage meters).

8.17.2 Summary of the Comments

Autonnic Research requested that EPA mandate usage meters in promulgation of final rulemaking (IV-D-02).

8.17.3 EPA's Analysis and Response

Due to the additional costs of installing a usage meter on small SI engines, and since usage meters in themselves would not result in additional emissions reductions during the useful life of engines, EPA is not mandating usage meters in the Phase 2 rule.

8.18 Metric units

8.18.1 Summary of the Proposal

EPA expressed the requirements of the proposed Phase 2 regulations in metric units (e.g., grams per kilowatt hour).

8.18.2 Summary of the Comments

EPA received comments that EPA must use American units in the rule (IV-D-14).

8.18.3 EPA's Analysis and Response

EPA is finalizing the requirements of the proposed Phase 2 regulations in metric units (e.g., grams per kilowatt hour), as consistent with authority under the Metric Conversion Act of 1975 and Executive Order on July 25, 1991.

Section 9: Other Regulatory Issues

9.1 Harmonization

9.1.1 Summary of the Proposal

EPA considered the value of harmonization with other regulatory programs, in particular with the California ARB, in the development of the Phase 2 proposal. First, while EPA did not propose the same emission standards as those being considered by the California ARB at the time of the proposal, EPA requested comment on whether the application of emission control technologies being considered by the California ARB are appropriate for a federal program at this time (63 FR 3961 and 3966). Second, EPA proposed that the steady-state test procedures in effect for Phase 1 and also required for the California ARB small engine program would be applicable for Phase 2, with minor changes. Finally, EPA's proposed compliance programs for Phase 2 engines included discussion of efforts to harmonize with California. In the discussion of the proposed certification requirements, the proposal described that EPA is working with the California ARB in an effort to develop a common application format that would reduce the certification burden for manufacturers, and that EPA anticipates that for the Phase 2 program, EPA and California would accept the same application format and would have the same application submittal process (63 FR 3984). In the discussion of the proposed production line testing requirements, EPA discussed interest in finding ways to harmonize with California, the possibility that data from production line testing of a 50-state family conducted for a California Quality Audit program could be acceptable for EPA's proposed CumSum process, and the commitment to continue to work with the California ARB to harmonize reporting formats, and similar information needs (63 FR 3989).

9.1.2 Summary of the Comments

EPA received comments on the level of the proposed emission standards. Some comments were supportive of the EPA proposed levels, and urged that EPA should not harmonize with more stringent levels proposed by the California ARB (EMA/OPEI, IV-D-12, p. 96; and PPEMA, IV-D-21, p. 16). Other comments urged EPA to adopt emissions levels more in line with the California program, or, at minimum, to commit to a Phase 3 that would achieve levels like those proposed by California (STAPPA/ALAPCO, IV-D-15, p. 2; and Ryobi, IV-D-18, p. 1).

EMA/OPEI commented that there are substantial benefits associated with harmonizing test procedures and compliance programs, and that EPA should finalize a rule that allows a manufacturer producing an engine family with a valid ARB Executive Order to sell that engine family nationwide (IV-D-12, p. 97). PPEMA suggested that EPA should accept compliance with California certification, production line testing, and in-use testing requirements for 50-state families (IV-D-21, p.16). In addition, as discussed above in section 8.10, Honda and PPEMA requested that EPA and California harmonize engine labeling requirements.

9.1.3 EPA Analysis and Response

EPA is adopting more stringent standards than those proposed for Class I engines. The nonhandheld standards adopted today are more aligned with California ARB's program (see sections 2.3 and 2.6 of this document for discussion of the standards).

EPA has also modified the requirements of the compliance program for the final rule such that the certification, production line testing, and in-use testing requirements are more aligned with the California ARB's program (see discussion at section 5 of this document). However, while the certification requirements have been harmonized with those of California, EPA cannot automatically allow engines with a valid California Executive Order to be sold nationwide, as suggested by EMA/OPEI. Rather, manufacturers will be required to submit a certification application to EPA for the annual certification required by the CAA.

The EPA and California test procedures are harmonized, and it will be possible for manufacturers to have a 50-state label for their engines (see discussion at section 8.10 of this document).

9.2 Regulatory Development Process

9.2.1 Summary of the Proposal

In the background section of the preamble to the proposal, EPA described steps in the development of the Phase 2 proposal, including the efforts of the Small Nonroad Engine Negotiated Rulemaking Committee, which met from September 1993 to February 1996, the development of the Handheld Statement of Principles (SOP) and the Nonhandheld SOP in May and December 1996, respectively, and the publication of an Advanced Notice of Proposed Rulemaking in March 1997 (see 63 FR 3951-3952). The Phase 2 proposal, which is in large part based on the two SOPs and the ANPRM, contained proposed emission standards that the Agency at the time believed were the most stringent that could be achieved in the time allowed, based on information available to EPA at the time of the proposal.

9.2.2 Summary of the Comments

EMA/OPEI expressed support for the Nonhandheld SOP that formed the basis for the stringent Phase 2 standards proposed for small nonhandheld SI engines, and went on to say that "a substantial potential benefit of an SOP-type approach to rulemaking is the ability of industry to take advantage of the greater certainty the SOP brings to the rulemaking process. By having an earlier and clearer sense of where EPA is headed than otherwise is provided in the traditional notice and comment rulemaking, manufacturers can direct their development programs earlier and in a more focussed manner on meeting the challenges of more stringent standards" (IV-D-12, p. 3).

Regarding the development of the Nonhandheld SOP, STAPPA and ALAPCO expressed concern that EPA negotiated separately with portions of the affected industry to reach an agreement that clearly did not have the support of other interest groups represented in the reg-neg and clearly

did not meet the needs of other stakeholders. In particular, STAPPA and ALAPCO argued that critical components of Handheld SOP were not included in the Nonhandheld SOP, in spite of the agreement in the Handheld SOP that the programs for handheld and nonhandheld engines would be identical (such as the in-use enforcement program, and a commitment to a technology review and a process an timeline for considering and implementing Phase 3 standards) (IV-D-15, pp 1-4).

Ryobi charged that the proposed Phase 2 rule is based on a biased proposal that resulted from a failed regulatory negotiation, and that this is hardly an appropriate basis for an EPA proposed regulation. In particular, Ryobi asserts that EPA developed a proposed rule without the participation of those who have been the strongest supporters of achieving the goals and requirements of the CAA (IV-D-18, p. 5).

MECA commented that the SOP process has not promoted the development of an effective Phase 2 regulatory program. MECA expressed support for EPA's effort to gain the input of all stakeholders in developing regulatory programs and achieving consensus where appropriate. However, MECA suggests that the SOP process does not put all stakeholders on equal footing as is intended by the Clean Air Act and the Administrative Procedure Act. In addition, MECA suggests that the SOP process appears to create an almost insurmountable presumption that what is agreed to in the SOP will become the final rule. MECA expressed concern that the rulemaking subsequent to the signing of the SOP lacks the vigorous, on-going type of analysis that one would expect as part of a traditional rulemaking process, and urged EPA to significantly strengthen its proposed Phase 2 regulations by adopting more stringent final standards (IV-D-13, pp. 6-7).

Finally, Pioneer Eclipse Corp. commented that Pioneer's interests in this rulemaking have not been adequately represented, and that exclusion of any indoor power equipment representative from the early stages of this rulemaking renders any conclusions or assumptions EPA obtained from the Small Engine Rulemaking Advisory Committee or the Nonhandheld SOP suspect (IV-D-19).

9.2.3 EPA Analysis and Response

EPA followed requirements of the CAA, the Administrative Procedure Act, and the Federal Advisory Committee Act in both the regulatory negotiation process and in the SOP process. During the regulatory negotiation, and throughout the regulatory development process, EPA sought to identify and work with the range of affected stakeholders. For example, EPA began working with indoor power equipment manufacturers and their representatives as soon as these groups came to the Agency's attention. EPA agrees with EMA/OPEI that an SOP process can provide a framework for a proposal and can give manufacturers some benefits of ability for advanced planning. EPA disagrees with MECA's statement that the SOP process creates an almost insurmountable presumption that what is agreed to in the SOP will become the final rule. On the contrary, EPA agrees that to the extent more information comes in, and there are, for example, advances in technology, EPA must consider these in the rulemaking process. The SOPs established parameters only for the proposed rule, and did not constitute final EPA decisions. In fact, EPA is adopting more stringent standards for Class I engines than those proposed, based on additional information gathered in the course of the rulemaking process. In addition, advances in technology for emission

control for handheld engines that have only recently come to the Agency's attention are a primary factor in the Agency's decision to not finalize a handheld Phase 2 program in this action, but rather, to provide an opportunity for further public comment through a supplemental proposal.

9.3 Clean Air Act Mandate

9.3.1. Summary of Proposal

The Phase 2 proposal contained standards that the Agency believed, given the information available at the time of the proposal, would achieve the greatest degree of emission reduction achievable through application of technology which will be available and considering lead time under the proposed schedule of compliance, noise, energy, safety, and cost factors associated with applying such technology to a nationwide program (see 63 FR 3958).

9.3.2 Summary of Comments

MECA commented that the proposed program as defined by the two SOPs that EPA signed with portions of the regulated industry, fall far short of what could be achieved, what has already been demonstrated, and what Congress mandated in the CAA Amendments of 1990. In particular, MECA asserted that the proposal fails to consider the significant additional emission reductions that could be achieved if catalyst technology were utilized or if some of the advanced engine management and fuel delivery technologies were employed (IV-D-13, pp. 1-2).

Ryobi commented that the proposed Phase 2 rule does not meet the requirements of the CAA because the standards do not achieve the greatest degree of emission reduction achievable at the earliest possible date taking into account the various statutory factors (IV-D-18, pp. 4-5).

STAPPA/ALAPCO also commented that EPA's proposal for nonroad engines does not satisfy the requirement of the CAA (IV-D-15, p. 2).

Other commenters supported that proposed emissions levels as the most stringent possible in the time frame allotted (EMA/OPEI, IV-D-12; and PPEMA, IV-D-21).

9.3.3. EPA Analysis and Response

Since the time of the proposal, EPA has gained additional information on the ability of the nonhandheld industry to meet more stringent Class I standards in the extended time frame allowed by the provisions of the final rule. The final standards reflect EPA's more fully informed analysis of the emissions levels that are achievable through application of available technology, considering cost, lead time, energy and safety factors. The provisions of the final rule fully meet the requirements of the Clean Air Act.

In addition, recent information on advances in technology for emission control for handheld

engines has led the Agency to delay promulgation of a Phase 2 program for handheld engines pending a supplementary proposal and opportunity for additional public comment.

9.4 Procedural Compliance in Adopting Final Standards

EPA recently received supplemental comments from OPEI, late in the rulemaking process, which OPEI had previously labeled as "draft." OPEI did not request that they be included in the docket for the rulemaking until two days before the court-ordered deadline for signature of the final rule. (CITE DOCKET DOCUMENT I.D. NUMBER, ONCE KNOWN). The unsigned comments were first submitted in draft on November 5, 1998, and again submitted in draft on December 3, 1998. OPEI responded on March 1, 1999 to prior EPA queries regarding whether OPEI wanted to include these comments in the rulemaking record. Given the lateness of OPEI's submission, EPA is not obligated to formally respond to OPEI's comments. However, EPA is providing some response to avoid any confusion that might arise from the late addition of OPEI's comments.

9.4.1. Summary of the Proposal

EPA's proposed phase 2 nonhandheld HC + NOx standards were based on the SOP with nonhandheld engine and equipment manufacturers, and for Class I engines would not have required any significant modifications to existing SV technology. The preamble to the NPRM discussed the proposed Class I standard, and the possible application of more emissions-efficient OHV technology, at 63 FR 3953-54, 3958-61, 3966. However, EPA requested comment on the issue of moving to OHV technology for Class I engines, discussed what a possible OHV-based Class I standard would be, estimated the additional per engine cost that would result from converting Class I engines to OHV, discussed the then-proposed California ARB OHV-based Class I standard, and solicited further information comment regarding all aspects of the proposed Class I standards.

9.4.2 Summary of the Comments

In addition to its comments submitted jointly with EPA, OPEI submitted late "draft" comments on December 3, 1998, which it later requested to be included in the rulemaking record. Many of OPEI's remarks are related to the achievability of a Class I standard that is based on the availability of OHV engines, which are substantially similar to other comments summarized and responded to elsewhere in this document. The comments summarized below contained unique and new arguments that OPEI had not previously presented.

First OPEI asserted that for EPA to fully comply with the requirements of the CAA, RFA and APA, EPA should distribute copies of the draft final regulations to affected small business representatives.

Second, OPEI characterized the nonhandheld SOP as something that EPA and engine manufacturers had "committed to implement," including "establishing" a Class I standard that allows the continued use of V engines.

Third, OPEI made a number of claims about the requirements of the RFA, as amended by the SBREFA. OPEI generally asserted that when EPA proposes a rule, RFA section 603 "requires" EPA to prepare and make available at the time of proposal an initial regulatory flexibility analysis. OPEI also stated that at the final rule stage, EPA "must also publish a final [regulatory flexibility analysis]" under RFA section 604. OPEI then reviewed the provisions of RFA section 609, arguing that EPA is required to provide certain information to the SBA Chief Counsel for Advocacy, obtain the advice of potentially affected small entities, and convene a federal review panel to evaluate the draft proposal and small entity comments, all prior to publishing a proposed rule. OPEI claimed that if EPA adopted Class I standards based on the availability of OHV technology without first following this process, the Agency would violate the RFA. OPEI noted that EPA had certified the proposal as having no significant impact on a substantial number of small entities based on the fact that the proposed rule had anticipated an SV-based standard, which would have entailed few if any equipment modifications and, hence, costs. OPEI argued that EPA could not thereafter adopt a fundamentally different final rule that would have a significant impact on small business, and that OPEI's small business member companies had not had an adequate opportunity to comment on the rule since there was no initial regulatory flexibility analysis that addressed possible impacts on them if EPA were to adopt an OHV-based Class I standard. OPEI further claimed that EPA's proposal, while it requested comment on the OHV issue, gave small entities a false impression that OHV standards were not a real possibility.

Fourth, OPEI claims that the administrative record does not support an OHV-based Class I standard under CAA section 213(a)(3), since the proposal had estimated that there would not be any cost impact on nonhandheld equipment manufacturers. With EPA adopting final standards that are OHV-based and that will impose some costs on equipment manufacturers, EPA is required to provide the industry draft regulatory language upon which to comment in order to build an adequate record.

Fifth, OPEI claimed that EPA could not characterize its final rule adopting an OHV-based Class I standard as "logical outgrowth" of the proposal, since EPA had expressly proposed an SV-based standard and had certified the proposal under the RFA. As evidence of this, OPEI claimed that OPEI and other industry stakeholders did not submit comments on the "hypothetical impact" OHV-based standards would have on equipment makers.

9.4.3 EPA Response to Comments

First, EPA disagrees with OPEI's claim that in order to comply with the procedural requirements of the CAA, RFA and APA the Agency must distribute copies of draft final regulations to possibly affected small entities. The Phase 2 rule is being adopted under the procedural requirements of section 307(d) of the CAA, which does not require the Agency to take such a step. Moreover, CAA section 307(d) explicitly exempts this rule from the procedural requirements of the APA. Thus, any procedural requirements that would apply to a final rule issued under the APA, except as provided in CAA section 307(d), are not applicable to this final rule.

Second, EPA reiterates that the SOP signed by the Agency and nonhandheld manufacturers

did not constitute final agency action regarding the regulatory program and did not bind EPA to "implement" or "establish" the final program such that it matched the SOP. SOPs can only establish parameters for how an agency expects to develop a proposed rule, and the Agency cannot take this final regulatory action through such a document and without going through the notice and comment rulemaking process.

Third, regarding OPEI's assertions on EPA's compliance with the RFA, EPA notes that many of the actions that OPEI claims EPA is required to do apply only in cases where the Agency is not able to conclude that the proposed rule or final rule, as applicable, will not have a significant economic impact on a substantial number of small entities. These include the requirements to prepare an initial or final regulatory flexibility analysis under RFA sections 603 and 604, and the notification and panel requirements under RFA section 609. Since the proposed Class I standards that made up the core and central focus of EPA's proposal were based on SV technology, the Agency properly certified the proposal under the RFA and was not required to either prepare an initial regulatory flexibility analysis or convene a small business panel. EPA also believes it has legitimately determined that the final rule will not have a significant economic impact on a substantial number of small entities. Therefore EPA does not agree that the fact that the final Class I standard is OHV-based and imposes some additional costs on engine and equipment manufacturers constitutes a violation of the RFA. In light of the significantly increased lead time and expanded phase-in flexibilities under the final rule, EPA continues to believe that the record supports the Agency's final conclusions about the lack of a significant impact on a substantial number of small entities. Moreover, since EPA estimated and discussed the per engine increase in costs that could entail to engine manufacturers under an OHV-based standard, EPA believes that small business equipment manufacturers could have used those or their own estimates and applied them to their own equipment production volumes. Thus, those entities could have commented to EPA regarding the economic burden an OHV-based standard would have had on them. The proposal made clear that OHV-based standards were under consideration for the final rule -EPA analyzed the technology, possible standards, and engine costs, and asked what other modifications to the proposed rule might be needed to accommodate an OHV-based standard. Finally, as a legal matter, EPA does not interpret the RFA to restrict the Agency's ability to modify a rule in going from proposal to final, where as here the Agency's conclusions at both stages regarding the impact on small entities are supported by the record and the rule otherwise complies with applicable CAA requirements.

Fourth, EPA believes that the record for the final rule does adequately analyze costs on both engine and equipment manufacturers. EPA disagrees with OPEI's implicit assertion that industry must be provided either an opportunity to review the Agency's draft conclusions regarding all cost data or an opportunity to review the draft final regulations before the record could be sufficient. Such a process would ensure that regulations are indefinitely delayed, since the Agency is constantly in the process of receiving and analyzing new information. Moreover, EPA notes that EPA published a Notice of Availability on December 1, 1998, identifying the additional record information that EPA received after publication of the proposed rule.

Finally, EPA disagrees with OPEI's claim that the final rule is not a "logical outgrowth" of

the proposal, in part for the reasons discussed above. EPA does not interpret the traditional Small Refiner logical outgrowth test as having been modified by the passage of the SBREFA amendments to the RFA. The Agency is not per se barred from adopting a final rule that is different from and a logical outgrowth of a proposal that was certified as having no significant economic impact on a substantial number of small entities. Moreover, notwithstanding OPEI's claims, EPA notes that OPEI, in its comments submitted jointly with EMA, commented at length about the cost impacts an OHV-based standard would have on equipment manufacturers, and on small businesses (see IV-D-12, at pp. 11-15). Thus, OPEI's claim that equipment manufacturers could not have commented on the issue is not consistent with its own earlier and timely comments.

Section 10: Costs and Cost Effectiveness

10.1 Catalyst Costs

10.1.1 Summary of the Proposal

EPA's NPRM Regulatory Support Document, page 3-37, estimated catalyst costs for nonhandheld engines to be slightly higher than that for 2 stroke engines, which were estimated to be in the range of $6 to $12 per engine. The cost range depended on whether the catalyst was ceramic or metallic, and included a number of additional items to apply the catalyst technology (assembly, muffler/heat shield needs and fixed costs). No costs were given in the RSD for catalysts used on nonhandheld engines because catalysts were not assumed to be required to meet the standards and were not included in the cost analysis.

10.1.2 Summary of the Comments

Additional data on costs for catalysts were provided by MECA to the EPA. The data consisted of a third-party survey of catalyst manufacturers conducted in response to a request for cost information by the California ARB. MECA summarized the data in their comments by stating the cost estimate for catalysts (substrate and washcoat) on non-handheld engines indicates an estimated per unit cost of $3 for Class I and $5-$7 for Class II engines. MECA also stated that the 1996 cost study, on which EPA relied for catalyst cost estimates, does not include any further cost optimization that would occur in the ensuing years before more stringent standards take effect. MECA urges EPA to revise its cost calculations based on the information MECA has submitted.

In addition, MECA acknowledges that EPA must consider changes to the engine that are necessary in order to achieve reasonable catalyst efficiencies for the regulated useful life of the engine. MECA states that design improvements in the current nonhandheld engine design, to achieve catalyst efficiencies of 40%-50% at the end of a non-handheld engine's regulatory useful life, may include lowering scavenger losses, improved combustion efficiency, leaner engine settings and improved fuel delivery. The addition of air will also be part of the control strategy, but this can be achieved by using a pulse valve or even a simple opening. Also, the muffler must be designed to house a properly sized catalyst. Production tolerances likely would need to be improved, for example, to better control for oil consumption, and possibly more durable parts employed, but these types of improvements likely will occur in any event as engines are required to meet tighter emission standards for their useful lives.

10.1.3. EPA's Response to the Comments

EPA estimated per unit catalyst costs in the NPRM RSD for two stroke engines at $4.00 for ceramic substrates and $8.00 for metallic substrates. MECA suggests that $3.00 for Class I and $5-$7 for Class II would be appropriate. Review of the MECA data shows that MECA chose costs based on high volume use (several million units) of catalysts only. Based on the standards for this FRM and other technology options (conversion to low emission OHV and improvements to OHV),

it is not likely that catalysts will be used in high volume, but only in specific cases in which slight improvements are needed. In addition, MECA did not assume any costs for insulation, installation or baffling that would likely be needed in order to install catalysts on nonhandheld engines. Therefore, in the RIA for the FRM, EPA assumed slightly different costs from the MECA estimates stated above, however did rely on the MECA data for catalysts and the ICF 1996 Cost Study for additional system costs. EPA assumed catalyst and related expenses (not including engine improvements) would range between $4.71-$8.60 for Class I engines and $8.19-$14.65 for Class II engines for high volume to low volume cases. Note, however that the RIA analysis does not include any assumption of catalyst use on nonhandheld engines and therefore these numbers are for comparison purposes only to other technologies.

10.2 Costs Concern Raised By Pioneer Eclipse

10.2.1 Summary of the Proposal

Pioneer Eclipse Corp. converts existing OHV gasoline engines to use propane and/or sets the existing LPG air/fuel system to insure that the engine is producing an absolute minimum CO in order to meet OSHA indoor air requirements. Therefore, Pioneer qualifies as both an engine and equipment manufacturer. The Phase 2 NPRM assumes no costs in the regulation for equipment manufacturers using OHV engines. Costs for engine manufacturers of OHV designs include changes to the combustion chamber, intake system, piston rings and piston designs[9]. Such technologies would be included in the engine supplier to Pioneer since Pioneer only adjusts the fuel and/or fuel regulation system of the engine.

10.2.2 Summary of the Comments

Pioneer Eclipse, Inc. has submitted information that the Phase 2 rulemaking will result in an increased weighted average cost per engine of $105.17, an 18% increase in engine costs. This is based on a number of factors. 1) Pioneer/Eclipse purchases all of its engines from large volume engine manufacturers. "Pioneer must, in some cases convert the engines to use LPG fuel, and in all cases including engines already configured to use LPG, must reset the air/fuel system to insure that the engine is producing an absolute minimum of CO." 2) Each of Pioneer's engine families will have to be submitted to an independent testing facility for full initial certification test. 3) Pioneer will be exempt from Production Line Testing requirements of Phase 2. 4) A significant amount of a properly trained persons time will have to be dedicated to regulatory matters each year. 5) Significant dollar amounts of Direct material (certified regulators, catalyzed mufflers, etc.) and the associated additional Direct Labor and Overhead cost to install this equipment.

Pioneer acknowledges the exemption from PLT, however, Pioneer states that the remaining

[9] The estimated variable cost for improvement to OHV engines in Class I and II is $2.25, and the capital cost is estimated at $605,000 per engine family.

engine certification requirements still impose excessive costs. Pioneer believes this excessive cost demonstrates that EPA has failed to give "appropriate consideration to the cost of applying" the technology required to comply with the Phase II standards, as required by section 213(a)(3) of the Clean Air Act. Therefore, Pioneer requests that EPA amend the proposed rules to exempt small manufacturers of propane-powered spark-ignited engines used solely for indoor applications and subject to OSHA indoor air quality standards. Lastly, in Pioneers analysis on emissions, they note that they need no ABT credits based on their credit calculations.

10.2.3 EPA's Response to the Comments

Based on Pioneer's certification production estimates per engine family, Pioneer qualifies for flexibilities as an engine and equipment manufacturer. The flexibilities can be summarized as follows. Certification flexibilities for small volume engine manufacturers (=/<10,000 units) include 1) can opt out of PLT, SEA still applicable; 2) waiver of phase-in requirements - have until 2010 to produce Phase 2 compliant engines; 3) can certify using assigned df. Small volume equipment manufacturers (=/<5,000) can continue use of Phase 1 engines for 3 years after phase-in of applicable standards, if no Phase 2 engine is available. Small volume equipment models (=/< 500 units) can use Phase 1 engines throughout Phase 2 if they demonstrate no Phase 2 compliant engine is available for existing model (if the equipment is "significantly modified" then this exemption ends). Lastly, a hardship provision is included where any equipment manufacturer may use Phase 1 engines through one year past the last phase-in year.

Based on Pioneer's own analysis, it is understood that Pioneer currently meets the Phase 2 emission standards and are attempting to reduce compliance costs. To aid the reduction of compliance costs for small volume entities, EPA has raised the cutoff for small volume engine families from 2,500 to 5,000 and a certification specific flexibility has been added. Overall, the FRM certification flexibilities for small volume engine manufacturers (<10,000 units) or small volume engine families (<5,000 units) include 1) allowed to be "Phase 1" engines until 2010 model year, 2) excluded from ABT until model year 2010, 3) can opt out of PLT; SEA still applicable, and 4) can certify using assigned deterioration factors. The use of assigned deterioration factors is a flexibility which will provide an option of simplified certification for Pioneer Eclipse. However, if Pioneer believes their deterioration to be different than that from the assigned, then they may opt to perform some durability testing. A total of 10 years from the finalization of this rulemaking to gather emission reduction technology should be sufficient time over which Pioneer, and other propane converters, may spread costs in order to obtain some in-use emission data.

10.3 Costs for SV to OHV Conversion

10.3.1 Summary of the Proposal

In the NPRM, EPA utilized costs for conversion of side valve engine designs to overhead valve engine designs from ICF and EF&EE's October 1996 study entitled "Cost Study for Phase Two Small Engine Emission Regulations". The NPRM assumed only Class II side valve engines

would be converted to overhead valve engines and therefore no costs were assumed for Class I engines. The costs for Class II side valve engines were variable costs of $8.59 per engine and capital costs of $1,015,000 per engine family.

10.3.2 Comments

Briggs and Stratton submitted comments that the costs supplied to EPA from EPA's contractor, ICF/EFEE, for use in EPA's cost benefit analysis for conversion to OHV for Class II, were not complete. Briggs and Stratton reiterated the discussions they had with EFEE's representative and discussed those things the contractor did not include in their final report to EPA including the complexity of machining an OHV head in relation to a SV head, higher pressure tolerant pistons, rods and crank, permanent mold pistons in OHV engines, etc. The author of the letter states, "...because the authors of the draft report apparently misunderstand the differences in the complexity of machining OHV and SV engines, they erroneously conclude that "the few additional machining operations required for the OHV cylinder and cylinder head would not likely require any new machine tools, but would be necessary to change fixtures, jigs and material handling equipment. Their estimate of total machine costs -- less than $1 million -- is in my opinion quite inaccurate. In fact, the machinery needed to produce volumes of more than one mission engines would cost more than five times the amount estimated by the draft report. This is due in part to the significantly more complex dies needed to case an OHV head in comparison to an SV head, and to the differences in machining noted above."

10.3.3 EPA's Response to the Comments

EPA has reviewed the 1996 ICF report and the confidentially submitted information supplied by Briggs & Stratton and Tecumseh on cost estimates for conversion to OHV per engine family. Based on the fact that the test facility modernization and production methods per engine family vary per manufacturer and engine family (based on production volume), EPA is relying on industry submitted data for the costs of conversion from SV to OHV engine design. EPA has updated the final cost analysis in EPA's Regulatory Impact Analysis[10] based on analysis of the manufacturer's data.

[10] Traditional costs have been able to be independently estimated for the technologies are usually an add on technology and not an engine redesign. However, unless an in-depth analysis is done for each engine manufacturer, then EPA must rely on the information submitted by these industries.