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Part II

Environmental Protection Agency

40 CFR Part 94

Control of Emissions of Air Pollution From New CI Marine Engines at or Above 37 kW; Proposed Rule

PART II

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 94

[AMS–FRL–6196–3]

RIN 2060–AI17

Control of Emissions of Air Pollution From New CI Marine Engines at or Above 37 kW

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of Proposed Rulemaking.

SUMMARY: In this action, EPA is proposing an emission control program for new compression-ignition marine engines rated at or above 37 kilowatts. The affected engines are used for propulsion and auxiliary purposes in a wide variety of marine applications. The standards proposed for these engines would require substantial reductions in oxides of nitrogen and particulate matter emissions to correspond with the next round of emission standards for comparable land-based engines. The proposed standards are expected to provide a significant reduction in oxides of nitrogen and particulate matter emissions from this source. When combined with other mobile source emission control programs, the program described in this action will help provide long-term improvements in air quality in many port cities and other coastal areas. Overall, the proposed program would provide much-needed assistance to states facing ozone and particulate air quality problems, which can cause a range of adverse health effects for their citizens, especially in terms of respiratory impairment and related illnesses.

The persons potentially affected by this action are those who manufacture new compression-ignition marine engines or marine vessels or other equipment using such engines. Additional requirements apply to companies that rebuild or maintain these engines.

DATES: EPA will hold a hearing on the proposed rulemaking on January 19, 1999. EPA requests comments on the proposed rulemaking by February 26, 1999. More information about commenting on this action and on the public hearing and meeting may be found under Public Participation in **SUPPLEMENTARY INFORMATION**, below.

ADDRESSES: Materials relevant to this proposal, including the Draft Regulatory Impact Analysis, are contained in Public Docket A–97–50. Additional materials relevant to EPA's earlier proposal, which was published in 1994 and supplemented in 1996 but not finalized, can be found in Public Docket A–92–28 (Control of Air Pollution; Emission Standards for New Gasoline Spark-Ignition and Diesel Compression-Ignition Marine Engines). Both of these dockets are located at room M–1500, Waterside Mall (ground floor), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, DC 20460. The docket may be inspected from 8:00 a.m. until 5:30 p.m., Monday through Friday. A reasonable fee may be charged by EPA for copying docket materials.

Comments on this proposal should be sent to Public Docket A–97–50 at the above address. EPA requests that a copy of comments also be sent to Jean Marie Revelt, U.S. EPA, Engine Programs and Compliance Division, 2000 Traverwood Dr., Ann Arbor, MI 48105.

The public hearing will be held at the National Vehicle and Fuel Emissions Laboratory, 2000 Traverwood Drive, Ann Arbor, Michigan. The public hearing will begin at 10 a.m. and will continue until all testimony has been presented. People who wish to testify will be requested to register on the day of the hearing. Time limits may be imposed for each speaker, depending on the number of people who request to testify. A transcript of the hearing will be placed in the docket. Arrangements for copies may also be made directly with the court reporter, on the day of the hearing. The court reporter may charge a fee for this service.

For further information on electronic availability of this proposal, see **SUPPLEMENTARY INFORMATION** below.

FOR FURTHER INFORMATION CONTACT: Margaret Borushko, U.S. EPA, Engine Programs and Compliance Division, (734) 214–4334; Borushko.Margaret@epa.gov.

SUPPLEMENTARY INFORMATION:

Regulated entities

Persons or companies potentially regulated by this action are those that manufacture or introduce into commerce new compression-ignition marine engines and those that make vessels or other equipment using such engines. Further requirements apply to companies that rebuild or maintain marine engines. Regulated categories and entities include:

Category	Examples of regulated entities	NAICS code	SIC code
Industry	Manufacturers of new marine diesel engines	333618	3519
Industry	Manufacturers of marine vessels	3366	3731
			3732
Industry	Engine repair and maintenance	811310	7699

This list is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. To determine whether particular activities may be regulated by this action, the reader should carefully examine the proposed regulations, especially the applicability criteria in § 94.1. Questions regarding the applicability of this action to a particular entity may be directed to the person listed in **FOR FURTHER INFORMATION CONTACT.**

Obtaining Electronic Copies of the Regulatory Documents

The preamble, regulatory language and Draft Regulatory Impact Analysis are also available electronically from the EPA Internet Web site. This service is free of charge, except for any cost already incurred for internet connectivity. The electronic version of this proposed rule is made available on the day of publication on the primary Web site listed below. The EPA Office of Mobile Sources also publishes Federal Register notices and related documents on the secondary Web site listed below.

1. http://www.epa.gov/docs/fedrgstr/EPA–AIR/ (either select desired date or use Search feature)
2. http://www.epa.gov/OMSWWW/ (look in What's New or under the specific rulemaking topic)

Please note that due to differences between the software used to develop the document and the software into which the document may be downloaded, changes in format, page length, etc., may occur.

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I. Introduction

Air pollution is a serious threat to the health and well-being of millions of Americans, and imposes a large burden on the U.S. economy. As discussed below, ground-level ozone and PM have been linked to potentially serious respiratory health problems and environmental degradation. Over the past two decades, emission control programs established at the state and federal levels have significantly reduced emissions from individual sources, and many of these sources now pollute at only a fraction of their precontrol rates. These programs have concentrated on reducing ground-level ozone levels, with a focus on its main precursors, oxides of nitrogen (NO_X) and volatile organic compounds (VOCs).[1] In addition, steps have been taken to reduce airborne particulate matter (PM), which is also a major air quality concern in many regions.

However, continued industrial growth and expansion of motor vehicle usage threaten to reverse these past achievements. Today, many states are finding it increasingly difficult to meet the current ozone and particulate matter National Ambient Air Quality Standards (NAAQS) by the deadlines established in the Clean Air Act (the ''Act'').[2] In addition, even those states that are approaching or have reached attainment of the current ozone and PM NAAQS are likely to see these gains lost if current trends persist.

National mobile source emission control programs have been successful in reducing NO_X, HC, and PM emissions

[1] VOCs consist mostly of hydrocarbons (HC), including nonmethane hydrocarbons (NMHC).

[2] See 42 U.S.C. 7401, et seq.

from new regulated engines. These programs have resulted in reductions of more than 90 percent on a per-vehicle basis for new gasoline-fueled passenger cars. Emissions from light-duty trucks have also been reduced to very low levels. The more recent diesel engine programs, as supplemented by new, more stringent requirements for highway and nonroad diesel engines, will significantly reduce emissions from that category as well. As a result of these programs, emission reductions on a per-vehicle or per-engine basis have greatly offset emission increases due to the rising mobile source population and usage rates.

Until now, EPA's effort to control emissions from marine sources has been limited to outboard and personal watercraft engines and marine diesel engines rated under 37 kW. EPA's analysis of national NO_X and PM levels suggests that marine diesel engines are a considerable source of these pollutants. The inventory contribution of marine diesel engines is presented under Background (Section II.A.4.), and is described in greater detail in the Draft Regulatory Impact Analysis. Consequently, emission controls for these engines may yield important reductions in national NO_X and PM inventories. At the same time, designing an emission control program for marine diesel engines at or above 37 kW poses certain challenges. The tremendous range of engine sizes in this category, from small generators used on board fishing or recreational vessels to large propulsion engines used on board ocean-going vessels, suggests a need to set different requirements for different groups of engines. In addition, technological challenges inherent to nonroad diesel-cycle engine design must be addressed.[3] Traditional NO_X control approaches tend to increase PM emissions, and vice versa. However, methods to achieve simultaneous NO_X and PM control are being developed for land-based diesel engines, and EPA believes similar solutions can be applied to marine diesel engines due to similarities among the engines. A more complete discussion of technology issues is presented under Technological Feasibility (Section VII). Finally, the large number of ship and boat builders and their relative inexperience with emission control requirements suggest a need for a flexible implementation process. A more detailed discussion of the characteristics of this industry is included under Industry Characterization (Section II.C.).

In this document, EPA is proposing to extend the federal emission control program to the marine segment of the nonroad industry by proposing an emission control program for all new marine diesel engines rated over 37 kW.[4] The program described in this action follows EPA's Supplemental Advance Notice of Proposed Rulemaking (Supplemental ANPRM), published on May 22, 1998 (63 FR 28309), and the comments received on that notice and other new information provide the framework for its provisions.

II. Background

A. Air Quality Problems Addressed in the Proposed Rule

The emission standards proposed in this document will provide important reductions of ground-level ozone and particulate matter (PM) nationally, as well as carbon monoxide (CO) control. This section summarizes the air quality rationale for these new emission standards and their anticipated impact on marine diesel engines.

1. Ozone

Ground-level ozone is formed by complex photochemical reactions involving HC and NO_X in the presence of sunlight.[5] According to a growing body of research, ground-level ozone can have harmful physical effects on humans. It severely irritates the mucous membranes of the nose and throat, which can lead to coughing and even choking. It also impairs normal functioning of the lungs, and chronic exposure may cause permanent lung damage. The risk of suffering these effects is particularly high for children and for people with compromised respiratory systems. Ground-level ozone has also been shown to injure plants and building materials.

Diesel engines contribute to ground-level ozone levels primarily through their NO_X emissions, which are a much higher portion of total NO_X+HC emissions than for most gasoline engines. This is of significant concern not only because of ozone impacts but also because NO_X has important independent effects on human health and general environmental conditions. NO_X includes several gaseous compounds that are lung irritants and can increase susceptibility to respiratory illness and pulmonary infection. NO_X also contributes to the secondary formation of PM (nitrates), acid deposition, and the overgrowth of algae in coastal estuaries. Additional information on these environmental and health effects may be found in EPA staff papers and air quality criteria documents for ozone and nitrogen oxides.[6, 7, 8, 9]

Acceptable levels of ground-level ozone have been set by EPA pursuant to the Act. States are divided into areas for air quality planning purposes, and these areas are categorized as to whether they meet the current National Ambient Air Quality Standard for ozone by the deadlines established in the Act.[10] As of October, 1997 there are 59 areas designated as in ''nonattainment'' for ozone.

The state and local governmental organizations charged with designing and implementing emission control programs to bring these areas into attainment have mounted significant efforts in recent years to reduce ozone concentrations. Their state implementation plans, combined with federal mobile source emission control programs, have yielded encouraging signs of success. The main precursors of ozone, NO_X and VOCs (including HC), have been reduced in many areas, and average ozone levels are beginning to decrease. However, this progress is in jeopardy. EPA projects that emission increases that accompany economic expansion will eventually outpace per-

[3] References to diesel-cycle engines, also referred to as ''diesel engines'' in this document, are intended to cover a particular kind of engine technology, i.e., compression ignition combustion. Compression-ignition engines are typically operated on diesel fuel, although other fuels, such as compressed natural gas, may also be used. This contrasts with otto-cycle engines (also called spark-ignition or SI engines), which typically operate on gasoline. The requirements set out in this notice are intended to apply to all combustion-ignition engines.

[4] This proposal is based on metric units. To convert to English units, one kilowatt equals 1.341 horsepower.

[5] Ground-level ozone should not be confused with stratospheric ozone, a protective layer of the upper atmosphere that filters the sun's harmful ultraviolet rays.

[6] U.S. EPA, ''Review of National Ambient Air Quality Standards for Ozone, Assessment of Scientific and Technical Information,'' OAQPS Staff Paper, EPA–452/R–96–007, 1996 (Air docket A–95–58).

[7] U.S. EPA, ''Air Quality Criteria for Ozone and Related Photochemical Oxidants,'' EPA/600/P–93/004aF, 1996 (Air Docket A–95–58).

[8] U.S. EPA, ''Review of National Ambient Air Quality Standards for Nitrogen Dioxide, Assessment of Scientific and Technical Information,'' OAQPS Staff Paper,'' EPA–452/R–95–005, 1995 (Air Docket A–93–06).

[9] U.S. EPA, ''Air Quality Criteria for Oxides of Nitrogen,'' EPA/600/8–91/049aF, 1993 (Air Docket A–93–06).

[10] See 42 U.S.C. 7401, *et seq.*

[11] U.S. EPA, ''Review of National Ambient Air Quality Standards for Particulate Matter, Assessment of Scientific and Technical Information,'' OAQPS Staff Paper, EPA–452/R–96–013, 196 (Air Docket A–95–54).

[12] U.S. EPA, ''Air Quality Criteria for Particulate Matter,'' EPA/60/P–95/001aF, 1996 (Air Docket A–95–54).

[13] The largest fraction of ambient PM is attributed

source reductions in ozone precursors. Increases in the number of sources, as well as increased use of existing sources, mean that even full implementation of current emission control programs will fall short of what will be needed to achieve and maintain ozone attainment. By the middle of the next decade, the Agency expects that, without additional controls, the downward trends in overall ground-level ozone will be reversed. Consequently, it is important to develop new strategies that improve, or at least maintain, the progress in ozone reductions that have been achieved to date.

2. Particulate Matter

Particulate matter, like ozone, has been linked to a range of serious respiratory health problems. Particulate matter is a collection of small particles emitted by diesel engines. Many different organic pollutants are adsorbed on these particles. The size and chemical composition of particulate matter are the main reasons for concern about the effects of PM on human health. Their small size increases the likelihood that the particles will reach and lodge in the deepest and most sensitive areas of human lungs. This can lead to severe lung problems and increases susceptibility to respiratory infection, such as pneumonia, aggravation of acute and chronic bronchitis, and asthma. It can also lead to decreased lung function (particularly in children and individuals with asthma) and alterations in lung tissue and structure and in respiratory tract defense mechanisms. Additional information on these effects may be found in an EPA staff paper and an air quality criteria document for particulate matter.[11, 12]

Acceptable levels of PM have also been set by EPA. Currently, there are 80 PM–10 nonattainment areas across the U.S. (PM–10 refers to particles smaller than 10 microns in diameter.) As is the case with NO_X, levels of PM caused by stationary and mobile sources are expected to rise in the future, not only because of the increase in number of sources and activity levels of these sources, but also because elevated NO_X levels can lead to increased PM levels. This is because NO_X from diesel engines and other sources is transformed in the atmosphere into fine secondary nitrate particles. Secondary nitrate PM, consisting mostly of ammonium nitrate, accounts for a substantial fraction of the airborne particulate in some areas of the country. EPA believes that mobile sources contribute substantially to the fraction of ambient PM that is generally considered controllable.[13] Consequently, EPA has been developing new mobile source strategies to control PM emissions.

3. Carbon Monoxide

Along with NO_X, HC, and PM, carbon monoxide (CO) is another mobile source pollutant that is addressed by the program proposed in this document. CO has long been known to have substantial adverse effects on human health and welfare, including toxic effects on blood and tissues, and effects on organ functions. CO has been linked to fetal brain damage, reduced visual perception, cognitive functions and aerobic capacity, and increased risk of heart problems for people with heart disease. There are currently approximately 20 serious or moderate CO nonattainment areas in the United States.

4. Contribution of Marine Diesel Engines to NO_X, HC, PM and CO Levels

EPA's inventory analysis suggests that marine diesel engines are a significant source of NO_X and PM emissions. This inventory analysis, presented in more detail in the Draft Regulatory Impact Analysis prepared for this action, suggests that marine diesel engines currently contribute approximately one million tons of NO_X per year, representing 8.1 percent of mobile source NO_X and 4.8 percent of total NO_X emissions. Marine diesel engines also contribute approximately 42,000 tons of PM per year, representing 4.4 percent of the directly emitted PM from mobile sources and 1.0 percent of total directly emitted PM emissions.[14] In addition to directly emitted PM, EPA estimates that, as a national average, marine diesel engines contribute approximately 40,000 tons of PM in the form of secondary nitrate particles, based on the estimated one million tons of NO_X emitted by these engines. In addition, emissions from marine diesel engines tend to be concentrated in specific areas of the country (ports, coastal areas, and rivers), and so local levels of these pollutants can be much higher. Consequently an emission control program that addresses NO_X and PM emissions from marine diesel engines can be an important tool toward the goal of reducing the health and environmental hazards associated with these and other pollutants.

The contribution of marine diesel engines to national HC and CO levels is much less than for NO_X and PM. EPA estimates that marine diesel engines contribute less than two-tenths of one percent of the national levels of these pollutants. Nevertheless, the program being proposed in this rule includes limits for HC and CO emissions. These limits will provide a small, positive, air quality benefit.

B. Legislative and Regulatory History

1. Statutory Authority

Section 213(a)(1) of the Clean Air Act directed the Agency to study emissions from nonroad engines and vehicles to determine, among other things, whether these emissions ''cause, or significantly contribute to, air pollution that may reasonably be anticipated to endanger public health or welfare.'' Section 213(a)(2) further required EPA to determine whether the emissions of CO, VOC, and NO_X found in the above study significantly contribute to ozone or CO emissions in more than one nonattainment area. With an affirmative determination of significance, section 213(a)(3) requires the Agency to establish emission standards regulating CO, VOC, and NO_X emissions from new nonroad engines and vehicles. EPA may also promulgate emission standards under section 213(a)(4) regulating any other emissions from nonroad engines that EPA finds contribute significantly to air pollution.

The Nonroad Engine and Vehicle Emission Study required by section 213(a)(1) was completed in November 1991.[15] On June 17, 1994, EPA made an affirmative determination under section 213(a)(2) that nonroad emissions are significant contributors to ozone or CO in more than one nonattainment area.[16] In the same document, EPA set a first phase of emission standards (''Tier 1 standards'') for land-based nonroad diesel engines rated at or above 37 kW.[17] These requirements were recently augmented by a new rulemaking that sets more stringent Tier 2 emission levels for new land-based nonroad diesel engines at or above 37 kW as well as Tier 1 standards for nonroad diesel engines less than 37 kW.[18] EPA has also initiated additional rulemakings to set

[11] U.S. EPA, ''Review of National Ambient Air Quality Standards for Particulate Matter, Assessment of Scientific and Technical Information,'' OAQPS Staff Paper, EPA–452/R–96–013, 196 (Air Docket A–95–54).

[12] U.S. EPA, ''Air Quality Criteria for Particulate Matter,'' EPA/60/P–95/001aF, 1996 (Air Docket A–95–54).

[13] The largest fraction of ambient PM is attributed to ''miscellaneous'' and ''natural'' sources, including wind erosion, wildfires, and fugitive dust, which are difficult or impossible to control.

[14] Excluding erosion or fugitive dust.

[15] This study is available in docket A–92–28.

[16] *See* 59 FR 31306, June 17, 1994.

[17] Ibid.

[18] *See* 63 FR 56967, October 23, 1998.

emission standards for other subgroups of nonroad engines, including spark-ignition (SI, typically gasoline) engines less than 19 kW, [19] spark-ignition (SI, typically gasoline) marine engines (outboards and personal watercraft), [20] and locomotives. [21] This action takes another step toward the comprehensive nonroad engine emission control strategy envisioned in the Act by proposing an emission control program for marine diesel engines at or above 37 kW.

2. Regulatory History

Numerical emission standards for marine diesel engines were originally proposed in 1994, as part of a proposed rule for control of emissions from both spark-ignition and compression-ignition marine engines. [22] At that time, EPA had a limited understanding of the marine diesel industry and, relying on the similarities between land-based nonroad and marine diesel engines, proposed to apply the same emission levels as those in the then just-finalized land-based nonroad rule. The nonroad Tier 1 standards are set out in Table 1. EPA proposed that these standards for marine diesel engines take effect January 1, 1999 for engines less than 560 kW, and January 1, 2000, for engines 560 KW and above. Although no upper limit on engine size was proposed for application of these standards to marine diesel engines, EPA requested comment on whether an upper limit should be established above which the emission control program being developed concurrently under the auspices of the International Maritime Organization (IMO) should apply. The IMO is the Secretariat for the International Convention on the Prevention of Pollution from Ships (that convention is also referred to as MARPOL 73/78). Annex VI to that Convention, adopted on September 27, 1997 (but not yet in force) contains, among other provisions, requirements to limit NO_X emissions from marine diesel engines, but sets no limits for other engine pollutants (i.e., HC, CO, PM). [23] A more detailed discussion of the MARPOL 73/78 Annex VI NO_X requirements is included in Section II.B.3. below. Table 1 also contains the Annex VI NO_X limits, which would apply to new engines greater than 130 kW installed on vessels constructed on or after January 1, 2000, or which undergo a major conversion after that date.

TABLE 1.—COMPARISON OF NUMERICAL EMISSION LIMITS: EPA'S NONROAD TIER 1 LEVELS AND MARPOL ANNEX VI LEVELS

Agency	Engine speed	HC (g/kW-hr)	CO (g/kW-hr)	NO_X (g/kW-hr)	PM (g/kW-hr)
EPA (Proposed)	All	1.3	11.4	9.2	0.54
MARPOL Annex VI (n =engine speed, rpm).	=130 rpm	None	None	17.0	None
	130 rpm≤n≥2000 rpm	None	None	$45*n(^{-0.2})$	None
	n ≥ 2000	None	None	9.8	None

In response to the 1994 NPRM, several commenters requested that EPA harmonize domestic emission standards for marine diesel engines to the levels being then considered at the IMO, in effect, applying the draft Annex VI limits domestically. Because the draft Annex VI standards (which are the same as those finalized in 1997) were not as stringent as the proposed domestic standards, this was a significant issue. On February 7, 1996, EPA published a Supplemental NPRM to address this and other concerns in more detail. [24] Specifically, EPA identified and requested comment on three alternative harmonization approaches: (1) Adopt the draft Annex VI NO_X emission standard instead of the standard proposed in the NPRM; (2) retain the average NO_X emission standard of 9.2 g/kW-hr proposed by EPA and also adopt the MARPOL Annex VI NO_X limit as a cap that no engine could exceed; or (3) determine an appropriate engine speed or engine power output cutoff point such that engines of high horsepower and low and medium speeds would be subject to the draft Annex VI NO_X emission limits and engines of low horsepower and high speed would be subject to the 9.2 g/kW-hr average standard proposed by EPA with the 9.8 g/kW-hr Annex VI level as a cap that no engine could exceed. EPA also sought comment on harmonizing the numerical emission limits for other pollutants. Options considered were to drop, retain, or alter the proposed standards for HC, CO, PM, and smoke.

While the development of the national marine rule and the negotiations at the International Maritime Organization continued, EPA began a new action for land-based nonroad diesel engines as part of a new Agency initiative to reduce national NO_X and PM emissions from mobile sources. This action, subsequently finalized September 27, 1998, sets more stringent standards for land-based nonroad engines, known as Tier 2 standards (see Section V.A., below). [25] These Tier 2 standards will come into effect as early as 2001 for some engine categories. The rule also includes more stringent Tier 3 standards, which will go into effect subject to a review to be conducted in 2001. That review will be conducted through the normal public rulemaking process. Finally, marine diesel engines less than 37 kW were included with their land-based counterparts in this diesel land-based nonroad rule, with standards to come into effect as early as 1999 for Tier 1 and 2004 for Tier 2.

Also during this time, EPA finalized a rule setting emission standards for new locomotive engines. [26] The locomotive program consists of three separate sets of standards, with applicability of the standards dependent on the date a locomotive is first manufactured. The first set of standards (Tier 0) applies to locomotives and locomotive engines originally manufactured from 1973 through 2001.

[19] *See* 60 FR 34582 (July 3, 1995) for the final rule establishing Tier 1 standards and 62 FR 14740 (March 27, 1997) for the ANPRM discussing Tier 2 standards.

[20] *See* 61 FR 52087 (October 4, 1996) for the final rule. EPA did not set numerical emission standards for sterndrive and inboard gasoline marine engines in this rule.

[21] *See* 62 FR 6365 (February 11, 1997); the final rule was signed December 17, 1997 and is available electronically (see Section VI below).

[22] See 59 FR 55929 (November 9, 1994).

[23] Other provisions of Annex VI include requirements for ozone-depleting substances, sulfur content of fuel, incineration, VOCs from refueling, and fuel quality. The United States has signed Annex VI, but the Annex has not yet been forwarded to the Senate for its advice and consent.

[24] *See* 61 FR 4600 (February 7, 1996).

[25] *See* 62 FR 50152 (September 24, 1997).

[26] *See* 62 FR 6365 (February 11, 1997); the final rule was signed December 17, 1997 and is available electronically (see Section VI below).

The Tier 0 standards will be phased in over a two-year period beginning in 2000, and will apply at the time of each remanufacture (as well as at the time of original manufacture for locomotives originally manufactured in 2000 and 2001). The next set of standards (Tier 1) apply to locomotives and locomotive engines originally manufactured from 2002 through 2004. Such locomotives and locomotive engines will be required to meet the Tier 1 standards at the time of original manufacture and at each subsequent remanufacture. The final set of standards (Tier 2) apply to locomotives and locomotive engines originally manufactured in 2005 and later. Such locomotives and locomotive engines will be required to meet the Tier 2 locomotive standards at the time of original manufacture and at each subsequent remanufacture. The numerical standards are contained in Table 2.

TABLE 2.—LOCOMOTIVE STANDARDS

[Line-haul only]

Tier	HC (g/kW-hr)	CO (g/kW-hr)	NO_X (g/kW-hr)	PM (g/kW-hr)
Tier 0	1.3	6.7	12.7	0.80
Tier 1	0.7	2.9	9.9	0.6
Tier 2	0.4	2.0	7.4	0.27

The land-based nonroad diesel engine and locomotive rules led EPA to reconsider its approach to the control of emissions from marine diesel engines at or above 37 kW. Because of the similarities among land-based nonroad, locomotive, and marine diesel engines, EPA began to consider an alternative program for marine diesel engines based on the technologies that will be used to meet the land-based requirements. As a result, EPA did not take final action on marine diesel engines when it finalized the original marine rule.[27] Instead, EPA published an Advance Notice of Proposed Rulemaking advising interested parties of the change in approach for marine diesel engine emission controls and asking for comment on various aspects of the program under consideration. The program proposed in this action follows from the approach described in the ANPRM, the comments submitted by interested parties, and information gathered by EPA in the meantime.

3. MARPOL Annex VI

In response to growing international concern about air pollution and in recognition of the highly international nature of maritime transportation, the parties to the International Maritime Organization called upon the organization, in 1990, to develop a program to reduce emissions from marine vessels. The IMO's Marine Environmental Protection Committee (MEPC) was instructed to design a program, to become a new Annex VI to the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), that would achieve a 30 percent reduction in NO_X and a 50 percent reduction in SO_X emissions when fully phased in. Requirements for ozone-depleting substances, VOCs from cargo compartments on oil tankers, shipboard incinerators, and fuel oil quality rounded out the scope of the program. From the beginning, the engine-specific provisions of proposed Annex VI covered only NO_X emissions. No restrictions on PM, HC, or CO emissions were considered. Reductions in SO_X emissions were to be pursued through limiting the sulfur content of fuel.

After several years of negotiation, a final version of Annex VI was adopted by the Member States of the IMO at a diplomatic conference on September 26, 1997. However, pursuant to Article 6 of the Annex, it will not go into force until fifteen States, the combined merchant fleets of which constitute not less than 50 percent of the gross tonnage of the world's merchant shipping, have ratified it. The Annex in its entirety will acquire the force of law in the United States only after the Senate (by a vote of two-thirds) concurs in the treaty and the United States deposits its instrument of ratification. Nevertheless, it is expected that ship owners will begin installing compliant engines on relevant ships to comply with the dates set forth in the Annex. Specifically, the NO_X provisions contained in Regulation 13 provide that each diesel engine with a power output of more than 130 kW installed on a ship constructed on or after January 1, 2000, or that undergoes a major conversion on or after January 1, 2000, must meet the NO_X emission limits described in Table 1, above. This specification of an effective date in Regulation 13 means that, once the Annex goes into effect, Member States will be able to require compliance by any ship constructed on or after January 1, 2000 or by any engine that undergoes a major conversion on or after that date. In other words, once the Annex goes into effect, it will be enforceable back to the dates specified in Regulation 13.

Two other features of Annex VI NO_X requirements are noteworthy. First, while the requirements set out in Regulation 13 are expected to extend to all vessels used in the marine environment, a special provision has been included in paragraph 1(b)(ii) to allow Member States to set different standards for engines installed on ships used domestically. EPA intends in this action to take advantage of this provision by setting more stringent national requirements. Second, Regulation 13 is augmented with a separate document, called the NO_X Technical Code, which sets out some compliance requirements and test procedures. Through reference in the Annex, the provisions of this Code are made mandatory on Parties to the Annex. A more detailed discussion of the NO_X curve and the NO_X Technical Code are included in the Draft Regulatory Impact Analysis.

4. State Activities

Section 209 of the Act allows EPA to authorize California to regulate emissions from new motor vehicles and new motor vehicle engines, as well as nonroad engines with the exception of new engines used in locomotives and new engines used in farm and construction equipment rated under 130 kW.[28] So far, the California Air Resources Board (California ARB) has adopted requirements for three groups of nonroad engines: (1) Diesel-and otto-cycle small off-road engines rated under 19 kW; (2) new land-based nonroad diesel engines rated over 130 kW; and (3) land-based nonroad recreational engines, including all-terrain vehicles, snowmobiles, off-road motorcycles, go-carts, and other similar vehicles. New

[27] *See* 61 FR 52087 (October 4, 1996).

[28] The Clean Air Act limits the role states may play in regulating emissions from new motor vehicles and nonroad engines. California is permitted to establish emission standards for new motor vehicles and most nonroad engines; other states may adopt California's programs (sections 209 and 177 of the Act).

requirements that apply to new nonroad SI engines rated over 19 kW were completed by CARB in October 1998. California ARB has also approved a voluntary registration and control program for existing portable equipment, and is currently considering an emission program for recreational gasoline marine engines that may be more stringent than the program finalized by EPA in 1996.

EPA has been in consultation with California state officials and various interest groups to pursue operational measures that would reduce marine engine emissions without setting emission standards. Under investigation are defined traffic lanes, restrictions on engine operation while in port, and other measures that could be tailored to the situation at each port.

5. European Commission Action

The European Commission has proposed emission limits for recreational marine engines, including diesel engines. These requirements would apply to all new engines sold in member countries. The numerical emission limits, shown in Table 3, consist of the Annex VI NO_X limit for small marine diesel engines and the rough equivalent of Tier 1 nonroad emission levels for HC and CO. The PM limits, however, are more stringent than Tier 1 nonroad levels, reflecting Europe's greater concern for the visual impacts of diesel emissions. Emission testing is to be conducted using the ISO D2 duty cycle for constant-speed engines and the ISO E5 duty cycle for all other engines. At the current time, the EU has not initiated a separate action for commercial marine diesel engines.

TABLE 3.—PROPOSED EUROPEAN EMISSION LIMITS FOR RECREATIONAL MARINE DIESEL ENGINES

Pollutant	Emission limit (g/kW-hr)
NO_X	9.8
PM	0.14
HC	*1.5
CO	5.0

*Increases slightly with increasing engine power rating.

C. Industry Characterization

The two groups of companies most likely to be affected by the proposed emission control program are engine manufacturers and vessel manufacturers. This section contains a brief discussion of these entities. A more complete discussion is included in the Draft Regulatory Impact Assessment, which can be found in its entirety in EPA Air Docket A–97–50.

1. Marine Diesel Engine Manufacturers

As discussed in Section IV, the proposed emission control program applies to three categories of marine diesel engines. This discussion reflects those categories.

Category 1 and Category 2 marine diesel engines are often derived from land-based engines. Their production is often referred to as marinization, meaning the land-based engine is modified for use in the marine environment. Marinization can be a very complex process or may be relatively simple. Depending on the degree of change to the base engine, marinization can significantly affect the emission characteristics of an engine. Some of the more complex changes associated with marinization are performed by large engine manufacturers. For these companies, marinization may involve a significant redesign of their land-based product. A less intensive type of marinization is performed by post-manufacturer marinizers. These companies purchase a complete or semi-complete land-based engine from an engine manufacturer and finish or modify it using specially designed parts. The most basic type of marinization is performed by companies that purchase a completed engine from an engine manufacturer and modify it to make it compatible for installation on a marine vessel, without changing the underlying design characteristics or engine calibration. These companies are referred to in this rulemaking as engine dressers. In contrast to the other marinization processes, these changes do not typically affect the emission characteristics of the engine.

Category 3 engines have no land-based mobile source equivalents. These engines are typically designed exclusively for marine purposes. They are often designed for unique applications or unique vessels.

(a) Category 1 Engine Manufacturers. Total annual production of Category 1 marine diesel engines in the U.S. is about 15,000 units per year. Of these, commercial propulsion and auxiliary marine engines make up about 30 percent and 10 percent, respectively, of the total production. The remaining engines are used for propulsion in recreational vessels. While the recreational engines are produced in greater quantities, commercial propulsion and auxiliary engines contribute more to air pollution on account of their much greater use.

Commercial applications for these engines are widely varied. Most of these boats are relatively small and operate near the home port. Primary examples of such vessels include fishing boats, crew boats, tour boats, and small tugboats and ferries. Recreational vessels are usually either yachts or are used for recreational fishing. These recreational vessels may in some cases be used for commercial purposes.

Engine manufacturers produce the large majority of marine diesel engines, with the remaining engines being produced by post-manufacture marinizers. About a dozen engine manufacturers offer Category 1 engines, though Caterpillar, Cummins, and Detroit Diesel together sell about 80 percent of all marine diesel engines. Fifteen or more companies are either post-manufacture marinizers or engine dressers. Most of these are small businesses with very low sales volumes.

Due to the wide range of companies and their operations, engine maintenance and rebuild practices are far from uniform. Some are serviced regularly by authorized distributors, others are maintained by local for-hire mechanics. Some companies that operate vessels choose to reduce expenses by keeping a staff of mechanics to conduct preventive and routine engine maintenance and, in some cases, complete engine rebuilds. Depending on the size of an operator's fleet, which may run from one to several dozen vessels, and on the strength of the company, there may or may not be an adequate ongoing investment in maintaining engines to maximize long-term engine performance.

(b) Category 2 Engine Manufacturers. Large tugboats and fishing boats are the principal applications for Category 2 marine engines. These high-powered engines are used for carrying greater loads, a greater degree of off-shore use and, in many cases, more intensive operations. It is common for companies to own and operate small fleets of these vessels. In addition, multiple Category 2 engines are commonly used for auxiliary power on an ocean-going vessel.

Category 2 engines are derived from or use the same technology as locomotive engines. Not surprisingly, Category 2 engines are produced by the same companies that make locomotive engines, and the segment is characterized by a very small number of manufacturers. General Motors Electromotive Division (EMD) sells the greatest number of Category 2 engines, with additional sales from Caterpillar and a few other companies (mostly from foreign manufacturers).

Post-manufacture marinizers play a role in producing Category 2 marine engines. For example, three authorized EMD distributors take on the responsibility of marinizing engines, overseeing sales distribution, and managing installation and service as needed. Unlike post-manufacture marinizers for Category 1 engines, these companies have sufficient volumes and diversified operations to the point that they are not small businesses.

With prices approaching $1 million for a new engine, there is a strong motivation to maintain and remanufacture engines in the field. Preventive maintenance programs are common, often including extensive ongoing diagnostics for oil quality, fuel consumption, and other engine performance parameters. Engines are often completely remanufactured every five years. Procedures have improved to the point that engine durability on remanufactured engines is no different than on new engines. Since engine remanufacturing costs only 20 to 30 percent as much as buying a new engine, even twenty- or thirty-year-old engines are frequently overhauled to provide dependable power.

(c) Category 3 Engine Manufacturers. Category 3 marine diesel engines are the largest mobile source engines addressed by EPA. They are similar in size to land-based power plant generators, and are used primarily for propulsion of ocean-going vessels. There are currently no U.S. manufacturers of Category 3 marine engines. The Agency, however, has identified 22 foreign manufacturers of these engines, a large fraction of which are located in Germany and Japan. In addition, of the Category 3 engine manufacturers identified, only 12 produce engines of their own design. The remainder of the manufacturers produce engines under licensing agreements with other companies that control engine design.

2. Commercial Vessel Builders

The industry characterization for the commercial marine vessel industry was developed by ICF, Incorporated under contract with EPA. A summary of their findings can be found in the Chapter 2 of the Draft RIA. The full report is available from EPA Air Docket A–97–50. The report makes a distinction between two broad groups of commercial vessels, ''ships'' and ''boats,'' based on a vessel's basic dimensions, mission, and area of operation.

(a) Commercial Ships. This category is comprised of large merchant vessels, usually exceeding 120 meters (400 feet) in length, that engage in waterborne trade or passenger transport. These ships tend to operate in Great Lakes, coastwise, inter-coastal, noncontiguous, or transoceanic routes. Principal commercial ship types are dry cargo ships, tankers, bulk carriers and passenger ships. Passenger ships include cruise ships and larger ferries. The large majority of commercial ships are foreign-built. There are currently 18 major shipbuilding facilities in the United States, most of which focus on military construction.

(b) Commercial Boats. This category is comprised of smaller service and industrial vessels that provide service to commercial ships, industrial vessels, or barges or that perform specialized marine functions. Commercial boats are found mainly in inland or coastal waters. Principal commercial boat types are tugboats, towboats, offshore supply boats, fishing and fisheries vessels, passenger boats, and industrial boats. Passenger boats include crewboats, excursion boats, and smaller ferries. The vast majority of boats used in the United States are also built in the United States. In contrast to the highly concentrated shipbuilding industry, there are several hundred yards that build many different types of boats.

3. Recreational Vessel Builders

While not as numerous as commercial boat builders, there is still a considerable number of recreational boat builders. EPA identified approximately 75 boat builders, not including those that build sailboats. Most of these companies also produce vessels that use gasoline engines. In fact, diesel engines represent a small portion of the overall product offerings for these companies. A small number of recreational boat builders concentrate on diesel engine products. Most companies, however, sell as few as one per month or even one per year. The analysis shows that recreational boat building is concentrated in coastal states with the largest presence in the state of Florida.

Recreational boat building relies more on serial production than does commercial boat building. Users have little, if any, choice in the mechanical features of the vessel and the engine specifically. This is in part due to the way in which these boats are built. Recreational boats are typically made of fiberglass to minimize vessel weight and to facilitate planing. Fiberglass construction has the disadvantage of not offering much flexibility for installing a different engine than that which the vessel was designed to take. Also, planing requires a precise match between the engine and its location in the vessel. Engines are usually purchased from factory authorized distribution centers. The boat builder provides the specifications to the distributor, which helps match an engine for a particular application.

III. Engines Covered

A. General Scope of Application

The scope of application of the proposed emission control program is broadly set by § 213(a)(3) of the CAA, which instructs EPA to promulgate regulations containing standards applicable to emissions from those classes or categories of new nonroad engines and new nonroad vehicles that are found to cause or contribute to ozone or carbon monoxide concentrations in more than one nonattainment area. Generally speaking, then, the proposed rule is intended to cover all new marine diesel engines and new marine vessels that use those engines.

For the purpose of interpreting this scope of application for both engines and vessels, EPA is proposing to generally extend the definition of ''new'' contained in 40 CFR 89.2 to marine diesel engines at or above 37 kW. Under that definition, an engine is considered new until its legal or equitable title has been transferred and the engine has been placed into service. Because the definition of new in 40 CFR 89.2 applies to both engines and equipment, its extension to the marine sector would extend as well to vessels which, starting with the implementation dates of the proposed emission limits, would be considered new until their equitable or legal title has been transferred to an ultimate purchaser.

EPA seeks comment on whether to augment this definition of ''new'' by following the approach used in the recently finalized locomotive rule. That rule expands the definition of ''new'' to also include ''a locomotives or locomotive engine which has been remanufactured, but has not been placed back into service.'' [29] This approach was designed to respond to the very long useful lives of locomotives. Because locomotive engines remain in service for as long as 40 or 50 years, with periodic rebuilds, it was deemed advisable to require remanufactured locomotives to meet a special set of emission standards, depending on the date of their original manufacture. Because marine diesel engines are also kept in service for very long periods of time, such an approach would also lead to additional emission

[29] *See* 40 CFR 92.2.

benefits through the application of emission standards on engines that have been put into service but that have subsequently been remanufactured. In fact, this approach may be technologically easier to apply to marine diesel engines than locomotives because of their greater cooling potential. In addition, while not identical, the MARPOL Annex VI provisions contain a similar requirement, which requires engines to meet the NO_X emission limits when the engine undergoes a major conversion after January 1, 2000.

At the same time, important obstacles may prevent application of this approach to marine diesel engines. Setting emission limits for remanufactured existing engines may be very disruptive to a large number of small businesses. Also, unlike the railroad industry, companies operating Category 2 marine diesel engines do not rely on a small number of engine remanufacturers to work on their engines. In fact, many of these operators employ their own mechanics to do all maintenance and remanufacturing work. There is accordingly little uniformity in remanufacturing practices across the industry. EPA would need to conduct a major outreach effort to educate the industry about the implications of such a requirement on their business. EPA seeks comment on the feasibility and potential costs and benefits of remanufacturing provisions for existing marine diesel engines. EPA also seeks comment on its authority to establish such programs for each marine engine category, including comment regarding whether marine engines are ever remanufactured to ''as new'' condition, like locomotive engines.

For the purpose of further clarifying the definition of ''new,'' 40 CFR 89.2 specifies that a nonroad engine, vehicle, or equipment is placed into service when it is used for its functional purposes. For the purpose of applying this criteria to marine diesel engine and new vessels, EPA is proposing that a marine diesel engine is used for its functional purpose when it is installed on a marine vessel. This clarification is needed because some marine diesel engines are made by modifying a highway or nonroad engine that has already been installed on a vehicle or other equipment. In other words, the engine has been transferred to an ultimate purchaser after it is used for its functional purpose as a land-based nonroad engine (for example, on a truck or a backhoe) and is therefore no longer new, but it is later removed for marinization and installation on a marine vessel. While the 40 CFR part 89 requirements for land-based nonroad diesel engines do not contain such a requirement, EPA believes it is reasonable to treat these engines as new marine engines when they are installed on a vessel. While the practice of marinizing used highway or nonroad engines may be infrequent, it could become more common if these engines are not subject to the standards in this proposal.

New marine engines are either made in the United States or imported here. It should be noted that not all engines produced in the United States will be subject to the proposed emission limits. Consistent with other mobile source emission control programs, engines intended for sale abroad would be exempt from the requirements.

Engines imported for use in the United States would be covered by the proposed program whether they are imported as loose engines or already installed on a vessel constructed elsewhere. All imported engines would be required to have a certificate of conformity issued by EPA before they could be entered into commerce in the United States, subject to limited exemptions. In addition, EPA proposes to apply the approach contained in its other on-highway and nonroad engine programs, according to which any engine or vessel that is imported into the United States that does not have a currently valid, unexpired certificate of conformity and that was built after the effective date of the applicable standards, would be considered to be new at the time it is imported into the United States and would have to comply with the relevant emission limits in effect at that time. Thus, for example, a marine vessel manufactured in a foreign country in 2004 that is imported into the United States in 2007 would be considered to be new, and its engine would have to comply with the proposed emission limits that would be in effect for MY2007. This provision is important to prevent manufacturers from avoiding the emission requirements by building vessels abroad, transferring their title, and then importing them as used vessels.

Finally, while engines that are intended for export will not be subject to the requirements of the proposed emission control program, marine engines that are exported but that are subsequently re-imported into the United States are intended to be covered. This would be the case when a foreign company purchases marine engines manufactured in the United States for installation on a vessel that will be subsequently exported to the United States. It would also be the case when a foreign company purchases marine engines manufactured in the United States for dressing and subsequent re-exportation to the United States. Engines that are intended for export but that will be re-imported into the United States are intended to be subject to the proposed rule at the time of manufacture, unless the vessel manufacturer, engine dresser, or marinizer intends to re-certify the engines as complying with the proposed emission limits before they enter the United States. Consequently, foreign purchasers who do not wish to recertify the engines will need to make sure they purchase complying engines for those marine vessels or engines they intend to subsequently offer for sale in the United States. Engines intended for export and sale in a foreign country should be easily distinguishable from complying engines because complying engines are required to be labeled as such. Any person who introduces into commerce in the United States a noncomplying engine that is intended for export and use in a foreign country would be subject to civil penalties.

To determine when an engine or vessel will be considered ''imported'' for the purposes of determining compliance with the proposed emission control program, EPA proposes to follow the approach contained in the Harmonized Tariff Schedule of the United States (HTSUS). According to HTSUS, vessels used in international trade or commerce or vessels brought into the territory of the United States by nonresidents for their own use in pleasure cruising are admitted without formal customs consumption entry or payment of duty.[30] This approach is consistent with the Treasury Department's ruling, which concluded that vessels coming into the United States temporarily as carriers of passengers or merchandise are not subject to customs entry or duty, but if brought into the United States permanently they are to be considered and treated as imported merchandise.

Practically, the above discussion means that engines installed on vessels flagged in another country that come into the United States temporarily will not be subject to the proposed emission limits. This approach is consistent with typical international practices, whereby countries do not generally impose restrictions on the flag vessels of other countries. In recognition of this practice, the numerous Member States of the IMO

[30] HTSUS (1994), Additional U.S. Note 1. In particular, cruise ships, ferry boats, cargo ships, barges and ''similar vessels for the transportation of persons or goods'' are duty free. HTSUS (1994) 8901.

recently concluded an international agreement stipulating limits for the emission of nitrogen oxides applicable to ships engaged in international voyages. The above discussion also means that engines installed on vessels that are brought into the United States permanently would be subject to the proposed emission control program. EPA seeks comment on this implication and seeks information concerning the frequency with which this situation would occur.

B. Propulsion and Auxiliary Engines

The proposed scope of application is intended to cover all new marine diesel engines at or above 37 kW. This universe of engines includes both propulsion and auxiliary marine diesel engines. Consistent with the definitions in 40 CFR 89, a propulsion engine is intended to be one that moves a vessel through the water or assists in guiding the direction of the vessel (for example, bow thrusters). Auxiliary engines are intended to be all other marine engines.

In the final land-based nonroad rule, EPA determined that a portable auxiliary engine that is used onboard a marine vessel would not be considered to be a marine engine.[31] Instead, a portable auxiliary engine is considered to be a land-based auxiliary engine and is subject to the requirements of 40 CFR 89. To distinguish a marine auxiliary engine installed on a marine vessel from a land-based portable auxiliary engine used on a marine vessel, EPA specified in that rulemaking that an auxiliary engine is installed on a marine vessel if its fuel, cooling, or exhaust system are an integral part of the vessel or require special mounting hardware. All other auxiliary engines are considered to be portable and therefore land-based.

It has become clearer that the differences between marine auxiliary engines and their land-based counterparts may be so small as to suggest that these engines should not be treated differently at all. An alternative approach is to consider all auxiliary engines to be the same and subject them to the land-based nonroad diesel emission requirements and implementation dates (40 CFR Part 89). These two groups of engines are often technologically similar, if not identical, and are dressed for their applications in the same way. The main advantage of this alternative approach is that engine manufacturers would not have to certify these engines twice, once for land-based applications and once for marine applications. A consequence of treating these auxiliary engines as land-based nonroad diesel engines is that there would be some adjustments in emission limits, implementation date, and other provisions. EPA seeks comment on whether the land-based and marine distinctions are necessary for auxiliary engines and on whether EPA should adopt the alternative approach described above.

C. Exemptions

1. Recreational Engines

Marine diesel engines used in recreational and commercial applications are different in several respects. Commercial vessels are designed primarily to efficiently move cargo, either in their own hold or by pushing or pulling other vessels. Consequently, they are typically displacement vessels, which means the vessel is pushed through the water. Optimal operations are more a function of hull characteristics, which are designed to reduce drag, than engine size, and these vessels can be powered by engines with power ratings analogous to land-based applications. Commercial vessels are also often heavily used, and their engines are designed to operate for as many as 2,000 to 5,000 hours a year at the higher engine loads needed to push the vessel and its cargo through the water. In addition, these vessels are often designed for specific purposes, and many characteristics, including the choice of engine, are set by the purchaser.

Recreational vessels, in contrast, are designed primarily for speed. To reach high speeds, it is necessary to reduce the surface contact between the vessel and the water, and consequently these vessels typically operate in a planing mode. Planing, in turn, imposes two requirements on vessel design. First, the vessel needs to have a very high power, but lightweight engine to achieve the speeds necessary to push the vessel onto the surface of the water. Consequently, recreational engine manufacturers have focused on achieving higher power output with lighter engines (this is also referred to as high power density). The tradeoff is less durability, and recreational engines are warranted for fewer hours of operation than commercial marine engines. The shorter warranty period is not a great concern, however, since recreational vessels, and therefore their engines, are typically used for fewer hours per year than commercial engines, and spend much less time operating at higher engine loads.

Second, the vessel needs to be as light as possible, with vertical and horizontal centers of gravity precisely located to allow the hull of the vessel to be lifted onto the surface of the water. Consequently, recreational vessel manufacturers have focused on designing very lightweight hulls. They are typically made out of fiberglass, using precisely designed molds. The tradeoff is a reduced ability to accommodate any changes to the standard design. In other words, purchasers are not given much choice as to the design of the vessel and, more particularly, the engine that will be used to power it. Recreational vessels are typically designed around a specific engine or group of engines, and engines that are heavier or that are physically larger cannot be used without jeopardizing the vessel's planing abilities.

EPA has learned that many recreational engines already use the types of technologies that will be necessary to reach the proposed standards. These technologies are typically used to increase the power density of recreational engines. EPA is concerned that redirecting the impact of these technologies toward emission reduction may reduce engine power density. This, in turn, means that recreational vessel builders may have to resort to larger, heavier engines to achieve the same engine power. They may also have to redesign their hulls, and fiberglass molds, to accommodate larger, heavier engines. This can be a costly requirement, since most vessel manufacturers destroy their master hulls once the fiberglass molds are produced.

To allow more time to evaluate the potential impact of the proposed emission limits on the recreational vessel industry, EPA is not proposing to include recreational propulsion marine diesel engines in the proposed emission control program. Instead, EPA intends to consider requirements for those engines in a separate rulemaking. The Notice of Proposed Rulemaking for that recreational marine diesel rule is expected to be signed by November 23, 1999, and the Final Rule is expected to be signed in October, 2000.

EPA considered various methods to distinguish commercial and recreational marine diesel engines for the purpose of this exemption, including relying on physical differences between recreational and commercial engines or their warranty periods. These methods were found to be unsatisfactory. Relying on physical differences between recreational and commercial engines would be difficult, especially since these engines are likely to become more similar as Tier 2 technologies are applied to commercial engines. Relying

[31] *See* 63 FR 56967, October 23, 1998.

on warranty periods would be difficult because not all engine manufacturers have the same product ratings with the same warranty periods. Imposing such requirements would unnecessarily impose a degree of uniformity across the industry that may hinder engine design or marketing strategies.

Consequently, EPA is proposing to take a more flexible approach and is proposing to define a recreational marine engine as a marine propulsion engine intended by the engine manufacturer to be installed on a recreational vessel. In other words, a recreational engine would be defined by the engine manufacturer. EPA is also proposing that installation of a new recreational engine on a new nonrecreational vessel would be prohibited, and that all recreational engines be clearly labeled with language that specifies the engine is intended for use only on recreational vessels. Specifically, EPA is proposing the following label language:

THIS RECREATIONAL ENGINE DOES NOT COMPLY WITH FEDERAL MARINE ENGINE EMISSION REQUIREMENTS FOR NONRECREATIONAL VESSELS. INSTALLATION OF THIS ENGINE IN ANY NONRECREATIONAL VESSEL IS A VIOLATION OF FEDERAL LAW SUBJECT TO CIVIL PENALTY.

Thus, EPA intends that recreational engines can be used only in recreational vessels. It should be noted that the converse of this provision is not true, and that EPA does not intend to prohibit the use of a certified engine on a recreational vessel. In fact, EPA encourages recreational vessel manufacturers to use certified engines due to the beneficial impact it would have on the environment. It should also be noted that this prohibition does not prevent someone from installing an old marine engine in an old vessel.

EPA seeks comment on using a labeling requirement to distinguish recreational engines from commercial engines for the purpose of the exemption, and on whether this approach will be sufficient for preventing the installation of noncertified recreational engines on commercial vessels. EPA also seeks comment on whether a power or displacement cutoff should be also specified, above which engines could no longer be designated as recreational. For example, a power cutoff of 560 kW may be appropriate because larger engines are installed on custom-built recreational vessels that are not subject to the same design constraints as smaller serially-built fiberglass vessels.

For the purpose of the exemption, EPA is proposing to adopt the definition of recreational vessel as that term is defined in 46 U.S.C. 2101. According to that definition, a recreational vessel is a vessel (A) being manufactured or operated primarily for pleasure; or (B) leased, rented or chartered to another for the latter's pleasure. EPA further proposes that, for the purposes of part (B) of this definition, the vessel cannot be leased, rented, or chartered for more than six passengers. EPA is proposing that vessels for hire that can carry more than six passengers, whether or not they ever actually do, be deemed nonrecreational vessels. This is consistent with the definition of recreational vessel for certain Coast Guard safety requirements (See 33 CFR 183.3, 33 CFR 175.3). At the same time, EPA is concerned that including vessels used for hire in the definition of recreational vessel may be inappropriate, since vessels used for hire may be used far more extensively than recreational vessels owned by individuals solely for their own pleasure. Therefore, EPA seeks comment on whether the definition of recreational engine should be extended to vessels for hire.

In addition, to avoid any ambiguities inherent in the term ''pleasure,'' vessels used solely for competition or used at any time in any other way to generate income or revenue in any way not associated with the hiring out of the vessel to other people for their pleasure will not be considered recreational. In other words, if a boat is used for both recreational and commercial purposes, it will be considered a commercial vessel. Thus, for example, a vessel that is used for several weeks a year for lobster fishing and at other times of the year used for recreational purposes will not be considered to be a recreational vessel for the purpose of the proposed program.

2. Modified New Land-Based Engines

A small segment of the marine diesel engine market consists of companies that take a new, land-based engine and modify it for installation on a marine vessel. However, unlike post-manufacture marinizers (described in Section V.L.1., below), some of the companies that modify an engine for installation on a marine vessel do not change it in ways that may affect emissions. Instead, the modifications may consist of adding mounting hardware and a generator or propeller gears. It can also involve installing a new marine cooling system that meets original manufacturer specifications and duplicates the cooling characteristics of the land-based engine, but with a different cooling medium (i.e., water). In many ways, these manufacturers are similar to nonroad equipment manufacturers that purchase certified nonroad engines to make auxiliary engines. This simplified approach of producing an engine can more accurately be described as dressing an engine for a particular application. Because the modified land-based engines are subsequently used on a marine vessel, however, these modified engines would be considered marine diesel engines, which would then fall under the requirements proposed in this document.

To clarify the responsibilities of engine dressers under this rule, EPA is proposing to exempt them from the requirement to certify engines to the proposed standards, provided the following conditions are met.

(i) The engine being dressed, (the ''base'' engine) must be a highway, land-based nonroad, or locomotive engine, certified pursuant to 40 CFR 86, 40 CFR 89, or 40 CFR 92, respectively, or a marine diesel engine certified pursuant to this part.

(ii) The base engine's emissions, for all pollutants, must be at least as good as the otherwise applicable marine diesel emission limits. In other words, starting in 2004, a dressed nonroad Tier 1 engine will not qualify for this exemption, since the more stringent standards for marine diesel engines go into effect at that time.

(iii) The dressing process must not involve any modifications that can change engine emissions.

(iv) All components added to the engine, including cooling systems, must follow base engine manufacturer specifications.

(v) The original emissions-related label must remain clearly visible on the engine.

(vi) The engine dresser must notify purchasers that the marine engine is a dressed highway, nonroad, or locomotive engine and is exempt from the requirements of 40 CFR 94.

(vii) The engine dresser must report annually to EPA the models that are exempt pursuant to this provision and such other information as EPA deems necessary to ensure appropriate use of the exemption.

EPA is proposing to consider any engine dresser that does not meet these conditions to be an engine manufacturer, and the engine to be a new marine diesel engine, and require their engines to be certified to comply with the provisions of this proposed rule.

It should be noted that an engine dresser that violates the above criteria could be liable under anti-tampering

provisions for any change made to the land-based engine that affects emissions. The dresser could also be subject to a compliance action, for selling new marine engines that are not certified to the required emission standards. In addition, the base engine manufacturer could be subject to a compliance action if the engine is found to be out of compliance.

EPA seeks comments on three aspects of this proposed exemption. First, EPA seeks comment on whether highway engines should be included in the set of base engines that can be modified by an engine dresser for marine application without needing further certification. EPA made a previous decision not to allow certified highway engines to be used in nonroad applications without recertifying. This decision was in response to claims that highway engines may not be able to meet applicable emission requirements on the steady-state test cycles applicable to nonroad engines. EPA is nevertheless proposing to allow engine dressers to modify certified highway engines without recertifying them as marine engines, because EPA believes that engine dressers would be unfairly penalized by the constraint that was originally intended for manufacturers selling two versions of their own engines. EPA requests comment on whether it is appropriate to include highway base engines in this exemption.

Second, EPA seeks comment on how to ensure that exempted dressed engines comply with the not-to-exceed requirements described in Section V.F. of this proposal. The base engines certified under 40 CFR 86, 40 CFR 89, or 40 CFR 92 are not subject to these provisions at the present time. Engines that are not subject to the off-cycle emission program may not have test data demonstrating compliance with this requirement.

Finally, EPA seeks comment on whether land-based engines that are credit users (those which have an FEL higher than the standard) should be allowed to benefit from the exemption. According to the above proposed criteria, the base engine's emissions must be at least as good as the otherwise applicable marine diesel emission limits. However, it may be the case that the base engine is a credit user, and that in fact its emissions are not as good as the otherwise applicable marine diesel emission limits, even though it is certified to the same or more stringent emission limits. This is of concern because engine dressers often prepare engines for marine vessels that are used in a particular area of the country. This means that high-emitting dressed engines may be concentrated in just a few port areas. In addition, it is unlikely that enough credit generators will be dressed for marine purposes that will offset the higher emitting credit users. The obvious solution to this problem is to specify that land-based nonroad or locomotive engines whose certification relied on the use of credits cannot benefit from this exemption. However, it is not clear that engine dressers will be able to identify these engines, or to modify their production practices if they happen to rely heavily on them for their own production. EPA seeks comment on this, as well as on any other solutions that will ensure that engines dressed for marine applications do not exceed the marine diesel emission limits.

3. Other Exemptions

EPA is proposing to extend other basic nonroad exemptions to marine diesel engines. These include the testing exemption, the manufacturer-owned exemption, the precertification exemption, the display exemption, the national security exemption, and the export exemption described in 40 CFR 89 Subpart J. In addition, EPA seeks comment on an additional exemption for racing and on the scope of the national security exemption. It should be remembered that these exemptions are not necessarily automatic, and that the engine or vessel manufacturer, or ultimate engine owner, may need to apply for them. As part of its approval, EPA may require exempted engines to be labeled.

With regard to the national security exemption, EPA is proposing to apply the approach used in the Agency's existing land-based nonroad and gasoline marine programs (40 CFR 89.908 and 40 CFR 91.1008). According to this exemption, only marine engines used in vessels that exhibit substantial features ordinarily associated with military combat, such as armor and/or permanently affixed weaponry, and which will be owned and/or used by an agency of the federal government with responsibility for national defense, will be considered exempt from the proposed emission control program. No request for an exemption would be necessary for these engines. Thus, according to this approach, engines used on vessels such as aircraft carriers, destroyers, and submarines would automatically be exempt from the proposed program. EPA believes extending the nonroad national security exemption to diesel marine engines is appropriate because the vessels on which these engines are used are designed for specific national security missions, and the exemption will ensure that emission controls do not compromise the ability of these vessels to achieve their military missions. However, it is EPA's understanding that the Department of Defense, and the Navy in particular, adopt emission control technology to the extent it is practical and feasible.

It is EPA's understanding that other public vessels, such as some vessels operated by the Coast Guard or Maritime Administration or vessels used for general cargo purposes by the Navy or other armed service branches, may not have features ordinarily associated with military combat. Such vessels would not qualify for the automatic exemption under the proposed national security exemption. EPA seeks comment on the nature and uses of vessels in such fleets and on the appropriate delineation of the national security exemption. EPA does not believe that application of the emission control technology that will be used to achieve the diesel marine Tier 2 emission limits will hinder the design and use of these vessels. Nevertheless, there may be situations in which an exemption from the emission controls may be necessary. To address this possibility, manufacturers can request a special national security exemption. A manufacturer requesting such an exemption would be required to explain why the exemption is required, and the request would need to be endorsed by an agency of the federal government charged with responsibilities for national defense. EPA requests comment on applying the land-based nonroad and gasoline marine military exemption approach to diesel marine engines or whether these engines are sufficiently different in application from land-based military equipment as to require a different approach. If another approach is more appropriate, EPA requests comment on what that approach should be.

With regard to racing engines, EPA is proposing to allow an exemption for marine diesel engines that are installed on vessels used solely in competition. To limit the application of this requirement to professional racing, EPA is also proposing that the racing exemption may not be given to any vessel that is used for recreational purposes. In other words, high-powered recreational vessels that are not used solely in competition will not be eligible for the racing exemption. The proposed approach is different from the approach used by EPA for SI marine engines (40 CFR Part 91) and land-based nonroad diesel engines (40 CFR Part 89). In those regulations, EPA defined ''used solely

for competition'' based on physical features of the vessel. However, EPA does not believe that marine diesel vessels used solely for competition will necessarily have physical features that are not found on other high performance marine vessels. Thus, in this rulemaking, EPA is proposing to interpret ''used solely for competition'' literally, such that the exemption would apply only to engines that are, in fact, used solely for competition. The Agency requests comment regarding whether it should also use this literal approach for SI marine engines or land-based nonroad engines.

IV. Engine Categories

The engines that are the subject of this action are very diverse in terms of physical size, emission technology, control hardware, and costs associated with reducing emissions. These differences make it difficult to design one set of emission requirements for all marine diesel engines. For example, numerical emission limits that may be reasonable and feasible for a 37 kW engine used on an 5.5-meter (18-foot) boat may not be reasonable or feasible for a 1,500 kW engine installed on a tug or a 20,000 kW engine installed on an ocean-going container ship. Similarly, numerical emission limits appropriate for very large engines may be not be appropriately stringent for smaller engines, requiring little or no emission reduction.

Consequently, it is necessary to divide marine diesel engines into categories for the purposes of applying emission limits and duty cycles. In developing these categories, EPA had two criteria. First, the categories should allow EPA to take advantage of existing control programs that apply to the base engines from which marine engines are derived. Second, the categories should minimize category straddlers. In choosing how to distinguish between groups of marine diesel engines, EPA considered using rated power, rated speed, total displacement, and several other factors. However, after reviewing the engine parameters of the range of diesel engine models currently being produced, EPA concluded that per-cylinder displacement was the best way to distinguish engine groupings. Per-cylinder displacement is an engine characteristic that is not easily changed and is constant for a given engine model or series of engine models. More specifically, EPA is considering the following categorization scheme, which is summarized in Table 4. EPA requests comment on this categorization scheme.

TABLE 4.—ENGINE CATEGORY DEFINITIONS

Category	Displacement per cylinder	Basic engine type
1	Disp. < 5 liters (and power ≥ 37 kW)	Land-based Nonroad Diesel.
2	5 ≤ disp. < 20 liters	Locomotive.
3	Disp. ≥ 20 liters	Unique, ''Cathedral.''

EPA proposes to define Category 1 engines as those marine diesel engines that are rated above 37 kW, but have a per-cylinder displacement of less than 5 liters. This definition is intended to break out the class of marine engines that are serially produced and generally derived from land-based nonroad configurations or use the same emission control technologies. These engines are typically used as propulsion engines on recreational vessels as well as small commercial vessels (fishing vessels, tugboats, towboats, dredgers, etc.) They are also used as auxiliary engines on vessels of all sizes and applications.

EPA proposes to define Category 2 engines as those marine diesel engines with per-cylinder displacement at or above 5 liters and up to 20 liters. This category is intended to include engines that are of similar size and configurations as locomotive engines and use the same or similar emission control technologies. These engines are widely used as propulsion engines in harbor and coastal vessels, and can be used as auxiliary engines on ocean-going vessels and larger tugs.

EPA proposes to define Category 3 engines as those marine diesel engines with a displacement at or above 20 liters per cylinder. These are very large high-power engines that are used almost exclusively for propulsion on vessels engaged in Great Lakes or trans-oceanic trade.

EPA is further proposing to divide Category 1 engines into several subgroups. These subgroups are similar to the land-based nonroad diesel engine subgroups, with one significant change: EPA is proposing to base the marine subgroups on engine displacement rather than engine power. EPA believes this is a more appropriate scheme for two reasons. First, manufacturers sometimes offer different engine models that are the same except for the number of cylinders. These engines may fall into different power groupings by virtue of the added power from adding cylinders. Second, marine engines are often available in a wider range of power than their land-based counterparts. While it may be possible to define wider power bands for marine diesel engine subgroups, it may not be possible to do so without creating phase-in disadvantages for particular companies, especially in comparison to their land-based phase-in schedule. A displacement scheme should minimize these inequities. Consequently, EPA is proposing a displacement approach to defining engine groups, as described in Table 5.

TABLE 5.—CATEGORY 1 ENGINE GROUPS

Displacement (liters/cylinder)	Approximate corresponding power band from land-based nonroad rulemaking	
	kW	hp
Displ.<0.9	37≤kW<75	50≤hp<100
0.9≤displ.<1.2	75≤kW<130	100≤hp<175
1.2≤displ.<1.5	130≤kW<225	175≤hp<300
1.5≤displ.<2	225≤kW<450	300≤hp<600
2.0≤displ.<2.5	450≤kW<560	600≤hp<750

TABLE 5.—CATEGORY 1 ENGINE GROUPS—Continued

Displacement (liters/cylinder)	Approximate corresponding power band from land-based nonroad rulemaking	
	kW	hp
2.5≤displ.<5.0	kW≤560	hp≤750

In selecting the displacement values corresponding with the nonroad power ranges, EPA examined the engine displacement and power characteristics of a wide range of existing engines. The listed displacement values were selected to provide the greatest degree of consistency with the established land-based nonroad engine power groups. The wide range in power ratings for engines with a given per-cylinder displacement, however, led to a high degree of overlap in the attempted correlation between displacement and power rating. As a result, some nonroad engine models that were spread across different power groupings are brought together under a single displacement grouping. This has the potential to move an engine model into a group with somewhat more or less stringent requirements, but in almost all cases there was sufficient overlap to avoid moving a family of engines into an entirely new grouping. The observed overlap highlights the benefit of relying on displacement for a simplified approach. This should give manufacturers opportunity to more sensibly plan an R&D effort to a family of engines that must meet a single set of requirements with a common implementation date.

The most important aspect of defining sub-groups relates to which engines are treated like nonroad diesel engines rated above 560 kW. Emission limits and implementation dates for smaller marine engines are relatively uniform; however, the biggest group of Category 1 engines are subject to less stringent emission limits (for Tier 3) and have more lead time, which makes it especially important to properly separate engines. Investigation of engine models led to three key observations. First, of the engines lines with per-cylinder displacement between 2.5 and 5.0 liter, all had configurations with available power ratings above 560 kW; several of these were much greater than 560 kW. Second, except for one instance, all engines with displacements less than 2.5 liter had configurations with available power ratings below 560 kW; this means that the manufacturers of these engines would have to meet the more aggressive requirements for some of those engines. The only exception is the DDC 149 series engines, which is being replaced with a new engine model. Third, the common practice of bolting two marine engines together would often place the combined engine artificially into the less stringent regime. For example, with respect to emissions and performance, two six-cylinder 300 kW engines bolted together would operate the same as each individual engine. Yet, by doubling the power at the crankshaft, the engine would be subject to less challenging requirements.

The net effect of changing to a displacement-based grouping is hard to quantify. Somewhat greater emission reductions would likely result for the reasons described above, though it is difficult to identify the relative sales volumes of engines that would fall above and below the threshold under both scenarios. The effect on costs is expected to be small. As described above, no engines would be subject to the more stringent standards that would not have a subset of the engine line already subject to those same standards under a power-based grouping arrangement. As a result, there should be no increase in R&D expenses. Variable costs would be incurred for a greater number of engines, but the costs analysis in the Draft RIA makes clear that variable costs play a relatively small role in the overall cost impact of emission requirements. The Draft RIA lists various engine models with their displacement groups. EPA requests comment on this approach to defining Category 1 engine groups. Also, EPA requests comment on whether it would be appropriate to pursue redefinition of the nonroad diesel emission standards into these displacement-based groupings as part of a separate, future rulemaking.

V. Description of Proposed Standards and Related Provisions

In developing this proposal, EPA has developed a comprehensive program to reduce emissions from marine diesel engines. This section describes the proposed emission limits for Category 1 and Category 2 engines. It also sets out provisions that will ensure that engines comply with the emission limits across all engine speed and load combinations, as well as throughout their useful life. Proposed requirements related to test procedures and fuel specifications are also discussed, as well as several certification and compliance provisions. Standards and related provisions for Category 3 engines are described in Section VI, below.

A. Standards and Dates

1. Marine Tier 2 Emission Limits

The Agency's general goal in designing emission control requirements for Category 1 and Category 2 marine diesel engines is to develop a long-term program that will achieve significant emission reductions. In developing such a program, the Agency is guided by § 213(a)(3) of the CAA, which instructs EPA to set standards for nonroad engines that ''achieve the greatest degree of emission reduction achievable through application of technology the Administrator deems will be available for the engines or vehicles to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology.'' The Act also instructs EPA to first consider standards equivalent in stringency to standards for comparable motor vehicles or engines (if any) regulated under § 202, taking into consideration technological feasibility, costs, and other factors.

The relevant engines regulated under § 202 are on-highway truck engines, both light-duty and heavy-duty. The most recent NO_X emission limits set by EPA for these engines range from approximately 2.5 g/kW-hr for heavy-duty trucks to less than 2.0 g/kW-hr for light-duty trucks. After consideration, EPA determined that it is not appropriate to extend the on-highway limits to diesel marine engines for three reasons. First, these emission limits reflect a history of emission control that is not shared by marine diesel engines, which are currently uncontrolled, and it is not clear that marine diesel engines can achieve such stringent emission

limits. In comparison, EPA estimates the baseline emission rates of marine diesel engines to be approximately 10.5 g/kW-hr for the smaller marine diesel engines. Second, the duty cycle demands for marine engines are considerably different than those for on-highway trucks, which must be reflected in any choice of emission limits for marine engines. Finally, engines used in marine applications cover a much broader power range. As described elsewhere in this preamble, the marine engines covered by this rule vary in size from 37 kW to in excess of 90,000 kW—much larger than any on-highway engines, which vary from approximately 50 kW to 500 kW. It may not be possible for the larger marine diesel engines to achieve the limits that were set for a smaller universe of on-highway engines.

Instead of basing the proposed emission limits on on-highway engines, EPA believes it is more appropriate to consider the standards for land-based nonroad diesel engines already promulgated pursuant to § 213. This approach is favorable because the vast majority of marine diesel engines are derived from or use the same technologies as land-based engines. As described in the Draft Regulatory Impact Assessment, manufacturers of marine diesel engines typically start with a partially- or fully-completed land-based nonroad diesel engine or, in some cases, a highway diesel engine, and adapt it for use in the marine environment (this process is typically called ''marinization'').

EPA initially considered extending the land-based nonroad diesel Tier 1 emission limits, as described in the NPRM for new gasoline spark-ignition and diesel compression-ignition engines.[32] These limits are contained in Table 1, above. However, after further consideration, EPA has concluded that those emission limits do not meet the § 213 criteria. Available data suggests that marine diesel engines already perform at or near the NO_X emission limits (9.2 g/kW–hr). This is not surprising, given that the Tier 1 levels required the application of very simple emission control technology, primarily timing retard and better cooling. In addition, engine manufacturers have been exploring better engine cooling for quite some time in an effort to boost engine power.

Tier 2 nonroad technologies have been applied to marine diesel engines with good results. As described in the Draft Regulatory Impact Analysis, engine manufacturers participating in several California demonstration programs experimented with applying Tier 2 technologies, including electronic controls, better turbocharging, and raw-water aftercooling, to various commercially used engines. These programs have shown that NO_X emissions can be reduced by 40 to 60 percent. These results suggest that application of the land-based nonroad Tier 1 emission limits will not achieve the greatest degree of emission reduction achievable, taking into account technological feasibility, costs and other factors, as required by the Clean Air Act. Therefore, EPA is not proposing to extend the land-based nonroad Tier 1 emission limits to marine diesel engines.

At the same time, EPA is concerned about directly applying the land-based nonroad Tier 2 emission limits to marine diesel engines, for at least three reasons. First, the results obtained in the demonstration projects may be better than could be expected over a more general application of these Tier 2 technologies. Specifically, the demonstration projects were carefully controlled programs, and the engines were specially adapted for the participating vessels. These engines may have seen better maintenance or fewer extremes in use than typical marine diesel engines.

Second, manufacturers have indicated that there may be some hardware problems that would have to be worked out before land-based nonroad Tier 2 technologies can be applied to marine diesel engines. For example, achieving Tier 2 emission limits will require a higher use of raw-water aftercooling, which may present some problems for commercial marine engines. As currently designed, these systems can require more frequent maintenance, and may pose some reliability problems. In addition, it is not clear whether split-housing turbochargers can be used extensively with raw-water aftercooling, since the temperature differences between the interior and exterior of the turbocharger can cause material failure.

Finally, and perhaps most importantly, the demonstration projects gathered emissions data primarily for NO_X. It is not clear what effect application of these technologies had on PM emissions. This is an important concern because of the NO_X/PM tradeoff (as NO_X emissions are decreased, PM emissions tend to rise due to the change in combustion temperatures).

To address these concerns while still encouraging the use of land-based nonroad technologies on marine diesel engines, EPA is proposing a two-step approach for Category 1 and 2 marine diesel emission limits. Reflecting the above-described concerns, this approach assumes less than optimal transfer of land-based nonroad technologies to marine engines in the short run. In the long run, however, this approach assumes engine manufacturers will develop ways to fully optimize the transfer of land-based nonroad Tier 2 and Tier 3 emission control technologies to marine diesel engines. This two step approach will also give engine manufacturers more time to resolve mechanical barriers that prevent marine engines from more completely exploiting the water cooling potential of the environment in which they operate (water). Specifically, as described in the technological feasibility section below and the Draft Regulatory Impact Assessment, greater use of raw water and separate system aftercooling will permit marine engines to greatly reduce NO_X emissions. Taken as a whole, the proposed emission limits are expected to yield the greatest degree of emission reduction achievable through the application of technology that is expected to be readily available during the time frame covered by the proposal taking into account technological feasibility, costs and other factors, as required by the Clean Air Act.

Table 6 contains the proposed emission limits for marine diesel Category 1 and Category 2 engines. In the first step, which EPA is calling Tier 2 due to the similarity to land-based Tier 2 emission limits, EPA proposes a 7.2 g/kW-hr NO_X+HC limit, to apply to both categories of engines. Again, this limit is intended to result in short-term NO_X reductions while not requiring manufacturers to completely resolve the transfer of land-based Tier 2 technologies to marine engines. These marine Tier 2 emission limits are proposed to apply beginning in 2004 for engines up to 5 liters per cylinder and 2006 for engines up to 20 liters per cylinder. The staggered dates reflect the added complexities of applying these limits to larger engines. The MARPOL Annex VI NO_X limits are also provided in this table for comparison.

[32] *See*, 59 FR 55929, November 9, 1994.

TABLE 6.—PROPOSED TIER 2 MARINE DIESEL EMISSION LIMITS AND IMPLEMENTATION DATES

Subcategory	HC+NO_X g/kW–hr	PM g/kW–hr	CO g/kW–hr	Implementation date
Power ≥ 37 kW 0.5 ≤ disp < 0.9	7.2	0.40	5.0	2004
0.9 ≤ disp < 1.2	7.2	0.30	5.0	2004
1.2 ≤ disp < 1.5	7.2	0.20	3.5	2004
1.5 ≤ disp < 2.0	7.2	0.20	3.5	2004
2.0 ≤ disp < 2.5	7.2	0.20	3.5	2004
2.5 ≤ disp < 5.0	7.2	0.20	3.5	2006
5.0 ≤ disp < 20.0	7.2	0.27	2.0	2006
MARPOL Annex VI, for comparison purposes (NO_X only)				
n ≥ 2000 rpm	9.8	None	None	1/1/2000
130 rpm≤n<2000 rpm	$45*n^{(-0.2)}$	None		1/1/2000
n <130 rpm	17.0	None	None	1/1/2000

It is expected that marine diesel engines can achieve this emission limit through the application of electronic controls and better cooling, perhaps supplemented by some degree of timing retard. EPA is also proposing emission controls for PM and CO, that are equal to the land-based nonroad and locomotive limits for these pollutants, depending on the size of the engine. EPA does not believe it is necessary to relax these limits relative to the land-based programs. Due to the NO_X/PM tradeoff, the higher NO_X emission limit should ensure the feasibility of achieving the PM limits as well. Diesel engines inherently have low CO emissions, and the proposed limits are intended to serve as a cap.

EPA is proposing new requirements designed to ensure that the standards are met during real world operation as well as under laboratory tests (see Section V.F. ''Not-to-Exceed Requirements''). According to these requirements, marine engines may not exceed the applicable emission limits by more than 25 percent while the engine is operated in any load/speed combination contained in a specified not-to-exceed (NTE) zone. EPA believes that the technology listed above that will be used to meet the proposed standards will be sufficient to meet the combined emission limits and NTE requirements. While the NTE transient operation requirements have an effect on PM emissions, this is not expected to pose any design difficulties. Marine operations typically have only limited transience and the NTE requirements are designed so that a short transience can be averaged into a minimum operating period.

EPA believes the proposed marine diesel emission limits set out in Table 6 strike the appropriate balance, taking into consideration the recently finalized Tier 2 emission limits that apply to the land-based nonroad engines from which many if not most diesel marine engines are derived and the special characteristics of marine diesel engines that may make achievement of those limits difficult. EPA requests comments on these proposed marine diesel Tier 2 limits. Specifically, it may be the case that the barriers to applying land-based technologies to marine diesel engines, including recreational engines, are smaller than expected, and that the land-based nonroad emission control program is, in fact, technologically feasible. In that case, extension of the land-based programs would be the appropriate approach according to the criteria set out in the Clean Air Act. The land-based Tier 2 emission limits are contained in Table 7. EPA also seeks comment on whether the superior cooling potential of marine diesel engines would permit even lower emission standards for NO_X and PM at an acceptable cost.

TABLE 7.—LAND-BASED NONROAD TIER 2 EMISSION LIMITS AND IMPLEMENTATION DATES

Subcategory	HC+NO_X g/kW–hr	PM g/kW–hr	CO g/kW–hr	Implementation date
Power ≥ 37 kW 0.5 ≤ disp < 0.9	7.5	0.4	5.0	2004
0.9 ≤ disp < 1.2	6.6	0.3	5.0	2003
1.2 ≤ disp < 1.5	6.6	0.2	3.5	2003
1.5 ≤ disp < 2.0	6.4	0.2	3.5	2001
2.0 ≤ disp < 2.5	6.4	0.2	3.5	2002
2.5 ≤ disp < 5.0	6.4	0.2	3.5	2006
5.0 ≤ disp < 20.0	0.4, 7.4	0.27	2.0	2005

2. Marine Tier 3 Emission Limits

In the long run, it is anticipated that greater experience with emission controls and the transfer of land-based technologies to marine engines will make more stringent emission limits feasible. For this second step, which EPA is calling Tier 3 due to the similarity to land-based Tier 3 emission limits, EPA proposes a 3.0 g/kW–hr NO_X+HC limit, to apply to marine diesel engines up to 2.5 l/cyl beginning in 2008. EPA believes this emission limit should be achievable within the time available through more aggressive engine cooling and use of electronic engine controls. At the same time, and similar to the Tier 2 limits, there are uncertainties regarding the transferability of land-based Tier 3 technologies to these marine diesel engines. Because more complete information on the technologies that will be used to achieve these limits for land-based engines will not be available for several years, EPA intends to reconsider these marine Tier 3 limits as part of a feasibility review, to take place in 2003. At that time, EPA will examine the extent to which the proposed Tier 3 standards are technologically feasible and otherwise appropriate under the

Clean Air Act. The marine diesel Tier 3 NO_X+HC limits are set out in Table 8.

TABLE 8.—PROPOSED TIER 3 MARINE DIESEL HC+NO_X Emission Limits and Implementation Dates*

Subcategory	HC+NO_X g/kW–hr	Implementation date
Power ≥ 37 kW 0.5 ≤ disp < 0.9	4.0	2008
0.9 ≤ disp < 1.2	4.0	2008
1.2 ≤ disp < 1.5	4.0	2008
1.5 ≤ disp < 2.0	4.0	2008
2.0 ≤ disp < 2.5	4.0	2008
2.5 ≤ disp < 5.0	5.0	2010
5.0 ≤ disp < 20.0	5.0	2010

*Note: These limits are subject to a 2003 Feasibility Review.

EPA also seeks comment on whether the marine diesel Tier 3 limits should follow the land-based nonroad limits, set out in Table 9. As discussed under the Tier 2 limits, above, it could be the case that transferring land-based nonroad Tier 3 technologies will be easier than anticipated. This, in combination with the superior cooling potential of marine engines, may make achievement of the land-based Tier 3 standards feasible. If adopted, these land-based limits would be subject to review in the 2003 feasibility study.

TABLE 9.—LAND-BASED NONROAD TIER 3 EMISSION LIMITS AND IMPLEMENTATION DATES*

Subcategory	HC+NO_X g/kW-hr	Implementation date
Power ≥ 37 kW 0.5 ≤ disp < 0.9	4.7	2008
0.9 ≤ disp < 1.2	4.0	2007
1.2 ≤ disp < 1.5	4.0	2006
1.5 ≤ disp < 2.0	4.0	2006
2.0 ≤ disp < 2.5	4.0	2006

*Note: These limits are subject to a 2003 Feasibility Review.

As noted in Table 8, EPA is also proposing Tier 3 emission limits for Category 1 marine diesel engines at or above 2.5 l/cyl. and Category 2 marine diesel engines. Tier 3 emission controls are necessary for these engines because of the importance of their emissions to local ozone inventories. Marine diesel engines at or above 2.5 l/cyl are an important part of the emission inventory of many cities with commercial ports.[33] While the population of engines in these areas may be smaller than land-based nonroad equipment or locomotives, it is also the case that their use is much more concentrated, being limited to port areas. In addition, many cities with commercial ports are in nonattainment areas, and the second phase emission limits will be an important tool to help them reduce local ozone levels.

EPA did not set Tier 3 emission limits for land-based nonroad engines at or above 560 kW or for locomotives, due to the limited cooling potential of those engines. These engines are typically installed in relatively restrictive spaces, and are unable to take full advantage of air-to-air cooling systems. However, EPA believes that marine diesel engines at or above 2.5 l/cyl should be able to meet more stringent Tier 3 emission limits because they can take advantage of the medium in which they operate, water, to achieve better engine cooling and additional NO_X reductions. At the same time, the ability of these larger engines to take full advantage of raw water aftercooling or separate system aftercooling is complicated by the same constraints that must be overcome for the smaller engines. To accommodate concerns about overcoming this constraint, as well as uncertainty over the transferability of more efficient cooling technology from the smaller to the larger marine diesel engines, EPA intends to review the Tier 3 emission limits for engines at or above 2.5 liters per cylinder as part of the 2003 Feasibility Review. EPA seeks comment on the proposed Tier 3 limits for these engines, concerning both their stringency and implementation dates.

Finally, EPA will also examine the need to set more stringent PM limits as part of the 2003 Feasibility Review. Consideration of more stringent PM standards will be a function of, but not depend exclusively on, the ease with which engines are expected to reach the NO_X+HC limits, the extent to which the higher sulfur content of marine diesel fuel can be accommodated, whether the land-based nonroad diesel engine PM limits are revised as part of that category's 2001 feasibility review, and the cost of such limits.

Before making a final decision in the 2003 review, EPA intends to issue a proposal and offer an opportunity for public comment on whether the Tier 3 standards continue to be consistent with the requirements of the Act and continue to be technologically feasible for implementation according to the proposed schedule. Any Tier 3 PM standards would also be proposed in such a notice. Following the close of the comment period, EPA intends to issue a final Agency decision.

If by 2003 EPA finds the emission standards are not feasible according to the proposed schedule, or are otherwise not appropriate under the Act, EPA will propose changes to the program, possibly including adjustments to the levels of the standards. The adjusted standards may be more or less stringent than those already established, including the possibility of a new emission standard for particulate matter. The standards finalized in the rulemaking initiated by this proposal would stay in effect unless revised by the subsequent rulemaking procedure.

3. Interim Emission Limits

As noted above, EPA considered but rejected proposing land-based nonroad Tier 1 emission limits to marine diesel engines. Such emission limits would not be cost-effective because marine diesel engines often already meet the Tier 1 emission limits, and a Tier 1 program would simply impose a certification burden for minimal emission benefits.

At the same time, however, EPA is concerned about leaving these engines uncontrolled until the implementation dates of the marine Tier 2 standards (2004 for engines up to 2.5 l/cyl and 2006 for engines between 2.5 and 20 l/cyl). As noted above, these engines can be a considerable source of NO_X and PM emissions in port and coastal areas, many of which are in nonattainment zones.

This problem may be alleviated, however, by the MARPOL Annex VI emission control program. Regulation 13 of Annex VI to the International Convention on the Prevention of Pollution from Ships calls for engines installed on ships constructed on or after January 1, 2000, to meet emission limits similar in stringency to the land-based nonroad Tier 1 limits. Although the Annex VI emission limits are not enforceable until the Annex goes into effect (12 months after it is ratified by 15 countries representing at least 50 percent of the gross tonnage of the world's merchant shipping), it is expected that ship owners will begin to comply with these emission limits in 2000 to avoid future enforcement actions. According to Regulation 13(1)(b)(ii), the Annex requirements will apply even to ships operated in domestic waters unless a country takes action to the contrary. It is expected that the MARPOL Annex VI program will act as a cap on NO_X emissions, since engine manufacturers will have to make

[33] Category 1 and 2 marine diesel engines make up approximately 6 percent of the NO_X emission inventory for San Diego, 5 percent for San Francisco and 2 percent for Los Angeles-South Coast, Baltimore, and Chicago. *See* Commercial Marine Vessel Contributions to Emission Inventories, Final Report, Submitted by Booz-Allen & Hamilton, Inc., October 7, 1991.

compliant engines available for installation on ships beginning January 1, 2000. At the same time, however, there is some concern about compliance with these limits because they will not be enforceable until the Annex goes into effect. In addition, the international inspection program, when it goes into effect, will cover only engines installed on ships at or above 400 gross tons.[34]

EPA seeks comment on whether it is appropriate to rely on the MARPOL Annex VI program as an interim cap on NO_X emissions, with no formal emission limits or certification program set by EPA. Also, EPA seeks comment on how to verify that engine manufacturers are, in fact, complying with the MARPOL Annex VI program prior to the implementation date of Annex VI.

4. Total Hydrocarbons

EPA proposes to use total hydrocarbons (HC) rather than nonmethane hydrocarbons in its emission standards for marine diesel engines. This is consistent with locomotive standards but inconsistent with land-based nonroad standards. Methane was considered to be removed from the regulated pollutants since it is significantly less reactive than other hydrocarbons in the formation of ozone. However, for diesel engines, methane only makes up about two percent of the total hydrocarbons. In addition, HC generally makes up less than five percent of the combined HC+NO_X from a marine diesel engine. The combination of these two factors renders the methane fraction of the exhaust insignificant when compared to the significant digits in the proposed HC+NO_X standard.

The advantage of using total hydrocarbons rather than nonmethane hydrocarbons in the proposed standard is that it simplifies the emission measurement. To determine NMHC, both HC and methane must be measured. Methane is generally measured by speciating total hydrocarbons using a gas chromatograph, which can be time consuming and costly. In addition, by using total hydrocarbons for the standard for all marine diesel engines, the standards are consistent for Category 1 and Category 2.

B. Crankcase Emissions

EPA is proposing to require that all marine diesel engines either have closed crankcases (where blowby gases are routed into the engine intake air stream), or route all blowby gases into the engine exhaust stream for inclusion in all exhaust emission measurements. Manufacturers would be allowed flexibility for routed blowby gases in in-use configurations, provided that the blowby gases could be readily routed into the exhaust for any in-use test. This approach is similar to the approach used by EPA for locomotives. The purpose of this proposed requirement is to provide manufacturers the incentive to reduce crankcase emissions to the maximum extent possible, or to eliminate them all together.

C. Smoke Requirements

EPA is not proposing smoke requirements for marine diesel engines. Marine diesel engine manufacturers have stated that many marine diesel engines, even though currently unregulated, are manufactured with smoke limiting controls at the request of the engine purchasers. Users seek low smoke emissions both because they dislike the residue smoke emissions leave on decks and because they can be subject to penalties in ports that have smoke emission requirements. In many cases, marine engine exhaust gases are mixed with water prior to being released. This practice reduces the significance of smoke emissions since smoke becomes significantly less visible. Moreover, the Agency believes that the PM standards being proposed here will have the effect of limiting smoke emissions as well. EPA requests comment on these views and, specifically, on whether there is a need at this time for additional control of smoke emissions from Category 1 marine engines, and if so, what the appropriate limits should be.

If a smoke limit is desirable, EPA also requests comment on what the test procedure should be. There is currently no test procedure that can be used to measure compliance with a smoke limit. Most propulsion marine engines operate over a torque curve governed by the propellor. Consequently, a vessel with an engine operating at a given speed will have a narrow range of torque levels. Some large propulsion marine engines have variable-pitch propellers, in which case the engine operates much like constant-speed engines. It should be noted, however, that ISO is working on a proposal for marine diesel engine smoke test procedures. A copy of a recent draft is being placed in the docket for this rulemaking. As this procedure is finalized by ISO, and emission data become available, EPA may review the issue of smoke requirements for all marine diesel engines. EPA requests comment on this overall approach to smoke emissions from marine diesel engines, as well as comment on the draft ISO procedures.

D. Alternative Fuels

EPA has determined that the proposed standards should apply to marine diesel engines, without regard to the type of fuel that they use. This is consistent with nonroad diesel engine regulations of 40 CFR part 89. It is also generally consistent with the locomotive regulations; however, the locomotive regulations apply even more broadly because they also include spark-ignited engines. EPA recognizes that few, if any, alternative-fueled marine engines are currently being manufactured, but believes that it is appropriate to make clear to manufacturers what standards will apply to such engines should they be produced.

The broad applicability of the proposed standards raises two potential issues. The first issue is related to the form of the HC standards. In its regulation of highway vehicles and engines (59 FR 48472, September 21, 1994), the Agency determined that it is not appropriate to apply total hydrocarbon standards to engines fueled with natural gas (which is comprised primarily of methane), but rather that nonmethane hydrocarbon (NMHC) standards should be used. Thus, EPA is setting NMHC+NO_X standards for compression-ignition natural gas-fueled marine engines. These NMHC+NO_X standards are numerically equivalent to the HC+NO_X standards proposed for diesel engines. Similarly, EPA has determined that alcohol-fueled engines should be subject to HC-equivalent (HCE) standards instead of HC standards (54 FR 14426, April 11, 1989). HC-equivalent emissions are calculated from the oxygenated organic components and non-oxygenated organic components of the exhaust, summed together based on the amount of organic carbon present in the exhaust. (The reader is referred to the April 11, 1989 final rule for more information regarding the determination of HC-equivalence.) EPA is proposing these approaches because it has previously determined that these approaches will result in the most equivalent stringency for all fuel types.

The second issue raised by the regulation is related to the need for slightly different test procedures for alternative-fueled engines. This issue is being resolved in this rulemaking by referencing the test procedures found in 40 CFR Parts 89 and 92, both of which include flexibility for testing alternative-fueled engines. EPA requests comment

[34] *See* Regulation 5, Surveys and Inspections, of the Annex.

on whether more specific regulation is needed for marine engines.

E. Test Procedures

For this marine regulation, EPA is proposing to use previously established test procedures for diesel nonroad engines. Specifically, EPA is proposing that Category 1 marine engines be tested using the land-based nonroad test procedures of 40 CFR Part 89, and that Category 2 marine engines be tested using the locomotive test procedures of 40 CFR Part 92. There are two reasons for using this approach. First, most manufacturers of marine compression-ignition engines also manufacture land-based engines and will be equipped to test engines using these test procedures. Second, marine compression-ignition engines are fundamentally similar to their land-based counterparts, and it is therefore appropriate to measure their emissions in the same way. At the same time, some changes are necessary, EPA is proposing the modifications to these test procedures described below.

1. Duty cycles

The duty cycle used to measure emissions is intended to simulate operation in the field. Testing an engine for emissions consists of exercising it over a prescribed duty cycle of speeds and loads, typically using an engine dynamometer. The nature of the duty cycle used for determining compliance with emission standards during the certification process is critical in evaluating the likely emissions performance of engines designed to those standards.

To address operational differences between engines, EPA is proposing different duty cycles for different types of compression-ignition marine propulsion engines. EPA is proposing that propulsion engines that operate on a fixed-pitch propeller curve be certified using the International Standards Organization (ISO) E3 duty cycle. This is a four-mode steady-state cycle developed to represent in-use operation of marine diesel engines on vessels 24 meters in length and larger. The four modes lie on an average propeller curve based on the vessels surveyed in the development of this duty cycle. Another duty cycle, ISO E5, was developed to represent in-use operation of smaller marine diesel engines; this cycle is similar to the E3 except that an idle mode is added and the cycle is more heavily weighted towards lower power modes. The E3 is designed for engines used to propel vessels greater than 24 meters in length while the E5 is designed for engines used to propel vessels less than 24 meters in length. The attractiveness of the E3 duty cycle is that, according to EPA's inventory analysis, the majority of $HC+NO_X$ emissions from marine diesel engines are generated by engines on vessels more than 24 meters in length. By choosing a single cycle to represent all propeller-curve marine diesel engines, EPA hopes to reduce certification burdens for marine engines that are used in vessels both over and under 24 meters in length.

EPA is proposing that fixed-speed marine propulsion engines with variable-pitch propellers be certified on the ISO E2 duty cycle. This duty cycle is also a four-mode steady-state cycle. It uses the same power and weighting factors as the E3 cycle, but the engine is operated in each mode at rated speed.

EPA is also proposing that variable-speed marine propulsion engines with variable-pitch propellers be certified on the ISO E2 duty cycle. These engines are designed to operate near their power curve to maximize fuel efficiency. In general, these engines will operate at a constant speed except when maneuvering in port. Because of the expense of the system, variable-speed engines are rarely used with variable-pitch propellers. ISO does not have a test duty cycle specifically designed for these engines. However, because most of their operation is at constant speed, EPA is proposing that these engines certify using the E2 duty cycle. EPA proposes that the speed setting for testing should coincide with the speed setting at which the engine would spend most of its time in use.

For auxiliary engines, EPA is proposing that constant-speed auxiliary engines be certified to the ISO D2 duty cycle and that variable-speed auxiliary engines be certified to the ISO C1 duty cycle. These duty cycles are consistent with the requirements for land-based nonroad diesel engines. More detail on the proposed duty cycles is contained in the Draft Regulatory Impact Analysis (Draft RIA) associated with this proposal. EPA requests comment on the appropriateness of the proposed duty cycles.

Under the provisions of the land-based nonroad rule, engine manufacturers have the option to petition for their marine engines to be included in land-based engine families. EPA is not proposing this flexibility for propulsion marine engines because the ''not-to-exceed'' provisions described below require the use of the marine duty cycles.

For larger marine engines, conventional emission testing on a dynamometer becomes more difficult because of the size of the engine. Often engine mock ups are used for the development of these engines where a single block is used for many years and only the power assembly is changed out. EPA proposes that for Category 2 engines, certification tests may be performed on these engine mock ups provided that their configuration is the same as that of the production engines. In addition, for larger Category 2 marine engines, EPA requests comment on whether or not single-cylinder tests should be allowed for certification testing. Assuming that each cylinder in an engine is equivalent, a single-cylinder test should give the same brake-specific emission results as a full engine test.

2. In-Use Testing

As with its other federal mobile source programs, EPA retains the authority to perform in-use testing on marine engines to ensure compliance in use. This testing may include taking in use marine diesel engines out of the vessel and testing them in a laboratory, as well as field testing of in use engines in the vessel, in a marine environment. EPA's proposal specifies the equipment and related procedures for use in laboratory based testing. EPA is not at this time, however, specifying similar provisions for field testing. EPA expects that the capabilities of field testing equipment will increase over time, and it is better to allow this to occur without attempting to pick testing technologies at this time, or interfere with this development process.

Field testing data will be used by EPA in two ways. First, it may be used as a screening tool, with follow up laboratory testing where appropriate. Second, it may be used directly as a basis for compliance determinations, when the field testing itself provides reliable information from which conclusions can be drawn regarding what laboratory based emissions levels would be. The probative value of field test data is expected to increase over time, as the capabilities of field testing equipment are developed. The flexibility in testing that these approaches provide will allow EPA to most efficiently conduct in use testing, and will also address those situations where it is physically or otherwise impossible to remove an engine from a marine vessel for testing in a laboratory.

For compression-ignition marine engines that expel exhaust gases under water or mix their exhaust with water, EPA proposes to require that the engines be equipped with an exhaust sample port where a probe can be inserted for in-use exhaust emission testing. It is important that the location of this port

allow a well mixed and representative sample of the exhaust. The purpose of this proposed provision is to simplify in-use testing. EPA requests comment on the proposed in-use testing provisions.

3. Test Fuel

Section 206(h) of the Clean Air Act requires EPA to ensure that the test procedure, including the test fuel, adequately represent in-use operation. To facilitate the testing process, EPA specifies a test fuel that is intended to be representative of in-use fuels. Engines would have to meet the standard on any fuel that meets the proposed test fuel specifications, with one modification as described later. This section describes the test fuel EPA is proposing for Category 1 and Category 2 engines. This test fuel is to be used for all testing associated with the regulations proposed in this document, to include certification, production line and in-use testing, as well as any NTE testing.

EPA is proposing that the recently finalized test fuel specifications for nonroad diesel engines be applied, with a modification to the sulfur specification as described later, to both Category 1 and 2 marine diesel engines. EPA believes that largely adopting the nonroad fuel will simplify development and certification burdens for marine engines that are developed from land-based counterparts. The proposed test fuel for marine diesel engine testing has a sulfur specification range of 0.03 to 0.80 weight-percent (wt%), which covers the range of sulfur levels observed for most in-use fuels. Manufacturers are generally responsible for ensuring compliance with the emission standards using any fuel within this range. Thus, they will be able to harmonize their marine test fuel with U.S. highway (<0.05 wt%), nonroad (0.03 to 0.40 wt%), locomotive (0.2 to 0.4 wt%) and European testing (0.1 to 0.2 wt%). The full range of proposed test fuel specifications are presented in Chapter 3 of the Draft RIA.

EPA is proposing a higher upper limit for the marine diesel engine sulfur specification (0.8 wt%) than was recently finalized for land-based nonroad engines (0.4 wt%) because there is some information available that suggests that marine fuels may have higher sulfur contents than land-based diesel fuels.[35] Using ASTM specification D 2069 as a guide, EPA considered choosing an upper limit of 1.5 wt% sulfur. Although 1.5 wt% may be appropriate based on the ASTM specification, EPA is proposing that this upper limit on sulfur content be 0.8 wt% because PM can not accurately be measured using the proposed testing procedures using fuels with a sulfur content higher than 0.8 wt%.[36] EPA requests comment on whether it is appropriate to limit the test fuel specification in this way due to this testing constraint.

The proposed PM standards were largely determined to be feasible based on the feasibility of the corresponding standards for land-based nonroad and locomotive applications, which have a 0.4 wt% sulfur upper limit for the test fuel. Since PM emissions are somewhat fuel sulfur-dependent, EPA does not believe that it is appropriate to require compliance with the PM standards using fuel with a sulfur content above 0.4 wt%. It is for this reason that EPA is proposing to allow a correction of PM emissions for tests that are run using fuel with a sulfur content greater than 0.4 wt%. Thus, the measured PM emissions for any test performed using fuel with a sulfur content of greater than 0.4 wt% would be corrected to the level that would have been measured if the fuel had a sulfur content of 0.4 wt%. The proposed correction method is that used for land-based nonroad engine testing. EPA requests comment on whether this correction method is accurate and appropriate for this application.

It is EPA's intent that engines be designed for the whole range of in-use fuels and that any testing conducted by EPA would use test fuels typical of in-use fuels. Unfortunately, the test procedure currently limits the Agency from reaching this objective for marine diesel engines if in-use fuels do in fact have sulfur levels as high as the current ASTM specifications allow. EPA requests comment on whether currently available marine fuel has a sulfur content significantly higher than land-based nonroad fuel. EPA will be investigating marine fuel further and is requesting information on the specifications that are used in use. It is EPA's intent to develop test procedures that will allow for the accurate measurement of PM emission over the entire range of in-use fuel characteristics. If successful, the Agency would intend to broaden the range of certification fuel to reflect the full range of in-use fuels. Any efforts to do so would consider the impacts on the appropriateness and feasibility of the PM standards and would likely be undertaken in the planned 2003 technology review for the Tier 3 standards.

EPA requests comment on all aspects of its proposed test fuel provisions. EPA is also interested in obtaining more information on the specifications of marine fuel used in Category 2 marine engines. Essentially, this proposal assumes that Category 2 marine engines are operating on a distillate fuel. The Agency requests comments on this approach and on how often residual fuels or residual fuel blends are burned in Category 2 engines.

4. Adjustable Parameters

Marine diesel engines are often designed with adjustable components, to allow the engine to be adjusted for maximum efficiency when used in a particular application. This practice simplifies marine diesel engine production, since the same basic engine can be used in many applications. While EPA recognizes the need for this practice, EPA is also concerned that the engine meet the proposed emission limits throughout the range of adjustment. Therefore, and consistent with the locomotive rule, the Agency is proposing that manufacturers specify in their applications for certification the range of adjustment for these components across which the engine is certified to comply with the applicable emission standards, and demonstrate compliance across that range.

Practically, this requirement means that a manufacturer would specify a range of fuel injection timing, for example, over which the engine would comply with the emission standards. This range could be designed to account for differences in fuel quality. Operators would then be prohibited by the anti-tampering provisions from adjusting engines outside of this range.

Ideally, to ensure that engines are always operated within the specified range of adjustment, marine diesel engine manufacturers should be required to design their engines to prevent adjustments outside the specified range. However, EPA recognizes that it may be necessary to adjust injection timing or other adjustable parameters outside the originally specified control range during engine remanufacture to accommodate engine wear. There are at least two alternative solutions to this problem. First, engine manufacturers could be

[35] ''Final Report: 1996 American Petroleum Institute/National Petroleum Refiners Association Survey of Refining Operations and Product Quality'' suggests that actual marine diesel fuels may have sulfur contents somewhat higher than general nonroad diesel fuels. ASTM specification D 2069 includes a specification for general purpose marine distillate fuel with a maximum sulfur content of 1.5 wt%.

[36] ''Exhaust Gas Emission Measurements: A Contribution to a Realistic Approach,'' D. Bastenhof, dieselMAC, May, 1995.

required to set a range of adjustments that would accommodate changes necessary at the time the engine will be remanufactured. Alternatively, compliance with the range of adjustments could be ensured through anti-tampering provisions, with the requirement that the new range of adjustments be specified at the time of remanufacture. EPA seeks comments on these and other approaches to ensure that engines with adjustable parameters meet the proposed emission requirements.

5. Definition of Rated Speed

The definition of rated speed, where speed is the angular velocity of an engine's crankshaft (usually expressed in revolutions per minute, or rpm) is an important aspect of the test cycles and ''not-to-exceed'' (NTE) zones proposed in this document. In the past, EPA has expected engine manufacturers to declare reasonable rated speeds for their engines; however, EPA is concerned that some manufacturers may have declared rated speeds that are not really representative of the operating characteristics of a particular engine in order to influence the parameters under which their engines could be certified. Under EPA's highway transient duty cycle, manufacturers would likely receive a NO_X emission benefit if they declared a rated speed that was higher than the actual rated speed of the engine. Under EPA's nonroad and proposed marine steady-state duty cycles, manufacturers would likely receive a NO_X emission benefit if they declared a lower rated speed. In addition, a low declared rated speed would shrink a marine engine's NTE zone.

Currently, U.S. highway and nonroad diesel engine regulations specify two slightly different ways to determine rated speed. EPA's highway heavy-duty diesel regulation defines rated speed as the manufacturer's specified rated speed, as defined at 40 CFR 86.082–2, or calculated speed, whichever yields the higher speed. The calculated speed in the highway rule is determined by averaging the minimum and maximum speeds at which 98% of maximum power is generated. This calculation can yield unreasonable speeds in some high-torque-rise engines. EPA's nonroad rule defines rated speed as the maximum full-load governed speed for governed engines and the speed of maximum horsepower for ungoverned engines. The International Standards Organization (ISO–8178) defines a diesel engine's rated speed as the speed at which, according to the statement of the engine manufacturer, rated power is delivered. This is similar to the International Maritime Organization's definition; the crankshaft revolutions per minute at which the rated power occurs as specified on the nameplate and in the Technical File of the marine diesel engine.

To determine a single rated speed definition that encompasses the complete range of engine operation, EPA analyzed the maximum-power versus speed curves from eleven highway and nonroad engines. These engines were all similar to marine engines and they may be used in marine applications. EPA observed that most mechanically governed engines had distinct governor droops at speeds slightly higher than the speed at maximum power. High-torque-rise engines, however, had gradual decreases in power beyond the maximum-power speed, followed by a steep rate of governor droop. Furthermore, some electronically governed engines had multiple rates of power decrease between the maximum-power speed and the onset of governor droop. See Figure 1 for an illustration of four different maximum-power versus speed curves.

Based on this analysis, EPA proposes that the rated speed of any engine shall be defined at the single point on an engine's maximum-power versus speed curve that lies farthest away from the zero-power, zero-speed point on a normalized maximum-power versus speed plot. In other words, consider straight lines drawn between the origin (speed = 0, load = 0) and each point on an engine's maximum-power versus speed curve (see Figure 1). Note that the maximum-power versus speed curve is normalized so that 100% power and 100% speed are set at the maximum power and maximum-power speed point. Under this proposal, rated speed would be defined at that point where the magnitude (length) of this line reaches its maximum value. The magnitude of this line, called $Rated__Speed_{factor}$ in this rule, is calculated by using the following equation:

$$Rated_Speed_{factor} = \sqrt{(\%\ Maximum_Power_Speed)^2 + (\%\ Maximum\ Power)^2}$$

Rated speed shall be the speed value of the data point that returns the maximum value of $Rated__Speed_{factor}$.

EPA proposes the following procedure to determine rated speed:

1. Generate maximum-power versus speed data points by using the appropriate method defined in 40 CFR 86.1332–90. EPA recognizes that 40 CFR 86.1332–90 does not address the issue of electronic engines that vary injection timing, rate shaping, exhaust gas recirculation, and variable-nozzle turbocharging with respect to their operating conditions. These engines' maximum-power versus speed curves can vary as a function of the method in which the curves are determined (i.e., transient curve generation versus steady-state curve generation). EPA proposes that the engine operation generating the maximum $Rated__Speed_{factor}$ shall be the operation under which rated speed is determined. EPA seeks comment on this proposal.

2. Compare power values to determine the point where power is a maximum.

3. Normalize power values with respect to maximum power.

4. Normalize speed with respect to the speed at which maximum power is generated.

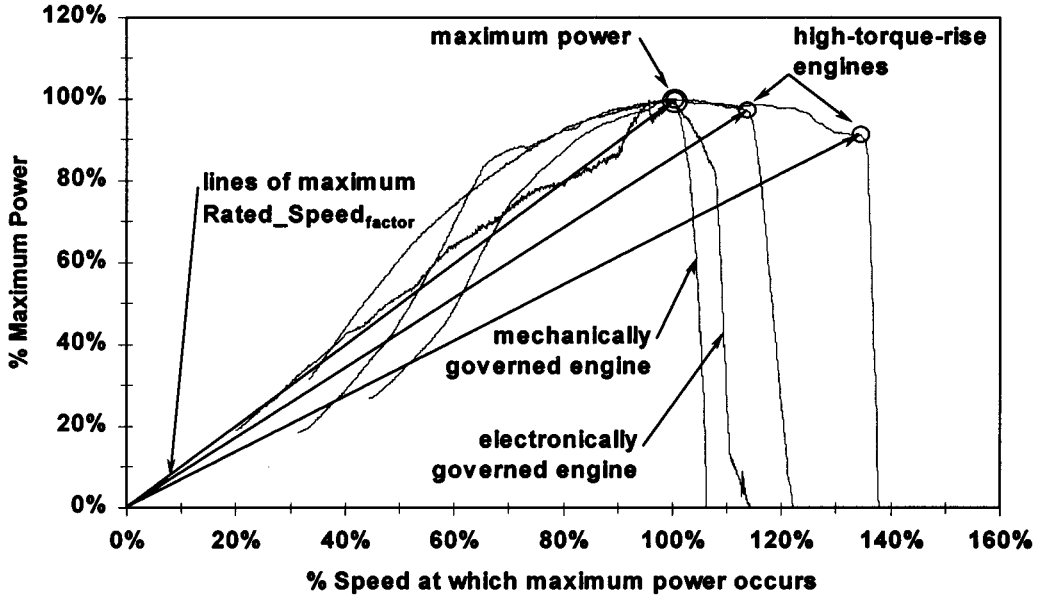
5. Calculate the $Rated__Speed_{factor}$ for each normalized data point.

6. Compare all $Rated__Speed_{factor}$ values to determine the maximum value of $Rated—Speed_{factor}$.

7. The speed at which maximum $Rated__Speed_{factor}$ occurs shall be the rated speed for certification and NTE zone testing.

Examples of results from this calculation are illustrated by circles superimposed on four maximum-power versus speed curves in Figure 1. EPA seeks comment on this proposal.

Figure 1: Maximum-power versus speed curves (normalized). Rated speed points are circled.



F. Not-to-Exceed Requirements

EPA's goal is to achieve control of emissions over the broad range of in-use speed and load combinations that can occur on a vessel so that real-world emission control is achieved, rather than just controlling emissions under certain laboratory conditions. An important tool for achieving this goal is an in-use program with an objective standard and an easily implemented test procedure. Historically, EPA's approach has been to set a numerical standard on a specified test procedure and rely on the prohibition of defeat devices to ensure in-use control over a broad range of operation not included in the test procedure.

No single test procedure can cover all real world applications, operations, or conditions. Yet to ensure that emission standards are providing the intended benefits in use, the Agency must have a reasonable expectation that emissions under real world conditions reflect those measured on the test procedure. The defeat device prohibition is designed to ensure that emissions controls are employed during real world operation and not just under laboratory or test procedure conditions. However, the defeat device prohibition is not a quantified standard and does not have an associated test procedure, so it does not have the clear objectivity and ready enforceability of a numerical standard and test procedure. As a result, the current focus on a standardized test procedure makes it harder to ensure that engines will operate with the same level of control in the real world as in the test cell.

Because the E3 duty cycle uses only four modes on an average propeller curve to characterize marine diesel engine operation, EPA is concerned that an engine designed to the duty cycle would not necessarily perform the same way over the range of speed and load combinations seen on a vessel. The E3 duty cycle is based on an average propeller curve, but a propulsion marine engine may never be fitted with an ''average propeller.'' For instance, a light vessel with a planing hull may operate at lower torques than average while the same engine operated on a heavy vessel with a deep displacement hull may operate at higher torques than average. This can largely be a function of how well the propeller is matched to the engine and vessel. A planing hull vessel can operate at high torques at low speed prior to planning. In addition, the E3 duty cycle only includes steady-state operation while some transience is seen in use.

To ensure that propulsion emissions are controlled from marine diesel engines over the full range of speed and load combinations seen on vessels, EPA proposes to establish a zone under the engine's power curve where the engine may not exceed a specified emissions limit, for any of the regulated pollutants, under any operation that could reasonably be expected to be seen in the real world. In addition, EPA proposes that the whole range of real ambient conditions be included in this ''not-to-exceed'' (NTE) zone testing. The NTE zone, limit, and ambient conditions are described below.

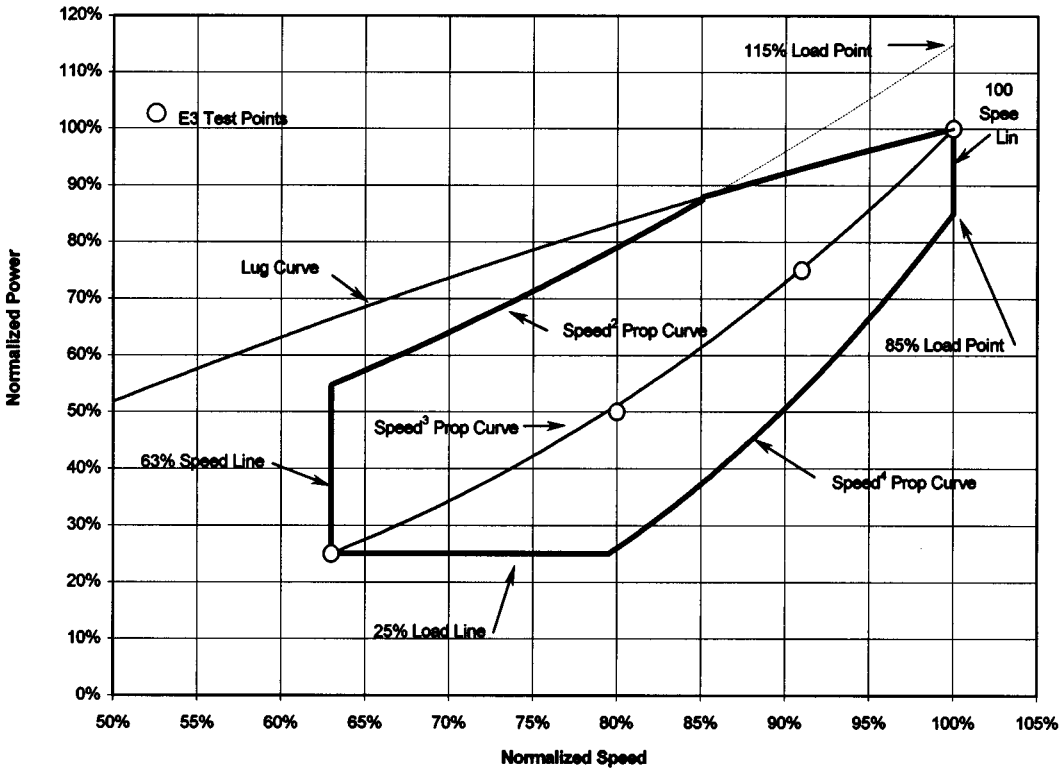
EPA believes that there are significant advantages to taking this sort of approach. The test procedure is very flexible so it can represent any and all in-use conditions (ambient and operation). Therefore, the NTE approach takes all of the benefits of a numerical standard and test procedure and expands it to cover a broad range of conditions. Also, laboratory testing makes it harder to perform in-use testing since either the engines would have to be removed from the vessel or care would have to be taken that laboratory-type conditions can be achieved on the vessel. With the NTE approach, in-use testing and compliance become much easier since emissions may be sampled during normal vessel use. Because this approach is objective, it makes enforcement easier and provides more certainty to the industry of what is expected in use versus over a fixed laboratory test procedure.

Even with the NTE requirements, EPA believes that it is still important to retain standards based on the steady-state duty cycles. This is the standard that EPA expects the certified marine diesel engines to meet on average in use. The NTE testing is more focused on maximum emissions for segments of operation and should not require additional technology beyond what is used to meet the proposed standards. EPA believes that basing the emissions standards on a distinct cycle and using the NTE zone to ensure in-use control creates a comprehensive program. In addition, the steady-state duty cycles

give a basis for calculating credits for use in the averaging, banking, and trading program.

The proposed NTE zone for marine diesel engines that would certify using the E3 duty cycle is illustrated in Figure 1 and is defined by the power curve of the engine up to rated speed. This zone is based on the range of conditions that a marine diesel propulsion engine could typically see in use. EPA is proposing a similar approach for engines certified using the constant-speed E2 duty cycle. In this case, the ''not-to-exceed'' zone is at the speed for which the engine is designed to operate for loads ranging from 25 to 100 percent of maximum load at that speed. More detail on the development of the boundaries and conditions associated with the proposed NTE zones may be found in Chapter 3 of the Draft RIA. EPA requests comment on the NTE zones.

Figure 2: Illustration of "Not to Exceed" Zone



EPA proposes the limit on emissions within the NTE zones to be 1.25 times the standard (or FEL if ABT is used) for all of the regulated pollutants (HC, NO_X, CO, PM). The standard itself is intended to represent the average emissions under steady-state conditions. Since it is an average, some points can be higher, some lower, and the manufacturer will design to maximize performance and still meet the engine standard. The NTE limit is on top of this. It is designed to make sure that no part of the engine operation and that no application goes too far from the average level of control. Data presented in Chapter 3 of the Draft RIA shows that the proposed limit of 1.25 times the standard is feasible for marine diesel engines, yet challenging because of variations in emissions at high versus low speeds and loads for some engines. The proposed limit is consistent with the enforcement policy currently in place for the highway heavy-duty diesel program.[37] However, the proposed marine NTE zones are much smaller than for highway heavy-duty diesel engines due to the smaller range of operation typically seen in use.

Although transient operation would be included in the NTE testing, only operation that would reasonably be expected to be seen in use would be included. Therefore, engine testing may include transient speed and load operation. Examples of this type of transience would be bringing a vessel to plane or changing speeds. Because the majority of marine operation is fairly steady, EPA believes that the NTE testing should allow for short emissions spikes under transience. Engine testing may not include transient operation that cannot be replicated by similar engines as installed on actual vessels in use, since those are operations that the engine is not designed for and is not expected to see in-use. Therefore, there would be no in-use emission impact from such operations. To ensure that a short transience does not unfairly give high results, EPA proposes that the emissions sampling must be at least over a 30 second time period. This 30 second sampling period should be long enough to allow an emissions spike to be averaged out while still retaining a short enough period to look at a specific type of operation. EPA proposes that an acceleration associated with bringing a vessel to plane be eligible for inclusion in any NTE type testing regardless of whether it falls within the NTE zone shown in Figure 1.

The NTE standards are proposed to apply under any ambient air conditions. Within the following air temperature and humidity ranges, no corrections will be allowed to account for the effects

[37] ''Heavy-duty Diesel Engines Controlled by Onboard Computers: Guidance on Reporting and Evaluating Auxiliary Emission Control Devices and the Defeat Device Prohibition of the Clean Air Act,'' U.S. EPA, October 15, 1998.

of temperature or humidity on emissions: 13–35°C for ambient air temperature and 7.1–10.7 grams water per kilogram of dry air for humidity. Ambient water temperature must be in the range of 5–32°C during NTE testing. In addition, the engines must comply with the standards for the full range of test fuel specifications.

The defeat device provisions established for highway and nonroad engines are proposed to apply to marine diesel engines in addition to the NTE requirements. A design in which an engine met the standard at the steady-state test points but was intentionally designed to approach the NTE limit everywhere else would be considered to be defeating the standard. Electronic controls that recognize when the engine is being tested for emissions and adjust the emissions from the engine would be another example of a defeat device, regardless of the emissions performance of the engine.

EPA is aware that marine diesel engines may not be able to meet the emissions limit under all conditions. Specifically, there are times when emissions control must be compromised for startability or safety. EPA is not proposing that engine starting be included in the NTE testing. In addition, EPA manufacturers would have the option of petitioning the Administrator to allow emissions to increase under engine protection strategies such as when an engine overheats.

EPA proposes to allow manufacturers to petition to adjust the size and shape of the NTE zone for certain engines if they can certify to the Agency that the engine will not see operation outside of the revised NTE zone in use. This way, manufacturers could avoid having to test their engines under operation that they would never see in use. However, manufacturers would still be responsible for all operation of an engine on a vessel that would reasonably be expected to be seen in-use and would be responsible for ensuring that their specified operation is indicative of real-world operation. In addition, if a manufacturer designs an engine for operation at speeds and loads outside of the proposed NTE zone (i.e., variable-speed engines used with variable-pitch propellers), the manufacturer would be responsible for notifying EPA so that their NTE zone can be modified appropriately to include this operation.

EPA is interested in refining the NTE concept for marine diesel engines prior to the final rule where appropriate. One concern may exist for mechanically controlled engines that are only capable of a fixed injection timing. It may be difficult for these engines to achieve a flat emissions profile, especially at low speeds and loads where brake-specific emissions are often higher. One potential option for addressing this problem would be to split the NTE zone into two subzones with a relaxed cap at lower speeds and loads. EPA requests comment on this option and on any other technical options and improvements to the off-cycle provisions as proposed.

The Engine Manufacturers Association has presented an off-cycle concept to EPA in response to concerns and concepts raised by the Agency. This concept is in a briefing format and may be found in the docket.[38] In the EMA concept, the NTE zone emissions limit is based on the emissions at individual steady-state test modes with limits on the interpolated values between the modes rather than a flat cap. In the highway policy, EPA uses a concept similar to this but it is in addition to a flat emissions limit. The NTE zone described by EMA is smaller than the proposed zone, and the emissions limit is higher on average. EPA requests comment on this approach and on whether or not it is needed in addition to the proposed approach as in the on-highway program.

EPA is not proposing an NTE limit, at this time, for engines certified using the D2 or C1 test duty cycles. EPA does not yet have enough data on the operating characteristics of auxiliary engines to determine NTE zones and associated limits for these engines. However, EPA is gathering data and intents to evaluate the NTE concept for auxiliary engines. This effort will likely be combined with the efforts begun to evaluate off-cycle emission for land-based nonroad engines. EPA requests comment on appropriate NTE zones and limits for auxiliary engines.

G. Voluntary Low-Emitting Engine Program

Officials representing certain cities, states, or regions in the U.S. have expressed interest in developing incentive programs to encourage the use of engine technologies that go beyond federal emission standards. Some of these technologies have already undergone significant development. In the final rule for land-based nonroad diesel engines, EPA included a program of voluntary standards for low-emitting engines, referring to these as ''Blue Sky Series'' engines (63 FR 56967, October 23, 1998). EPA is proposing similar voluntary standards as part of this rulemaking. The program, if successful, will lead to the introduction and more widespread use of these low-emission technologies.

Ongoing research has led to much improved prospects for a variety of low-emitting diesel engine technologies. Technology developments to meet upcoming emission requirements for highway diesel engines are expected to substantially reduce emissions without relying on exhaust aftertreatment. Much of this technology development forms the basis for setting the emission limits described in this proposal, but EPA believes that manufacturers may be prepared to more aggressively transfer some of these advanced technologies to marine engines. The motivation to exceed emission requirements could either be to gain early experience with certain technologies as a strategy to ensure long-term control of quality, or as a response to external incentives.

In addition, alternative fuels and exhaust aftertreatment options continue to expand as companies further develop technologies for reaching very low emission levels. For example, some particulate traps are now designed for regeneration without an active control system, sometimes using fuel-based catalyst materials to reduce regeneration temperature requirements. Selective catalytic reduction, long used very effectively in stationary source applications, is now in several demonstration marine vessels. Plasma and thermoelectric techniques are also under consideration for large particulate and NO_X reductions. EPA is very interested in seeing a demonstration of the emission-control potential for these engines in marine applications, especially related to the capability of maintaining low emission levels over extended in-use operation.

As with the land-based rule, EPA proposes that Tier 3 emission levels, where applicable, are the appropriate level for defining Blue Sky Series engines. For PM emissions, a calculated level corresponding to a 40 percent reduction beyond Tier 2 levels is proposed as a qualifying level for Blue Sky Series engines (see Table 10). While the Blue Sky Series emission limits are voluntary, a manufacturer choosing to certify an engine under this program would be required to meet all the provisions established to demonstrate compliance with these limits, including allowable maintenance, warranty, useful life, rebuild, and deterioration factor provisions.

[38] Engine Manufacturers Association, ''EMA Alternative Proposal for Controlling 'Off-Cycle' Emissions from Marine Engines,'' September 25, 1998.

TABLE 10.—VOLUNTARY EMISSION STANDARDS (G/KW-HR)

Rated Brake Power (kW)	$HC+NO_X$	PM
power ≥ 37 kW		
displ.<0.9	4.0	0.24
0.9≤displ.<1.2	4.0	0.18
1.2≤displ.<2.5	4.0	0.12
2.5≤displ.<5.0	5.0	0.12
5.0≤displ.<20	5.0	0.16

The Blue Sky Series program would begin immediately upon promulgation and would continue through the 2007 model year. EPA would evaluate the program to determine if it should be continued for 2008 and later engines, and if so, whether any changes are needed. This evaluation will be considered as part of the 2003 Feasibility Review.

Creating a program of voluntary standards for low-emitting engines, including testing and durability provisions to help ensure adequate in-use performance, will be a major step forward in advancing innovative emission control technologies, because EPA certification will provide protection against false claims of environmentally beneficial products. For the program to be most effective, however, incentives for the production of these engines must be created as well.

The Agency is concerned that such incentive programs not lead to a net detriment to the environment through the double-counting of benefits. EPA has therefore concluded that manufacturers choosing to sell an engine with the Blue Sky Series designation should not generate averaging, banking, and trading credits for demonstrating compliance with EPA programs. Other groups would then be free to design credit programs without concern for any double-counting or other unintended effect of overlapping programs. EPA solicits comment on the Blue Sky Series approach for marine diesel engines generally and on its interaction with the ABT program.

In addition to credit-based programs, the Agency sees substantial potential for users and state and local governments to establish incentive programs. For example, state or local governments or individual ports may be able to add incentives for introducing low-emitting engine technologies in harbor and other coastal vessels. The Agency solicits ideas that could encourage the creation of these incentive programs by users and state and local governments. EPA also solicits comment on additional measures that could be taken at a federal level to encourage development and introduction of these engines.

H. Durability

To achieve the full benefit of the emissions standards, manufacturers must design and build engines with durable emission controls. This means that manufacturers are responsible for the emission results for the engines they produce throughout their useful life.[39] It is also necessary to encourage the proper maintenance and repair of engines throughout their lifetime. The goal is for engines to maintain good emission performance throughout their in-use operation. Therefore, EPA believes it is necessary to adopt measures to address concerns about possible in-use emission performance degradation. The proposed durability provisions, described below, are intended to help ensure that engines are still meeting applicable standards in use. The specific areas of the durability program focused on here are useful life, warranty periods, deterioration factors, allowable maintenance intervals, and rebuilding requirements. Most of these provisions are carried over from the land-based or locomotive programs. EPA seeks comments on all aspects of this durability program.

1. Useful Life

Useful life is the period during which the marine engine is required to meet the emission standards. For Category 1 engines, EPA is proposing a useful life of 10 years or 10,000 hours of operation. This proposal is slightly different from the 10 years or 8,000 hours of operation finalized for land-based nonroad engines, to reflect the different usage pattern for marine engines. Specifically, the 10,000-hour requirement is based on an expected five-year period until the first time the engine is rebuilt, and an expected usage rate of 2,000 hours per year. EPA requests comment on this proposed useful life for Category 1 engines.

For Category 2 engines, EPA is proposing a useful life of 10 years or 20,000 hours of operation. This proposal differs from the 10 years or 7.5 MW-hours per horsepower useful life recently finalized for locomotive engines to reflect the hours of operation instead of MW-per-horsepower requirement for locomotive engines. This is because marine engine operation is typically monitored using hour meters rather than MW-hour meters. In this case, the 20,000-hour requirement for marine engines is calculated based on an operating rate of 4,000 hours of use per year, with five years between rebuilds. This hour value is less than would be obtained from 7.5 MW-hrs per horsepower and an average duty cycle for a locomotive. Using these values would result in a useful life value of about 30,000 hours. This is nevertheless appropriate, since locomotives typically receive significantly more maintenance in use, and are operated for longer periods between rebuilds. EPA requests comment on the proposed useful life for Category 2 engines.

TABLE 11.—PROPOSED USEFUL LIFE AND WARRANTY PERIODS

Category	Useful life		Warranty period	
	Hours	Years	Hours	Years
Category 1	10,000	10	5,000	5
Category 2	20,000	10	10,000	5

The above approach of basing useful life on time to first rebuild was chosen because it is difficult to justify holding the engine manufacturer responsible for an engine's emissions after the engine is rebuilt. The original engine manufacturer has little, if any, control over the rebuild process, and the rebuilding process often includes changes to the engine that may have an effect on emissions. At the same time, however, these engines are often kept in service much longer than the proposed useful life. Median values for service lives are 15 years for Category 1

[39] This is different from the approach used in MARPOL Annex VI, according to which manufacturers must ensure their engines meet the emission limits at the time of certification but ship owners become responsible for their continued compliance with the limits. Under that program, compliance is verified during flag-state and port-state inspections.

propulsion engines and 23 years for Category 2 engines. These longer service lives mean that the engine may be exempt from in-use testing for more than half its service life. EPA therefore believes it is important to be able to conduct recall testing on these engines throughout the established useful life period. Also, EPA requests comment on whether useful life should be based on the average time to first rebuild, or whether EPA should attempt to regulate emissions beyond the anticipated point of first rebuild, either through an extended useful life specification or some other means.

2. Warranty Periods

Tied to the useful life is the minimum warranty period imposed under the Clean Air Act. The proposed warranty periods for marine diesel engines are based on the ratio of useful life and warranty periods established for land-based nonroad engines. Specifically, EPA is proposing a warranty period of 5,000 hours or 5 years for Category 1 engines, and 10,000 hours or 5 years for Category 2 engines. EPA requests comment on this approach, or whether the locomotive approach based on one-third of the engine's useful life should be used.

EPA is also proposing defect reporting requirements. Consistent with the provisions that apply to highway and land-based nonroad engines, these provisions require Category 1 engine manufacturers to report to EPA whenever a manufacturer identifies a specific emission-related defect in 25 or more engines. However, EPA is proposing to specify a lower threshold of 10 engines for Category 2 marine engines, which is the same limit as applies to locomotives.

3. Deterioration Factors

To further ensure that the proposed emission limits are met in use, EPA proposes to require the application of a deterioration factor (DF) to Category 1 and Category 2 marine diesel engines in evaluating emission control performance during the certification and production-line testing process. The emissions from new engines are adjusted using the DF to account for potential deterioration in emissions over the life of the engine due to aging of emission control technologies or devices. The resulting emission level is intended to represent the expected emissions at the end of the useful life period. Specifically, EPA believes that the ability of new emission control technologies, such as aftertreatment, sophisticated fuel delivery controls, and some cooling systems, to reduce emissions declines as these systems age. The DF is applied to the certification emission test data to represent emissions at the end of the useful life of the engine. Currently, DFs are required for highway heavy-duty engines, nonroad land-based engines, and locomotive engines. EPA is proposing to extend this approach to marine diesel engines as well. EPA requests comment on all aspects of the proposed DF provisions, described below.

EPA is proposing that marine diesel engine DFs be determined by the engine manufacturers in accordance with good engineering practices. Consistent with the land-based nonroad and locomotive programs, EPA is not proposing a specified procedure. The DFs, however, would be subject to EPA approval, and must be consistent with in-use test data. Additionally, the DF should be calculated for the worst-case engine calibration offered within the engine family.[40]

It is not EPA's intent to require a great deal of data gathering on engines that use established technology for which the manufacturers have the experience to develop appropriate DFs. New DF testing may not be needed where sufficient data already exists. However, EPA is proposing to apply the DF requirement to all engines so that EPA can be sure that reasonable methods are being used to ascertain the capability of engines to meet standards throughout their useful lives.

Consistent with the land-based engine programs, EPA proposes to allow marine diesel engine manufacturers the flexibility of using carryover and carryacross of durability emission data from a single engine that has been certified to the same or more stringent standard for which all of the data applicable for certification has been submitted. In addition, EPA seeks comment on whether this flexibility should be extended to allow deterioration data from highway or nonroad engines to be used for similar marine diesel engines. EPA is concerned that DFs calculated for land-based engines may not be the same as for marine engines, due to their different operating environments and duty cycles.

Finally, EPA is proposing that DFs be calculated as an additive value (i.e., the arithmetic difference between emission level at full useful life and the emission level at the test point) for engines without exhaust aftertreatment devices. In contrast, DFs should be calculated as a multiplicative value (i.e., the ratio of the emission level at full useful life to the emission level at the test point) for engines using exhaust aftertreatment devices. This is consistent with the DF requirements applicable to other diesel engines, based on observed patterns of emission deterioration.

4. Allowable Maintenance Intervals

In the highway, land-based, and locomotive rules, EPA requires manufacturers to furnish the ultimate purchaser of each new nonroad engine with written instructions for the maintenance needed to ensure proper functioning of the emission control system. Generally, manufacturers require the owners to perform this maintenance as a condition of their emission warranties. If such required maintenance is more than the engine owner is likely to perform due to cost or inconvenience, then in-use emissions deterioration can result. Consequently, in both the nonroad and highway rules, EPA imposes limits on the frequency of maintenance that can be required of the engine owners for emission-related components; these limits also apply to the engine manufacturer during engine certification and durability testing. Further, the performance of maintenance would be considered during any in-use recall testing conducted by the Agency.

Consistent with the land-based nonroad rule, EPA is proposing minimum allowable maintenance intervals for Category 1 and Category 2 marine diesel engines, to ensure that their emission control technologies are practical in use. The proposed minimum intervals are very similar to those required for nonroad and highway diesel engines (40 CFR 89.109; 40 CFR 86.094–25). Alternatively, EPA could adopt the locomotive approach of not precisely defining minimum intervals for adjustment, cleaning, repair, or replacement of various components but, instead, merely requiring engine manufacturers to specify these minimum maintenance intervals at the time of certification, subject to EPA approval. EPA is not, however, proposing the locomotive approach in which locomotive owners who fail to properly maintain a locomotive will be subject to civil penalties for tampering. EPA requests comment on these approaches for allowable maintenance intervals and the appropriateness of extending the land-based intervals to marine diesel engines.

[40] The worst case would be the engine calibration expected to generate the highest level of emmission deterioration over the useful life, using good engineering judgment.

5. Rebuilt Engines

It is common for marine diesel engines to be rebuilt several times during the course of their lifetimes. Similar to land-based nonroad engines, EPA has two concerns regarding the rebuilding of marine diesel engines. First, EPA is concerned that during engine rebuilding, there may not be an incentive to check and repair emission controls that do not affect engine performance. Second, EPA is concerned that there may be an incentive to rebuild engines to an older configuration due to real or perceived performance penalties associated with technologies that would be used to meet the standards proposed in this notice. Such practices would likely result in increased emissions.

To address these concerns, EPA is proposing to extend the land-based nonroad rebuild requirements to marine diesel engines. Specifically, EPA proposes that the parties involved in the process of rebuilding or remanufacturing engines must follow specific provisions to avoid tampering with the engine and emission controls. Like the nonroad requirements, the applicability of these provisions is based on the build date of the engine. The rebuild requirements would apply to any engine built on or after the date that new standards apply to that engine's specific category or group, regardless of the emission levels that the individual engine is designed to achieve. The proposed provisions for rebuilding are as follows:

(1) EPA proposes that, during engine rebuilding, parties involved must have a reasonable technical basis for knowing that the rebuilt engine is equivalent, from an emissions standpoint, to a certified configuration (i.e., tolerances, calibrations, and specifications).

(2) When an engine is being rebuilt and remains installed or is reinstalled in the same vessel, it must be rebuilt to a configuration of the same or later model year as the original engine. When an engine is being replaced, the replacement engine must be an engine of (or rebuilt to) a configuration of the same or later model year as the original engine.

(3) At the time of rebuild, emission-related codes or signals from on-board monitoring systems may not be erased or reset without diagnosing and responding appropriately to the diagnostic codes. Diagnostic systems must be free of all such codes when the rebuilt engines are returned to service. Further, such signals may not be rendered inoperative during the rebuilding process.

(4) When conducting an in-frame rebuild or the installation of a rebuilt engine, all emission-related components not otherwise addressed by the above provisions must be checked and cleaned, repaired, or replaced where necessary, following manufacturer recommended practices.

Under this proposal, any person or entity engaged in the process, in whole or part, of rebuilding engines who fails to comply with the above provisions may be liable for tampering. Parties would be responsible for the activities over which they have control, so there may be more than one responsible party for a single engine in cases where different parties perform different tasks during the engine rebuilding process (e.g., engine rebuild, full engine assembly, installation). EPA is not proposing any certification or in-use emissions requirements for the rebuilder or engine owner. EPA requests comment on the appropriateness of applying this rebuild program to marine diesel engines.

EPA is proposing to adopt modest record keeping requirements that EPA believes are in line with customary business practices. The records would be kept by persons involved in the process of marine diesel engine rebuilding or remanufacturing and would include the hours of use accumulated on the engine at time of rebuild and a list of the work performed on the engine and related emission control systems, including a list of replacement parts used, engine parameter adjustments, design element changes, and work performed as described in item (4) of the rebuild provisions above. EPA proposes that such records be kept for two years after the engine is rebuilt.

Under this proposal, parties would be required to keep the information for two years but would be allowed to use whatever format or system they choose, provided that the information can be readily understood by an EPA enforcement officer. EPA proposes that parties would not be required to keep information that they do not have access to as part of normal business practice. In cases where it is customary practice to keep records for engine families rather than specific engines, where the engines within that family are being rebuilt or remanufactured to an identical configuration, such record keeping practices are proposed to be satisfactory. Rebuilders would be able to use records such as build lists, parts lists, and engineering parameters that they keep of the engine families being rebuilt rather than on individual engines, provided that each engine is rebuilt in the same way to those specifications. EPA requests comments on the appropriateness of the proposed record keeping requirements, including whether the records should be kept for a longer period of time, such as for five years.

6. Replacement Engines

As noted elsewhere in this discussion, an important constraint on the ability to replace a marine diesel engine concerns the ability to remove the engine from the vessel. In many cases, the vessel is built around the engine and removal is difficult if not impossible. Nevertheless, there may be situations in which a marine diesel can or must be removed from a vessel, to be replaced with a different engine. Under these requirements, whenever a compliant engine is removed from a vessel, the replacement engine must meet the emission requirements that were in effect at the time the vessel was built. For example, any engine installed on a vessel built in 2008 must comply with the requirements proposed in this action, regardless of whether it is installed in 2008 or any year thereafter. The intent of this requirement is to ensure that vessel owners cannot evade the proposed emission requirements by installing a noncomplying engine on their vessel after the vessel is placed into service. These provisions also allow, in some cases, engine manufacturers to produce new replacement engines of an older model that do not comply with the otherwise applicable standards, provided that the new engines meet the emission standards that applied to the engines being replaced. However, manufacturers would only be allowed to produce such engines in cases where it was necessary for reasons such as space constraints. Consistent with replacement engine provisions in other programs, some additional constraints ensure that companies do not circumvent the regulations (see 40 CFR 89, Subpart J). EPA seeks comment on the necessity of such a provision.

I. Certification

As discussed previously, EPA expects technology to be shared between land-based engines and marine engines. EPA expects some engine manufacturers to produce engines of the same basic design for sale in both areas. Specifically, Category 1 marine engines are expected to share the technology developed for land-based nonroad engines, and Category 2 engines are expected to share technology developed for locomotive engines. To account for this product overlap, EPA is proposing

to base certification data and administration requirements for Category 1 on the existing program for land-based nonroad engines, and for Category 2 marine engines on the existing program for locomotive engines.[41], [42] Specific certification provisions are discussed more fully in the following sections.

1. Engine Family Definition

EPA is proposing that engine grouping for the purpose of certification be accomplished through the application of an ''engine family'' definition. Engines expected to have similar emission characteristics throughout the useful life are proposed to be classified in the same engine family. Separate engine family classification is also required for each marine engine category (i.e., Categories 1, 2, and 3 will be in separate engine families).

EPA is proposing specific parameters to define engine family for each category of marine engine. To provide for administrative flexibility in the proposal, the Administrator will have the authority to separate engines normally grouped together or to combine engines normally grouped separately based upon a manufacturer's request substantiated with an evaluation of emission characteristics over the engine's useful life.

For Category 1, EPA is proposing to use the engine family definition for land-based nonroad engines with the addition of the fuel system type and fuel injection control used (mechanical versus electrical).[43] For Category 2, EPA is proposing to use the engine family definition for locomotive engines.[44]

These definitions are proposed to provide consistency between land-based and marine engines of the same basic type. The fuel system type and control type were added to the land-based nonroad engine family definition to reduce the variability of emissions within an engine family. This change will aid manufacturers in selecting the ''worst-case'' engine for emission testing. It will lessen the chance of noncompliance in use by ensuring that the highest emitting engine is tested during certification.

The engine family definition is fundamental to the certification process and to a large degree determines the amount of testing required for certification. As proposed, manufacturers would be required to estimate the rate of deterioration for each engine family (see the discussion of deterioration factors in Section V.G.3. for further details). Compliance with the emission standard will also be demonstrated for each engine family based upon required testing and the application of the deterioration factor. Separate certificates of conformity would be required for each engine family.

2. Emission Data Engine Selection

EPA is proposing that manufacturers select the highest emitting engine (i.e., ''worst-case'' engine) in a family for certification testing. In making that determination, the manufacturer shall use good engineering judgement (considering, for example, all engine configurations and power ratings within the engine family and the range of installation options allowed). By requiring the worst-case engine to be tested, EPA is assured that all engines within the engine family are complying with emission standards for the least cost in test engines run. If manufacturers feel that the engine family is grouped too broadly or that the worst-case emission data engine would underestimate the emission credits available under the ABT provisions, they may request the separation of the dissimilar calibrations (based on an evaluation of emission characteristics over the engine's useful life) into separate engine families.

J. SEA, Production Line Testing

One of the challenges of serial engine production is ensuring that each engine produced has the same emission characteristics as the original certification engine. The more traditional approach used for ensuring that the engines are produced as designed is called Selective Enforcement Auditing (SEA). In the SEA program, EPA audits the emissions of new production engines by requiring manufacturers to test engines pulled off the production line on short notice. This spot checking approach relies largely on a deterrence strategy. Manufacturers prefer to design their engines and production processes and take other steps necessary to make sure their engines are produced as designed in order to avoid the penalties associated with failing SEA tests.

However, EPA does not believe that an SEA-type approach is practical for the marine diesel engine industry, primarily because of the low production volumes. The small production volumes mean that on any given day that EPA would choose to do an SEA there may be no marine engines being produced, or there may not be enough to provide a representative sample of production.

Therefore, to ensure compliance of production engines, EPA is proposing an alternative approach, called Production Line Testing (PLT). The general object of a PLT program is the same as an SEA-based program, which is to enable manufacturers and EPA to determine, with reasonable certainty, whether certification designs have been translated into production engines that meet applicable standards (or FELs) at the time of production, before excess emissions are generated in use. The main difference between the two approaches is that PLT is performed on a regular basis during the year by the engine manufacturer according to criteria set by the Agency, while SEA is performed through periodic unannounced spot checks by EPA.

Under the proposed marine diesel engine PLT, a manufacturer would select engines from its production line for confirmatory testing. In general, one percent of a manufacturer's total projected annual U.S. marine diesel engine sales (propulsion and auxiliary) for each category would be required to be tested each year. EPA believes that a one percent sampling rate is appropriate for the marine diesel engine industry because of its low production volumes, and that a higher sampling rate would be unduly burdensome for this industry. EPA is not proposing a minimum number of tests for Category 1 engines and is proposing that if a manufacturer sells fewer than 100 units in the United States in a given year, it would not be required to do any PLT testing for its Category 1 engines that year. EPA requests comment on whether it would be more appropriate, in light of its proposed one percent sampling rate, to adopt a production trigger for Category 1 PLT testing of 50 engines per year, rather than 100 engines per year as proposed. EPA also requests comment on an approach whereby a manufacturer's cumulative production over time would be used to determine when PLT testing would be required for these Category 1 manufacturers. Under such an approach a test would be required under the PLT program when a manufacturer's cumulative Category 1 production over more than one model year reached 100 units. For Category 2 engines, EPA is proposing a minimum of one PLT test per year. Thus, for manufacturers with sales of less than

[41] See 40 CFR 89 Supart B for the provison of the land-based nonroad engine program.

[42] See 40 CFR 92 Supart C for the provison of the locomotive program.

[43] See 40 CFR 89.116 for the engine family definition used for land-based nonroad engines.

[44] See 40 CFR 92.204 for the engine family definition for locomotives.

[41] See 40 CFR 89 Supart B for the provison of the land-based nonroad engine program.

100 Category 2 engines a year, one test would be required. For purposes of calculating the number of tests required, EPA is proposing that Category 1 and Category 2 annual engine sales be considered separately.

EPA proposes that the choice of the engines to be tested pursuant to this program will be left to the manufacturer, but should be a random sample that is representative of annual production. EPA reserves the right to reject any engines selected by the manufacturers if it determines that such engines are not representative of actual production. Engines selected should cover the broadest range of production possible, and from year to year should be varied to cover all engine families if possible. Tests should also be distributed evenly throughout the model year, to the extent possible.

EPA proposes that emission testing of the PLT engines be conducted in accordance with the applicable federal testing procedures, and compliance with the proposed NTE provisions must be demonstrated as part of PLT testing. The results would be reported to EPA in periodic reports that would summarize emissions results, test procedures, and events such as the date, time, and location of each test. These reports will allow EPA to monitor continually the PLT data. If no testing is performed during the period, no report would be required. EPA is proposing that reports be submitted each quarter. EPA requests comment on whether quarterly reporting is too frequent, given the low production volumes of these engines, and whether a semester or trimester approach is more appropriate.

Under this testing scheme, if an engine fails a production line test, the manufacturer would test two additional engines out of either the next two days' production or the next fifteen engines produced in that engine family in accordance with the applicable federal testing procedures. EPA is proposing the dual approach to testing additional engines to account for variations in production volumes. If production volumes are high, then EPA believes that the two-day provision will allow for the orderly selection of additional test engines. Likewise, if production volumes are low, then the provision allowing the engines to be selected from the next fifteen produced will allow for orderly selection. When the average of the three test results, for any pollutant, are greater than the applicable standard or FEL for any pollutant, the manufacturer fails the PLT for that engine family. Such failures must be reported to EPA within two working days of the determination of a failure. It should be noted that, as proposed, compliance with the standards would be required of every covered engine. Thus, every engine that failed a PLT test would be considered in noncompliance with the standards and must be brought into compliance. EPA's proposal to use the average of three tests to determine compliance with the PLT program is intended only as a tool to decide when it is appropriate to suspend or revoke the certificate of conformity for that engine family, and is not meant to imply that not all engines have to comply with the standards.

In the proposed PLT program, the Administrator could suspend or revoke the manufacturer's certificate of conformity in whole or in part fifteen days after an EPA noncompliance determination for an engine family that fails the PLT, or if the engine manufacturer's submittal reveals that the PLT tests were not performed in accordance with the applicable testing procedure. During the fifteen day period following a determination of noncompliance, EPA would coordinate with the manufacturer to facilitate the approval of the required production line remedy in order to eliminate the need to halt production, to the greatest extent possible. The manufacturer must then address (i.e., bring into compliance, remove from service, etc.) the engines produced prior to the suspension or revocation of the certificate of conformity. EPA could reinstate the certificate of conformity subsequent to a suspension, or reissue one subsequent to a revocation, after the manufacturer demonstrates (through its PLT program) that improvements, modifications, or replacement have brought the engine family into compliance. The proposed regulations include hearing provisions that provide a mechanism to resolve disputes between EPA and manufacturers regarding a suspension or revocation decision based on noncompliance with the PLT. It is important to point out that the Agency would retain the legal authority to inspect and test engines should problems arise in the PLT program. It is also important to note that the definition of ''failure'' of the PLT is limited to the PLT program, and does not define failure or noncompliance for other purposes. It is based in part on the severity of the result of a failure (suspension or revocation of a certificate) and is not meant to limit in any way the overall obligation of the manufacturer to produce engines that meet the standard.

EPA recognizes the need to develop a PLT scheme that does not impose an unreasonable burden on the manufacturers. Therefore, consistent with the requirement that testing be required on one percent of total marine diesel engine production for each category, EPA is proposing that no PLT be required for manufacturers whose Category 1 marine diesel engines sales are less than 100 per year. This is because companies with such low sales are unlikely to have in-house testing facilities, and requiring such companies to send an engine to an independent test facility for PLT purposes may be too burdensome. EPA seeks comment on whether to extend this exemption to companies with fewer than 500 employees across all operations. It should be noted that companies that are exempt from the PLT program are not exempt from the other certification and compliance provisions described in this proposal. Engines exempt from the PLT program will still be required to meet the emission limits as produced and in use, and EPA reserves the right to conduct an SEA on any diesel engine manufacturer. In addition, EPA is not proposing to extend this flexibility provision to the Category 2 marine diesel engine PLT program, since those engines are typically produced in very small volumes.

Finally, while EPA believes that it has developed a PLT program that takes into account the circumstances of this industry, it also understands that alternative plans may be developed that better account for the individual needs of a manufacturer. Thus, provisions are proposed to allow a manufacturer to submit an alternative plan for a PLT program, subject to approval of the Administrator. A manufacturer's petition to use an alternative plan should address the need for the alternative, and should include justifications for the number and representativeness of engines tested, as well as having specific provisions regarding what constitutes a PLT failure for an engine family.

The Agency requests comment on all aspects of this proposed PLT program. Specifically, EPA requests comment on whether it should select the individual engines to be tested, or whether this should be done by the manufacturer, subject to EPA approval.

K. Miscellaneous Compliance Issues

EPA is proposing to extend the general compliance provisions for land-based nonroad engines to Category 1 and Category 2 marine diesel engines. These include the tampering, defeat device, imported engines and vessels, and general prohibition provisions. EPA seeks comment on extending these provisions to marine diesel engines, and

on any modifications that should be made to these provisions to accommodate special features of these engines.

L. Averaging, Banking, and Trading Program

Along with the proposed standards, EPA is proposing a marine averaging, banking, and trading (ABT) program. An ABT program allows the Agency to propose and finalize a more stringent set of marine diesel engine emission standards than might otherwise be appropriate under section 213 of the Clean Air Act. ABT reduces the cost and improves the technological feasibility of achieving the standards, helping to ensure the attainment of the proposed standards earlier than would otherwise be possible. Manufacturers gain flexibility in product planning and the opportunity for a more cost-effective introduction of product lines meeting a new standard. ABT also creates an incentive for the early introduction of new technology, which allows certain engine families to act as trail blazers for new technology. This can help provide valuable information to manufacturers on the technology before manufacturers need apply the technology throughout their product line. This early introduction of clean technology improves the feasibility of achieving the standards and can provide valuable information for use in other regulatory programs that may benefit from similar technologies. EPA views the effect of the ABT program itself as environmentally neutral because the use of credits by some engines is offset by the generation of credits by other engines. However, when coupled with the new standards, the ABT program would be environmentally beneficial because it would allow the new standards to be implemented earlier than would otherwise be appropriate under that Act. In addition, to the extent that any credits are not used, then there is an additional environmental benefit.

The voluntary ABT program allows the certification of one or more engine families within a given manufacturer's product line at emission levels above the applicable emission standards, provided that the increased emissions are offset by one or more families certified below the emission standards. The average of all emissions for a particular manufacturer's production (weighted by sales-weighted average power, production volume and useful life) must be at or below the level of the applicable emission standards. In addition to the averaging program just described, the proposed ABT program contains a banking and trading provision, which allows a manufacturer to generate emission credits and bank them for future use in its own averaging program or sell them to another entity. Compliance is determined on a total mass emissions basis to account for differences in production volume, power and useful life among engine families.

The ABT program EPA is proposing for marine diesel engines over 37 kW is based on the corresponding ABT programs recently adopted for land-based nonroad engines (63 FR 56967, October 23, 1998) and locomotives (63 FR 18978, April 16, 1998), which roughly correspond to the proposed Categories 1 and 2, respectively. When a manufacturer chooses to participate in the ABT program, it would be required to certify each participating engine family to a family emission limit (FEL) determined by the manufacturer during certification testing. A separate FEL would need to be determined for each pollutant the manufacturer is including in the ABT program. EPA is proposing that the ABT program be limited to $HC+NO_X$ and PM emissions. Thus, only two different FELs could be generated for a given engine family.

Consistent with the recently finalized land-based nonroad engine program, marine engine credits are proposed to be calculated based on the difference between the applicable standard(s) and FEL(s). However, credit calculation for marine engines is somewhat different than that for land-based nonroad engines, in that a load factor is inserted in the equation. This term is necessary because, contrary to land-based nonroad case, not all marine engines are expected to operate at the same load. EPA seeks comment on the credit calculation equation, which is as follows:

$$\text{Emission credits} = (\text{Std} - \text{FEL}) \times (\text{UL}) \times (\text{Production}) \times (\text{AvgPR}) \times (10^{-6}) \times (\text{LF})$$

Where:

- Std = the applicable cycle-weighted marine engine $THC+NO_X$ and/or PM emission standard in grams per kilowatt-hour.
- (ii) FEL = the family emission limit for the engine family in grams per kilowatt-hour. (The FEL may not exceed the limit established in § 94.304(m) for each pollutant.)
- UL = the useful life in hours.
- Production = the number of engines participating in the averaging, banking, and trading program within the given engine family during the calendar year (or the number of engines in the subset of the engine family for which credits are being calculated). Quarterly production projections are used for initial certification. Actual applicable production/sales volumes are used for end-of-year compliance determination.
- AvgPR = average power rating of all of the configurations within an engine family, calculated on a sales-weighted basis, in kilowatts.
- LF = the load factor, dependent on whether the engine is intended for propulsion or auxiliary applications, as follows:

A. 0.69 for propulsion engines
B. 0.51 for auxiliary engines.

Consistent with EPA's recently finalized land-based nonroad diesel engine rule, and because of the inherent trade-off between NO_X and PM emissions in diesel engines, EPA is proposing to adopt for marine diesel engines the provision in the land-based nonroad ABT program prohibiting the generation of credits for one pollutant and the simultaneous use of credits for the other pollutant within the same engine family. In other words, a manufacturer would not be allowed to simultaneously generate $HC+NO_X$ credits and use PM credits on the same engine family, and vice versa. EPA requests comment on whether an engine should be allowed to generate credits on one pollutant while using credits on another, and whether allowing such an additional flexibility would necessitate a reconsideration of the stringency of the emission limits.

EPA is proposing FEL upper limits in the same manner as those in the comparable land-based ABT programs to ensure that the emissions from any given family certified under this ABT program not be significantly higher than the applicable emission standards. In general, these FEL upper limits correspond to the existing previous tier of standards for the various classes. In other words, the FEL upper limits are generally the Tier 1 standards for engines certifying according to the ABT provisions relative to the Tier 2 standards, and the Tier 2 standards for engines certifying according to the ABT provisions relative to the Tier 3 standards. Since EPA is not including any Tier 1 standards for marine engines in this proposal, it is proposing to use the land-based Tier 1 standards as FEL upper limits for the proposed Tier 2 marine engine standards. When the ABT provisions for land-based nonroad engines were recently revised there were no Tier 1 standards in place for some land-based categories and pollutants. These cases correspond to some Category 1 marine engines. In

those cases EPA chose FEL upper limits based on typical in-use emission levels of precontrol engines, or existing California Air Resources Board emission standards. For a more complete discussion of the rationale for the Tier 2 FEL upper limits for Category 1 engines the reader is directed to the recent final rule concerning land-based nonroad engine emission standards. As an alternative to using the Tier 1 land-based emission standards as FEL upper limits under the proposed Tier 2 standards, EPA is requesting comment on whether it should consider using the MARPOL Annex VI NO_X standard as the appropriate NO_X FEL upper limit. Under this approach EPA would continue to use the land-based Tier 1 PM standard as the Tier 2 FEL upper limit. As part of this approach EPA would have to accommodate the fact that the MARPOL Annex VI standard is for NO_X only and the proposed Tier 2 standards are $HC+NO_X$. EPA requests comment under this approach as to how best to deal with this inconsistency.

Consistent with the land-based ABT programs from which this proposed program is derived, EPA is proposing that ABT credits generated under this program have an infinite life, with no discounting applied. Also consistent with the recently finalized land-based nonroad diesel rule, EPA is proposing that credits generated on land-based engines not be allowed to be used for demonstrating compliance for marine diesel engines. EPA is concerned that manufacturers who produce engines used in both marine and land-based applications could effectively trade out of the marine portion of the program, thereby potentially obtaining a competitive advantage over small marinizers who sell only marine engines. For similar reasons, EPA is proposing that credit exchanges not be permitted between Categories 1 and 2 engines. EPA seeks comment on the need for these restrictions and on the degree to which imposing them may create barriers to low-cost emission reductions.

EPA is also proposing that credits generated relative to the Tier 2 standards not be allowed to be used toward Tier 3 compliance for either Category 1 or Category 2 engines based on concerns about the possibility of using such credits to ''trade out'' of compliance with the Tier 3 standards.

EPA is proposing that the ABT program begin with the implementation of the Tier 2 standards, with no option for the early generation of credits. While the Agency believes that, on a total sales average basis, the Tier 2 standards as proposed will result in significant emission reductions from uncontrolled levels, it is aware of some engine configurations whose emissions are currently at or near the levels of the Tier 2 standards. EPA is concerned that the emissions from such engine families could be reduced below the proposed Tier 2 standards without much effort and that easy credits could be generated if early banking were allowed. Such credits could then be used to significantly delay implementation of the Tier 2 standards for other engine families. EPA requests comment on whether it should consider an early credit banking option and what types of restrictions it should place on such early credits in order to address this concern. Commenters are requested to consider, among other options, restrictions such as early credits being calculated relative to levels more stringent than the Tier 2 standards, discounting of early credits (possibly only if above a set threshold level), and limited credit life for early credits.

In the recent rule cited above which set emission standards for land-based nonroad diesel engines, EPA also set emission standards for marine diesel engines below 37 kW. These engines were also included in the land-based ABT program in that rule, with some restrictions. EPA is not proposing any changes to the way under 37 kW marine diesel engines are treated in this ABT program. EPA is not proposing to integrate the ABT program in that rule for under 37 kW marine engines with this proposed program. Thus, EPA is proposing that no trading be allowed for engines above and below 37 kW. EPA requests comment on whether it should allow trading between engine families above and below 37 kW. Comments in favor of removing this proposed restriction should address that fact that the stringency of the standards for marine diesel engines below 37 kW was determined in the absence of this ABT flexibility. Comments should address whether allowing trading between engine families above and below 37 kW would appropriately require EPA to reexamine the stringency of the standards for engines under 37 kW.

EPA is proposing not to allow the exchange of credits between Category 1 marine engine families and land-based nonroad engine families. This restriction is proposed for the same reason that EPA is proposing to restrict credit exchanges between engine families above and below 37 kW (i.e., that the stringency of the land-based standards was determined in the absence of the availability of credit exchange between marine and land-based engines). In addition, there are differences in the way that marine and land-based credits are calculated that are implicit in the calculation and that make the credits somewhat incompatible. The first is that the difference in test duty cycles means there is an implicit difference in load factor between the two. The second is that there are provisions in this proposal for varying useful lives, which are not included in the land-based nonroad regulations. In addition, as discussed above, the actual credit calculation equations for the two programs are different. EPA requests comment on whether it should allow credit exchanges between marine and land-based nonroad engine families and, if so, whether credits traded from one program would need to be adjusted to account for the different credit calculation equations. EPA also seeks comment on whether it would be necessary to reconsider the stringency of the land-based nonroad emission limits were such cross-program trading allowed.[45]

EPA is also proposing to prohibit all trading between Category 2 engines and locomotive engines because locomotive credits are calculated based on expected remaining service life (which could be many useful life periods, due to the inclusion of the remanufacturing provisions for locomotives), whereas Category 2 marine engine credits are only calculated on a single useful life basis.

As discussed in the section on the recreational engine exemption earlier in this preamble, EPA is proposing to allow the use of certified engines in recreational applications. This allowance raises an issue with respect to credit generation in the ABT program. Engines used in recreational applications tend to have significantly lower usage rates than engines used in commercial applications. EPA is concerned that if an engine is certified as a credit generating configuration then it could, if used in a recreational application, generate credits on paper that will not have corresponding actual emission reductions in use. EPA requests comment on the likely frequency of certified engines being used in recreational applications. EPA also requests comment on whether it should take steps to prevent such

[45] It may be necessary to reconsider the stringency of the land-based nonroad engine emission standards because those limits were set based on an ABT program that is confined to land-based engines. Extending the universe of credits to include those generated by marine engines could increase the credits available to the land-based program, thus reducing the overall stringency of that program.

''false'' credits from being generated, such as by not allowing certified engines used in recreational applications from participating in the ABT program, or by prorating ABT credits according to expected usage rates.

Participation in the proposed marine diesel ABT program would be voluntary. For those manufacturers that choose to utilize the program, compliance for participating engine families would be evaluated in two ways. First, compliance of individual engine families with their FELs would be determined and enforced in the same manner as compliance with the emission standards in the absence of an averaging, banking and trading program. Each engine family must certify to the FEL (or FELs, as applicable), and the FEL would be treated as the emission limit for certification, production-line and in-use testing (as well as for any other testing done for other enforcement purposes) for each engine in the family. Second, the final number of credits available to the manufacturer at the end of a model year after considering the manufacturer's use of credits from averaging, banking and trading must be greater than or equal to zero.

When credits are generated and traded in the same model year, EPA proposes to make both buyers and sellers of credits potentially liable for any credit shortfalls, except in cases where fraud is involved. This provision is consistent with other mobile source ABT programs. The marine diesel engine certificates of both parties involved in the violating trading transaction could be voided ab initio (i.e. back to date of issue) if the engine family or families exceed emission standards as a result of a credit shortfall. Where cases involve a manufacturer being defrauded into purchasing non-existent credits, that manufacturer would only be expected to make up the credit shortfall that resulted from the lack of real credits.

The integrity of the proposed marine diesel averaging, banking and trading program depends on accurate recordkeeping and reporting by manufacturers, and effective tracking and auditing by EPA. Failure of a manufacturer to maintain the required records would result in the certificates for the affected engine family or families being voided retroactively. Violations of reporting requirements could result in a manufacturer being subject to civil penalties as authorized by sections 213 and 205 of the Clean Air Act. EPA proposes to allow positive reporting errors (i.e., those errors that result in an underestimation of the manufacturer's positive credit balance) to be corrected provided that the errors are identified within 180 days of EPA's receipt of the manufacturer's annual report.

EPA requests comment on all aspects of the proposed ABT program. Specifically, the Agency requests comment on the various restrictions (averaging sets, etc.) proposed for the program and the lack of an early credit banking program, and the time limit for correcting reporting errors.

M. Special Provisions

In general, EPA sets engine emission standards that take full effect at a set point in time, concurrently precluding the installation of engines not certified to the new standards in vehicles or equipment. The rigidity of this approach is lessened to some extent through averaging, banking, and trading programs, which allow engine manufacturers to produce engines that exceed the emission limits as long as the added emissions can be offset by engines that emit below the required levels. While this approach generally works well, additional flexibility provisions to help relieve compliance burdens may be needed in special cases. Consequently, EPA is proposing the following set of flexibility provisions. EPA seeks comment on all aspects of these flexibility provisions.

1. Post Manufacturer Marinizers Provisions

Category 1 and Category 2 marine diesel engines are produced using one of three basic manufacturing methods. In the first, least common, method, marine engines are designed and built exclusively for marine applications. This is typically the case for very large Category 3 engines as well as some smaller engines that are produced for special niche markets. In the second, more common, method, an engine manufacturer produces a marine diesel engine using a land-based nonroad or highway engine that was built by that same manufacturer. In the third method, an unrelated company, referred to as a ''post-manufacture marinizer'' produces a marine diesel engine by purchasing a completed or partially completed land-based nonroad or highway engine from an engine manufacturer and modifying it for use in the marine environment according to that manufacturer's own processes. Post-manufacturer marinizers (PMM) tend to be small companies, and their output is often designed for niche markets. PMMs often have only limited resources for engine certification, and several have indicated to EPA that burdensome certification requirements would put them out of business.

To address the concerns of these companies, EPA is proposing several provisions that are intended to streamline the certification process for PMMs.

(a) Application of Flexibility Provisions. The following flexibility provisions will be available only to PMMs. EPA has previously defined the term ''post-manufacture marinizer'' in 40 CFR 89.2 as ''a person who produces a marine diesel engine by substantially modifying a certified or uncertified complete or partially complete engine; and is not controlled by the manufacturer of the base engine or by an entity that also controls the manufacturer of the base engine.'' That definition goes on to clarify that ''substantially modify means changing an engine in a way that could change engine emission characteristics.''

EPA has become aware that the above definition may be too narrow. It implies that only those persons who substantially modify an engine will be considered PMM; those who do not modify the engine in ways that would change the engine's emission characteristics (i.e, the modifications are not ''substantial'') would not trigger the PMM designation. This was not meant to be the case. EPA intended that a person who modifies in any way an engine certified to a previous tier or who modifies in any way an uncertified engine would be considered a PMM and would have to recertify the engine to the marine emission limits in place at the time the engine is marinized. Therefore, EPA is proposing to revise the definition of PMM, to clarify that a PMM is a person who substantially modifies a land-based engine previously certified to the same or more stringent emission limits as the currently applicable marine emission limits, or a person who modifies in any way an uncertified engine or an engine certified to a previous tier of emission limits.

This modification of the PMM definition will not affect the engine dresser exemption described in Section III.B.2 above, since one of those criteria is a requirement that the dressed engine be certified to emission limits at least as stringent as those applicable to marine diesel engines a the time the engine is dressed.

Finally, EPA intends that a vessel manufacturer that substantially modifies a certified engine or that modifies an uncertified engine or an engine certified to a previous tier of emission limits would be considered a PMM and would have to comply with the certification and compliance provisions proposed in this document. This clarification is necessary because it is not uncommon

for vessel manufacturers to modify marine engines. This is often done to increase the power of an engine, to respond to the needs of a particular user. By considering such vessel manufacturers as PMM, EPA will ensure that the engine modifications do not also increase the emissions of an otherwise certified engine.

(b) Broader Engine Families. EPA is proposing to allow PMMs to use a broader engine family definition. Under this provision a PMM may include any engines that have similar emission deterioration characteristics in one engine family. Thus, a PMM could conceivably group all marine engines into one marine engine family. The only restriction is that the engines are all in the same category. Separate engine families will be required for each category of marine engines.

Note that all other provisions of the proposal shall apply to this broad engine family including, but not limited to, selection and testing of an emission data engine, application of a deterioration factor (DF), and compliance with the standards.

(c) Carryover Provisions. This proposal makes provision for carryover of engine data, which allows engine manufacturers to use data generated in a previous model year's certification to certify for the current year. This provision will also apply to the broader PMM engine families, with the constraint that new data will need to be generated if any model in the broad family is modified in any way that will make it the highest emitter in the family.

(d) *Streamlined Certification for Subsequent Years.* EPA is proposing a streamlined certification process for PMMs. This process would be applicable beginning with the year after the relevant implementation dates and continuing until engine design changes cause a different engine model to be the highest emitter in the broad PMM family. Recertification would be required at that point. Under this streamlined certification process, the manufacturer would submit its annual certification application stating that there have been no changes in the design or production of the engine models that make up the engine family. If there have been changes, the PMM could still avoid a complete certification submission with test data by demonstrating that there is no change in the identity of the highest emitter or its emissions. EPA requests comment on such a streamlined certification program for PMM.

(e) *NTE Flexibility.* As noted above, EPA is including an off-cycle emission requirement whereby engine manufacturers would be required to demonstrate that marine diesel engine emissions do not exceed a specified cap at any point in a specified zone of operation (see Section V.E.2., above). EPA expects that demonstrating compliance with the NTE will call for additional R&D and testing to measure and control emissions under any speed and load combination that can occur on a vessel. These costs are included in EPA's analysis of economic impacts, but EPA believes that the costs would be disproportionately difficult for a PMM to bear. EPA therefore requests comment on alternative approaches to address in-use emissions for these small manufacturers to ensure in-use performance while minimizing the testing burden for PMMs.

(f) *Additional Compliance Time.* Because of the nature of their business, marinizing partially or fully completed engines manufactured by another company, the ability of PMM to certify their engines as complying with the proposed emission limits may be affected by circumstances that are beyond their control. Consequently, there may be situations in which, despite its best efforts, a PMM cannot meet the implementation dates, even with the flexibility provisions described above. Such a situation may occur if an engine supplier without a major business interest in a PMM were to change or drop an engine model very late in the implementation process, or was not able to supply the PMM with an engine in sufficient time for the PMM to recertify the engine. Based on this concern, EPA is proposing to allow a one-year delay in the implementation dates for PMMs. EPA requests comment on the necessity of such a provision, whether its application should be limited only to small companies, and on whether the one-year delay should be automatic or subject to approval by EPA.

(g) *Special Hardship Provision.* As a relief mechanism of last resort, EPA is also proposing to extend to PMM the hardship relief provisions contained in the recently finalized land-based nonroad rule (40 CFR 89.102(f)). Under this provision, PMM can petition EPA for additional time to demonstrate compliance with the emission limits. Under this hardship relief provision, appeals must be made in writing, be submitted before the earliest date of noncompliance, be limited to firms that fit the small business criteria established by the Small Business Administration (fewer than 500 employees), include evidence that failure to comply was not the fault of the PMM (such as a supply contract broken by the engine supplier, and include evidence that the inability to sell the subject engines will have a major impact on the company's solvency. The Agency would work with the applicant to ensure that all other remedies available under the flexibility provisions are exhausted before granting additional relief, and would limit the period of relief to no more than one year. Furthermore, the Agency proposes that applications for hardship relief only be accepted during the first year after the effective date of an applicable new emission standard. To avoid the creation of a self-fulfilling prophesy, by which the very existence of this provision prompts engine manufacturers to delay engine developments, EPA expects that this provision will be used only rarely. Each granting of relief would be treated as a separate agreement, with no prior guarantee of success, and with the inclusion of measures, agreed to in writing by the PMM, for recovering the lost environmental benefit. Comment is requested on all aspects of this proposal.

2. Vessel Builder Flexibilities

As part of the land-based nonroad rule, EPA proposed a set of flexibility provisions for equipment manufacturers. These provisions were intended to give equipment manufacturers more time to comply with the requirement that they use only certified engines beginning with the implementation dates the engine standards. The additional time was necessary because the engine compartment on land-based nonroad equipment is relatively restricted, and changes to the physical characteristics of a nonroad engine could require extensive equipment redesign. However, equipment manufacturers may be unable to obtain a certified Tier 2 or Tier 3 engine before the implementation dates for those engines. The flexibility provisions were designed to give extra time for product redesign to equipment manufacturers that need it without postponing the emission benefits of the entire program.

While recognizing the importance of such a transition program for land-based nonroad equipment manufacturers, EPA is not proposing a similar proposal for marine vessels. There are three reasons for this. First, EPA has learned that the commercial vessel production process is actually a very flexible process. Commercial marine vessels are generally designed for a specific purchaser, to meet specific operational requirements. This means that a vessel purchaser will typically tell a

manufacturer what kind of load the vessel is intended to carry, and what kind of engine to use. The vessel manufacturer then designs the vessel, or adapts an existing design, based on these requirements. EPA believes that this kind of design process can easily accommodate any changes to an engine that may occur as a result of the proposed program, regarding its physical dimensions or weight. Second, commercial marine vessels are not serially produced in the same way as land-based nonroad equipment. Sales volume by manufacturer is much smaller in the commercial marine industry. Therefore, marine vessel manufacturers do not need extra time to accommodate engine changes across a wide range of equipment offerings. Third, it typically takes a significant amount of time to design and build a commercial marine vessel. EPA believes that any design changes required as a result of engine changes can be accommodated in the normal vessel construction period. Nevertheless, there may be special situations in which vessel manufacturers may have difficulties producing vessels that use compliant engines. EPA seeks comment on any such circumstances, and the types of flexibility provisions that would be needed to address those concerns.

N. Application of Provisions to Marine Diesel Engines Less Than 37 kW

Marine diesel engines less than 37 kW were included in the rulemaking for nonroad diesel engines and are subject to the emission control program contained in 40 CFR Part 89. That program has two tiers of emission limits, phased in from 1999 to 2000 for Tier 1 and 2004 to 2005 for Tier 2. In general, marine diesel engines less than 37 kW are subject to the same certification and compliance program as land-based nonroad diesel engines. Exceptions to this general approach include the duty cycle (E3, but with a C1 option), ABT program restrictions (land-based credits cannot be used to offset marine diesel emissions), and implementation flexibility provisions that would allow post-manufacture marinizers to phase in compliance with Tier 1 emission limits according to the schedule extended to nonroad equipment manufacturers.

EPA is aware that some companies manufacture marine diesel engines above and below the 37 kW threshold. Most of these companies are small businesses with limited ability to devote staff to managing compliance with emission control requirements. One possible administrative change that may lessen this burden would be to move the provisions for marine diesel engines rated below 37 kW currently contained in 40 CFR Part 89 to 40 CFR Part 94. Transferring the provisions for marine diesel engines rated below 37 kW in this way would ensure that engine manufacturers, vessel manufacturers, and the general public need consult only one area of the Code of Federal Regulations to identify the emission control programs applicable to all marine diesel engines.

An important goal of any such change should be to avoid changing the level of stringency of the requirements for marine diesel engines less than 37 kW. EPA therefore does not intend to change the level or timing of emission limits or other provisions that may affect the emissions from these engines.

EPA is, however, seeking comment on the extent to which the administrative portions of the certification and compliance requirements for marine diesel engines less than 37 kW should be harmonized with those proposed in this document. Commenters are encouraged to specify which provisions should be harmonized for these engines and to explain why this would be helpful. EPA believes that such harmonization would be appropriate for several reasons. First, harmonization of these provisions will ensure that engine manufacturers have only one set of administrative requirements to follow instead of two, thus simplifying the certification and approval process for both the manufacturers and EPA. Second, harmonization would formally extend the special compliance flexibility provisions of this proposal to post-manufacture marinizers that modify smaller diesel engines, including the more relaxed definition of engine family and streamlined certification renewals. Third, this would clarify the requirements for engine dressers.

VI. Category 3 Engine Provisions

A. Emission Limits

Category 3 engines are very large marine diesel engines, typically used for propulsion purposes on ocean-going vessels. Although these engines can achieve power ratings in excess of 75,000 kW, they are diesel engines and, with certain limitations, can benefit from the emission control technologies that are used on other diesel engines. Perhaps the most important of these limitations is the fuel on which they are operated, called residual fuel. This fuel is the by-product of distilling crude oil to produce lighter petroleum products such as gasoline, DM-grade diesel fuel (used in on-highway, land-based nonroad and smaller diesel marine engines), and kerosene. It possesses a high viscosity and density, which affects ignition quality, and it typically has high ash, sulfur and nitrogen content in comparison to marine distillate fuels. Furthermore, residual fuel parameters are highly variable because its content is not regulated. It is this high variability that makes it difficult to apply timing retard as a control strategy. Ship engineers will generally optimize engine timing to achieve peak pressures for each fuel blend and would not likely have the expertise or incentive to optimize for emissions. Residual fuel can increase engine NO_X emissions from 20–50% and PM from 750% to 1250% when compared to distillate fuel.[46]

In determining the appropriate emission limits for Category 3 engines, EPA considered the application of existing diesel emission technologies. These engines are, for the most part, already employing Tier 1 and Tier 2 technologies, including turbocharging, injection improvements, electronics, and more efficient cooling. Application of these technologies has already been extremely optimized, with engines being supercharged as well as turbocharged, and with two-stage seawater aftercooling to reduce engine temperatures. The application of these technologies results in very high fuel efficiency and optimal engine operation.

Because of the extensive use of Tier 2 technologies on Category 3 engines, the opportunities for emission reductions are not as extensive as they are for smaller engines. The most likely set of next-generation technologies that could potentially be applied to these engines include EGR, SCR, and water injection. However, as discussed in the Draft Regulatory Impact Assessment, these technologies are still under development for marine diesel engines of this size and thus the Agency does not believe it is appropriate to set emission limits that would require their use at this time. In addition, their application to Category 3 engines is complicated by the quality of the fuel used in these engines.

EPA believes it is appropriate to consider an emission limit that would rely largely on the use of injection rate shaping, with some retarded timing. By optimizing a variable fuel injection rate, a small amount of fuel can be delivered early to initiate combustion. Once combustion begins, the rest of the fuel

[46] D. Bastenhof. Exhaust Gas Emission Measurements: A Contribution to a Realistic Approach, 1995 (Air Docket A–97–50).

can be injected. Through this strategy, the peak temperature in the cylinder can be reduced by reducing the amount of fuel that is mixed with air prior to the start of combustion. This premixed fuel results in a large thermal spike when it burns when compared to diffusion burning. By reducing the peak temperatures, it is more difficult for NO_X to form.

EPA analysis indicates that the appropriate emission limits for Category 3 engines, that would require injection rate shaping but not extensive timing retard, are the limits that were recently adopted in MARPOL Annex VI. These NO_X limits also take into account the special fuel used by these engines. Those limits are contained in Table 1, above. EPA also believes that these emission limits would be the appropriate standards under the Clean Air Act, under the current circumstances. With respect to emission reductions, while MARPOL Annex VI targeted a 30% NO_X emission decrease, EPA analysis indicated that a 17% NO_X decrease could be expected. However, implementation of these NO_X limits will prevent further increases in NO_X resulting from further developments in Category 3 engine design. Because of Category 3 engines' characteristic design and operation for minimum BSFC (see the Draft RIA), further improvements in materials and engine design will only increase specific NO_X emissions in the absence of these limits.

Because the MARPOL Annex VI NO_X limits would likely be implemented independently of any Clean Air Act requirement, assuming ratification by the United States of Annex VI, EPA believes it would be unnecessary and redundant to adopt the same program under the Clean Air Act. Therefore, EPA is not proposing to adopt emission limits for Category 3 engines as part of this rule. Instead, EPA expects U.S. vessel owners to begin installing engines certified to the MARPOL Annex VI limits beginning with the effective date set in Annex VI (January 1, 2000), following the procedures otherwise applicable to that Annex. EPA requests comment on this approach, as well as the rationale behind its adoption. EPA seeks comment on how to ensure that U.S. vessel owners begin installing Category 3 engines beginning with ships constructed on or after January 1, 2000. EPA also seeks comment as to whether EPA should be required to examine implementation of the Annex domestically as part of the 2003 Feasibility Review, described in Section V.A.3., above.

EPA seeks comment on the proposed approach to Category 3 engines. EPA also seeks comment on whether EPA should consider a longer terms strategy as well and, if so, what those long-term NO_X emission limits should be. Finally EPA seeks comment on the need to adopt a PM limit for these engines. MARPOL Annex VI does not set a PM limit, presumably because of the fuel variability issue and the lack of an appropriate PM test method for residual fuels (see the Draft RIA). EPA seeks comment on the desirability to go beyond the Annex VI requirement by setting a PM standard for Category 3 engines and, if so, what that PM limit should be and how it shall be tested.

Category 3 engines can switch between fuels, and, as stated above, residual fuel can increase NO_X emissions by 20%–50% and PM emissions by 1000% (±250%) compared to marine distillate fuel. Foreign vessels with Category 3 engines currently account for 45% of the NO_X emissions from Category 3 engines (see the Draft Regulatory Impact Assessment). One mechanism to reduce NO_X emissions from these engines would be restricting the use of residual fuel in or near port regions, perhaps utilizing remote CO_2, SO_X, and PM sensing technologies to non-intrusively discriminate the fuel burned by a ship. If such a technology can be demonstrated, enforcement could become as straightforward as determining automobile speed on a highway. EPA seeks comment on whether ports and states could effectively employ such a strategy, for example as a condition on use of ports. Comments provided on this question will assist EPA in assessing the extent to which such a locally-imposed emission control strategy would be practical. These comments, in turn, will also help EPA determine whether it would be useful to issue guidance on how to establish such programs, both for California's South Coast ports and ports located in other areas of the country.

B. Category 1 and 2 Engines Aboard Vessels Engaged in Foreign Trade

EPA proposes an additional provision for Category 1 and 2 engines that are installed on U.S.-flagged vessels engaged in foreign trade that meet the criteria described below. This provision will allow these engines to be certified to the MARPOL Annex VI NO_X curve instead of the EPA proposed limits provided certain conditions are met. This provision would go into effect at the same time as the implementation of the proposed domestic emission requirements for these engines. In other words, waivers would not be needed until 2004 for engines with a per cylinder displacement below 2.5 liters and until 2006 for engines with a per cylinder displacement at or above 2.5 liters but below 20 liters. Prior to these dates, it is assumed that engines installed on these vessels will be compliant with the MARPOL NO_X limits.

This special provision is intended to address the different circumstances in which these engines will be used, rather than any differences in their operation. Specifically, Category 1 and Category 2 engines installed on foreign trade vessels are typically used for auxiliary purposes. These engines are often essential for the smooth functioning of the vessel, since they are used to generate electricity for navigational equipment (radar, gyrocompass, and telecommunications), maneuvering equipment (steering gear, bow thrusters), and crew services (lighting in the engine room, cooking in the galley). If these engines were to fail, a ship would be stranded and would most likely require a tow into port. Repairing engines to EPA requirements may be difficult in a foreign port because of availability of replacement parts. This may cause a ship owner to incur significant downtime costs to have the replacement part or a new engine delivered to a foreign port. Alternatively the ship owner may have to buy a noncomplying engine while overseas, only to replace it when the vessel returns to the United States. Allowing Category 1 and Category 2 engines to meet the MARPOL Annex VI limits instead of the EPA's requirements will reduce if not eliminate any difficulties associated with the maintenance and repair of these engines while at sea, since vessels worldwide are expected to comply with those limits beginning in 2000.

EPA believes that this special provision for Category 1 and Category 2 engines will have minimal impact on U.S. air quality if it is limited to those vessels that engage in foreign trade. EPA proposes to define a U.S.-flagged vessel engaged in foreign trade as one that has solely a registry endorsement pursuant to Coast Guard regulations at 46 CFR 67.17. Vessels with multiple endorsements (e.g., foreign and coastwise) will need to demonstrate to the Administrator's satisfaction that the vessel will spend less than 25% of its operating time within 320 nautical kilometers (200 nautical miles) of U.S. territory. This determination would need to be made during the ship's construction, based on the business plans of the ship owner. EPA does not believe application for this determination will be burdensome

because the vessel owner will have built the ship with a specific trade in mind.

To ensure that only the appropriate vessels use this provision, EPA proposes that Category 1 and 2 engines be labeled to indicate that they have been certified only to the MARPOL Annex VI NOC_X curve limits, and that they are not intended for use on domestic vessels. In addition, EPA proposes that any vessel owner who seeks this exemption obtain a waiver from EPA. Such a waiver would be issued upon satisfactory demonstration that the vessel will be used for foreign trade. EPA proposes that a vessel will be considered to be used for foreign trade if it spends less than 25 percent of its operating time within 200 nautical miles of the United States, and it does not operate solely between the United States, Canada, Mexico, Bermuda, or the Bahamas. Without this additional limit, EPA is concerned that ships whose engines do, in fact, have a significant impact on U.S. air quality would be exempt from the proposed domestic program. Also, because they operate in closer proximity to the United States these vessels are unlikely to experience problems with maintaining engines certified to EPA standards.

EPA seeks comment on whether this special provision for Category 1 and Category 2 engines installed on U.S.-flagged foreign trade vessels is necessary. EPA also requests comment on how best to define the group of vessels that should benefit from the provision while ensuring that those vessels operating in the United States meet the emission requirements proposed in this document. EPA requests comment on whether ships that operate solely between the United States, Mexico, the Bahamas, and Canada should be able to benefit from this provision.

VI. Technological Feasibility

The emissions standards proposed in this action would apply to a large variety of marine diesel engine sizes and applications. Section 213(a)(3) of the Clean Air Act calls for EPA to establish standards that provide for the ''greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the engines or vehicles to which such standards apply, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology.''

This section describes EPA's understanding of the range of technologies that will be available to manufacturers to comply with the proposed standards for Category 1 and 2 marine diesel engines and the technological approach anticipated for Category 3 marine engines. EPA believes that the technology discussed below will be sufficient for both the proposed standards and the NTE requirements. The costs associated with these technologies will be discussed in Section VII. EPA has concluded, as described in the Draft RIA, that the proposed standards will have no significant negative effect on noise, energy, or safety. The technological feasibility of the proposed standards is discussed below for each category.

A. Category 1 Engines

EPA believes that the emission reduction strategies that are expected to be used on land-based nonroad diesel engines to meet the nonroad Tier 2 and Tier 3 standards can also be applied to Category 1 marine diesel engines. This is because marine diesel engines are generally derivatives of land-based nonroad and highway engines. Marine engine manufacturers and marinizers make modifications to the engine to make it ready for use in a vessel. These modifications can range from basic engine mounting and cooling changes to a restructuring of the power assembly and fuel management system. The Draft RIA discusses this process in more detail.

1. Development of Implementation Schedule

For Category 1 engines with specific displacements below 2.5 liters per cylinder, the proposed implementation dates for Tier 2 essentially represent a four year lead time beyond the scheduled implementation date of the MARPOL Annex VI NO_X standard. Another four years of lead time is proposed for Tier 3. Having a single implementation date for several subcategories has an advantage for marine engines because it removes concerns associated with engine families that fall into several subcategories. This is important since marine engines may not fall into the same categories as their land-based nonroad counterparts. In some cases, using the same staggered approach for marine as for land-based nonroad engines could require the marine version to be certified before the land-based version of an engine. However, it is EPA's intent that marine engine designs have the benefit of being able to make use of the emission controls developed for land-based nonroad engines.

The proposed implementation schedule allows up to a three-year delay in standards for Category 1 marine engines relative to the implementation dates of the land-based nonroad standards. This should make this proposed regulatory scheme more cost-effective by allowing time for the carryover of technology from land-based nonroad to marine engines.

For engines with specific displacements greater than or equal to 2.5 liters per cylinder, EPA proposes an additional two years of lead time. This additional lead time would make the implementation date for the proposed marine Tier 2 standards consistent with the land-based nonroad Tier 2 implementation date for these engines. Therefore, the marine engines would be able to use technology developed for land-based applications. In addition, there are currently no Tier 3 standards for land-based nonroad engines of this size; therefore, the extra lead time may be necessary for the larger Category 1 marine engines to achieve Tier 3 levels. EPA requests comment on the proposed implementation dates.

2. Development of Numerical Standards

Marine diesel engines are typically derived from or use the same technology as land-based nonroad diesel engines and should therefore be able to effectively use the same emission control strategies. In fact, marine engines can make use of the water they operate in as a cooling medium, which can help them reduce charge air intake temperatures more easily than land-based nonroad engines. By cooling the intake charge, formation of NO_X emissions can be reduced. Also, as discussed in Chapter 3 of the Draft RIA, data on five marine engines show that emissions measured on the proposed ISO E3 marine duty cycle are roughly equivalent to those measured on the land-based nonroad ISO C1 duty cycle. Finally, several demonstration marine diesel engines have been in service for a couple years in California with emission levels that are very close to meeting the standards proposed in this document. These demonstration engines are all using established technology that EPA anticipates will be used to comply with this proposed rule. The Draft RIA provides more detail on the emissions levels achieved and the technology applied to these engines.

Because of the lead time needed to transfer land-based technology to the marine environment, EPA believes that it is reasonable to propose near-term standards that are somewhat less stringent compared to land-based nonroad in the Tier 2 time frame. EPA

believes that more stringent Tier 3 standards are feasible in the long term especially given the technology being developed for land-based nonroad engines and the long lead time. Proposing a slightly less stringent numerical NO_X emissions limit for Tier 2 marine than for Tier 2 land-based nonroad engines should allow marine engine manufacturers the flexibility to focus on Tier 3 technology and still reduce emissions in the interim without spending excessive resources on Tier 2.

3. Technological Approaches

EPA anticipates that the proposed standards for marine engines will be met primarily with technology that will be applied to land-based nonroad engines to meet the proposed Tier 2 and Tier 3 emission standards. Much of this technology already has been established in highway applications and is already being used in limited land-based nonroad and marine applications. EPA's analysis of this technology is described in detail in Chapter 3 of the Draft RIA for this proposed rule and is summarized below.

By proposing multiple levels of standards that extend well into the next decade, EPA is providing engine manufacturers with substantial lead time for developing, testing, and implementing emission control technologies. This lead time and the coordination of standards with those for land-based nonroad engines allows time for a comprehensive program to integrate the most effective emission control approaches into the manufacturers' overall design goals related to durability, reliability, and fuel consumption.

Engine manufacturers have already shown some initiative in producing limited numbers of low NO_X marine diesel engines. More than 80 of these engines have been placed into service in California through demonstration programs. The Draft RIA discusses, in detail, these engines and their emission results. Through the demonstration programs, EPA has been able to gain some insight into what technologies can be used to meet the proposed emission standards.

Highway engines have been the leaders in developing new emission control technology for diesel engines. Because of the similar engine designs in land-based nonroad and marine diesel engines, it is clear that much of the technological development that has led to lower emitting highway engines can be transferred or adapted for use on land-based nonroad and marine engines. Much of the improvement in emissions from these engines comes from ''internal'' engine changes such as variation in fuel injection variables (injection timing, injection pressure, spray pattern, rate shaping), modified piston bowl geometry for better air-fuel mixing, and improvements intended to reduce oil consumption. Introduction and ongoing improvement of electronic controls have played a vital role in facilitating many of these improvements.

Other technological developments that are expected to be used on nonroad engines will require a greater degree of development before they can be applied to marine diesel engines. Turbocharging is widely used now in marine applications, especially in larger engines, because it improves power and efficiency by compressing the intake air. Turbocharging may also be used to decrease particulate emissions in the exhaust. Today, marine engine manufacturers generally have to rematch the turbocharger to the engine characteristics of the marine version of a nonroad engine and often will add water jacketing around the turbo housing to keep surface temperatures low. Once the Tier 2 nonroad engines are available to the marine industry, matching the turbochargers for the engines will be an important step in achieving low emissions.

Aftercooling is a well established technology that can be used to reduce NO_X by reducing the temperature of the charge air after it has been heated during compression. Reducing the charge air temperature directly reduces the peak cylinder temperature during combustion, which is the primary cause of NO_X formation. Air-to-water and water-to-water aftercoolers are well established for land-based applications. For engines in marine vessels, there are two different types of aftercooling used: jacket-water and raw-water aftercooling. With jacket-water aftercooling, the coolant to the aftercooler is cooled through a heat exchanger by ambient water. This cooling circuit may be either the same circuit used to cool the engine or a separate circuit. By moving to a separate circuit, marine engine manufacturers would be able to achieve further reductions in the intake charge temperature. This separate circuit could result in even lower temperatures by using raw water as the coolant. This means that ambient water is pumped directly to the aftercooler. Raw-water aftercooling is currently being used widely in recreational applications. Because of the access that marine engines have to a large ambient water cooling medium, EPA anticipates that marine engine manufacturers will largely achieve the reductions in NO_X emissions for this proposal through the use of aftercooling.

To meet the proposed standards, Category 1 marine diesel engine manufacturers are expected to use many of the strategies discussed above. Electronic controls offer great potential for improved control of engine parameters for better performance and lower emissions. Unit pumps or injectors would allow higher-pressure fuel injection with rate shaping to carefully time the delivery of the whole volume of injected fuel into the cylinder. Marine engine manufacturers should be able to take advantage of modifications to the routing of the intake air and the shape of the combustion chamber of nonroad engines for improved mixing of the fuel-air charge. Separate circuit jacket- and raw-water aftercooling will likely gain widespread use in turbocharged engines to increase performance and lower NO_X.

To meet the proposed Tier 3 standards, EPA believes that two technologies would be especially useful. Common rail injection systems provide greater overall control of the fuel injection strategy by maintaining a constant supply of high-pressure fuel at the injectors. Also, exhaust gas recirculation is anticipated to be applied to land-based nonroad diesel engines, which will provide valuable experience in applying this control strategy to marine engines. These technologies are not anticipated to be developed for land-based nonroad engines with specific displacements greater than or equal to 2.5 liters per cylinder. However, EPA believes that the concepts can be adapted from smaller land-based nonroad and highway engines. To account for difficulties of adapting common rail fuel injection and EGR to these larger engines, EPA is proposing a higher marine Tier 3 $HC+NO_X$ standard than for engines with specific displacements less than 2.5 liters per cylinder. A more detailed treatment of the feasibility of these engines meeting the proposed standards is included in the Draft RIA.

4. Conclusions Regarding Technological Feasibility

The standards in this proposal are the most challenging that can be set in this time frame. Category 1 marine diesel engine manufacturers will need to use the available lead time to develop the necessary emission control strategies, including transfer of technology from land-based nonroad diesel engines. This development effort will require not only achieving the targeted emission levels, but also ensuring that each engine will meet all performance and emission

requirements over its useful life. The proposed standards clearly represent significant reductions compared with baseline emission levels.

Emission control technology for diesel engines is in a period of rapid development in response to the range of emission standards in place and anticipated for highway and land-based nonroad engines in the years ahead. This development effort will automatically transfer to some extent to marine engines, since marine engines are often derivatives of highway and land-based nonroad engines. Regardless, this development effort will need to expand to marine diesel engines as a result of this proposal. Because the technology development for highway and land-based nonroad engines will to a large extent constitute basic research of diesel engine combustion, the results should be applicable to marine engines.

Based on information currently available, EPA believes that it is feasible for Category 1 marine diesel engine manufacturers to meet the proposed standards using combinations of technological approaches discussed above and in the Draft RIA. To the extent that the technologies described above may not yield the full degree of emission reduction anticipated, manufacturers could still rely on a modest degree of fuel injection timing retard as a strategy for complying with the proposed emission standards. As described under Economic Impacts below, injection timing retard may be associated with some decrease in fuel efficiency.

In addition, EPA believes that the flexibilities incorporated into this proposal will permit marinizers and vessel builders to respond to engine changes in an orderly way. For these industries, EPA expects that meeting these requirements will pose a significant challenge, but one that is feasible taking into consideration the availability and cost of technology, time, noise, energy, and safety.

B. Category 2 Engines

EPA believes that the emission reduction strategies that are expected to be used on locomotive diesel engines to meet the recently finalized standards can also be applied to Category 2 marine diesel engines. This is because the majority of Category 2 marine diesel engines are derivatives of locomotive engines. Similar to Category 1, marine engine manufacturers and marinizers then make modifications to the engine to make it ready for use in a vessel.

1. Development of Implementation Schedule

EPA is proposing a similar approach as proposed for Category 1 engines. Because of the marinization process, marine engine manufacturers will likely need some time to respond to changes in locomotive engine designs associated with their standards. This is why EPA is proposing that there be a one year delay between the implementation of the locomotive Tier 2 and the marine Tier 2 standards. EPA believes that a four year additional lead time is sufficient for Category 2 marine engine manufacturers to achieve the additional reductions associated with the proposed Tier 3 standards. In any case, the Tier 3 standards are proposed to be subject to a feasibility review in 2003.

2. Development of Numerical Standards

EPA proposes the marine Tier 2 emissions standards for Category 2 marine diesel engines to be the same level as the locomotive line-haul Tier 2 emissions standards. The Draft RIA compares baseline marine emissions on the E2 and E3 cycles to baseline locomotive emissions on the line-haul cycle and shows that the baseline emissions for marine are about the same or slightly lower than for locomotives. Thus, EPA believes that no change in the standards is required due to the duty cycle. Although locomotives are required to meet standards for a line-haul and a switch duty cycle, the line-haul standard was chosen for this comparison because it is more similar to the proposed marine duty cycles than the switch cycle.

EPA believes that further reductions are possible from Category 2 marine engines than are required for locomotive engines. This is why EPA is proposing Tier 3 standards for Category 2 marine engines. Technologically, marine engines do not have nearly the cooling constraints that locomotive engines have and they do not need to be designed for operation at high altitudes. In addition, under the lead time associated with the proposed Tier 3 standards, EPA believes that further emission control technology can be applied to these engines.

3. Technical Approach

Most of the emission control strategies anticipated to be used on locomotive engine to meet the locomotive Tier 2 standards are similar to those expected to be used on nonroad engines to meet the land-based nonroad Tier 2 standards. These technologies include combustion chamber modifications, better oil control, improvements in fuel injector design (i.e., rate shaping, higher pressures, nozzle geometry), electronic engine management controls, and separate circuit aftercooling. In addition, the older two-stroke engine designs are already being replaced by four-stroke engine designs. EPA believes that these technological improvements can be directly applied to Category 2 marine diesel engines. Most likely, the marine engine manufacturers will need to rematch the turbochargers and cooling circuits to respond to the new locomotive engine designs.

EPA believes that marine engines have two advantages over locomotive engines for reducing NO_X. Marine engines have access to ambient water, which gives them the ability to achieve very low charge air temperatures with an aftercooler. Locomotives, on the other hand, have extreme packaging constraints, which minimize their ability to cool the charge air. Locomotive engines must also be designed to meet their standards at high altitudes while Category 2 marine diesel engine operate at or near sea level. Because marine engines do not operate at high altitude, they have less of a concern for design tradeoffs between maintaining low NO_X and low smoke levels.

Similar to Category 1, EPA believes that the key technologies needed for Category 2 marine engines to meet the proposed marine Tier 3 emissions standards are common rail fuel injection and exhaust gas recirculation. These technologies are not anticipated to be developed for locomotive engines for Tier 2. However, EPA believes that the concepts can be adapted from land-based nonroad and highway engines. As an alternative strategy, manufacturers may choose to rely on injection timing retard as a way of trimming NO_X emissions. However, this may be associated with a fuel efficiency penalty. To account for difficulties of adapting common rail fuel injection and EGR to these larger engines, EPA is proposing the same marine Tier 3 $HC+NO_X$ standard proposed for Category 1 engines with specific displacements greater than 2.5 liters per cylinder. This proposed standard is somewhat relaxed compared to the land-based nonroad Tier 3 standards.

4. Conclusions Regarding Technological Feasibility

Based on information currently available, EPA believes that it is feasible for Category 2 marine diesel engine manufacturers to meet the proposed standards using combinations of technological approaches discussed above and in the Draft RIA. In addition,

EPA believes that the implementation schedule and the flexibilities incorporated into this proposal will permit marinizers and vessel builders to respond to engine changes in an orderly way. For these industries, EPA expects that meeting these requirements will pose a significant challenge, but one that is feasible taking into consideration technology, time, noise, energy, and safety.

C. Category 3 Engines

EPA is not proposing national standards for Category 3 marine engines. However, emissions reductions are expected to be gained through the international NO_X requirements adopted in MARPOL Annex VI.

1. Rationale for Relying on MARPOL Annex VI Requirements

Because of the competitive nature of international maritime transport, ship owners and ship builders have been working for years on techniques to improve diesel engine fuel efficiency. These research efforts have been very successful, and the thermal efficiencies of new Category 3 marine diesel engines are very high, approaching 45 to 50 percent. System efficiencies (i.e., the thermal efficiency for the ship as a whole) can be as high as 85 percent, for example, because of the use of engine heat to generate steam power. The competitive nature of the shipping industry continues to provide incentives for gaining further reductions in fuel consumption since fuel is the largest variable cost associated with shipping.

Category 3 engines have two characteristics that require discussion. First, the same strategies that have been used over time to achieve these high thermal efficiencies have generally resulted in an increase in NO_X emissions. Reducing NO_X with the technology used today basically means calibrating the engines with a focus on emissions as well as fuel consumption. For instance, timing could be retarded to reduce NO_X by reducing peak cylinder temperatures associated with the burning of fuel that is premixed with air prior to the start of combustion. Any resulting adverse impact on fuel consumption could be minimized through fuel injection strategies and charge air charging and cooling strategies. Consequently, EPA does not expect any significant increase in fuel consumption rates. Added emission control could be achieved using EGR, water in fuel emulsion, or SCR. The benefits and drawbacks of these technologies are discussed below.

Second, Category 3 engines operate on bunker fuel. This fuel is also called residual fuel because it is the fuel left in a refinery after the lighter ends have been distilled. Although some distillate may be blended into this residual fuel, the resulting bunker fuel is considerably different than the fuel burned by any other diesel engines. For instance, the viscosity is so high, that the fuel must be melted before it can flow to the engine. The warmed fuel also needs to be passed through centrifuges to remove water, sludge, and other contaminants. Sulfur levels in this fuel may be as high as 5 percent by weight. Specifications even exist for the amount of cat bottoms (worn metal and catalyst from a hydro-cracker) in the fuel. The special characteristics and handling needs of bunker fuel make the application of new emission control technologies challenging.

Because of the special fuels used by these engines and their international use, EPA is not proposing to set national emission limits for Category 3 engines beyond the MARPOL Annex VI requirements based on the types of technologies that are already used for fuel efficiency reasons on these engines today. EPA believes that this approach is reasonable given the Clean Air Act requirements that direct EPA to promulgate regulations that achieve the greatest degree of emission reduction achievable through the application of available technology giving appropriate consideration to cost, lead time, noise, energy, and safety concerns. Applicable technology for Category 3 engines is discussed below. EPA believes that the proposed limits will not only prevent future increases in NO_X associated with historical design improvements, but actually reduce NO_X from new engines by about 17 percent as discussed in the Draft RIA.

EPA's main focus across all of its diesel engine emission control programs is to reduce NO_X and PM emissions. HC and CO limits are of less importance because the contribution of diesel engines to the inventory of these pollutants is relatively low. With regard to Category 3 engines, high PM emissions are largely a result of the fuel used in these engines, as opposed to the technical characteristics of these engines. As discussed in the Draft RIA, the use of residual fuel or residual fuel blends in these engines can lead to PM emissions that are an order of magnitude higher than when distillate fuel is used. In addition, current established PM test methods show unacceptable variability when sulfur levels exceed 0.8 weight percent sulfur, and no PM test has been developed for these engines that corrects that variability. For these reasons, EPA is not proposing a PM standard for Category 3 engines. Similarly, EPA is not proposing HC or CO standards for these engines, but requests comment on whether adding such additional standards on top of the MARPOL Annex VI NO_X standard is necessary, and if so at what levels.

2. Technological Approaches

A number of technical designs and engine modifications are capable of reducing NO_X emissions from compression-ignition engines and have the potential to be technologically feasible for Category 3 marine engines. These technologies include retarded injection timing, engine fine tuning, exhaust gas recirculation, water emulsified fuel, and selective catalytic reduction. Benefits and challenges associated with these technologies are discussed below and were derived from CARB Mail-Out #91–42 and information gathered by the NO_X working group of the Bulk Chemical Handling Subcommittee of the IMO.

A feasible and simple means of reducing NO_X from diesel engines is by retarding injection timing. This method lowers the peak combustion temperature and pressure in the cylinder, resulting in 10–30 percent lower NO_X. However, the disadvantages include higher specific fuel consumption, lower power, harder startability, and higher levels of HC, CO, PM, and smoke. In addition, injection timing generally has to be tailored to fuel quality for Category 3 engines operating on residual fuel. To recover the lost fuel economy and performance or to reduce the amount of injection timing retard, additional technologies that improve fuel atomization have been employed on other mobile source engines. Fuel atomization can be improved by increasing fuel pump pressure and advance strategies, and through nozzle geometry. Another fuel injection technique for reducing NO_X is rate shaping. By injecting a small amount of fuel to begin combustion before injecting the majority of the fuel, high temperatures associated with the burning of premixed fuel can be reduced.

Engine fine tuning includes modification of essential engine components and could result in a 20–40 percent reduction in NO_X emissions. More specifically, engine fine tuning could include modifications in the injection system, charge air system, and combustion chamber design. Such changes on new highway engines have already achieved more than 50 percent NO_X reductions.

Exhaust gas recirculation (EGR) involves recirculating some of the

exhaust gas back into the intake manifold. This lowers the combustion temperature and therefore can lower NO_X emissions by as much as 20–50 percent. For marine engines, the applicability of EGR is complicated by the quality of the fuel. Sulfur and soot from combustion gases can cause increased wear of piston rings, valves, and other components. Therefore, EGR is more likely to be useful for engines running on cleaner distillate fuels.

Water emulsification of the fuel is another technique that lowers maximum combustion temperature, reducing NO_X 20–50 percent without an increase in fuel consumption. There are at least two ways to accomplish the emulsification during combustion: in the combustion chamber or in the fuel tank. Combining water and fuel for the first time in the chamber requires significant changes to the cylinder head to add an injector. Combining water with fuel in the tank may introduce combustion problems due to unstable emulsion. Also, this technique requires a significantly redesigned fuel handling system to overcome the potential risk of corrosion and to maintain power output. In any event, extra liquid storage availability is necessary to retain similar range.

Selective catalytic reduction (SCR) is one of the most effective, but also most complex and expensive, means of reducing NO_X from large diesel engines. Emission reductions in excess of 90 percent can be achieved using SCR. In SCR systems, a reducing agent, such as ammonia, is injected into the exhaust and both are channeled through a catalyst where NO_X emissions are reduced. These systems are being successfully used for large stationary source applications, which operate under constant, high-load conditions.

A number of disadvantages are apparent for the use of current technology SCR systems on ships. The SCR system is effective only over a narrow range of exhaust temperatures. The effectiveness of the system is decreased at reduced temperatures exhibited during engine operation at partial loads. Most of the engine operation near port cities is likely to be at these partial loads. This sort of a system would require an additional tank to store ammonium (or urea to form ammonia). Also, excess ammonia in the exhaust can occur during transient operation, where control of optimum ammonia injection is difficult. However, Category 3 marine engines generally operate under steady-state conditions.

3. Conclusions Regarding Technological Feasibility

Given the available emissions control technology for Category 3 engines and the fuel quality issues, EPA believes that the MARPOL Annex VI standards for NO_X are appropriate and sufficient for Category 3 marine diesel engines. EPA's main concern is that the range of adjustable parameters be set so that the engine will meet the proposed standards in this range. EPA proposes to use, and seeks comment on, the MARPOL Annex VI provisions designed to prevent tampering with the engine settings in such a way as will increase emissions. EPA believes that it may be appropriate to investigate PM standards and more stringent NO_X standards for Category 3 engines in the context of the MARPOL Convention in the future.

VIII. Projected Impacts

A. Environmental Impacts

In Chapter 5 of the Draft Regulatory Impact Analysis, EPA provides a detailed explanation of the methodology used to determine the environmental benefits from marine diesel engines associated with this proposal. EPA requests comment on all aspects of the emissions inventory analysis. The following discussion gives a general overview of the methodology and the results.

1. Category 1 Engines

For the purposes of the inventory analysis, Category 1 was divided into recreational, commercial, and auxiliary marine diesel engines. Although no standards are proposed in this document for recreational engines, uncontrolled emissions from these engines are included in the inventory analysis. Annual emissions were then calculated using engine populations, load factors, annual hours of use, rated power, emission factors, turnover, and growth rates. The sources for and the values of these factors are provided in the Draft RIA. It should be noted that EPA has received some indication that the annual use for recreational engines may be lower than assumed in the inventory analysis and calculations (Table 5–2 of the Draft Regulatory Impact Analysis). EPA seeks comment on annual usage rates for recreational, as well as commercial and auxiliary, engines.

Table 12 presents the projected emissions inventory from Category 1 marine engines with and without the proposed standards. Table 12 also presents the anticipated effects of the MARPOL Annex VI standards on the Category 1 NO_X inventory. The proposed CO standard is intended as a cap, so no benefits are claimed here.

Table 12 presents the projected emissions inventory from Category 1 marine engines with and without the proposed standards. Table 12 also presents the anticipated effects of the MARPOL Annex VI standards on the Category 1 NO_X inventory. The proposed CO standard is intended as a cap, so no benefits are claimed here.

TABLE 12.—CATEGORY 1 EMISSIONS INVENTORY

[Thousand short tons]

Year	HC		NO_X			PM		CO
	Base	Control	Base	MARPOL Annex VI	Control	Base	Control	Base
2000	12.1	12.1	465	464	464	14.9	14.9	73
2005	12.8	12.5	492	484	470	15.8	15.2	78
2010	13.6	12.1	521	507	420	16.8	14.1	82
2020	15.3	12.0	586	565	303	18.9	13.0	92
2030	17.3	13.4	663	640	310	21.4	13.0	105

2. Category 2 Engines

Baseline emissions inventories for Category 2 marine engines were developed for the EPA under contract with Carnegie Mellon University.[47] For the purposes of this analysis, emissions are included from all Category 2 engines

[47] Corbett, J., Fischbeck, P., ''Commercial Marine Emissions Inventory and Analysis for United States Continental and Inland Waterways,'' Carnegie Mellon University, Order No. 8A–0516–NATX, September 1998.

operated in the Great Lakes, inland waterways, and coastal waters up to 320 kilometers (200 miles) offshore. Emissions from U.S. flagged vessels were determined using ship registry data, fuel consumption, rated power, operation assumptions, and fuel specific emission factors. Emissions from foreign flagged vessels were developed based on cargo movements and waterways data, vessel speeds, average dead weight tonnage per ship, and assumed cargo capacity factors.

To model the benefits of the proposed standards, EPA applied an engine replacement schedule and new engine standards to the baseline inventory. In this case, no emission reductions are expected beyond the already low levels of HC. Table 13 shows the projected emissions for Category 2 vessels with and without the proposed standards. The anticipated NO_X impacts for the application of MARPOL Annex VI standards to U.S. flagged vessels are also included.

TABLE 13.—CATEGORY 2 EMISSIONS INVENTORY

[Thousand short tons]

Year	HC	NO_X			PM		CO	
	Base	Base	MARPOL Annex VI	Control	Base	Control	Base	Control
2000	11.1	267	265	265	6.1	6.1	34.1	34.1
2010	12.3	295	275	255	6.8	6.6	37.7	36.3
2020	13.6	325	387	206	7.5	6.9	41.7	37.0
2030	15.0	360	309	167	8.3	7.3	46.0	38.3
2040	16.5	397	339	162	9.1	7.9	50.8	41.5

3. Category 3 Engines

The emissions inventory for Category 3 was calculated using the same methodology as for Category 2. EPA believes that some NO_X benefits may be achieved by adopting the MARPOL Annex VI NO_X standard for engines used in U.S. flagged vessels. Table 14 presents projected emissions from Category 3 engines operated in U.S. waters. Note that the reductions here present both the impacts, in the U.S., of U.S. flagged vessels meeting the MARPOL Annex VI NO_X standard and the potential impacts if foreign flagged vessels were to meet the MARPOL Annex VI standard.

TABLE 14.—CATEGORY 3 BASELINE AND PROJECTED EMISSIONS INVENTORY UNDER VARYING IMPLEMENTATION OF MARPOL ANNEX VI CONTROLS

[Thousand short tons]

Year	NO_X			HC	PM	CO
	base	Annex VI applied to U.S.-flag vessels only	Annex VI applied to all vessels	base	base	base
2000	273	272	271	8.1	21.2	25.0
2010	301	290	279	9.0	23.4	27.6
2020	333	310	289	9.9	25.8	30.5
2030	368	338	309	10.9	28.6	33.7
2040	406	372	338	12.1	31.5	37.2

4. Total Impacts

Table 15 contains the baseline annual emissions from marine diesel engines as a whole as well as projections of the annual emissions with the MARPOL Annex VI requirements and proposed standards in place. According to this analysis, the proposed emission limits would result in reductions, beyond the MARPOL Annex VI limits, of 10 percent HC, 28 percent NO_X, 12 percent PM, and 3 percent CO from marine diesel engines in 2020. Nationally, these reductions represents reductions of 1.3 percent NO_X and 0.1 percent PM. Obviously, the percent reduction would be much higher for port areas. This is especially true for San Diego, Beaumont-Port Arthur, San Francisco and similar ports where marine diesel engines account for a large fraction of the NO_X emissions.[48]

[48] Marine diesel engines make up about approximately 17% of the NO_X on a summer day for San Diego, 15% for Beaumont-Port Arthur, and 12% for San Francisco. *See*, Commercial Marine Vessel Contributions to Emission Inventories, Final Report, Submitted by Booz-Allen & Hamilton, Inc., October 7, 1991.

TABLE 15.—EMISSION INVENTORY IMPACTS OF THE PROPOSED RULE

		2000	2010	2020	2030
HC 10^3 short tons	Baseline	31.3	34.8	38.7	43.2
	Controlled	31.3	33.3	35.4	39.3
	Reduction	0%	4%	9%	9%
NO_X 10^3 short tons	Baseline	1,005	1,117	1,244	1,390
	IMO	1,001	1,072	1,162	1,287
	Controlled	1,001	965	819	815
	Reduction	0%	10%	28%	34%
PM 10^3 short tons	Baseline	42.3	46.9	52.2	58.2
	Controlled	42.3	44.1	45.7	50.2
	Reduction	0%	6%	12%	14%
CO 10^3 short tons	Baseline	133	147	165	184
	Controlled	133	146	160	177
	Reduction	0%	1%	3%	4%

In addition to the effect of the proposed standards on direct PM emissions noted above, the proposed standards are expected to reduce the concentrations of secondary PM. Secondary PM is formed when NO_X reacts with ammonia in the atmosphere to yield ammonium nitrate particulate. As described in Chapter 5 of the Draft RIA, each 100 tons of NO_X reduction results in about a 4-ton reduction in secondary PM. This conversion rate varies from region to region, and is greatest in the West. EPA estimates that the 425,000 tons per year total NO_X reduction projected for marine engines in 2020 would result in about a 17,000 tons per year reduction in secondary PM. This secondary PM reduction is more than double the direct PM reductions for 2020 projected for this proposed rule.

EPA also believes the proposed regulations will tend to reduce noise. One important source of noise in diesel combustion is the sound associated with the combustion event itself. When a premixed charge of fuel and air ignites, the very rapid combustion leads to a sharp increase in pressure, which is easily heard and recognized as the characteristic sound of a diesel engine. The conditions that lead to high noise levels also cause high levels of NO_X formation. Fuel injection changes and other NO_X control strategies therefore typically reduce engine noise, sometimes dramatically.

EPA does not anticipate any negative impacts on energy or safety as a result of this proposed rule. The impact of the proposed standards on energy is measured by the effect on fuel consumption from complying engines. Although it is not expected to be a primary compliance strategy, marine engine manufacturers could retard engine timing to comply with emission limits. This could lead to an increase in fuel consumption in the absence of other changes to the engines. Most of the technology changes anticipated in response to the proposed standards, however, have the potential to reduce fuel consumption as well as emissions. Therefore, on balance, no increase in energy consumption is expected. As far as safety is concerned, EPA believes that marine engine manufacturers will use only proven technology that is currently used in other engines such as nonroad land-based diesel applications, locomotives, and diesel trucks.

B. Economic Impacts

EPA expects that in almost all cases, manufacturers will produce a complying marine engine by adapting an engine that has been designed and certified to meet highway or nonroad emission standards. This analysis considers the cost of these upgrades to the base engines as part of the impact of new marine emission standards; variable costs are applied directly, with an additional fixed cost added to apply the technologies to marine engines. The analysis arrives at the full cost impact by considering changes to turbocharging and aftercooling applicable to marine engines. Full details of EPA's cost analysis can be found in Chapter 4 of the Draft RIA.

1. Methodology

In assessing the economic impact of setting emission standards, EPA has made a best estimate of the combination of technologies that an engine manufacturer might use to meet the new standards at an acceptable cost. In some cases, however, it is difficult to make a distinction between technologies needed to reduce emissions for compliance with emission standards and those technologies that offer other benefits for improved fuel economy, power density, and other aspects of engine performance. EPA believes that without new emission standards, manufacturers would continue research on and eventually deploy many technological upgrades to improve engine performance or more cost-effectively control emissions. Modifications to fuel injection systems and the introduction of electronic controls are expected to continue, regardless of any change in emission standards, to improve engine performance. This is especially true for marine engines, which generally benefit from the transfer of highway and land-based engine technology improvements. Some further development with a focus on NO_X, HC, and PM emissions will nevertheless play an important role in achieving emission reduction targets.

Because several technology upgrades have benefits that go beyond reducing emissions, a difficulty in assessing the impact of new emission standards is establishing the appropriate technology baseline from which to make projections. Ideally, the analysis would establish the mix of technologies that manufacturers would have introduced absent the changes in emission standards, then make a projection for any additional changes in hardware or calibration required to comply with those standards. This is especially important for marine engines, since technology improvements are often carried over from counterpart land-based engines. The costs of those projected technology and calibration changes would then most accurately quantify the impact of setting new emission standards. While it is difficult to take into account the effect of ongoing technology development, EPA is concerned that assessing the full cost of the anticipated technologies as an impact of the new emission standards would inappropriately exclude from consideration the observed benefits for engine performance, fuel consumption,

and durability.[49] Short of having sufficient data to predict the future with a reasonable degree of confidence, EPA faces the need to devise an alternate approach to quantifying the true impact of the new emission standards. EPA requests comment on the most appropriate way of accounting for these non-emission benefits.

A variety of technological improvements are projected for complying with the new emission standards. Selecting these technology packages requires extensive engineering analysis and judgment. The fact that manufacturers will be applying extensive effort to improve diesel engine technologies across programs ensures that these technologies will develop significantly before reaching production. This ongoing research and development will lead to reduced costs in three ways. First, research will lead to enhanced effectiveness for individual technologies, allowing manufacturers to use simpler packages of emission control technologies than would otherwise be predicted given the current state of development. Similarly, the continuing effort to improve the emission control technologies will include innovations that allow lower-cost production. Finally, manufacturers will focus research efforts on any potential drawbacks, such as increased fuel consumption or maintenance costs, attempting to minimize or overcome any negative effects.

Estimated cost increases are presented as incremental changes in purchase price. The incremental change in purchase price for new engines and equipment is comprised of variable costs (for hardware and assembly time) and fixed costs (for research and development, retooling, and certification). Total operating costs, including maintenance and fuel consumption, are considered as well. Cost estimates based on these projected technology packages represent an expected incremental cost of engines as they begin to comply with new emission standards. Costs in subsequent years are projected to decrease due to several factors, as described below. Separate projected costs were derived for engines used in five different ranges of rated power; costs were developed for engines near the middle of the listed ranges. All costs are presented in 1998 dollars.

While the following analysis projects a relatively uniform emission control strategy for designing the different categories of engines, this should not suggest that EPA expects a single combination of technologies will be used by all manufacturers. In fact, depending on basic engine emission characteristics, EPA expects that control technology packages will gradually be fine-tuned to different applications. Furthermore, EPA expects manufacturers to use averaging, banking, and trading programs as a means to deploy varying degrees of emission control technologies on different engines. EPA nevertheless believes that the projections presented here provide a cost estimate representative of the different approaches manufacturers may ultimately take.

2. Engine Technologies

The land-based engines that serve as the base engines for marine diesel applications will be changing as a result of new emission standards adopted for nonroad and locomotive engines. Most new land-based nonroad and locomotive engines rated over 37 kW will be subject to two new tiers of standards spanning the next ten years. These engines will be designed, manufactured, and certified to have reduced emissions. The technological challenge for developing compliant marine engines is therefore to make the necessary engine modifications for marine applications without substantially increasing emission levels, while ensuring that these emission levels are maintained over the range of potential marine operation.

Manufacturers of Category 1 engines are expected to comply with the proposed Tier 2 emission limits by conducting basic engine modifications, upgrading fuel systems, adding some degree of electronic controls, or improving aftercooling systems. Manufacturers of Category 2 engines are expected to redesign combustion chambers, improve high-pressure electronic fuel injection systems, and upgrade or add turbocharging and aftercooling. For Tier 3 emission limits, all manufacturers are expected to rely on some form of electronically controlled common rail fuel system with separate-circuit aftercooling and exhaust gas recirculation.

Except for the aftercooling changes, hardware improvements for nonroad and locomotive engines should be transferrable to marine engines, in many cases with some degree of adaptation. The analysis includes a substantial amount of development time to make adjustments for turbocharger matching, reprogramming electronic control software, optimizing for emission performance over the not-to-exceed zone, and other changes that may be needed to prepare an engine for marine applications. Also, because manufacturers will in many cases be producing a new engine design outside of the normal product development cycle, extensive development costs are included to design a marine version of a base engine, taking into account not only direct expenses for controlling emissions, but also considering some need for re-optimizing performance. Finally, since marine engines rely on seawater, not the ambient air, for rejecting heat from the engine and aftercooler, the cost of adding these systems are considered separately.

3. Estimated Costs

The projected costs of these new technologies for meeting the new emission limits are itemized in the Draft RIA and summarized in Table 16. Anticipated incremental cost impacts of the Tier 2 emission limits for the first years of production range from $2,600 to $54,000 per engine, in general with proportionally higher projected costs for larger engines. Estimated costs for Tier 3 emission limits, which are calculated incremental to the Tier 2 projections, are similar, with first-year costs ranging from $5,300 to $45,000. Long-term impacts on engine costs are expected to be much lower, dropping to levels between $1,100 and $11,000 for Tier 3 engines. Most of this cost reduction is accounted for by the fact that development time and other fixed costs dominate the cost analysis, but disappear after the projected five-year amortization period.

The cost analysis also includes an estimated burden resulting from the need to do additional maintenance work during periodic rebuilds. Complying engines will be equipped with technologies that will require replacement of hardware that is either more expensive than from earlier models, or that is only used because of emission standards. Using typical rebuild schedules, the analysis projects incremental costs for multiple rebuilds, resulting in net-present-value costs that range from $700 to $12,000. In addition to rebuild cost impacts, Table 16 includes an estimated cost burden for conducting production line testing of 1 percent of total industry-wide production.

Ship and boat builders are not expected to face any increase in costs as a result of the new emission standards. Commercial vessels are built to accommodate a wide range of engines. Customers are therefore able to order a vessel by choosing from a broad selection of engine models. Because

[49] While EPA does not anticipate widespread, marked improvements in fuel consumption, small improvements on some engines may occur.

there is a degree of customizing in the construction of commercial vessels, EPA does not expect that future production will be sensitive to the anticipated changes in engine design resulting from the new emission standards. EPA requests comment on the extent to which commercial vessel construction may be affected by new emission standards.

TABLE 16.—PROJECTED INCREMENTAL COSTS BY POWER RATING (KW)

Power rating (kW)	Tier	Incremental engine cost*	Incremental operating cost per engine (npv)
37–225	Tier 2	$2,577	$737
	Tier 3 (years 1–5)	5,303	829
	Tier 3 (year 6 and later)	1,112	829
225–560	Tier 2	4,249	1,128
	Tier 3 (years 1–5)	6,210	1,119
	Tier 3 (year 6 and later)	1,829	1,119
560–1000	Tier 2	25,319	207
	Tier 3 (years 1–5)	25,507	2,647
	Tier 3 (year 6 and later)	5,601	2,647
1000–2000	Tier 2	22,725	635
	Tier 3 (years 1–5)	26,537	4,519
	Tier 3 (year 6 and later)	10,659	4,519
2000–5000	Tier 2	54,103	12,430
	Tier 3 (years 1–5)	44,583	2,874
	Tier 3 (year 6 and later)	3,169	2,874

*Tier 3 costs are calculated incremental to Tier 2 estimates.

Characterizing these estimated costs in the context of their fraction of the total purchase price and life-cycle operating costs is helpful in gauging the economic impact of the new standards. Although the incremental cost projections in Table 16 increase dramatically with increasing power rating, they in fact represent a comparable price change relative to the total price of the engine. The estimated first-year cost increases are all at most 3 percent of estimated vessel prices, with even lower long-term effects, as described above.

Since vessel owners also decide between replacing and rebuilding existing engines, the cost impact relative to engine price is also relevant. EPA estimates that Tier 3 cost impacts will approach 10 or 15 percent of total engine prices. Once fixed costs are amortized, the cost impact drops to a range between 1 and 5 percent of total engine prices. EPA requests comment on the likelihood that these costs will affect normal rates of turnover to new engines.

4. Aggregate Costs to Society

The above analysis presents unit cost estimates for each power category. These costs represent the total set of costs borne by engine manufacturers to comply with emission standards. With current data for engine and vessel sales for each category and projections for the future, these costs can be translated into projected direct costs to the nation for the new emission standards in any year. Aggregate costs are estimated at about $19 million in the first year the new standards apply, increasing to a peak of about $57 million in 2008 as increasing numbers of engines become subject to the new standards. The following years show a drop in aggregate costs as the per-unit cost of compliance decreases, resulting in aggregate costs of about $14 million in 2015, followed by slowly growing costs due to increasing sales over time.

5. Sensitivity Analysis

There has been some concern expressed that the technologies used to meet emission requirements for land-based engines will be less effective at controlling emissions from marine engines. Some of the reasons suggested for needing a more aggressive approach include the change in duty cycle, the effects of ''marinizing'' an engine, and the need to comply with emission limits across not-to-exceed zones. Manufacturers could rely on injection timing retard as a technology option for achieving an additional measure of NO_X control. Also, manufacturers may choose, for example, to avoid the high R&D costs of implementing a new technology for an engine family with low sales volume by relying on timing retard as a lower-cost alternative. In addition, manufacturers using EGR may need to add exhaust gases during medium-and high-load operation to the point that there would be an increase in fuel consumption that cannot be offset by improvements such as better control of fuel injection. EPA therefore conducted a sensitivity analysis to show the costs associated with a fuel penalty resulting from relying on retarded timing or EGR.

Because the requirement to control emissions throughout an engine's operating range poses the greatest challenge at low speeds and loads, EPA calculated the costs of increasing fuel consumption by one percent at modes 2 and 3 and by three percent at mode 4 (lightest load operation). Using the weightings for the composite duty cycle, increased life-cycle fuel consumption from this net 1.0 percent fuel penalty can be calculated and then discounted to the present at a 7 percent rate. The resulting estimated net-present-value cost increase ranges from $400 for a 100 kW engine to $19,000 for a 3000 kW engine. Considering the established effectiveness of timing retard as a strategy to control NO_X emissions, this may be considered a viable approach, either as a substitute or a supplemental technology.

C. Cost-effectiveness

EPA has estimated the cost-effectiveness (i.e., the cost per ton of emission reduction) of the proposed marine standards for the same nominal power ratings of marine engines and vessels highlighted earlier in this section. This analysis has been performed only for Category 1 and Category 2 marine engines, since the proposed regulation would not apply to Category 3 engines. Chapter 6 of the Draft RIA contains a more detailed discussion of the cost-effectiveness analysis.

As described in the Draft RIA, neither costs nor emission benefits were attributed to the not-to-exceed provisions included in this proposal. The calculated cost-effectiveness of the proposed emission limits presented here therefore includes all the anticipated effects on costs and emission reductions.

1. Tier 2

For determining the cost-effectiveness of the Tier 2 portion of this proposal, only benefits beyond those achieved by the MARPOL Annex VI standard are considered. EPA believes this is a conservative estimate because EPA attributed all of the costs of the technology associated with the Tier 2 levels to this action and did not attribute any of these costs to the MARPOL Annex VI standard. For the sake of this analysis, EPA assumed that all of the increased costs were incurred to achieve $HC+NO_X$ benefits. NO_X reductions represent approximately 98 percent of the total $HC+NO_X$ emission reductions expected from the proposed standards. Table 17 presents the cost-effectiveness of the Tier 2 standards.

TABLE 17.—COST-EFFECTIVENESS OF THE PROPOSED MARINE TIER 2 STANDARDS FOR HC AND NO_X

Nominal power (kW)	NPV of total lifetime costs	NPV benefits (short tons)	Discounted cost-effectiveness	Cost-effectiveness without non-emission benefits
100	$1,938	4.3	$449	$738
400	3,016	26	116	201
750	22,713	80	283	317
1500	20,386	267	76	86
3000	47,754	829	58	76

Weighting the projected cost and emission benefit numbers presented above by the populations of the individual power categories, EPA calculated the cost-effectiveness of the proposed $HC+NO_X$ standards for Category 1 and 2 both separately and combined. Table 18 contains the resulting aggregate cost-effectiveness results for the proposed Tier 2 standards.

TABLE 18.—AGGREGATE COST-EFFECTIVENESS FOR THE PROPOSED MARINE TIER 2 STANDARDS FOR HC AND NO_X

	NPV of total lifetime costs	NPV benefits (short tons)	Discounted cost-effectiveness
Category 1	$3,669	24	$156
Category 2	47,754	829	58
Combined	4,617	41	113

While the cost estimates described under the Economic Impacts do not take into account the observed value of performance improvements in the field, these non-emission benefits should be taken into account in the calculation of cost-effectiveness. EPA believes that an equal weighting of emission and non-emission benefits is justified for those technologies which clearly have substantial non-emission benefits, namely electronic controls, fuel injection changes, turbocharging, and engine modifications. For some or all of these technologies, a greater value for the non-emission benefits could likely be justified. This has the effect of halving the cost for those technologies in the cost-effectiveness calculation. The cost-effectiveness values in this document are based on this calculation methodology. Cost-effectiveness values are shown without adjustment for non-emission benefits in Tables 17 and 19 for comparison purposes. EPA requests comment on this approach.

2. Tier 3

As described above in the preceding section, the projected costs of complying with the proposed standards will vary by the rated power and model year (i.e., year 1 versus year 6). Therefore, the cost-effectiveness will also vary from model year to model year. For comparison purposes, the discounted costs, emission reductions, and cost-effectiveness of the marine Tier 3 $HC+NO_X$ standards are shown in Table 19 for the same model years discussed in the preceding section. The cost-effectiveness of the proposed Tier 3 standards has been calculated incrementally to the costs and benefits associated with the proposed Tier 2 standards. This analysis was performed similarly to the Tier 2 analysis. According to this analysis, the cost-effectiveness of the proposed Tier 3 program is roughly equivalent to that of the proposed Tier 2 program. Table 19 presents the cost-effectiveness results for the five nominal power ratings.

TABLE 19.—COST-EFFECTIVENESS OF THE PROPOSED MARINE TIER 3 STANDARDS FOR HC AND NO_X

Nominal power (kW)	Model year grouping	NPV of total lifetime costs	NPV benefits (short tons)	Discounted cost-effectiveness	Cost-effectiveness without non-emission benefits
100	1 to 5	$4,831	4.2	$1,155	$1,407
	6+	1,166		279	451
400	1 to 5	5,804	30	196	236
	6+	1,726		58	99
750	1 to 5	23,834	77	308	351
	6+	4,831		62	103
1500	1 to 5	24,279	136	178	216
	6+	8,402		62	112

TABLE 19.—COST-EFFECTIVENESS OF THE PROPOSED MARINE TIER 3 STANDARDS FOR HC AND NO_X—Continued

Nominal power (kW)	Model year grouping	NPV of total lifetime costs	NPV benefits (short tons)	Discounted cost-effectiveness	Cost-effectiveness without non-emission benefits
3000	1 to 5	36,652	290	127	163
	6+	4,553		16	20

As with Tier 2, EPA calculated the cost-effectiveness of the proposed Tier 3 HC+NO_X standards for Category 1 and 2 both separately and combined by weighting the projected cost and emission benefits by the populations of the individual power categories. Table 20 contains the resulting aggregate cost-effectiveness results for the proposed Tier 3 standards.

TABLE 20.—AGGREGATE COST-EFFECTIVENESS FOR THE PROPOSED MARINE TIER 3 STANDARDS FOR HC AND NO_X

	Model year grouping	NPV of total lifetime costs	NPV benefits (short tons)	Discounted cost-effectiveness
Category 1	1 to 5	$6,503	20	$327
	6+	1,709		87
Category 2	1 to 5	36,652	290	127
	6+	4,553		16
Combined	1 to 5	7,151	26	278
	6+	1,799		70

3. Comparison to Other Programs

In an effort to evaluate the cost-effectiveness of the HC+NO_X controls for marine engines, EPA has summarized the cost-effectiveness results for five other recent EPA mobile source rulemakings that required reductions in NO_X (or NMHC+NO_X) emissions. The heavy-duty vehicle portion of the Clean Fuel Fleet Vehicle Program yielded a cost-effectiveness of approximately $1,500 per ton of NO_X. The most recent NMHC+NO_X standards for highway heavy-duty diesel engines yielded a cost-effectiveness of $100–$600 per ton of NMHC+NO_X. The newly adopted standards for locomotive engines yielded a cost-effectiveness of $160–$250 per ton of NO_X. Finally, the recent standards for nonroad engines reported a cost-effectiveness of $410–$600 per ton. The cost-effectiveness of the new HC+NO_X standards for marine diesel engines presented above is more favorable than the cost-effectiveness than any of the other recent programs.

EPA has also summarized the cost-effectiveness results for three other recent EPA mobile source rulemakings that required reductions in PM emissions. The cost-effectiveness of the most recent urban bus engine PM standard was estimated to be $10,000–$16,000 per ton, and the cost-effectiveness of the urban bus retrofit/rebuild program was estimated to be approximately $25,000 per ton. The nonroad FRM reported a cost-effectiveness for PM, using the same conservative method used here for marine, of $2,300 per ton. The PM cost-effectiveness of the new emission standards presented above is more favorable than that of either of the urban bus programs and is comparable to the nonroad rule.

For comparison to other PM control strategies, EPA has also analyzed the PM cost-effectiveness of the new standards if any of the costs were attributed to PM. EPA conservatively made these calculations as if half of the increased costs were attributable to PM control. This approach effectively double-counts these costs, since the full cost of the program is assessed in the calculation of cost-effectiveness for NO_X+HC. This aggregate discounted lifetime cost-effectiveness represents the highest figure that could be expected for cost-effectiveness of the new standards and was calculated to provide an indication of the upper bound of PM cost-effectiveness values. The resulting fleet-wide discounted lifetime cost-effectiveness of the proposed PM standards is approximately $600–$2,600 per ton. This cost-effectiveness is much better than for the urban bus PM standard and the urban bus retrofit/rebuild program and is comparable to the nonroad Tier 2 standards.

In addition to the benefits of reducing ozone within and transported into urban ozone nonattainment areas, the NO_X reductions from the new standards are expected to have beneficial impacts with respect to crop damage, secondary particulate formation, acid deposition, eutrophication, visibility, and forests, as described earlier. Because of the difficulty of quantifying the monetary value of these societal benefits, the cost-effectiveness values presented do not assign any numerical value to these additional benefits. However, based on an analysis of existing studies that have estimated the value of such benefits in the past, the Agency believes that the actual monetary value of the multiple environmental and public health benefits produced by large NO_X reductions similar to those projected under this final rule will likely be greater than the estimated compliance costs.

IX. Public Participation

A. Comments and the Public Docket

Publication of this document opens a formal comment period for this proposal. EPA will accept comments for the period indicated under **DATES** above. The Agency encourages all parties that have an interest in the program described in this document to offer comment on all aspects of this rulemaking. Throughout this proposal are requests for specific comment on various topics.

EPA attempted to incorporate all the comments received in response to the ANPRM, though not all comments are addressed directly in this document. Anyone who has submitted comments on the ANPRM, or any of EPA's previous publications related to marine

diesel engines, and feels that those comments have not been adequately addressed is encouraged to resubmit comments as appropriate.

The most useful comments are those supported by appropriate and detailed rationales, data, and analyses. The Agency also encourages commenters that disagree with the proposed program to suggest and analyze alternate approaches to meeting the air quality goals of this proposed program. All comments, with the exception of proprietary information, should be directed to the EPA Air Docket Section, Docket No. A–97–50 before the date specified above.

Commenters wishing to submit proprietary information for consideration should clearly separate such information from other comments by (1) labeling proprietary information ''Confidential Business Information'' and (2) sending proprietary information directly to the contact person listed (see **FOR FURTHER INFORMATION CONTACT**) and not to the public docket. This will help ensure that proprietary information is not inadvertently placed in the docket. If a commenter wants EPA to use a submission of confidential information as part of the basis for the final rule, then a nonconfidential version of the document that summarizes the key data or information should be sent to the docket.

Information covered by a claim of confidentiality will be disclosed by EPA only to the extent allowed and in accordance with the procedures set forth in 40 CFR part 2. If no claim of confidentiality accompanies the submission when it is received by EPA, it will be made available to the public without further notice to the commenter.

B. Public Hearing

The Agency will hold a public hearing as noted under **DATES** above. Any person desiring to present testimony at the public hearing is asked to notify the contact person listed above at least five business days prior to the date of the hearing. This notification should include an estimate of the time required for the presentation of the testimony and any need for audio/visual equipment. EPA suggests that sufficient copies of the statement or material to be presented be available to the audience. In addition, it is helpful if the contact person receives a copy of the testimony or material prior to the hearing.

The hearing will be conducted informally, and technical rules of evidence will not apply. A sign-up sheet will be available at the hearing for scheduling the order of testimony. A written transcript of the hearing will be prepared. The official record of the hearing will be kept open for 30 days after the hearing to allow submittal of supplementary information.

X. Administrative Requirements

A. Administrative Designation and Regulatory Analysis

Under Executive Order 12866, the Agency must determine whether this regulatory action is ''significant'' and therefore subject to Office of Management and Budget (OMB) review and the requirements of the Executive Order (58 FR 51735, Oct. 4, 1993). The order defines ''significant regulatory action'' as any regulatory action that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or,

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, EPA has determined that this proposal is a ''significant regulatory action.'' If implemented as proposed, EPA's estimates show total societal costs for most years between $15 million and $20 million, with peak costs reaching about $57 million in 2008. This action was submitted to the Office of Management and Budget for review and a Draft RIA has been prepared and is available in the docket associated with this rulemaking. Any written comments from OMB and any EPA response to OMB comments are in the public docket for this proposal.

B. Regulatory Flexibility

The Regulatory Flexibility Act (RFA) generally requires an agency to conduct a regulatory flexibility analysis of any rule subject to notice and comment requirements, unless the Agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small not-for-profit enterprises, and small governmental jurisdictions. For the reasons set out below, this proposed rule would not have a significant impact on a substantial number of small entities.

EPA has identified five types of entities that may be affected by the proposed rule: engine manufacturers, engine dressers, post-manufacture marinizers, commercial vessel builders, and commercial boat builders. A sixth group of entities, recreational vessel builders, is not considered in this analysis because, as described in Section III.B.1, above, EPA is proposing to exempt these engines from the proposed emission control program.

Using the Small Business Administration definition of small for this industry sector (fewer than 500 employees), one group of entities, marine engine manufacturers, presents no small business impacts concerns because all of the manufacturers are large.

There are numerous entities with fewer than 500 employees that manufacture commercial vessels and commercial boats.[50] However, the proposed emission control program is expected to impose very little additional cost on these entities. This is because, according to discussions with several of these vessel and boat builders as well as with one of their trade associations, the production of commercial vessels is flexible enough to accommodate physical changes to the engine without vessel redesign.

As described in Section III.C.2 above, engine dressers are companies that adapt a land-based diesel engine for use in the marine environment by adding mounting hardware, a marine cooling system, a generator, or propeller gears, but without changing the engine in ways that may affect emissions (see Section III.B.2, above). These companies are typically small, regional companies, with few employees and relatively small annual sales in terms of both dollars and units. Because these companies are proposed to be exempt from the certification and compliance programs set out in today's action, EPA believes that they will incur very minor costs as a result of the proposed program. Their only compliance burden consists of an annual report that must be submitted to

[50] Commercial vessels are larger merchant vessels, typically exceeding 400 feet in length and generally used in waterborne trade and/or passenger transport. Commercial boats are smaller service, industrial, and fishing vessels generally used in inland and coastal waters. A more in-depth description of these industry sectors in contained in ''Industry Characterization: Commercial Marine Vessel Manufacturers'' prepared by ICF Incorporated for US Environmental Protection Agency, Contract No. 68–C5–0010, Work Assignment 211, September 1998 (Docket No. A–97–50).

EPA to demonstrate that they meet the criteria for the engine dresser exemption described in Section III.B.2. This reporting requirement is expected to impose very little additional cost on these companies.

The group of small entities likely to be affected by the proposed rule are post-manufacture marinizers (PMM). Unlike engine dressers, PMM modify a land-based engine for use in the marine environment by changing it in ways that may affect emissions. This includes, but is not limited to, changes to the fuel or cooling systems. The following discussion of the impacts on small post-manufacture marinizers is derived from an impact assessment prepared for this rulemaking by ICF Incorporated and discussions with small PMM.[51]

Through conversations with engine manufacturers and vessel builders, EPA initially identified twelve small post-manufacture marinizers. Four of these were subsequently eliminated from the Agency's PMM impact analysis (two were eliminated because there were subsidiary companies of other companies on the list; two others were eliminated because they do not produce Category 1 marine engines). The eight remaining companies were used to develop a model small company, for purposes of exploring the impact of this rulemaking. Using this model small company as a guide, it was estimated that average compliance costs would range from 1.3 percent to 3.9 percent, depending on the compliance cost scenario used.[52] EPA thus concludes that, provided the compliance burdens of these companies can be reduced, an impact of approximately 1.3 percent can be anticipated. As discussed above, this proposal contains many flexibility provisions for small post-manufacture marinizers, including an expanded definition of engine family, which is expected to reduce the number of certification tests these companies will be required to do; a streamlined certification process, beginning the year after the implementation of the emissions limits provided the emissions of their highest emitting engine has not changed; an extra year for compliance; and special hardship provisions.

Because the number of companies examined is so small, EPA also performed an analysis using company-specific data instead of the model company. According to this data, in the least costly compliance scenario, four small PMM may be affected by more than 3 percent of sales, 2 companies by 1–3 percent of sales, and 2 companies less than 1 percent of sales,. Of the four companies originally projected to be affected by more than 3 percent of sales, two were eliminated because they are, in fact, engine dressers; hence, the original estimate of 3 percent is an overstatement of costs for these companies. As discussed above, engine dressers would only be subject to a reporting requirement, which is expected to impose very little additional cost. Consequently, it is expected that two small companies may be affected by more than 3 percent of annual sales. However, it may be possible for these companies to reduce the impacts of this rule further. For example, these companies could marinize a cleaner engine, thus reducing the design and development costs associated with bringing a previous tier engine to the proposed emission limits. Alternatively, they may be able to work more closely with the base engine manufacturer to reduce the need for extensive redesign of their marinization process.

Subsequent to completion of the ICF impact assessment, EPA identified several other small PMM (see the Draft Regulatory Assessment for a complete list of small PMM). However, analysis of their financial data does not change the above conclusion that most small PMM could avoid high compliance costs by applying the proposed small PMM flexibility provisions. Therefore, EPA believes it is appropriate to certify this rulemaking as not having a significant economic impact on a substantial number of small companies.

Therefore, I certify that this action will not have a significant economic impact on a substantial number of small entities.

The Agency continues to be interested in the potential impacts of the proposed rule on small entities and welcomes additional comments during the rulemaking process on issues related to such impacts. The Agency is continuing its efforts to notify other small business engine and equipment manufacturers of this rule and inform them of their opportunities for providing feedback to the Agency.

C. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* An Information Collection Request has been prepared by EPA, and a copy may be obtained from Sandy Farmer, OPPE Regulatory Information Division; U.S. Environmental Protection Agency (2137); 401 M St., S.W.; Washington, DC 20460 or by calling (202) 260–2740.

The information being collected is to be used by EPA to ensure that new marine diesel engines comply with applicable emissions standards through certification requirements and various subsequent compliance provisions.

The annual public reporting and recordkeeping burden for this collection of information is estimated to average 589 hours per response, with collection required annually. The estimated number of respondents is 32. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, disclose, or provide information to or for a federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjusting the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are displayed in 40 CFR Part 9 and 48 CFR Chapter 15.

Comments are requested on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques. Send comments on the ICR to the Director, OPPE Regulatory Information Division; U.S. Environmental Protection Agency (2137); 401 M St., S.W.; Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th St., N.W., Washington, DC 20503, marked ''Attention: Desk Officer for EPA.'' Include the ICR number in any correspondence. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after December 11, 1998, a comment to OMB is best ensured of having its full effect if OMB

[51] Characterization and Small Business Impact Assessment for Small and Large Marine Compression Ignition Engine Manufacturers/Marinizers, prepared by ICF Incorporated for U.S. Environmental Protection Agency, Contract Number 68–C5–0010, Work Assignment Number 211, September 1998 (Air Docket A–97–50).

[52] Three cost scenarios were explored: $100,000, $200,000, and $300,000 per engine family.

receives it by January 11, 1999. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), P.L.104–4, establishes requirements for federal agencies to assess the effects of their regulatory actions on state, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''federal mandates'' that may result in expenditures to state, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the Administrator publishes with the final rule an explanation of why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that this rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any one year. The rule does not impose any enforceable duties on State, local, or tribal governments, i.e., they manufacture no engines and are therefore not required to comply with the requirements of this rule. For the same reason, EPA has determined that this rule also contains no regulatory requirements that might significantly or uniquely affect small governments. EPA projects that annual economic effects will be far less than $100 million. Thus, this proposed rule is not subject to the requirements of sections 202 and 205 of the UMRA.

E. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (''NTTAA''), Public Law 104–113, § 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless doing so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This proposed rule involves technical standards. As described in Section V.E. above, ISO standards are a potentially applicable voluntary consensus standard. The Agency has decided, however, not to propose ISO procedures in this rulemaking. The Agency has determined that these procedures would be impractical because they rely too heavily on reference testing conditions. Because the test procedures in these regulations need to represent in-use operation typical of operation in the field, they must be based on a range of ambient conditions. EPA has determined that the ISO procedures are not broadly usable in their current form, and therefore cannot be adopted by reference. EPA has instead chosen to rely on the procedures outlined in 40 CFR Part 89, Subparts D and E. EPA is hopeful that future ISO test procedures will be developed that are usable for the broad range of testing needed, and that such procedures could then be adopted by reference. EPA also expects that any development of revised test procedures will be done in accordance with ISO procedures and in a balanced manner and thus include the opportunity for involvement of a range of interested parties (potentially including parties such as industry, EPA, state governments, and environmental groups) so that the resulting procedures can represent these different interests.

F. Protection of Children

Executive Order 13045, entitled ''Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997), applies to a rule that is determined to be ''economically significant,'' as defined under Executive Order 12866, if the environmental health or safety risk addressed by the rule has a disproportionate effect on children. For these rules, the Agency must evaluate the environmental health or safety effects of the planned rule on children; and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This proposed rule is not subject to Executive Order 13045, because it does not involve decisions on environmental health or safety risks that may disproportionately affect children. Moreover, this rule is determined not to be economically significant under Executive Order 12866.

G. Enhancing the Intergovernmental Partnership under Executive Order 12875

Under Executive Order 12875, EPA may not issue a regulation that is not required by statute and that creates a mandate upon a State, local or tribal government, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by those governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 12875 requires EPA to provide to the Office of Management and Budget a description of the extent of EPA's prior consultation with representatives of affected State, local and tribal governments, the nature of their concerns, copies of any written communications from the governments, and a statement supporting the need to issue the regulation. In addition, Executive Order 12875 requires EPA to develop an effective process permitting elected officials and other representatives of State, local and tribal governments ''to provide meaningful and timely input in the development of regulatory proposals containing significant unfunded mandates.''

This rule would not create a mandate on State, local or tribal governments. The rule would not impose any enforceable duties on these entities, because they do not manufacture any engines that are subject to this rule. This rule would be implemented at the federal level and impose compliance obligations only on private industry. Accordingly, the requirements of section 1(a) of Executive Order 12875 do not apply to this rule.

H. Consultation and Coordination with Indian Tribal Governments

Under Executive Order 13084, EPA may not issue a regulation that is not required by statute, that significantly or uniquely affects the communities of Indian tribal governments, and that imposes substantial direct compliance costs on those communities, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 13084 requires EPA to provide to the Office of Management and Budget, in a separately identified section of the preamble to the rule, a description of the extent of EPA's prior consultation with representatives of affected tribal governments, a summary of the nature of their concerns, and a statement supporting the need to issue the regulation. In addition, Executive Order 13084 requires EPA to develop an effective process permitting elected officials and other representatives of Indian tribal governments ''to provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities.''

This rule would not significantly or uniquely affect the communities of Indian tribal governments. As noted above, this rule would be implemented at the federal level and impose compliance obligations only on private industry. Accordingly, the requirements of section 3(b) of Executive Order 13084 do not apply to this rule.

XI. Statutory Authority

In accordance with section 213(a) of the Clean Air Act, 42 U.S.C. 7547(a), EPA conducted a study of emissions from nonroad engines, vehicles, and equipment in 1991. Based on the results of that study, EPA determined that emissions of NO_X, VOCs (including HC), and CO from nonroad engines and equipment contribute significantly to ozone and CO concentrations in more than one nonattainment area (see 59 FR 31306, June 17, 1994). Given this determination, section 213(a)(3) of the Act requires EPA to promulgate (and from time to time revise) emissions standards for those classes or categories of new nonroad engines, vehicles, and equipment that in EPA's judgment cause or contribute to such air pollution. EPA has determined that marine diesel engines rated over 37 kW ''cause or contribute'' to such air pollution. (See the June 1994 final rule and Section II.A. above).

Where EPA determines that other emissions from new nonroad engines, vehicles, or equipment significantly contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, section 213(a)(4) authorizes EPA to establish (and from time to time revise) emission standards from those classes or categories of new nonroad engines, vehicles, and equipment that EPA determines cause or contribute to such air pollution. In the June 1994 final rule, EPA made this determination for emissions of PM and smoke from nonroad engines in general and for diesel nonroad engines rated over 37 kW. With this document, EPA is making the same findings for marine diesel engines. (See Section II.A. above).

List of Subjects in 40 CFR Part 94

Environmental protection, Administrative practice and procedure, Confidential business information, Diesel fuel, Imports, Incorporation by reference, Motor vehicle pollution, Reporting and recordkeeping requirements, Research, Warranties.

Dated: November 24, 1998.

Carol M. Browner,

Administrator.

For the reasons set out in the preamble, title 40, chapter I, of the Code of Federal Regulations is proposed to be amended by adding part 94 as set forth below.

PART 94—CONTROL OF AIR POLLUTION FROM MARINE COMPRESSION-IGNITION ENGINES

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94.512 Suspension and revocation of certificates of conformity.

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Appendix I to Part 94—Emission-Related Engine Parameters and Specifications

Authority: 42 U.S.C. 7522, 7523, 7524, 7525, 7541, 7542, 7543, 7545, 7547, 7549, 7550 and 7601(a).

Subpart A—General Provisions for Emission Regulations for Compression-ignition Marine Engines

§ 94.1 Applicability.

(a) Except as noted in paragraphs (b) and (c) of this section, the provisions of this part apply to manufacturers, rebuilders, owners and operators of:

(1) Marine compression-ignition propulsion engines manufactured on or after January 1, 2004;

(2) Marine compression-ignition auxiliary engines manufactured on or after January 1, 2004; and

(3) Marine vessels manufactured on or after January 1, 2004 and which include a compression ignition engine.

(b) Notwithstanding the provision of paragraph (c) of this section, the requirements and prohibitions of this part do not apply with respect to the engines identified in paragraphs (a)(1) through (3) of this section where such engines are:

(1) Category 3 marine engines;

(2) Engines rated below 37 kW; or

(3) Engines on foreign vessels.

(c) The provisions of subpart L of this part apply to all persons with respect to the engines identified in paragraphs (a)(1) through (3) of this section.

(d) The provisions of this part do not apply to any persons with respect to the engines not identified in paragraphs (a)(1) through (3) of this section.

(e) The prohibition specified in § 94.1103(a)(6) applies to all persons with respect to recreational marine engines. Notwithstanding the provision of paragraph (c) of this section, requirements or prohibitions other than the prohibition specified in § 94.1103(a)(6) of this part do not apply with respect to recreational marine engines.

§ 94.2 Definitions.

(a) The definitions of this section apply to this subpart. They also apply to all subparts of this part, except where noted otherwise.

(b) As used in this part, all terms not defined in this section shall have the meaning given them in the Act:

Act means the Clean Air Act as amended (42 U.S.C. 7401 *et seq.*).

Adjustable Parameter means any device, system, or element of design which is physically or electronically capable of being adjusted (including those which are difficult to access) and which, if adjusted, may affect emissions or engine performance during emission testing.

Administrator means the Administrator of the Environmental Protection Agency or his/her authorized representative.

Aftertreatment system or *aftertreatment component* or *aftertreatment technology* means any system or component or technology mounted downstream of the exhaust valve or exhaust port whose design function is to reduce exhaust emissions.

Applicable standard means a standard to which an engine is subject; or, where an engine is certified to another standard or FEL, applicable standard means the other standard or FEL to which the engine is certified, as allowed by § 94.8. This definition does not apply to subpart D of this part.

Auxiliary means relating to a marine engine that is not a propulsion engine.

Auxiliary emission control device (AECD) means any element of design which senses temperature, vessel speed, engine RPM, atmospheric pressure, manifold pressure or vacuum, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission control system (including, but not limited to injection timing); or any other feature that causes in-use emissions to be higher than those measured under test conditions.

Averaging means the exchange of emission credits among engine families within a given manufacturer's product line.

Banking means the retention of emission credits by a credit holder for use in future calendar year averaging or trading as permitted by the regulations in this part.

Base engine means a land-based engine to be marinized, as configured prior to marinization.

Blue Sky Series engine means an engine meeting the requirements of § 94.7(e).

Calibration means the set of specifications, including tolerances, specific to a particular design, version, or application of a component, or components, or assembly capable of functionally describing its operation over its working range. This definition does apply to subpart B of this part.

Category 1 means relating to a marine engine with a rated power greater than or equal to 37 kilowatts and a specific engine displacement less than 5.0 liters per cylinder.

Category 2 means relating to a marine engine with a specific engine displacement greater than or equal to 5.0 liters per cylinder but less than 20 liters per cylinder.

Category 3 means relating to a marine engine with a specific engine displacement greater than or equal to 20 liters per cylinder.

Commercial marine engine means a marine engine that is not a recreational marine engine.

Compression-ignition means relating to a type of engine with operating characteristics significantly similar to the theoretical Diesel combustion cycle. The non-use of a throttle to regulate intake air flow for controlling power during normal operation is indicative of a compression-ignition engine.

Configuration means any subclassification of an engine family which can be described on the basis of gross power, emission control system, governed speed, injector size, engine

calibration, and other parameters as designated by the Administrator.

Constant-speed engine means an engine that is governed to operate only at a single rated speed.

Crankcase emissions means airborne substances emitted to the atmosphere from any portion of the engine crankcase ventilation or engine lubrication system.

Defeat device means an AECD or other control feature that reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal engine operation and use, unless the AECD or other control feature has been identified by the manufacturer in the application for certification, and:

(1) Such conditions are substantially represented by the portion of the applicable test cycle of § 94.105 during which the applicable emission rates are measured;

(2) The need for the AECD or other control feature is justified in terms of protecting the engine or vessel against damage or accident; or

(3) The AECD or other control feature does not go beyond the requirements of engine starting.

Deterioration factor means the difference between exhaust emissions at the end of useful life and exhaust emissions at the low hour test point expressed as either: the ratio of exhaust emissions at the end of useful life to exhaust emissions at the low mileage test point (for multiplicative deterioration factors); or the difference between exhaust emissions at the end of useful life and exhaust emissions at the low hour test point (for additive deterioration factors).

Diesel fuel means any fuel suitable for use in diesel engines which is commonly or commercially known or sold as diesel fuel.

Dress means to modify a land-based engine for use in a marine vessel, where such modification would not reasonably be expected to potentially affect emissions. This definition does not apply for engines that are not certified to Tier 2 or later standards.

Dresser means any entity that dresses an engine.

Emission control system means those devices, systems or elements of design which control or reduce the emission of substances from an engine. This includes, but is not limited to, mechanical and electronic components and controls, and computer software.

Emission credits means the amount of emission reduction or exceedance, by an engine family, below or above the emission standard, respectively, as calculated under subpart D of this part. Emission reductions below the standard are considered as ''positive credits,'' while emission exceedances above the standard are considered as ''negative credits.'' In addition, ''projected credits'' refer to emission credits based on the projected applicable production/sales volume of the engine family. ''Reserved credits'' are emission credits generated within a calendar year waiting to be reported to EPA at the end of the calendar year. ''Actual credits'' refer to emission credits based on actual applicable production/sales volume as contained in the end-of-year reports submitted to EPA.

Emission-data engine means an engine which is tested for purposes of emission certification or production line testing.

Emission-related defect means a defect in design, materials, or workmanship in a device, system, or assembly which affects any parameter or specification enumerated in Appendix I of this part.

Emission-related maintenance means that maintenance which substantially affects emissions or which is likely to affect the deterioration of the engine or vessel with respect to emissions.

Engine family means a group of engine configurations that are expected to have similar emission characteristics throughout the useful lives of the engines (see § 94.204), and that are (or were) covered (or requested to be covered) by a specific certificate of conformity.

Engineering analysis means a summary of scientific and/or engineering principles and facts that support a conclusion made by a manufacturer, with respect to compliance with the provisions of this part.

EPA Enforcement Officer means any officer or employee of the Environmental Protection Agency so designated in writing by the Administrator or his/her designee.

Exhaust emissions means substances (i.e., gases and particles) emitted to the atmosphere from any opening downstream from the exhaust port or exhaust valve of an engine.

Exhaust gas recirculation means an emission control technology that reduces emissions by routing gases that had been exhausted from the combustion chamber(s) back into the engine to be mixed with incoming air prior to or during combustion. The use of valve timing to increase the amount of residual exhaust gas in the combustion chamber(s) that is mixed with incoming air prior to or during combustion is not considered to be exhaust gas recirculation for the purposes of this part.

Family Emission Limit (FEL) means an emission level declared by the certifying manufacturer to serve in lieu of an otherwise applicable emission standard for certification and compliance purposes in the averaging, banking and trading program. FELs are expressed to the same number of decimal places as the applicable emission standard.

Foreign trade vessel means a vessel that spends less than 25 percent of its operating time within 320 nautical kilometers of U.S. territory, and which does not operate solely between the United States, Canada, Mexico, Bermuda, or the Bahamas.

Foreign vessel means a vessel of foreign registry or a vessel operated under the authority of a country other than the United States.

Fuel system means the combination of fuel tank(s), fuel pump(s), fuel lines and filters, pressure regulator(s), and fuel injection components, fuel system vents, and any other component involved in the delivery of fuel to the engine.

Green Engine Factor means a factor that is applied to emission measurements from an engine that has had little or no service accumulation. The Green Engine Factor adjusts emission measurements to be equivalent to emission measurements from an engine that has had approximately 300 hours of use.

Identification number means a specification (for example, model number/serial number combination) which allows a particular engine to be distinguished from other similar engines.

IMO NO_X Technical Code means the ''Technical Code on Control of Emission of Nitrogen Oxides From Marine Diesel Engines'', as adopted on September 26, 1997 by the International Maritime Organization in conference Resolution 2, Conference of the Parties to the International Convention for the Prevention of Pollution from Ship, 1973 as modified by the protocol of 1978 relating thereto (reported in MP/Conf. 3/35, 22 October 1997). The IMO NO_X Technical Code has been incorporated by reference at § 94.5 of this part.

Importer means an entity or person who imports engines from a foreign country into the United States (including its territories).

Intermediate Speed means peak torque speed if peak torque speed occurs from 60 to 75 percent of rated speed. If peak torque speed is less than 60 percent of rated speed, intermediate speed means 60 percent of rated speed.

If peak torque speed is greater than 75 percent of rated speed, intermediate speed means 75 percent of rated speed.

Low hour engine means an engine during the interval between the time that normal assembly operations and adjustments are completed and the time that 300 additional operating hours have been accumulated (including hours accumulated during emission testing, if performed).

Malfunction means a condition in which the operation of a component in an engine occurs in a manner other than that specified by the certifying manufacturer (e.g., as specified in the application for certification); or the operation of engine in that condition.

Manufacturer means any person engaged in the manufacturing or assembling of new engines or importing such engines for resale, or who acts for and is under the control of any such person in connection with the distribution of such engines. The term manufacturer includes post-manufacturer marinizers, but does not include any dealer with respect to new engines received by such person in commerce.

Marine means relating to a vessel or an engine that is installed or intended to be installed on a vessel.

Marine engine means a diesel engine that is installed or intended to be installed on a vessel. This definition does not include portable auxiliary engines for which the fueling, cooling and exhaust systems are not integral parts of the vessel.

Marine vessel has the meaning specified in the General Provisions of the United States Code, 1 U.S.C. 3.

Maximum rated power means the maximum brake power output of an engine.

Method of aspiration means the method whereby air for fuel combustion enters the engine (e.g., naturally aspirated or turbocharged).

Model year means the manufacturer's annual new model production period which includes January 1 of the calendar year, ends no later than December 31 of the calendar year, and does not begin earlier than January 2 of the previous calendar year. Where a manufacturer has no annual new model production period, model year means calendar year.

New marine engine means:

(1)(i) An engine, the equitable or legal title to which has never been transferred to an ultimate purchaser;

(ii) An engine placed in a vessel, the equitable or legal title to which has never been transferred to an ultimate purchaser; or

(iii) An engine that has not been placed into service on a vessel.

(2) Where the equitable or legal title to an engine or vessel is not transferred to an ultimate purchaser prior to its being placed into service, the engine ceases to be new after it is placed into service.

(3) With respect to imported engines, the term ''new marine engine'' means a engine that is not covered by a certificate of conformity under this part at the time of importation, and that was manufactured after the compliance date of the emission standards in this part which is applicable to such engine (or which would be applicable to such engine had it been manufactured for importation into the United States).

New vessel means a vessel, the equitable or legal title to which has never been transferred to an ultimate purchaser. Where the equitable or legal title to a vessel is not transferred to an ultimate purchaser prior to its being placed into service, the vessel ceases to be new when it is placed into service.

Nonconforming marine engine means a marine engine which is not covered by a certificate of conformity prior to importation or being offered for importation (or for which such coverage has not been adequately demonstrated to EPA); or a marine engine which was originally covered by a certificate of conformity, but which is not in a certified configuration, or otherwise does not comply with the conditions of that certificate of conformity. (Note: Domestic marine engines which are not covered by a certificate of conformity prior to their introduction into U.S. commerce are considered to be noncomplying marine engines.)

Oxides of nitrogen means nitric oxide and nitrogen dioxide. Oxides of nitrogen are expressed quantitatively as if the nitric oxide were in the form of nitrogen dioxide (oxides of nitrogen are assumed to have a molecular weight equivalent to nitrogen dioxide).

Post-manufacture marinizer means a person who produces a marine engine by substantially modifying an engine, whether certified or uncertified, complete or partially complete, and is not controlled by the manufacturer of the base engine or by an entity that also controls the manufacturer of the base engine. For the purpose of this definition, ''substantially modify'' means changing a Tier 2 or later engine in a way that could reasonably be expected to potentially change engine emission characteristics, or changing an uncertified or Tier 1 in any way. Vessel manufacturers that substantially modify engines are post-manufacturer marinizers.

Power assembly means the components of an engine in which combustion of fuel occurs, and consists of the cylinder, piston and piston rings, valves and ports for admission of charge air and discharge of exhaust gases, fuel injection components and controls, cylinder head and associated components.

Presentation of credentials means the display of the document designating a person as an EPA enforcement officer.

Primary fuel means that type of fuel (e.g., petroleum distillate diesel fuel) that is expected to be consumed in the greatest quantity (volume basis) when the engine is operated in use.

Propulsion means relating to an engine that moves a vessel through the water or directs the movement of a vessel.

Rated power means the maximum brakepower output of an engine.

Rated speed is the maximum test speed defined in § 94.107.

Rebuilder means any person that rebuilds or remanufactures an engine.

Recreational marine engine means a propulsion marine engine that is intended by the manufacturer to be installed on a recreational vessel, and which is permanently labeled as follows:

''THIS RECREATIONAL ENGINE DOES NOT COMPLY WITH FEDERAL MARINE ENGINE EMISSION REQUIREMENTS FOR NONRECREATIONAL VESSELS. INSTALLATION OF THIS ENGINE IN ANY NONRECREATIONAL VESSEL IS A VIOLATION OF FEDERAL LAW SUBJECT TO CIVIL PENALTY.''

Recreational vessel means a vessel being manufactured or operated primarily for pleasure, or being leased, rented or chartered to another for the latter's pleasure (except where the vessel is leased, rented, or chartered for more than six passengers). Vessels for hire which can carry more than six passengers, whether or not they ever actually do, are not recreational vessels. For this definition the term ''operated primarily for pleasure,'' does not include vessels used solely for competition or used at any time in any other way to generate income or revenue in any way not associated with the hiring out of the vessel to other people for their pleasure.

Service life means the total life of an engine. Service life begins when the engine is originally manufactured and continues until the engine is permanently removed from service.

Small manufacturer means a manufacturer that is classified as a small business by the Small Business Administration.

Specific emissions means emissions expressed on the basis of observed brake

power, using units of g/kW-hr. Observed brake power measurement includes accessories on the engine if these accessories are required for running an emission test (except for the cooling fan). When it is not possible to test the engine in the gross conditions, for example if the engine and transmission form a single integral unit, the engine may be tested in the net condition. Power corrections from net to gross conditions will be allowed with prior approval of the Administrator.

Specified by a certificate of conformity or *specified in a certificate of conformity* means stated or otherwise specified in a certificate of conformity or an approved application for certification.

Test engine means an engine in a test sample.

Test sample means the collection of engines or vessels selected from the population of an engine family for emission testing.

Tier 2 means relating to an engine subject to the Tier 2 emission standards listed in § 94.8.

Tier 3 means relating to an engine subject to the Tier 3 emission standards listed in § 94.8.

Total hydrocarbon equivalent means the sum of the carbon mass contributions of non-oxygenated hydrocarbons, alcohols and aldehydes, or other organic compounds that are measured separately as contained in a gas sample, expressed as petroleum-fueled engine hydrocarbons. The hydrogen-to-carbon ratio of the equivalent hydrocarbon is 1.85:1.

Trading means the exchange of engine emission credits between credit holders.

Ultimate purchaser means, with respect to any new engine or vessel, the first person who in good faith purchases such new engine or vessel for purposes other than resale.

United States. United States includes the customs territory of the United States as defined in 19 U.S.C. 1202, and the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

U.S.-directed production volume means the number of marine engine units, subject to this part, produced by a manufacturer for which the manufacturer has reasonable assurance that sale was or will be made to ultimate purchasers in the United States.

Useful life means the period during which an engine is designed to properly function in terms of reliability and fuel consumption, without being remanufactured, specified as hours of use and years. It is the period during which a new engine is required to comply with all applicable emission standards. (Note: § 94.9(a) specifies minimum requirements for useful life values.)

Voluntary emission recall means a repair, adjustment, or modification program voluntarily initiated and conducted by a manufacturer to remedy any emission-related defect for which notification of engine or vessel owners has been provided.

§ 94.3 Abbreviations.

The abbreviations of this section apply to all subparts of this part and have the following meanings:

AECD—Auxiliary emission control device
API—American Petroleum Institute
ASTM—American Society for Testing and Materials
°C—Degrees celsius
CI—Compression ignition
CO—Carbon monoxide
CO_2—Carbon dioxide
disp.—volumetric displacement of an engine cylinder
EGR—Exhaust gas recirculation
EP—End point
EPA—Environmental Protection Agency
FEL—Family emission limit
ft—foot or feet
FTP—Federal Test Procedure
g—gram(s)
g/kW-hr—Grams per kilowatt hour
gal—U.S. gallon
h—hour(s)
HC—hydrocarbon
Hg—Mercury
hp—horsepower
ICI—Independent Commercial Importer
in—inch(es)
K—Kelvin
kg—kilogram(s)
km—kilometer(s)
kPa—kilopascal(s)
kW—kilowatt
m—meter(s)
max—maximum
mg—milligram(s)
min—minute
ml—milliliter(s)
mm—millimeter
NIST—National Institute for Standards and Testing
NMHC-Non-methane hydrocarbons
NTIS—National Technical Information Service
NO—nitric oxide
NO_2—nitrogen dioxide
NO_X—oxides of nitrogen
No.—number
O_2—oxygen
pct—percent
PM—particulate matter
PMM—post-manufacturer marinizer
ppm—parts per million by volume
ppmC—parts per million, carbon
rpm—revolutions per minute
s—second(s)
SAE—Society of Automotive Engineers
SEA—Selective Enforcement Auditing
SI—International system of units (i.e., metric)
THC—Total hydrocarbon
THCE—Total hydrocarbon equivalent
U.S.—United States
U.S.C.—United States Code
vs—versus
W—watt(s)
wt—weight

§ 94.4 Treatment of confidential information.

(a) Any manufacturer may assert that some or all of the information submitted pursuant to this part is entitled to confidential treatment as provided by 40 CFR part 2, subpart B.

(b) Any claim of confidentiality must accompany the information at the time it is submitted to EPA.

(c) To assert that information submitted pursuant to this part is confidential, a person or manufacturer must indicate clearly the items of information claimed confidential by marking, circling, bracketing, stamping, or otherwise specifying the confidential information. Furthermore, EPA requests, but does not require, that the submitter also provide a second copy of its submittal from which all confidential information has been deleted. If a need arises to publicly release nonconfidential information, EPA will assume that the submitter has accurately deleted the confidential information from this second copy.

(d) If a claim is made that some or all of the information submitted pursuant to this part is entitled to confidential treatment, the information covered by that confidentiality claim will be disclosed by EPA only to the extent and by means of the procedures set forth in 40 CFR part 2, subpart B.

(e) Information provided without a claim of confidentiality at the time of submission may be made available to the public by EPA without further notice to the submitter, in accordance with 40 CFR 2.204(c)(2)(i)(A).

§ 94.5 Reference materials.

(a) The documents in paragraph (b) of this section have been incorporated by reference. The incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at U.S. EPA, OAR, 401 M Street, SW., Washington, DC 20460, or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

(b) The following paragraphs and tables set forth the material that has

been incorporated by reference in this part:

(1) *ASTM material.* The following table sets forth material from the American Society for Testing and Materials that has been incorporated by reference. The first column lists the number and name of the material. The second column lists the section(s) of the part, other than this section, in which the matter is referenced. The second column is presented for information only and may not be all-inclusive. More recent versions of these standards may be used with advance approval of the Administrator. Copies of these materials may be obtained from American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428. The table follows:

Document number and name	40 CFR part 94 reference
ASTM D86–97:	
''Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure''	§ 94.108
ASTM D93–97:	
''Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester''	§ 94.108
ASTM D129–95:	
''Standard Test Method for Sulfur in Petroleum Products (General Bomb Method)''	§ 94.108
ASTM D287–92:	
''Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products'' (Hydrometer Method)	§ 94.108
ASTM D445–97:	
''Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)''	§ 94.108
ASTM D613–95:	
''Standard Test Method for Cetane Number of Diesel Fuel Oil''	§ 94.108
ASTM D1319–98:	
''Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption''	§ 94.108
ASTM D2622–98:	
''Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry''	§ 94.108
ASTM D5186–96: ''Standard Test Method for ''Determination of the Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Tubine Fuels By Supercritical Fluid Chromatography''.	§ 94.108
ASTM E29–93a:	
''Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications''	§§ 94.9, 94.305, 94.509

(2) *IMO material.* The following table sets forth material from the International Maritime Organization that has been incorporated by reference. The first column lists the name of the material. The second column lists the section(s) of the part, other than this section, in which the matter is referenced. The second column is presented for information only and may not be all-inclusive. More recent versions of these standards may be used with advance approval of the Administrator. Copies of these materials may be obtained from the International Maritime Organization, 4 Albert Embankment, London SE1 7SR,U.K. The table follows:

Document number and name	40 CFR part 94 reference
Technical Code on Control of Emission of Nitrogen Oxides From Marine Diesel Engines, as adopted on September 26, 1997 by the International Maritime Organization in conference Resolution 2, Conference of the Parties to the International Convention for the Prevention of Pollution from Ship, 1973 as modified by the protocol of 1978 relating thereto (reported in MP/Conf. 3/35, 22 October 1997).	§ 94.105

§ 94.6 Regulatory structure.

This section provides an overview of the regulatory structure of this part.

(a) The regulations of this part 94 are intended to control emissions from in-use marine engines.

(b) The engines for which the regulations of this part (i.e., 40 CFR part 94) apply are specified by § 94.1, and by the definitions of § 94.2. The point at which an engine or vessel becomes subject to the regulations of this part is determined by the definitions of new marine engine and new marine vessel in § 94.2. Subpart J of this part contains provisions exempting certain engines and vessels from the emission standards in this part under special circumstances.

(c) To comply with the requirements of this part, a manufacturer must demonstrate to EPA that the engine meets the applicable standards of §§ 94.7 and 94.8, and all other requirements of this part. The requirements of this certification process are described in subparts C and D of this part.

(d) Subpart B of this part specifies procedures and equipment to be used for conducting emission tests for the purpose of the regulations of this part.

(e) Subparts E, F, and H of this part specify requirements for manufacturers after certification; that is during production and use of the engines.

(f) Subpart I of this part contains requirements applicable to the importation of marine engines covered by the provisions of this part.

(g) Subpart L of this part describes prohibited acts and contains other enforcement provisions relating to marine engines and vessels covered by the provisions of this part.

(h) Unless specified otherwise, the provisions of this part apply to all marine engines and vessels subject to the emission standards of this part.

§ 94.7 General standards and requirements.

(a) Marine engines and vessels may not be equipped with a defeat device.

(b) An engine may not be equipped with an emission control system for the purpose of complying with emission standards if such a system will cause or contribute to an unreasonable risk to public health, welfare, or safety in its operation or function.

(c) An engine with an emission control system may not emit any noxious or toxic substance which would not be emitted in the operation of the engine in the absence of such a system, except as specifically permitted by regulation.

(d) All engines subject to the emission standards of this part shall be equipped with a connection in the engine exhaust system that is located downstream of the engine and before any point at which the exhaust contacts water (or any other cooling/scrubbing medium) for the temporary attachment of gaseous and/or particulate emission sampling equipment. This connection shall be internally threaded with standard pipe threads of a size not larger than one-half inch, and shall be closed by a pipe-plug when not in use.

(e) All engines subject to the emission standards of this part shall broadcast on engine's controller area networks actual engine percent torque and actual engine speed.

§ 94.8 Exhaust emission standards.

(a) Exhaust emissions from marine compression-ignition engines shall not exceed the applicable exhaust emission standards contained in Table A–1 as follows:

TABLE A–1.—PRIMARY EXHAUST EMISSION STANDARDS (G/KW-HR)

Subcategory liters/cylinder	Tier	Model year*	THC+NO_X g/kW-hr	CO g/kW-hr	PM g/kW-hr
Power ≥ 37 kW and disp. <0.9	Tier 2	2004	7.2	5.0	0.40
	Tier 3	2008	4.0	5.0	.....
0.9 ≤ disp. <1.2	Tier 2	2004	7.2	5.0	0.30
	Tier 3	2008	4.0	5.0	.....
1.2 ≤ disp. <1.5	Tier 2	2004	7.2	3.5	0.20
	Tier 3	2008	4.0	3.5	.....
1.5 ≤ disp. <2.0	Tier 2	2004	7.2	3.5	0.20
	Tier 3	2008	4.0	3.5	.....
2.0 ≤ disp. <2.5	Tier 2	2004	7.2	3.5	0.20
	Tier 3	2008	4.0	3.5	.....
2.5 ≤ disp. <5.0	Tier 2	2006	7.2	3.5	0.20
	Tier 3	2010	5.0	3.5	.....
5.0 ≤ disp. <20	Tier 2	2006	7.2	2.0	0.27
	Tier 3	2010	5.0	2.0	.....

*The model years listed indicate the model years for which the specified tier of standards take effect.

(b) Exhaust emissions of oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter (and smoke, as applicable) shall be measured using the procedures set forth in subpart B of this part.

(c) In lieu of the NO_X standards, THC+NO_X standards, and PM standards specified in paragraph (a) of this section, manufacturers may elect to include engine families in the averaging, banking, and trading program, the provisions of which are specified in subpart D of this part. The manufacturer shall then set a family emission limit (FEL) which will serve as the standard for that engine family.

(d)(1) Naturally aspirated engines to which this subpart is applicable shall not discharge crankcase emissions into the ambient atmosphere, unless such crankcase emissions are permanently routed into the exhaust and included in all exhaust emission measurements.

(2) For engines using turbochargers, pumps, blowers, or superchargers for air induction, if the engine discharges crankcase emissions into the ambient atmosphere in use, these crankcase emissions shall be included in all exhaust emission measurements.

(e) Exhaust emissions from engines subject to the standards (or FELs) in paragraph (a), (c), or (f) of this section shall not exceed 1.25 times the applicable standards (or FELs) when tested in accordance with the supplemental test procedures specified in § 94.106.

(f) The following paragraphs define the requirements for low-emitting Blue Sky Series engines.

(1) *Voluntary standards.* Engines may be designated ''Blue Sky Series'' engines through the 2007 model year by meeting the voluntary standards listed in Table A–2, which apply to all certification and in-use testing.

TABLE A–2.—VOLUNTARY EMISSION STANDARDS (G/KW-HR)

Rated brake power (kW)	THC+NO_X	PM
power ≥ 37 kW disp. <0.9	4.0	0.24
0.9 ≤ disp. <1.2	4.0	0.18
1.2 ≤ disp. <2.5	4.0	0.12
2.5 ≤ disp. <5.0	5.0	0.12
5.0 ≤ disp. <20	5.0	0.16

(2) *Additional standards.* Blue Sky Series engines are subject to all provisions that would otherwise apply under this part.

(3) *Test procedures.* Manufacturers may use an alternate procedure to demonstrate the desired level of emission control if approved in advance by the Administrator.

(g) *Standards for alternative fuels.* The standards described in this section apply to compression-ignition engines, irrespective of fuel, with the following two exceptions:

(1) Engines fueled with natural gas shall comply with NMHC+NO_X standards that are numerically equivalent to the THC+NO_X described in paragraph (a) of this section; and

(2) Engines fueled with alcohol fuel shall comply with THCE+NO_X standards that are numerically equivalent to the THC+NO_X described in paragraph (a) of this section.

§ 94.9 Compliance with emission standards.

(a) The general standards and requirements in § 94.7 and the emission standards in § 94.8 apply to each new engine throughout its useful life period. The useful life is specified as hours and years, and ends when either of the values (hours or years) is exceeded.

(1) The minimum useful life in terms of hours is equal to 10,000 hours for Category 1 and 20,000 hours for Category 2. The minimum useful life in terms of years is 10 years.

(2) The manufacturer shall specify a longer useful life if the engine is designed to remain in service longer than the applicable minimum useful life. A manufacturer's recommended time to remanufacture/rebuild which is longer than the minimum useful life is one indicator of a longer design life.

(b) Certification is the process by which manufacturers apply for and obtain certificates of conformity from EPA, which allows the manufacturer to introduce into commerce new marine engines for sale or use in the U.S.

(1) Compliance with the applicable emission standards by an engine family shall be demonstrated by the certifying manufacturer before a certificate of conformity may be issued under § 94.208. Manufacturers shall demonstrate compliance using emission data, measured using the procedures specified in subpart B of this part, from a low hour engine. A development engine that is equivalent in design to the marine engines being certified may be used for Category 2 certification.

(2) The emission values to compare with the standards shall be the emission values of a low hour engine, or a development engine, adjusted by the deterioration factors developed in accordance with the provisions of § 94.219. Before any emission value is compared with the standard, it shall be rounded, in accordance with ASTM E 29–93a (incorporated by reference at § 94.5), to the same number of significant figures as contained in the applicable standard.

(c) Upon request by the manufacturer, the Administrator may limit the applicability of exhaust emission requirements of § 94.8(e) as necessary for safety or to otherwise protect the engine.

§ 94.10 Warranty period.

Warranties imposed by § 94.1107 shall apply for a period of hours equal to 50 percent of the useful life in hours or a period of years equal to 50 percent of the useful life in years, whichever comes first.

§ 94.11 Requirements for rebuilding certified engines.

(a) The provisions of this section apply with respect to engines subject to the standards prescribed in § 94.8 and are applicable to the process of engine rebuilding (or rebuilding a portion of an engine or engine system). The process of engine rebuilding generally includes disassembly, replacement of multiple parts due to wear, and reassembly, and may also include the removal of the engine from the vessel and other acts associated with rebuilding an engine.

(b) When rebuilding an engine, portions of an engine, or an engine system, there must be a reasonable technical basis for knowing that the resultant engine is equivalent, from an emissions standpoint, to a certified configuration (i.e., tolerances, calibrations, specifications), and the model year(s) of the resulting engine configuration must be identified. A reasonable basis would exist if:

(1) Parts installed, whether the parts are new, used, or rebuilt, are such that a person familiar with the design and function of motor vehicle engines would reasonably believe that the parts perform the same function with respect to emission control as the original parts; and

(2) Any parameter adjustment or design element change is made only:

(i) In accordance with the original engine manufacturer's instructions; or

(ii) Where data or other reasonable technical basis exists that such parameter adjustment or design element change, when performed on the engine or similar engines, is not expected to adversely affect in-use emissions.

(c) When an engine is being rebuilt and remains installed or is reinstalled in the same vessel, it must be rebuilt to a configuration of the same or later model year as the original engine. When an engine is being replaced, the replacement engine must be an engine of (or rebuilt to) a certified configuration that is equivalent, from an emissions standpoint, to the engine being replaced.

(d) At time of rebuild, emission-related codes or signals from on-board monitoring systems may not be erased or reset without diagnosing and responding appropriately to the diagnostic codes, regardless of whether the systems are installed to satisfy requirements in § 94.211 or for other reasons and regardless of form or interface. Diagnostic systems must be free of all such codes when the rebuilt engine is returned to service. Such signals may not be rendered inoperative during the rebuilding process.

(e) When conducting a rebuild without removing the engine from the vessel, or during the installation of a rebuilt engine, all critical emission-related components listed in Appendix I of this part not otherwise addressed by paragraphs (b) through (d) of this section must be checked and cleaned, adjusted, repaired, or replaced as necessary, following manufacturer recommended practices.

(f) Records shall be kept by parties conducting activities included in paragraphs (b) through (e) of this section. The records shall include at minimum the hours of operation at the time of rebuild, a listing of work performed on the engine, and emission-related control components including a listing of parts and components used, engine parameter adjustments, emission-related codes or signals responded to and reset, and work performed under paragraph (e) of this section.

(1) Parties may keep records in whatever format or system they choose as long as the records are understandable to an EPA enforcement officer or can be otherwise provided to an EPA enforcement officer in an understandable format when requested.

(2) Parties are not required to keep records of information that is not reasonably available through normal business practices including information on activities not conducted by themselves or information that they cannot reasonably access.

(3) Parties may keep records of their rebuilding practices for an engine family rather than on each individual engine rebuilt in cases where those rebuild practices are followed routinely.

(4) Records must be kept for a minimum of two years after the engine is rebuilt.

Subpart B—Test Procedures

§ 94.101 Applicability.

Provisions of this subpart apply for testing performed by the Administrator and for testing performed by manufacturers.

§ 94.102 General provisions.

(a) The test procedures specified in this subpart for marine engine testing are intended to produce emission measurements that are equivalent to emission measurements that would result from emission tests performed during in-use operation using the same engine configuration installed in a vessel.

(b) Test procedures otherwise allowed by the provisions of this subpart shall not be used where such procedures are not consistent with good engineering practice and the regulatory goal specified in paragraph (a) of this section.

(c) Alternate test procedures may be used if shown to yield equivalent results, and if approved in advance by the Administrator.

§ 94.103 Test procedures for Category 1 marine engines.

(a) Gaseous and particulate emissions shall be measured using the test procedures specified in 40 CFR part 89, except as otherwise specified in this subpart.

(b) The Administrator may specify changes to the provisions of paragraph (a) of this section that are necessary to comply with the general provisions of § 94.102.

§ 94.104 Test procedures for Category 2 marine engines.

(a) Gaseous and particulate emissions shall be measured using the test procedures specified in 40 CFR part 92, except as otherwise specified in this subpart.

(b)(1) The requirements of 40 CFR part 92 related to charge air temperatures, engine speed and load, and engine air inlet restriction pressures do not apply for marine engines.

(2) For marine engine testing, charge air temperatures, engine speed and load, and engine air inlet restriction pressures shall be representative of typical in-use marine engine conditions.

(c) The Administrator may specify changes to the provisions of paragraph (a) of this section that are necessary to comply with the general provisions of § 94.102.

§ 94.105 Test cycles.

(a) For the purpose of determining compliance with the emission standards of § 94.8 (a), (c), (f), and (g), propulsion engines that are used with (or intended to be used with) fixed-pitch propellers shall be tested using the test cycle described in Table B–1, which follows:

TABLE B–1.—DUTY CYCLE FOR PROPULSION ENGINES: FIXED-PITCH PROPELLER

Mode No.	Engine speed [1] (percent of rated speed)	Observed power [2] (percent of max. observed)	Minimum time in mode (minutes)	Weighting factors
1	100	100	5.0	0.20
2	91	75	5.0	0.50
3	80	50	5.0	0.15
4	63	25	5.0	0.15

[1] Engine speed: ± 2 percent of point.
[2] Power: Observed power with maximum fueling rate for operation at 100 percent point. Other points: ±2 percent of engine maximum value.

(b) For the purpose of determining compliance with the emission standards of § 94.8 (a), (c), (f), and (g), constant-speed propulsion engines that are used with (or intended to be used with) variable-pitch propellers shall be tested using the test cycle described in Table B–2, which follows:

TABLE B–2.—DUTY CYCLE FOR PROPULSION ENGINES: VARIABLE-PITCH PROPELLER

Mode No.	Engine speed [1] (percent of rated speed)	Observed power [2] (percent of max. observed)	Minimum time in mode (minutes)	Weighting factors
1	100	100	5.0	0.20
2	100	75	5.0	0.50
3	100	50	5.0	0.15
4	100	25	5.0	0.15

[1] Engine speed: ±2 percent of point.
[2] Power: Observed power with maximum fueling rate for operation at 100 percent point. Other points: ±2 percent of engine maximum value.

(c) For the purpose of determining compliance with the emission standards of § 94.8 (a), (c), (f), and (g), auxiliary engines shall be tested using the applicable test cycle described in 40 CFR part 89.

§ 94.106 Supplemental test procedures.

This section describes the test procedures for supplemental testing conducted to determine compliance with the exhaust emission requirements of § 94.8(e). In general, the supplemental test procedures are the same as those otherwise specified by this subpart, except that they cover any speeds, loads, ambient conditions, and operating parameters that may be experienced in use. The test procedures specified by other sections in this subpart also apply to these tests, except as specified in this section.

(a) Notwithstanding other provisions of this subpart, testing conducted to determine compliance with the exhaust emission requirements of § 94.8(e) may be conducted:

(1) At any speed and load (or combination of speeds and loads) within the applicable Not To Exceed Zone specified in paragraph (b) of this section;

(2) Without correction, at any ambient:

(i) Air temperature between 13°C and 35°C;

(ii) Water temperature (or equivalent) between 5°C and 32°C;

(iii) Humidity between 7.1 and 10.7 grams of moisture per kilogram of dry air; and

(3) With any continuous sampling period not less than 30 seconds in duration.

(b) The Not to Exceed Zone for marine propulsion engines that are used with (or intended to be used with):

(1) Fixed-pitch propellers as defined in Figure B–1;

(2) Variable-pitch propellers defined as any load greater than or equal to 25 percent of rated power, and any speed at which the engine operates in use.

(c)(1) Upon request by the manufacturer, the Administrator may specify a narrower Not to Exceed Zone for an engine family at the time of

certification, provided that the narrower Not to Exceed Zone includes all speeds and loads at which the engines are expected to normally operate in use.

(2) The Administrator may specify, at the time of certification, a broader Not to Exceed Zone for an engine family containing engines used in planing vessels, provided that the broader Not to Exceed Zone includes only speeds and loads at which the engines are expected to normally operate in use.

(3) The Administrator may specify, at the time of certification, a broader Not to Exceed Zone for an engine family containing engines used in vessels with variable-pitch propellers, provided that the broader Not to Exceed Zone includes only speeds and loads at which the engines are expected to normally operate in use.

(d) Testing of engines over a transient test cycle shall be conducted using the dilute emission sampling and analytical procedures specified for diesel engines in 40 CFR Part 86, Subpart N.

(e) Notwithstanding other provisions of this subpart, testing conducted to determine compliance with the exhaust emission requirements of § 94.8(e) may be conducted at any ambient air temperature or humidity outside the ranges specified in § 94.106(a)(2), provided that emission measurements are corrected to be equivalent to measurements within the ranges specified in § 94.106(a)(2). Correction of emission measurements made in accordance with paragraph (a)(3) of this section shall be made in accordance with good engineering practice. The measurements shall be corrected to be within the range using the minimum possible correction.

(f) Testing conducted under this section may include transient speed and load operation. Engine testing may not include transient operation that cannot be replicated by similar engines as installed on actual vessels in use.

(g) Testing conducted under this section may not include engine starting.

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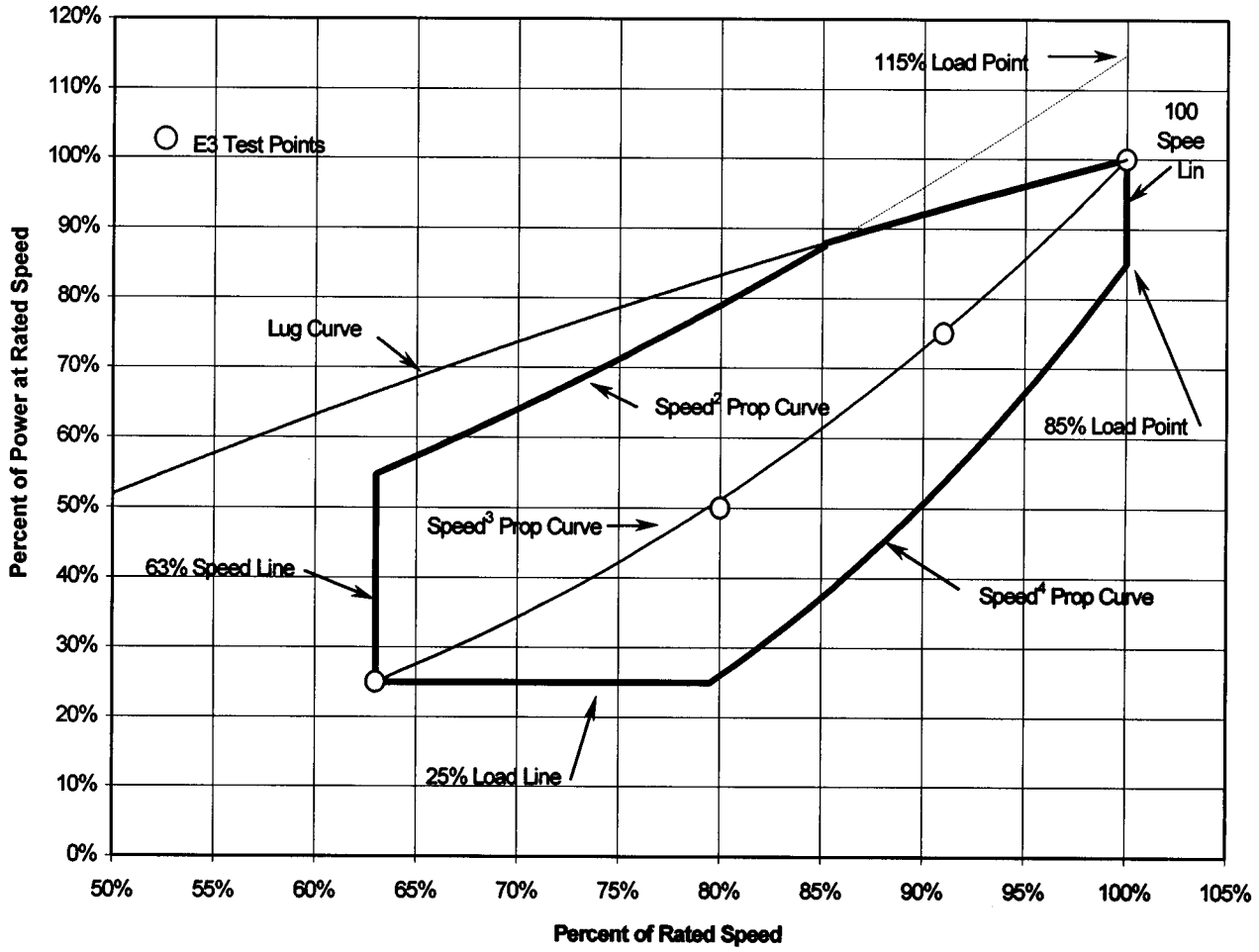
Figure B-1



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§ 94.107 Determination of rated speed.

This section specifies how to determine rated speed from a lug curve. This rated speed is the maximum test speed used in §§ 94.105 and 94.106.

(a) *Generation of lug curve.* Prior to beginning emission testing, generate maximum measured brakepower versus engine speed data points using the applicable method specified in 40 CFR 86.1332. These data points form the lug curve.

(b) *Normalization of lug curve.* (1) Identify the point (power and speed) on the lug curve at which maximum power occurs.

(2) Normalize the power values of the lug curve by dividing them by the maximum power value identified in

paragraph (b)(1) of this section, and multiplying the resulting values by 100.

(3) Normalize the engine speed values of the lug curve by dividing them by the speed at which maximum power occurs, which is identified in paragraph (b)(1) of this section, and multiplying the resulting values by 100.

(4) Maximum engine power is located on the normalized lug curve at 100 percent power and 100 percent speed.

(c) *Determination of rated speed.* Calculate the rated speed from the speedfactor analysis described in this paragraph (c).

(1) For a given combination of engine power and speed (i.e., a given power/speed point), the speedfactor is the normalized distance to the power/speed point from the zero power, zero speed point. The value of the speedfactor is defined as:

(2) Calculate speedfactors for the power/speed data points on the lug curve, and determine the maximum value.

(3) Rated speed is the speed at which the maximum value for the speedfactor occurs.

§ 94.108 Test fuels.

(a) *Petroleum diesel test fuel.* (1) The diesel fuels for testing marine engines designed to operate on petroleum diesel fuel shall be clean and bright, with pour and cloud points adequate for operability. The diesel fuel may contain nonmetallic additives as follows: cetane improver, metal deactivator, antioxidant, dehazer, antirust, pour depressant, dye, dispersant, and biocide. The diesel fuel shall also meet the specifications (as determined using methods incorporated by reference at § 94.5) in Table B–3 of this section, or substantially equivalent specifications approved by the Administrator, as follows:

TABLE B–3.—FEDERAL TEST FUEL SPECIFICATIONS

Item	Procedure (ASTM) [1]	Value (type 2–D)
Cetane	D613–95	40–48
Distillation Range:		
IBP, °C	D86–97	171–204
10% point, °C	D86–97	204–238
50% point, °C	D86–97	243–282
90% point, °C	D86–97	293–332
EP, °C	D86–97	321–366
Gravity, API	D287–92	32–37
Total Sulfur, %mass	D129–95 or D2622–98	0.03—0.80
Hydrocarbon composition:		
Aromatics, %vol.	D1319–98 or D5186–96	10 ([2])
Paraffins, Naphthenes, Olefins	D1319–98	([3])
Flashpoint, °C (minimum)	D93–97	54
Viscosity @ 38 °C, Centistokes	D445–97	2.0–3.2

[1] All ASTM procedures in this table have been incorporated by reference. See § 94.6.
[2] Minimum.
[3] Remainder.

(2) Other diesel fuels may be used for testing provided:

(i) They are commercially available; and

(ii) Information, acceptable to the Administrator, is provided to show that only the designated fuel would be used in service; and

(iii) Use of a fuel listed under paragraph (a)(1) of this section would have a detrimental effect on emissions or durability; and

(iv) Written approval from the Administrator of the fuel specifications is provided prior to the start of testing.

(3) The specification of the fuel to be used under paragraphs (a)(1) and (a)(2) of this section shall be reported in the application for certification.

(b) *Other fuel types.* (1) For engines which are designed to be capable of using a type of fuel (or mixed fuel) other than petroleum diesel fuel (e.g., natural gas or methanol), and which are expected to use that type of fuel (or mixed fuel) in service, a commercially available fuel of that type shall be used for exhaust emission testing. The Administrator shall determine the specifications of the fuel to be used for testing, based on the engine design, the specifications of commercially available fuels, and the recommendation of the manufacturer.

(2) The specification of the fuel to be used under paragraph (b)(1) of this section shall be reported in the application for certification.

(c)(1) Particulate emission measurements from engines without exhaust aftertreatment obtained using a diesel fuel containing more than 0.40 weight percent sulfur may be adjusted to a sulfur content of 0.40 weight percent.

(2) Adjustments to the particulate measurement shall be made using the following equation:

PMadj=PM-[BSFC *0.0917 *(FSF–0.0040)]

Where:

PMadj=adjusted measured PM level [g/Kw-hr]

PM=measured weighted PM level [g/Kw-hr]

BSFC=measured brake specific fuel consumption [G/Kw-hr]

FSF=fuel sulfur weight fraction

Subpart C—Certification Provisions

§ 94.201 Applicability.

The requirements of this subpart are applicable to manufacturers of engines subject to the standards of subpart A of this part.

§ 94.202 Definitions.

The definitions of subpart A of this part apply to this subpart.

§ 94.203 Application for certification.

(a) For each engine family that complies with all applicable standards and requirements, the manufacturer shall submit to the Administrator a completed application for a certificate of conformity.

(b) The application shall be approved and signed by the authorized representative of the manufacturer.

(c) The application shall be updated and corrected by amendment, where necessary, as provided for in § 94.210 to accurately reflect the manufacturer's production.

(d) Each application shall include the following information:

(1)(i) A description of the basic engine design, including but not limited to, the engine family specifications, the provisions of which are contained in § 94.208;

(ii) A list of distinguishable configurations to be included in the engine family;

(2) An explanation of how the emission control system operates, including detailed descriptions of:

(i) All emission control system components;

(ii) The injection timing map or maps (i.e., degrees before or after top-dead-center), and any functional dependence of such timing on other operational parameters (e.g., engine coolant temperature or engine speed);

(iii) Each auxiliary emission control device (AECD); and

(iv) All fuel system components to be installed on any production or test engine(s);

(3) A description of the test engine;

(4) Special or alternate test procedures, if applicable;

(5) A description of the operating cycle and the period of operation necessary to accumulate service hours on the test engine and stabilize emission levels;

(6) A description of all adjustable operating parameters (e.g., injection timing and fuel rate), including the following:

(i) The nominal or recommended setting and the associated production tolerances;

(ii) The intended adjustable range and the physically adjustable range;

(iii) The limits or stops used to limit adjustable ranges;

(iv) Production tolerances of the limits or stops used to establish each physically adjustable range; and

(v) Information relating to the reason that the physical limits or stops used to establish the physically adjustable range of each parameter, or any other means used to inhibit adjustment, are the most effective means possible of preventing adjustment of parameters to settings outside the manufacturer's specified adjustable ranges on in-use engines;

(7) For families participating in the averaging, banking, and trading program, the information specified in subpart D of this part;

(8) Projected U.S. directed production volume information for each configuration;

(9) A description of the test equipment and fuel proposed to be used;

(10) All test data obtained by the manufacturer on each test engine;

(11) The intended useful life period for the engine family, in accordance with § 94.9(a);

(12) The intended deterioration factors for the engine family, in accordance with § 94.218; and

(13) All information—including but not limited to message or parameter identification, scaling, limit, offset, and transfer function—required for EPA to interpret all messages and parameters broadcast on an engine's controller area network. (The manufacturer may reference publicly released controller area network standards where applicable. The format of this information shall be provided in a format similar to publicly released documents pertaining to controller area network standards.)

(14) An unconditional statement certifying that all engines included in the engine family comply with all requirements of this part and the Clean Air Act.

(15) A statement indicating whether the engine will be used in planing vessels or vessels with variable-pitch propellers.

(e) At the Administrator's request, the manufacturer shall supply such additional information as may be required to evaluate the application.

(f) (1) If the manufacturer submits some or all of the information specified in paragraph (d) of this section in advance of its full application for certification, the Administrator shall review the information and make the determinations required in § 94.208 (d) within 90 days of the manufacturer's submittal.

(2) The 90-day decision period is exclusive of any elapsed time during which EPA is waiting for additional information requested from a manufacturer regarding an adjustable parameter (the 90-day period resumes upon receipt of the manufacturer's response). For example, if EPA requests additional information 30 days after the manufacturer submits information under paragraph (f)(1) of this section, then the Administrator would make a determination within 60 days of the receipt of the requested information from the manufacturer.

(g)(1) The Administrator may modify the information submission requirements of paragraph (d) of this section, provided that all of the information specified therein is maintained by the manufacturer as required by § 94.215, and amended, updated, or corrected as necessary.

(2) For the purposes of this paragraph (g), § 94.215 includes all information specified in paragraph (d) of this section, whether or not such information is actually submitted to the Administrator for any particular model year.

(3) The Administrator may review a manufacturer's records at any time. At the Administrator's discretion, this review may take place either at the manufacturer's facility or at another facility designated by the Administrator.

§ 94.204 Designation of engine families.

This section specifies the procedure and requirements for grouping of engines into engine families.

(a) Manufacturers shall divide their engines into groupings of engines which are expected to have similar emission characteristics throughout their useful life. Each group shall be defined as a separate engine family.

(b) For Category 1 marine engines, the following characteristics distinguish engine families:

(1) Fuel;

(2) Cooling method (including cooling medium);

(3) Method of air aspiration;

(4) Method of exhaust aftertreatment (for example, catalytic converter or particulate trap);

(5) Combustion chamber design;

(6) Bore;

(7) Stroke;

(8) Number of cylinders, (engines with aftertreatment devices only);

(9) Cylinder arrangement (engines with aftertreatment devices only); and

(10) Fuel system configuration

(c) For Category 2 marine engines, the following characteristics distinguish engine families:

(1) The combustion cycle (e.g., diesel cycle);

(2) The type of engine cooling employed (air-cooled or water-cooled), and procedure(s) employed to maintain engine temperature within desired limits (thermostat, on-off radiator fan(s), radiator shutters, etc.);

(3) The bore and stroke dimensions;

(4) The approximate intake and exhaust event timing and duration (valve or port);

(5) The location of the intake and exhaust valves (or ports);

(6) The size of the intake and exhaust valves (or ports);

(7) The overall injection, or as appropriate ignition, timing characteristics (i.e., the deviation of the timing curves from the optimal fuel economy timing curve must be similar in degree);

(8) The combustion chamber configuration and the surface-to-volume ratio of the combustion chamber when the piston is at top dead center position, using nominal combustion chamber dimensions;

(9) The location of the piston rings on the piston;

(10) The method of air aspiration (turbocharged, supercharged, naturally aspirated, Roots blown);

(11) The turbocharger or supercharger general performance characteristics (e.g., approximate boost pressure, approximate response time, approximate size relative to engine displacement);

(12) The type of air inlet cooler (air-to-air, air-to-liquid, approximate degree to which inlet air is cooled);

(13) The intake manifold induction port size and configuration;

(14) The type of fuel and fuel system configuration;

(15) The configuration of the fuel injectors and approximate injection pressure;

(16) The type of fuel injection system controls (i.e., mechanical or electronic);

(17) The type of smoke control system;

(18) The exhaust manifold port size and configuration; and

(19) The type of exhaust aftertreatment system (oxidation catalyst, particulate trap), and characteristics of the aftertreatment system (catalyst loading, converter size vs engine size).

(d) Upon request by the manufacturer, engines that are eligible to be included in the same engine family based on the criteria in paragraph (b) or (c) of this section may be divided into different engine families. This request must be accompanied by information the manufacturer believes supports the use of these different engine families.

(e) Upon request by the manufacturer, the Administrator may allow engines that would be required to be grouped into separate engine families based on the criteria in paragraph (b) or (c) of this section to be grouped into a single engine family if the manufacturer demonstrates that the engines will have similar emission characteristics. This request must be accompanied by emission information supporting the appropriateness of such combined engine families.

§ 94.205 Prohibited controls, adjustable parameters.

(a) Any system installed on, or incorporated in, a new engine to enable such engine to conform to the standards contained in this part:

(1) Shall not in its operation or function cause significant (as determined by the Administrator) emission into the ambient air of any noxious or toxic substance that would not be emitted in the operation of such engine without such system, except as specifically permitted by regulation;

(2) Shall not in its operation, function or malfunction result in any unsafe condition endangering the engine, the ship, its operators, riders or property on a ship, or persons or property in close proximity to the engine; and

(3) Shall function during all in-use operation, except as otherwise allowed by this part.

(b) In specifying the adjustable range of each adjustable parameter on a new engine, the manufacturer, shall:

(1) Ensure that safe engine operating characteristics are available within that range, as required by section 202(a)(4) of the Clean Air Act, taking into consideration the production tolerances; and

(2) To the maximum extent practicable, limit the physical range of adjustability to that which is necessary for proper operation of the engine.

§ 94.206 Required information.

(a) The manufacturer shall perform the tests required by the applicable test procedures, and submit to the Administrator the information required by this section: *Provided*, that if requested by the manufacturer, the Administrator may waive any requirement of this section for testing of engines for which the required emission data are otherwise available.

(b) The manufacturer shall submit exhaust emission deterioration factors, with supporting data. The determination of the deterioration factors shall be conducted in accordance with good engineering practice to ensure that the engines covered by a certificate issued under § 94.208 will meet all of the emission standards in § 94.8 in use for the useful life of the engine.

(c) The manufacturer shall submit emission data on such engines tested in accordance with the applicable test procedures of subpart B of this part. These data shall include zero hour data, if generated. In lieu of providing the emission data required by paragraph (a) of this section, the Administrator may, upon request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other testing information) that the engine will conform with the applicable emission standards of § 94.8.

(d) The manufacturer shall submit a statement that the engines for which certification is requested conform to the requirements in § 94.7 and that the descriptions of tests performed to ascertain compliance with the general standards in § 94.7, and the data derived from such tests, are available to the Administrator upon request.

(e) The manufacturer shall submit a statement that the emission data engine used to demonstrate compliance with the applicable standards of this part is in all material respects as described in the manufacturer's application for certification; that it has been tested in accordance with the applicable test procedures utilizing the fuels and equipment described in the application for certification; and that on the basis of such tests, the engine family conforms to the requirements of this part. If, on the basis of the data supplied and any additional data as required by the Administrator, the Administrator determines that the test engine was not as described in the application for certification or was not tested in accordance with the applicable test procedures utilizing the fuels and equipment as described in the application for certification, the Administrator may make the determination that the engine does not meet the applicable standards. If the Administrator makes such a determination, he/she may withhold, suspend, or revoke the certificate of conformity under § 94.208 (c)(3)(i).

§ 94.207 Special test procedures.

(a) *Establishment of special test procedures by EPA.* The Administrator may, on the basis of written application by a manufacturer, establish special test procedures other than those set forth in this part, for any engine that the Administrator determines is not susceptible to satisfactory testing under the specified test procedures set forth in subpart B of this part.

(b) *Use of alternate test procedures by a manufacturer.* (1) A manufacturer may elect to use an alternate test procedure, provided that it is equivalent to the specified procedures with respect to the demonstration of compliance, its use is approved in advance by the Administrator, and the basis for the equivalence with the specified test procedures is fully described in the manufacturer's application.

(2) The Administrator may reject data generated under alternate test procedures if the data do not correlate with data generated under the specified procedures.

§ 94.208 Certification.

(a) If, after a review of the application for certification, test reports and data acquired from an engine or from a development data engine, and any other information required or obtained by EPA, the Administrator determines that the application is complete and that the engine family meets the requirements of the Act and this part, he/she will issue a certificate of conformity with respect to such engine family, except as

provided by paragraph (c)(3) of this section. The certificate of conformity is valid for each engine family from the date of issuance by EPA until 31 December of the model year or calendar year for which it is issued and upon such terms and conditions as the Administrator deems necessary or appropriate to ensure that the production engines covered by the certificate will meet the requirements of the Act and of this part.

(b) [Reserved]

(c) (1) The manufacturer shall bear the burden of establishing to the satisfaction of the Administrator that the conditions upon which the certificates were issued were satisfied or excused.

(2) The Administrator will determine whether the test data included in the application represents all engines of the engine family.

(3) Notwithstanding the fact that any engine(s) may comply with other provisions of this subpart, the Administrator may withhold or deny the issuance of any certificate of conformity, or suspend or revoke any such certificate(s) which has (have) been issued with respect to any such engine(s) if:

(i) The manufacturer submits false or incomplete information in its application for certification thereof;

(ii) The manufacturer renders inaccurate any test data which it submits pertaining thereto or otherwise circumvents the intent of the Act, or of this part with respect to such engine;

(iii) Any EPA Enforcement Officer is denied access on the terms specified in § 94.215 to any facility or portion thereof which contains any of the following:

(A) An engine which is scheduled to undergo emissions testing, or which is undergoing emissions testing, or which has undergone emissions testing; or

(B) Any components used or considered for use in the construction, modification or buildup of any engine which is scheduled to undergo emissions testing, or which is undergoing emissions testing, or which has undergone emissions testing for purposes of emissions certification; or

(C) Any production engine which is or will be claimed by the manufacturer to be covered by the certificate; or

(D) Any step in the construction of the engine; or

(E) Any records, documents, reports or histories required by this part to be kept concerning any of the items listed in paragraphs (c)(3)(iii)(A) through (D) of this section; or

(iv) Any EPA Enforcement Officer is denied ''reasonable assistance'' (as defined in § 94.215).

(4) In any case in which a manufacturer knowingly submits false or inaccurate information or knowingly renders inaccurate or invalid any test data or commits any other fraudulent acts and such acts contribute substantially to the Administrator's decision to issue a certificate of conformity, the Administrator may deem such certificate void *ab initio.*

(5) In any case in which certification of an engine is to be withheld, denied, revoked or suspended under paragraph (c)(3) of this section, and in which the Administrator has presented to the manufacturer involved reasonable evidence that a violation of § 94.215 in fact occurred, the manufacturer, if it wishes to contend that, even though the violation occurred, the engine in question was not involved in the violation to a degree that would warrant withholding, denial, revocation or suspension of certification under paragraph (c)(3) of this section, shall have the burden of establishing that contention to the satisfaction of the Administrator.

(6) Any revocation, suspension, or voiding of certification under paragraph (c)(3) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 94.216; and

(ii) Extend no further than to forbid the introduction into commerce of engines previously covered by the certification which are still in the hands of the manufacturer, except in cases of such fraud or other misconduct that makes the certification invalid *ab initio.*

(7) The manufacturer may request, within 30 days of receiving notification, that any determination made by the Administrator under paragraph (c)(3) of this section to withhold or deny certification be reviewed in a hearing conducted in accordance with § 94.216. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objections. If the Administrator finds, after a review of the request and supporting data, that the request raises a substantial factual issue, he/she will grant the request with respect to such issue.

(d) In approving an application for certification, the Administrator may specify:

(1) A broader range of adjustability than recommended by the manufacturer for those engine parameters which are subject to adjustment, if the Administrator determines that it will not be practical to keep the parameter adjusted within the recommended range in use;

(2) A longer useful life period, if the Administrator determines that the useful life of the engines in the engine family, as defined in § 94.2, is longer than the period specified by the manufacturer; and/or

(3) Larger deterioration factors, if the Administrator determines that the deterioration factors specified by the manufacturer do not meet the requirements of § 94.218.

(e) Within 30 days following receipt of notification of the Administrator's determinations made under paragraph (d) of this section, the manufacturer may request a hearing on the Administrator's determinations. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determinations and data in support of such objections. If, after review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, the manufacturer shall be provided with a hearing in accordance with § 94.216 with respect to such issue.

§ 94.209 Special provisions for post-manufacturer marinizers.

(a) *Eligibility requirements.* To be eligible to use the provisions of paragraph (b) of this section, the manufacturer shall demonstrate that it has met all the following requirements:

(1) The manufacturer must be a post-manufacturer marinizer as defined in § 94.2;

(2) The base engine used for modification shall have a Certificate of Conformity issued under 40 CFR part 89 or 40 CFR part 92 or the heavy-duty engine provisions of 40 CFR part 86; and (3) The certified emission levels (after application of deterioration factors) of the base engine shall be below the numerical levels of the otherwise applicable standards of this part for all pollutants.

(b) *Broader engine families.* (1) In lieu of the requirements of § 94.204, the manufacturer may group its engines into engine families that consist of engines that are within a single category of engines and have similar emission deterioration characteristics.

(2) All other provisions of this subpart shall apply to these engines using the engine family defined in (b)(1) of this section.

(c) *Hardship relief.* Post-manufacture marinizers may take any of the otherwise prohibited actions identified

in § 94.1103(a)(1) if approved in advance by the Administrator, and subject to the following requirements:

(1) Application for relief must be submitted to the Engine Programs and Compliance Division of the EPA in writing prior to the earliest date in which the applying manufacturer would be in violation of § 94.1103. The manufacturer must submit evidence showing that the requirements for approval have been met.

(2) [Reserved]

(3) The conditions causing the impending violation must not be substantially the fault of the applying manufacturer.

(4) The conditions causing the impending violation must be such that the applying manufacturer will experience serious economic hardship if relief is not granted.

(5) The applying manufacturer must demonstrate that no other allowances under this part will be available to avoid the impending violation.

(6) Any relief granted must begin within one year after the implementation date of the standard applying to the engines for which relief is requested, and may not exceed one year in duration.

(7) The Administrator may impose other conditions on the granting of relief including provisions to recover the lost environmental benefit.

(d) *Compliance date of standards.* Post-manufacture marinizers may elect to delay the compliance date of the standards in § 94.8 by one year, instead of using the provisions of paragraph (c) of this section. Post-manufacture marinizers wishing to take advantage of this provision must inform the Director of the Engine Programs and Compliance Division of their intent to do so in writing before the date that compliance with the standards would otherwise be mandatory.

§ 94.210 Amending the application and certificate of conformity.

(a) The manufacturer shall notify the Administrator when changes to information required to be described in the application for certification are to be made to a product line covered by a certificate of conformity. This notification shall include a request to amend the application or the existing certificate of conformity. Except as provided in paragraph (e) of this section, no manufacturer shall make said changes or produce said engines prior to receiving approval from EPA.

(b) A manufacturer's request to amend the application or the existing certificate of conformity shall include the following information:

(1) A full description of the change to be made in production, or of the engines to be added;

(2) Engineering evaluations or data showing that the engines as modified or added will comply with all applicable emission standards; and

(3) A determination whether the manufacturer's original test fleet selection is still appropriate, and if the original test fleet selection is determined not to be appropriate, test fleet selection(s) representing the engines changed or added which would have been required if the engines had been included in the original application for certification.

(c) The Administrator may require the manufacturer to perform tests on the engine representing the engine to be added or changed.

(d)(1) Based on the description of the amendment and data derived from such testing as the Administrator may require or conduct, the Administrator will determine whether the change or addition would still be covered by the certificate of conformity then in effect.

(2) If the Administrator determines that the change or new engine(s) meets the requirements of this part and the Act, the appropriate certificate of conformity shall be amended.

(3) If the Administrator determines that the changed engine(s) does not meet the requirements of this part and the Act, the certificate of conformity will not be amended. The Administrator shall provide a written explanation to the manufacturer of the decision not to amend the certificate. The manufacturer may request a hearing on a denial.

(e) A manufacturer may make changes in or additions to production engines concurrently with the notification to the Administrator, as required by paragraph (a) of this section, if the manufacturer complies with the following requirements:

(1) In addition to the information required in paragraph (b) of this section, the manufacturer shall supply supporting documentation, test data, and engineering evaluations as appropriate to demonstrate that all affected engines will still meet applicable emission standards.

(2) If, after a review, the Administrator determines additional testing is required, the manufacturer shall provide the required test data within 30 days or cease production of the affected engines.

(3) If the Administrator determines that the affected engines do not meet applicable requirements, the Administrator will notify the manufacturer to cease production of the affected engines and to recall and correct at no expense to the owner all affected engines previously produced.

(4) Election to produce engines under this paragraph will be deemed to be a consent to recall all engines that the Administrator determines do not meet applicable standards and to cause such nonconformity to be remedied at no expense to the owner.

§ 94.211 Emission-related maintenance instructions for purchasers.

(a) The manufacturer shall furnish or cause to be furnished to the ultimate purchaser of each new engine, subject to the standards prescribed in § 94.8, written instructions for the proper maintenance and use of the engine as are reasonable and necessary to assure the proper functioning of the emissions control system, consistent with the applicable provisions of paragraph (b) of this section.

(1) The maintenance and use instructions required by this section shall be clear and easily understandable.

(2) The maintenance instructions required by this section shall contain a general description of the documentation that would demonstrate that the ultimate purchaser or any subsequent owner had complied with the instructions.

(b)(1) The manufacturer must provide in boldface type on the first page of the written maintenance instructions notice that maintenance, replacement, or repair of the emission control devices and systems may be performed by any engine repair establishment or individual.

(2) The instructions under paragraph (b)(1) of this section will not include any condition on the ultimate purchaser's or owner's using, in connection with such engine, any component or service (other than a component or service provided without charge under the terms of the purchase agreement) which is identified by brand, trade, or corporate name. Such instructions also will not directly or indirectly distinguish between service performed by any other service establishments with which such manufacturer has a commercial relationship and service performed by independent vessel or engine repair facilities with which such manufacturer has no commercial relationship.

(3) The prohibition of paragraph (b)(2) of this section may be waived by the Administrator if:

(i) The manufacturer satisfies the Administrator that the engine will function properly only if the component or service so identified is used in connection with such engine, and

(ii) The Administrator finds that such a waiver is in the public interest.

(c) The manufacturer shall provide to the Administrator, no later than the time of the submission required by § 94.203, a copy of the emission-related maintenance instructions that the manufacturer proposes to supply to the ultimate purchaser or owner in accordance with this section. The Administrator will review such instructions to determine whether they are reasonable and necessary to ensure the proper functioning of the engine's emission control systems. If the Administrator determines that such instructions are not reasonable and necessary to ensure the proper functioning of the emission control systems, he/she may disapprove the application for certification or may require that the manufacturer modify the instructions.

(d) Any revision to the maintenance instructions which will affect emissions shall be supplied to the Administrator at least 30 days before being supplied to the ultimate purchaser or owner unless the Administrator consents to a lesser period of time, and is subject to the provisions of § 94.210.

(e) This paragraph (e) specifies emission-related scheduled maintenance for purposes of obtaining durability data for marine engines. The maintenance intervals specified in this paragraph are minimum intervals.

(1) All emission-related scheduled maintenance for purposes of obtaining durability data must occur at the same or longer hours of use intervals as those specified in the manufacturer's maintenance instructions furnished to the ultimate purchaser of the engine under paragraph (a) of this section. This maintenance schedule may be updated as necessary throughout the testing of the engine, provided that no maintenance operation is deleted from the maintenance schedule after the operation has been performed on the test equipment or engine.

(2) Any emission-related maintenance which is performed on equipment, engines, subsystems, or components must be technologically necessary to ensure in-use compliance with the emission standards. The manufacturer must submit data which demonstrate to the Administrator that all of the emission-related scheduled maintenance which is to be performed is technologically necessary. Scheduled maintenance must be approved by the Administrator prior to being performed or being included in the maintenance instructions provided to the purchasers under paragraph (a) of this section.

(i) The Administrator may require longer maintenance intervals than those listed in paragraphs (e)(3) and (e)(4) of this section where the listed intervals are not technologically necessary.

(ii) The Administrator may allow manufacturers to specify shorter maintenance intervals than those listed in paragraphs (e)(3) and (e)(4) of this section where technologically necessary for Category 2 engines.

(3) The adjustment, cleaning, repair, or replacement of items listed in paragraphs (e)(3)(i) through (e)(3)(iii) of this section shall occur at 1,500 hours of use and at 1,500-hour intervals thereafter.

(i) Exhaust gas recirculation system-related filters and coolers.

(ii) Positive crankcase ventilation valve.

(iii) Fuel injector tips (cleaning only).

(4) The adjustment, cleaning and repair of items in paragraphs (e)(4)(i) through (e)(4)(vii) of this section shall occur at 3,000 hours of use and at 3,000-hour intervals thereafter for engines rated under 130 kW, or at 4,500-hour intervals thereafter for nonroad compression-ignition engines rated at or above 130 kW.

(i) Fuel injectors.

(ii) Turbocharger.

(iii) Electronic engine control unit and its associated sensors and actuators.

(iv) Particulate trap or trap-oxidizer system (including related components).

(v) Exhaust gas recirculation system (including all related control valves and tubing), except as otherwise provided in paragraph (e)(3)(i) of this section.

(vi) Catalytic convertor.

(vii) Any other add-on emission-related component (i.e., a component whose sole or primary purpose is to reduce emissions or whose failure will significantly degrade emission control and whose function is not integral to the design and performance of the engine).

(f) Scheduled maintenance not related to emissions which is reasonable and technologically necessary (e.g., oil change, oil filter change, fuel filter change, air filter change, cooling system maintenance, adjustment of idle speed, governor, engine bolt torque, valve lash, injector lash, timing, lubrication of the exhaust manifold heat control valve, etc.) may be performed on durability vehicles at the least frequent intervals recommended by the manufacturer to the ultimate purchaser, (e.g., not the intervals recommended for severe service).

(g) Adjustment of engine idle speed on emission data engines may be performed once before the low-hour emission test point. Any other engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement on emission data vehicles shall be performed only with advance approval of the Administrator.

(h) Equipment, instruments, or tools may not be used to identify malfunctioning, maladjusted, or defective engine components unless the same or equivalent equipment, instruments, or tools will be available to dealerships and other service outlets and are:

(1) Used in conjunction with scheduled maintenance on such components; or

(2) Used subsequent to the identification of a vehicle or engine malfunction, as provided in paragraph (e) of this section for emission data engines; or

(3) Specifically authorized by the Administrator.

(i) All test data, maintenance reports, and required engineering reports shall be compiled and provided to the Administrator in accordance with § 94.215.

(j)(1) The components listed in paragraphs (j)(1)(i) through (j)(1)(vi) of this section are defined as critical emission-related components.

(i) Catalytic convertor.

(ii) Electronic engine control unit and its associated sensors and actuators.

(iii) Exhaust gas recirculation system (including all related filters, coolers, control valves, and tubing).

(iv) Positive crankcase ventilation valve.

(v) Particulate trap or trap-oxidizer system.

(vi) Any other add-on emission-related component (i.e., a component whose sole or primary purpose is to reduce emissions or whose failure will significantly degrade emission control and whose function is not integral to the design and performance of the engine).

(2) All critical emission-related scheduled maintenance must have a reasonable likelihood of being performed in use. The manufacturer must show the reasonable likelihood of such maintenance being performed in-use. Critical emission-related scheduled maintenance items which satisfy one of the conditions defined in paragraphs (j)(2)(i) through (j)(2)(vi) of this section will be accepted as having a reasonable likelihood of being performed in use.

(i) Data are presented which establish for the Administrator a connection between emissions and vehicle performance such that as emissions increase due to lack of maintenance, vehicle performance will simultaneously deteriorate to a point unacceptable for typical operation.

(ii) Survey data are submitted which adequately demonstrate to the Administrator with an 80 percent confidence level that 80 percent of such engines already have this critical maintenance item performed in-use at the recommended interval(s).

(iii) A clearly displayed visible signal system approved by the Administrator is installed to alert the equipment operator that maintenance is due. A signal bearing the message ''maintenance needed'' or ''check engine,'' or a similar message approved by the Administrator, shall be actuated at the appropriate usage point or by component failure. This signal must be continuous while the engine is in operation and not be easily eliminated without performance of the required maintenance. Resetting the signal shall be a required step in the maintenance operation. The method for resetting the signal system shall be approved by the Administrator. The system must not be designed to deactivate upon the end of the useful life of the engine or thereafter.

(iv) A manufacturer may desire to demonstrate through a survey that a critical maintenance item is likely to be performed without a visible signal on a maintenance item for which there is no prior in-use experience without the signal. To that end, the manufacturer may in a given model year market up to 200 randomly selected vehicles per critical emission-related maintenance item without such visible signals, and monitor the performance of the critical maintenance item by the owners to show compliance with paragraph (j)(2)(ii) of this section. This option is restricted to two consecutive model years and may not be repeated until any previous survey has been completed. If the critical maintenance involves more than one engine family, the sample will be sales weighted to ensure that it is representative of all the families in question.

(v) The manufacturer provides the maintenance free of charge, and clearly informs the customer that the maintenance is free in the instructions provided under paragraph (a) of this section.

(vi) The manufacturer uses any other method which the Administrator approves as establishing a reasonable likelihood that the critical maintenance will be performed in-use.

(3) Visible signal systems used under paragraph (j)(2)(iii) of this section are considered an element of design of the emission control system. Therefore, disabling, resetting, or otherwise rendering such signals inoperative without also performing the indicated maintenance procedure is a prohibited act.

§ 94.212 Labeling.

(a) *General requirements.* (1) Each new engine covered by a certificate of conformity under § 94.208 shall be labeled by the manufacturer in the manner described in this paragraph (b) of this section at the time of manufacture.

(2) Each new marine engine modified from a base engine by post-manufacturer marinizers in accordance with the provisions of § 94.209 (b) and covered by a certificate of conformity under § 94.208 shall be labeled by the PMM in the manner described in paragraph (b) of this section.

(b) *Engine labels.* (1) Engine labels meeting the specifications of paragraph (b)(2) of this section shall be applied by every manufacturer at the point of original manufacture.

(2)(i) Engine labels shall be permanent and legible and shall be affixed to the engine in a position in which it will be readily visible after installation of the engine in the vessel.

(ii) The label shall be attached to an engine part necessary for normal operation and not normally requiring replacement during the useful life of the engine.

(iii) The label shall be affixed by the manufacturer in such manner that it cannot be removed without destroying or defacing the label. The label shall not be affixed to any equipment which is easily detached from such engine.

(iv) The label may be made up of more than one piece, provided that all pieces are permanently attached to the same engine part.

(v) The label shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrasts with the background of the label:

(A) The label heading: Marine Engine Emission Control Information.

(B) Full corporate name and trademark of the manufacturer.

(C) The model year.

(D) The category and subcategory of marine engine.

(E) Engine family and configuration identification.

(F) A prominent unconditional statement of compliance with U.S. Environmental Protection Agency regulations which apply to marine engines designated by the parameters of paragraph (b)(2)(v) (A) through (E) of this section

(G) The useful life of the engine.

(H) The standards and/or FELs to which the engine was certified.

(I) Engine tune-up specifications and adjustments, as recommended by the manufacturer in accordance with the applicable emission standards, including but not limited to idle speeds(s), injection timing, valve lash (as applicable), as well as other parameters deemed necessary by the manufacturer.

(c) The provisions of this section shall not prevent a manufacturer from also providing on the label any other information that such manufacturer deems necessary for, or useful to, the proper operation and satisfactory maintenance of the vessel or engine.

§ 94.213 Submission of engine identification numbers.

(a) Upon request of the Administrator, the manufacturer of any engine covered by a certificate of conformity shall, within 30 days of receipt of such request, identify by engine identification number, the engines covered by the certificate of conformity.

(b) The manufacturer of any engines covered by a certificate of conformity shall provide to the Administrator, within 60 days of the issuance of a certificate of conformity, an explanation of the elements in any engine identification coding system in sufficient detail to enable the Administrator to identify those engines which are covered by a certificate of conformity.

§ 94.214 Production engines.

Any manufacturer obtaining certification under this part shall supply to the Administrator, upon his/her request, a reasonable number of production engines, as specified by the Administrator. The engines shall be representative of the engines, emission control systems, and fuel systems offered and typical of production engines available for sale or use under the certificate. These engines shall be supplied for testing at such time and place and for such reasonable periods as the Administrator may require.

§ 94.215 Maintenance of records; submittal of information; right of entry.

(a) Any manufacturer subject to any of the standards or procedures prescribed in this subpart shall establish, maintain and retain the following adequately organized and indexed records:

(1) General records. The records required to be maintained by this paragraph (a) shall consist of:

(i) Identification and description of all certification engines for which testing is required under this subpart.

(ii) A description of all emission control systems which are installed on

or incorporated in each certification engine.

(iii) A description of all procedures used to test each such certification engine.

(iv) A copy of all applications for certification, filed with the Administrator.

(2) Individual records. (i) A brief history of each engine used for certification under this subpart including:

(A) In the case where a current production engine is modified for use as a certification engine, a description of the process by which the engine was selected and of the modifications made. In the case where the certification engine is not derived from a current production engine, a general description of the buildup of the engine (e.g., whether experimental heads were cast and machined according to supplied drawings). In the cases in the previous two sentences, a description of the origin and selection process for fuel system components, ignition system components (as applicable), intake air pressurization and cooling system components, cylinders, pistons and piston rings, exhaust smoke control system components, and exhaust aftertreatment devices as applicable, shall be included. The required descriptions shall specify the steps taken to assure that the certification engine, with respect to its engine, drivetrain, fuel system, emission control system components, exhaust aftertreatment devices, or any other devices or components as applicable, that can reasonably be expected to influence exhaust emissions will be representative of production engines and that either: all components and/or engine, construction processes, component inspection and selection techniques, and assembly techniques employed in constructing such engines are reasonably likely to be implemented for production engines; or that they are as close as practicable to planned construction and assembly process.

(B) A complete record of all emission tests performed (except tests performed by EPA directly), including test results, the date and purpose of each test, and the number of hours accumulated on the engine.

(C) A record and description of all maintenance and other servicing performed, giving the date of the maintenance or service and the reason for it.

(D) A record and description of each test performed to diagnose engine or emission control system performance, giving the date and time of the test and the reason for it.

(E) A brief description of any significant events affecting the engine during the period covered by the history and not described by an entry under one of the previous headings, including such extraordinary events as accidents involving the engine or dynamometer runaway.

(ii) Each such history shall be started on the date that the first of any of the selection or buildup activities in paragraph (a)(2)(i)(A) of this section occurred with respect to the certification engine and shall be kept in a designated location.

(3) All records, other than routine emission test records, required to be maintained under this subpart shall be retained by the manufacturer for a period of 8 years after issuance of all certificates of conformity to which they relate. Routine emission test records shall be retained by the manufacturer for a period of one (1) year after issuance of all certificates of conformity to which they relate. Records may be retained as hard copy or reduced to computer disks, etc., depending on the record retention procedures of the manufacturer: Provided, that in every case all the information contained in the hard copy shall be retained.

(4) Nothing in this section limits the Administrator's discretion in requiring the manufacturer to retain additional records or submit information not specifically required by this section.

(5) Pursuant to a request made by the Administrator, the manufacturer shall submit to him/her the information that is required to be retained.

(6) EPA may void a certificate of conformity *ab initio* for an engine family for which the manufacturer fails to retain the records required in this section or to provide such information to the Administrator upon request.

(b) The manufacturer of engines subject to any of the standards prescribed in this part shall submit to the Administrator, at the time of issuance by the manufacturer, copies of all instructions or explanations regarding the use, repair, adjustment, maintenance, or testing of such engine, relevant to the control of crankcase, or exhaust emissions issued by the manufacturer, for use by other manufacturers, assembly plants, distributors, dealers, owners and operators. Any material not translated into the English language need not be submitted unless specifically requested by the Administrator.

(c) Any manufacturer participating in averaging, banking and trading program of subpart D of this part 94 must comply with the maintenance of records requirements of § 94.308.

(d)(1) Any manufacturer who has applied for certification of a new engine subject to certification testing under this subpart shall admit or cause to be admitted any EPA Enforcement Officer during operating hours on presentation of credentials to any of the following:

(i) Any facility where any such tests or any procedures or activities connected with such test are or were performed;

(ii) Any facility where any engine which is being tested (or was tested, or is to be tested) is present;

(iii) Any facility where any construction process or assembly process used in the modification or buildup of such an engine into a certification engine is taking place or has taken place; or

(iv) Any facility where any record or other document relating to any of the activities listed in this paragraph (d)(1) is located.

(2) Upon admission to any facility referred to in paragraph (d)(1) of this section, any EPA Enforcement Officer shall be allowed:

(i) To inspect and monitor any part or aspect of such procedures, activities and testing facilities including, but not limited to, monitoring engine preconditioning, emissions tests, service accumulation, maintenance, and engine storage procedures, and to verify correlation or calibration of test equipment;

(ii) To inspect and make copies of any such records, designs, or other documents, including those records specified in subpart D of this part; and

(iii) To inspect and/or photograph any part or aspect of any such certification engine and any components to be used in the construction thereof.

(3) In order to allow the Administrator to determine whether or not production engines, conform to the conditions upon which a certificate of conformity has been issued, or conform in all material respects to the design specifications applicable to those engines, as described in the application for certification for which a certificate of conformity has been issued, any manufacturer shall admit any EPA Enforcement Officer on presentation of credentials to:

(i) Any facility where any document, design or procedure relating to the translation of the design and construction of engines and emission related components described in the application for certification or used for certification testing into production engines is located or carried on;

(ii) Any facility where any engines to be introduced into commerce are manufactured; and

(iii) Any facility where records specified this section are located.

(4) On admission to any such facility referred to in paragraph (d)(3) of this section, any EPA Enforcement Officer shall be allowed:

(i) To inspect and monitor any aspects of such manufacture and other procedures;

(ii) To inspect and make copies of any such records, documents or designs;

(iii) To inspect and photograph any part or aspect of any such engine(s) and any component used in the assembly thereof that are reasonably related to the purpose of his/her entry; and

(iv) To inspect and make copies of any records and documents specified in this section.

(5) Any EPA Enforcement Officer shall be furnished by those in charge of a facility being inspected with such reasonable assistance as he/she may request to help him/her discharge any function listed in this part. Each applicant for or recipient of certification is required to cause those in charge of a facility operated for its benefit to furnish such reasonable assistance without charge to EPA whether or not the applicant controls the facility.

(6) The duty to admit or cause to be admitted any EPA Enforcement Officer applies to any facility involved in the manufacturing or assembling of engines, whether or not the manufacturer owns or controls the facility in question and applies both to domestic and to foreign manufacturers and facilities. EPA will not attempt to make any inspections which it has been informed that local law forbids. However, if local law makes it impossible to do what is necessary to insure the accuracy of data generated at a facility, no informed judgment that an engine is certifiable or is covered by a certificate can properly be based on those data. It is the responsibility of the manufacturer to locate its testing and manufacturing facilities in jurisdictions where this situation will not arise.

(7) For purposes of this section:

(i) ''Presentation of credentials'' shall mean display of the document designating a person as an EPA Enforcement Officer.

(ii) Where component or engine storage areas or facilities are concerned, ''operating hours'' shall mean all times during which personnel other than custodial personnel are at work in the vicinity of the area or facility and have access to it.

(iii) Where facilities or areas other than those covered by paragraph (d)(7)(ii) of this section are concerned, ''operating hours'' shall mean all times during which an assembly line is in operation or all times during which testing, maintenance, service accumulation, production or compilation of records, or any other procedure or activity related to certification testing, to translation of designs from the test stage to the production stage, or to engine manufacture, or assembly is being carried out in a facility.

(iv) ''Reasonable assistance'' includes, but is not limited to, clerical, copying, interpretation and translation services, the making available on request of personnel of the facility being inspected during their working hours to inform the EPA Enforcement Officer of how the facility operates and to answer his questions, and the performance on request of emissions tests on any engine which is being, has been, or will be used for certification testing. Such tests shall be nondestructive, but may require appropriate service accumulation. A manufacturer may be compelled to cause the personal appearance of any employee at such a facility before an EPA Enforcement Officer by written request for his appearance, signed by the Assistant Administrator for Air and Radiation or the Assistant Administrator for Enforcement and Compliance Assurance, served on the manufacturer. Any such employee who has been instructed by the manufacturer to appear will be entitled to be accompanied, represented and advised by counsel.

(v) Any entry without 24 hour prior written or oral notification to the affected manufacturer shall be authorized in writing by the Assistant Administrator for Air and Radiation or the Assistant Administrator for Enforcement and Compliance Assurance.

(8) EPA may void a certificate of conformity ab initio for engines introduced into commerce if the manufacturer (or contractor for the manufacturer, if applicable) fails to comply with any provision of this section.

§ 94.216 Hearing procedures.

(a)(1) After granting a request for a hearing under § 94.210 or § 94.208, the Administrator shall designate a Presiding Officer for the hearing.

(2) The hearing shall be held as soon as practicable at a time and place fixed by the Administrator or by the Presiding Officer.

(3) In the case of any hearing requested pursuant to § 94.208, the Administrator may in his/her discretion direct that all argument and presentation of evidence be concluded within such fixed period not less than 30 days as he/she may establish from the date that the first written offer of a hearing is made to the manufacturer. To expedite proceedings, the Administrator may direct that the decision of the Presiding Officer (who may, but need not be the Administrator) shall be the final EPA decision.

(b)(1) Upon his/her appointment pursuant to paragraph (a) of this section, the Presiding Officer will establish a hearing file. The file shall consist of the notice issued by the Administrator under § 94.210 or § 94.208 together with any accompanying material, the request for a hearing and the supporting data submitted therewith, and all documents relating to the request for certification and all documents submitted therewith, and correspondence and other data material to the hearing.

(2) The hearing file will be available for inspection by the applicant at the office of the Presiding Officer.

(c) An applicant may appear in person, or may be represented by counsel or by any other duly authorized representative.

(d)(1) The Presiding Officer, upon the request of any party, or in his/her discretion, may arrange for a prehearing conference at a time and place specified by him/her to consider the following:

(i) Simplification of the issues;

(ii) Stipulations, admissions of fact, and the introduction of documents;

(iii) Limitation of the number of expert witnesses;

(iv) Possibility of agreement disposing of all or any of the issues in dispute;

(v) Such other matters as may aid in the disposition of the hearing, including such additional tests as may be agreed upon by the parties.

(2) The results of the conference shall be reduced to writing by the Presiding Officer and made part of the record.

(e)(1) Hearings shall be conducted by the Presiding Officer in an informal but orderly and expeditious manner. The parties may offer oral or written evidence, subject to the exclusion by the Presiding Officer of irrelevant, immaterial and repetitious evidence.

(2) Witnesses will not be required to testify under oath. However, the Presiding Officer shall call to the attention of witnesses that their statements may be subject to the provisions of 18 U.S.C. 1001 which imposes penalties for knowingly making false statements or representations, or using false documents in any matter within the jurisdiction of any department or agency of the United States.

(3) Any witness may be examined or cross-examined by the Presiding Officer, the parties, or their representatives.

(4) Hearings shall be reported verbatim. Copies of transcripts of proceedings may be purchased by the applicant from the reporter.

(5) All written statements, charts, tabulations, and similar data offered in evidence at the hearings shall, upon a showing satisfactory to the Presiding Officer of their authenticity, relevancy, and materiality, be received in evidence and shall constitute a part of the record.

(6) Oral argument may be permitted in the discretion of the Presiding Officer and shall be reported as part of the record unless otherwise ordered by him/her.

(f)(1) The Presiding Officer shall make an initial decision which shall include written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law, or discretion presented on the record. The findings, conclusions, and written decision shall be provided to the parties and made a part of the record. The initial decision shall become the decision of the Administrator without further proceedings unless there is an appeal to the Administrator or motion for review by the Administrator within 30 days of the date the initial decision was filed.

(2) On appeal from or review of the initial decision, the Administrator shall have all the powers which he/she would have in making the initial decision including the discretion to require or allow briefs, oral argument, the taking of additional evidence or the remanding to the Presiding Officer for additional proceedings. The decision by the Administrator shall include written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law, or discretion presented on the appeal or considered in the review.

§ 94.217 Emission data engine selection.

(a) The manufacturer must select for testing, from each engine family, the engine configuration which is expected to be worst-case for exhaust emission compliance on in-use engines, considering all exhaust emission constituents and the range of installation options available to vessel builders.

(b) Each engine in the test fleet must be constructed to be representative of production engines.

(c) After review of the manufacturer's test fleet, the Administrator may select from the available fleet one additional test engine from each engine family.

(d) Each engine selected shall be tested according to the provisions of subpart B of this part.

(e) In lieu of testing an emission data engine selected under paragraph (a) of this section and submitting the resulting data, a manufacturer may, with Administrator approval, use emission data on a similar engine for which certification has previously been obtained or for which all applicable data required under this subpart have previously been submitted. These data must be submitted in the application for certification.

§ 94.218 Deterioration factor determination.

Manufacturers shall determine exhaust emission deterioration factors using good engineering judgement according to the provisions of this section. Every deterioration factor must be, in the Administrator's judgment, consistent with emissions increases observed in-use based on emission testing of similar engines. Deterioration factors that predict emission increases over the useful life of an engine that are significantly less than the emission increases over the useful life observed from in-use testing of similar engines shall not be used.

(a) A separate exhaust emission deterioration factor shall be established for each engine family and for each emission constituent applicable to that family.

(b) *Calculation procedures.* (1) For engines not utilizing aftertreatment technology (e.g., catalyst). For each applicable emission constituent, an additive deterioration factors shall be used; that is, a deterioration factor that when added to the low mileage emission rate equals the emission rate at the end of useful life. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this section.

(2) For engines utilizing aftertreatment technology (e.g., catalyst). For each applicable emission constituent, a multiplicative deterioration factors shall be used; that is deterioration factors that when multiplied by the low mileage emission rate equal the emission rate at the end of useful life. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this section.

(c) *Rounding.* (1) In the case of a multiplicative exhaust emission deterioration factor, the factor shall be rounded to three places to the right of the decimal point in accordance with ASTM E 29–93a (incorporated by reference at § 94.5).

(2) In the case of an additive exhaust emission deterioration factor, the factor shall be established to a minimum of two places to the right of the decimal in accordance with ASTM E 29–93a (incorporated by reference at § 94.5).

(d)(1) Except as allowed by paragraph (d)(2) of this section, the manufacturer shall determine the deterioration factors based on service accumulation and related testing, according to the manufacturer's procedures, and the provisions of §§ 94.219 and 94.220. The manufacturer shall determine the form and extent of this service accumulation, consistent with good engineering practice, and shall describe this process in the application for certification.

(2) *Alternatives to service accumulation and testing for the determination of a deterioration factor.* A written explanation of the appropriateness of using an alternative must be included in the application for certification.

(i) *Carryover and carryacross of durability emission data.* In lieu of testing an emission data or durability data engine selected under § 94.217 or § 94.219, and submitting the resulting data, a manufacturer may, with Administrator approval, use exhaust emission deterioration data on a similar engine for which certification to the same standard has previously been obtained or for which all applicable data required under this subpart have previously been submitted. These data must be submitted in the application for certification.

(ii) *Use of non-marine deterioration data.* In the case where a manufacturer produces a certified motor vehicle engine, locomotive engine, or other nonroad engine that is similar to the marine engine to be certified, deterioration data from the non-marine engine may be applied to the marine engine. This application of deterioration data from such an engine to a marine engine is subject to Administrator approval, and the determination of whether the engines are similar shall be based on good engineering judgment.

(iii) *Engineering analysis for established technologies.* In the case where an engine family uses technology which is well established, an analysis based on good engineering practices may be used in lieu of testing to determine a deterioration factor for that engine family. Engines using exhaust gas recirculation or aftertreatment are excluded from this provision. The manufacturer shall provide a written statement to the Administrator that all data, analyses, test procedures, evaluations, and other documents, on which the deterioration factor is based, are available to the Administrator upon request.

§ 94.219 Durability data engine selection.

(a) The manufacturer shall select for durability testing, from each engine family, the engine configuration which is expected to generate the highest level of exhaust emission deterioration on engines in use, considering all exhaust emission constituents and the range of installation options available to vessel builders. The manufacturer shall use good engineering judgment in making this selection.

(b) In lieu of testing the engine selected in paragraph (a) of this section, the manufacturer may select, using good engineering judgement, an equivalent or worse-case engine configuration. Carryover data satisfying the provisions of § 94.220 may also be used in lieu of testing the configuration selected in paragraph (a) of this section.

(c) Durability data engines shall be built from subsystems and components that are representative of actual production engines.

§ 94.220 Service accumulation.

(a) Stabilized emission service accumulation for emission data engines.

(1) Each test emission data engine in the test fleet must be operated with all emission control systems operating properly for a period sufficient to stabilize emissions.

(2) A manufacturer may elect to consider as stabilized emission levels from emission data engines with 125 or fewer hours of service.

(b) Durability data engines shall accummulate service in a manner which will represent the emission levels from in-use engines over their full useful life, consistent with good engineering judgement.

(1) Components may be removed from the engine and aged separately.

(2) End of useful life emission levels and deterioration factors may be projected from durability data engines which have completed less than full useful life service accumulation, provided that the amount of service accumulation completed and projection procedures are determined using good engineering judgement.

(c) No maintenance, other than recommended lubrication and filter changes or maintenance otherwise allowed by this part, may be performed during service accumulation without the Administrator's approval.

(d) Service accumulation should be performed in a manner using good engineering judgment to ensure that emissions are representative of in-use engines.

(e) The manufacturer must maintain, and provide to the Administrator if requested, records stating the rationale for selecting the service accumulation period and records describing the method used to accumulate service hours on the test engine(s).

§ 94.221 Application of good engineering judgment.

(a) The manufacturer shall exercise good engineering judgment in making all decisions called for under this subpart, including but not limited to selections, categorizations, determinations, and applications of the requirements of the subpart.

(b) Upon written request by the Administrator, the manufacturer shall provide within 15 working days (or such longer period as may be allowed by the Administrator) a written description of the engineering judgment in question.

(c) The Administrator may reject any such decision by a manufacturer if it is not based on good engineering judgment or is otherwise inconsistent with the requirements of this subpart.

(d) If the Administrator rejects a decision by a manufacturer with respect to the exercise of good engineering judgment, the following provisions shall apply:

(1) If the Administrator determines that incorrect information was deliberately used in the decision process, that important information was deliberately overlooked, that the decision was not made in good faith, or that the decision was not made with a rational basis, the Administrator may suspend or void *ab initio* a certificate of conformity.

(2) If the Administrator determines that the manufacturer's decision is not covered by the provisions of paragraph (d)(1) of this section, but that a different decision would reflect a better exercise of good engineering judgment, then the Administrator will notify the manufacturer of this concern and the basis of the concern.

(i) The manufacturer shall have at least 30 days to respond to this notice. The Administrator may extend this response period upon request from the manufacturer if it is necessary to generate additional data for the manufacturer's response.

(ii) The Administrator shall make the final ruling after considering the information provided by the manufacturer during the response period. If the Administrator determines that the manufacturer's decision was not made using good engineering judgment, he/she may reject that decision and apply the new ruling to future corresponding decisions as soon as practicable.

(e) The Administrator shall notify the manufacturer in writing regarding any decision reached under paragraph (d)(1) or (2) of this section. The Administrator shall include in this notification the basis for reaching the determination.

(f) Within 30 working days following receipt of notification of the Administrator's determinations made under paragraph (d) of this section, the manufacturer may request a hearing on those determinations. The request shall be in writing, signed by an authorized representative of the manufacturer, and shall include a statement specifying the manufacturer's objections to the Administrator's determinations, and data or other analysis in support of such objections. If, after review of the request and supporting data or analysis, the Administrator finds that the request raises a substantial factual issue, he/she shall provide the manufacturer a hearing in accordance with § 94.216 of this subpart with respect to such issue.

Subpart D—Certification Averaging, Banking, and Trading Provisions

§ 94.301 Applicability.

Marine engine families subject to the standards of subpart A of this part are eligible to participate in the certification averaging, banking, and trading program described in this subpart. The provisions of this subpart apply to manufacturers of new engines that are subject to the emission standards of § 94.8.

§ 94.302 Definitions.

The definitions of subpart A of this part apply to this subpart. The following definitions also apply.

Applicable standard means a standard that would have otherwise been applicable had the engine not been certified under this subpart to an FEL different than that standard.

Broker means any entity that facilitates a trade between a buyer and seller.

Buyer means the entity that receives credits as a result of trade or transfer.

Reserved credits means credits that have been generated but have not yet been reviewed by EPA or used to demonstrate compliance under the averaging provisions of this subpart.

Seller means the entity that provides credits during a trade.

§ 94.303 General provisions.

(a) Participation in the averaging, banking, and trading program is voluntary. A manufacturer may choose to involve some or all of its engine families in any or all aspects of the program.

(b) An engine family is eligible to participate in the certification averaging, banking, and trading program for $THC+NO_X$ and PM emissions if it is subject to regulation under this part with certain exceptions specified in paragraph (c) of this section. No averaging, banking, and trading program is available for meeting the CO standards of this part.

(c) Engines may not participate in the certification averaging, banking, and trading program if they are exported. Only engines certified under this part are eligible for inclusion in this certification averaging, banking, and trading program.

(d) Averaging involves the generation of credits by a manufacturer for use by that same manufacturer in the same calendar year. A manufacturer may use averaging during certification to offset an emission exceedance of an engine family caused by an FEL above the applicable emission standard, subject to the provisions of this subpart.

(e) Banking involves the generation of credits by a manufacturer in a given calendar year for use in a subsequent model year. A manufacturer may bank actual credits only after the end of the calendar year and after EPA has reviewed the manufacturer's end-of-year reports. During the calendar year and before submittal of the end-of-year report, credits originally designated in the certification process for banking will be considered reserved and may be redesignated for trading or averaging in the end-of-year report. Credits declared for banking from the previous calendar year that have not been reviewed by EPA may be used in averaging or trading transactions. However, such credits may be revoked at a later time following EPA review of the end-of-year report or any subsequent audit actions.

(f) Trading involves the sale of banked credits for use in certification of new engines under this part. Only banked credits may be traded; reserved credits may not be traded.

§ 94.304 Compliance requirements.

(a) Manufacturers wishing to participate in certification averaging, banking and trading programs shall select a FEL for each engine family they wish to include. The level of the FEL shall be selected by the manufacturer, subject to the upper limits described in paragraph (m) of this section. An engine family certified to an FEL is subject to all provisions specified in this part, except that the applicable FEL replaces the applicable $THC+NO_X$ and PM emission standard for the family participating in the averaging, banking, and trading program.

(b) A manufacturer may certify one or more engine families at FELs above or below the applicable emission standard, provided the summation of the manufacturer's projected balance of all credit transactions in a given calendar year is greater than or equal to zero, as calculated for each family under § 94.305 and reported under § 94.309.

(c) Manufacturers certifying engine families with FELs exceeding the applicable emission standard shall obtain emission credits in amounts sufficient to address the shortfall. Credits may be obtained from averaging, banking, or trading, subject to the restrictions described in this subpart.

(d) Manufacturers certifying engine families with FELs below the applicable emission standard may generate emission credits to average, bank, or trade, or a combination thereof.

(e) Engine families may not generate credits for one pollutant while also using credits for another pollutant in the same model year.

(f) Credits may only be used for certification; they may not be used to remedy a violation of the FEL determined by production line or in-use testing. Credits may be used to allow subsequent production of engines for an engine family failing production line testing if the manufacturer elects to recertify to a higher FEL.

(g) [Reserved].

(h) If an FEL is changed after initial certification in any given model year, the manufacturer must conduct production line testing to verify that the emission levels are achieved.

(i) Manufacturers participating in the averaging, banking and trading program must demonstrate compliance with the applicable emission standards at the end of the model year. Manufacturers that have certified engine families to FELs above the applicable emission standards and do not have sufficient emission credits to offset the difference between the emission standard and the FEL for such engine family (ies) will be in violation of the conditions of the certificate of conformity for such engine family (ies). The certificates of conformity may be voided *ab initio* for those engine families.

(j) In the event of a negative credit balance resulting from a credit trade, both the buyer(s) and the seller(s) are liable, except in cases involving fraud. Certificates of all engine families participating in a negative trade may be voided *ab initio.*

(1) Where a buyer of credits is not responsible for causing the negative credit balance, it is only liable to supply additional credits equivalent to any amount of invalid credits that it used.

(2) Credit holders responsible for the credit shortfall may be subject to the requirements of § 94.309(g)(3).

(k) Averaging sets. Credits generated by engine families in one averaging set may not be used for compliance by engine families in any other averaging set. The averaging sets are defined as:

(1) Category 1 engines certified to the Tier 2 standards.

(2) Category 2 engines certified to the Tier 2 standards.

(3) Category 1 engines certified to the Tier 3 standards.

(4) Category 2 engines certified to the Tier 3 standards.

(l) Credit life shall be unlimited.

(m) Upper limits. The FELs for $THC+NO_X$ and PM for new engines certified for participation in this averaging, banking and trading program may not exceed the following values:

(1) For Category 1 engines, the FEL may not exceed the levels contained in Table D–1.

TABLE D–1.—CATEGORY 1 UPPER LIMITS FOR FAMILY EMISSION LIMITS

Subcategory liters/cylinder	Tier	Model year*	$THC+NO_X$ FEL g/kW-hr	PM FEL g/kW-hr
Power ≥ 37 kW disp. < 0.9	Tier 2	2004	11.5	1.2
	Tier 3	2008	7.5	1.2
0.9 ≥ disp. < 1.2	Tier 2	2004	11.5	1.2
	Tier 3	2008	7.5	1.2
1.2 ≥ disp. < 1.5	Tier 2	2004	10.5	0.54
	Tier 3	2008	7.5	0.54
1.5 ≥ disp. < 2.0	Tier 2	2004	10.5	0.54
	Tier 3	2008	7.5	0.54

TABLE D–1.—CATEGORY 1 UPPER LIMITS FOR FAMILY EMISSION LIMITS—Continued

Subcategory liters/cylinder	Tier	Model year*	THC+NO_X FEL g/kW-hr	PM FEL g/kW-hr
2.0 ≥ disp. < 2.5	Tier 2	2006	10.5	0.54
	Tier 3	2008	7.5	0.54
2.5 ≥ disp. < 5.0	Tier 2	2008	10.5	0.54
	Tier 3	2010	7.5	0.54

* The model years listed indicate the model years for which the specified tier of limits take effect.

(2) For Category 2 engines, the FEL may not exceed the levels contained in Table D-2.

TABLE D–2.—CATEGORY 2 UPPER LIMITS FOR FAMILY EMISSION LIMITS

Tier	Model year*	THC+NO_X FEL g/kW-hr	PM FEL g/kW-hr
Tier 2	2008	10.7	0.60
Tier 3	2010	7.5	0.60

*The model years listed indicate the model years for which the specified tier of limits take effect.

§ 94.305 Credit generation and use calculation.

(a) For each participating engine family, THC+NO_X and PM emission credits (positive or negative) are to be calculated according to the equation in paragraph (b) of this section and rounded in accordance with ASTM E29–93a, to the nearest one-hundredth of a megagram (Mg). Consistent units are to be used throughout the calculation.

(b) Credits for each engine family are calculated as:

Emission credits = (Std—FEL) X (UL) X (Production) X (AvgPR) X (LF) X $(10-6)$

Where:

(i) Std=the applicable cycle-weighted marine engine THC+NO_X and/or PM emission standard in grams per kilowatt-hour.

(ii) FEL = the family emission limit for the engine family in grams per kilowatt-hour. (The FEL may not exceed the limit established in § 94.304(m) for each pollutant.)

(iii) UL = the useful life in hours.

(iv) Production = the number of engines participating in the averaging, banking, and trading program within the given engine family during the calendar year (or the number of engines in the subset of the engine family for which credits are being calculated). Quarterly production projections are used for initial certification. Actual applicable production/sales volumes are used for end-of-year compliance determination.

(v) AvgPR = average power rating of all of the configurations within an engine family, calculated on a sales-weighted basis, in kilowatts.

(vi) LF = the load factor, dependent on whether the engine is intended for propulsion or auxiliary applications, as follows:

(A) 0.69 for propulsion engines,

(B) 0.51 for auxiliary engines.

§ 94.306 Certification.

(a) In the application for certification a manufacturer must:

(1) Declare its intent to include specific engine families in the averaging, banking, and/or trading programs. Separate declarations are required for each pollutant (THC+NO_X and PM).

(2) Declare FELs for each engine family participating in certification averaging, banking, and/or trading.

(i) The FELs must be to the same number of significant digits as the emission standard.

(ii) In no case may the FEL exceed the upper limit prescribed in § 94.304(m).

(3) Conduct and submit detailed calculations of projected emission credits (positive or negative) based on quarterly production projections for each participating family and for each pollutant, using the applicable equation in § 94.305 and the applicable values of the terms in the equation for the specific family.

(i) If the engine family is projected to have negative emission credits, state specifically the source (manufacturer/engine family) of the credits necessary to offset the credit deficit according to quarterly projected production.

(ii) If the engine family is projected to generate credits, state specifically where the quarterly projected credits will be applied (manufacturer/engine family or reserved).

(4) Submit a statement that the engines for which certification is requested will not, to the best of the manufacturer's belief, cause the manufacturer to have a negative credit balance when all credits are calculated for all the manufacturer's engine families participating in the averaging, banking, and trading program.

(b) Based on this information, each manufacturer's certification application must demonstrate:

(1) That at the end of model year production, each engine family has a net emissions credit balance equal to or greater than zero for any pollutant and program for which participation in certification under averaging, banking, and/or trading is being sought. The equation in section § 94.305 shall be used in this calculation for each engine family.

(2) That the manufacturer will obtain sufficient credits to be used to comply with the emission standard for any engine family with an FEL that exceeds the applicable emission standard, or where credits will be applied if the FEL is less than the emission standard. In cases where credits are being obtained, for each engine family involved the manufacturer must identify specifically the source of the credits being used (manufacturer/engine family). All such reports shall include all credits involved in certification averaging, banking, or trading.

(3) That in cases where credits are being generated/supplied, the use of such credits is specifically designated (manufacturer/engine family or reserved). All such reports shall include all credits involved in certification averaging, banking, or trading.

(c) Manufacturers must monitor projected versus actual production throughout the model year to ensure that compliance with emission standards is achieved at the end of the model year

(d) At the end of the model year, the manufacturer must provide the end-of-year reports required under § 94.309.

(1) Projected credits based on the information supplied in the certification application may be used to obtain a certificate of conformity. However, any such projected credits must be validated based on review of the end of model year reports and may be revoked at a later time based on follow-up audits or any other verification measure deemed appropriate by the Administrator.

(2) Compliance for engine families using averaging, banking, or trading will be determined at the end of the model

previously submitted to EPA under this section, the manufacturer's credits and credit calculations will be recalculated. Erroneous positive credits will be void. Erroneous negative credit balances may be corrected by EPA.

(3) If EPA review of a manufacturer's end-of-year report indicates a credit shortfall, the manufacturer will be permitted to purchase the necessary credits to bring the credit balance to zero. These credits must be supplied at the ratio of 1.1 credits for each 1.0 credit needed. If sufficient credits are not available to bring the credit balance to zero for the family(ies) involved, EPA may void the certificate(s) for that family(ies) *ab initio.* In addition, all engines within an engine family for which there are insufficient credits will be considered to have violated the conditions of the certificate of conformity and therefore are not covered by that certificate.

(4) If within 180 days of receipt of the manufacturer's end-of-year report, EPA review determines a reporting error in the manufacturer's favor (that is, resulting in an increased credit balance) or if the manufacturer discovers such an error within 180 days of EPA receipt of the end-of-year report, the credits are restored for use by the manufacturer.

§ 94.310 Notice of opportunity for hearing.

Any voiding of the certificate under this subpart will be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 94.216 and, if a manufacturer requests such a hearing, will be made only after an initial decision by the Presiding Officer.

Subpart E—Emission-related Defect Reporting Requirements, Voluntary Emission Recall Program

§ 94.401 Applicability.

The requirements of this subpart of this part are applicable to manufacturers of engines subject to the provisions of subpart A of this part. The requirement to report emission-related defects affecting a given class or category of engines applies for eight years from the end of the year in which such engines were manufactured.

§ 94.402 Definitions.

The definitions of Subpart A of this part apply to this subpart.

§ 94.403 Emission defect information report.

(a) A manufacturer must file a defect information report whenever it determines, in accordance with procedures it established to identify either safety-related or performance defects, (or based on other information) that a specific emission-related defect exists in 25 or more Category 1 marine engines, or 10 or more Category 2 marine engines. No report must be filed under this paragraph for any emission-related defect corrected prior to the sale of the affected engines to an ultimate purchaser.

(b) Defect information reports required under paragraph (a) of this section must be submitted not more than 15 working days after the same emission-related defect is found to effect 25 or more Category 1 marine engines, or 10 or more Category 2 marine engines. Information required by paragraph (c) of this section that is either not available within 15 working days or is significantly revised must be submitted as it becomes available.

(c) Except as provided in paragraph (b) of this section, each defect report must contain the following information in substantially the format outlined:

(1) The manufacturer's corporate name.

(2) A description of the defect.

(3) A description of each class or category of engines potentially affected by the defect including make, model, calendar year produced, purchaser and any other information as may be required to identify the engines affected.

(4) For each class or category of engines described in response to paragraph (c)(3) of this section, the following shall also be provided:

(i) The number of engines known or estimated to have the defect and an explanation of the means by which this number was determined.

(ii) The address of the plant(s) at which the potentially defective engines were produced.

(5) An evaluation of the emissions impact of the defect and a description of any operational or performance problems which a defective engine might exhibit.

(6) Available emissions data which relate to the defect.

(7) An indication of any anticipated follow-up by the manufacturer.

§ 94.404 Voluntary emissions recall reporting.

(a) When any manufacturer initiates a voluntary emissions recall campaign involving an engine, the manufacturer shall submit to EPA a report describing the manufacturer's voluntary emissions recall plan as prescribed by this section within 15 working days of the date owner notification was begun. The report shall contain the following:

(1) A description of each class or category of engines recalled including the number of engines to be recalled, the calendar year if applicable, the make, the model, and such other information as may be required to identify the engines recalled.

(2) A description of the specific modifications, alterations, repairs, corrections, adjustments, or other changes to be made to correct the engines affected by the emission-related defect.

(3) A description of the method by which the manufacturer will notify engine owners.

(4) A description of the proper maintenance or use, if any, upon which the manufacturer conditions eligibility for repair under the remedial plan, an explanation of the manufacturer's reasons for imposing any such condition, and a description of the proof to be required of an engine owner to demonstrate compliance with any such condition.

(5) A description of the procedure to be followed by engine owners to obtain correction of the nonconformity. This shall include designation of the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor to remedy the defect, and the designation of facilities at which the defect can be remedied.

(6) If some or all the nonconforming engines are to be remedied by persons other than authorized warranty agents of the manufacturer, a description of the class of persons other than authorized warranty agents of the manufacturer who will remedy the defect.

(7) A copy of any written notification sent to engine owners.

(8) A description of the system by which the manufacturer will assure that an adequate supply of parts will be available to perform the repair under the remedial plan including the date by which an adequate supply of parts will be available to initiate the repair campaign, the percentage of the total parts requirement of each person who is to perform the repair under the remedial plan to be shipped to initiate the campaign, and the method to be used to assure the supply remains both adequate and responsive to owner demand.

(9) Three copies of all necessary instructions to be sent to those persons who are to perform the repair under the remedial plan.

(10) A description of the impact of the

(b) Unless otherwise specified by the Administrator, the manufacturer shall report on the progress of the recall campaign by submitting subsequent reports for six consecutive quarters, or until proven that remedial action has been adequately taken on all affected engines, whichever occurs first, commencing with the quarter after the voluntary emissions recall campaign actually begins. Such reports shall be submitted no later than 25 working days after the close of each calendar quarter. For each class or group of engine subject to the voluntary emissions recall campaign, the quarterly report shall contain the:

(1) Emission recall campaign number, if any, designated by the manufacturer.

(2) Date owner notification was begun, and date completed.

(3) Number of engines involved in the voluntary emissions recall campaign.

(4) Number of engines known or estimated to be affected by the emission-related defect and an explanation of the means by which this number was determined.

(5) Number of engines inspected pursuant to voluntary emission recall plan.

(6) Number of inspected engines found to be affected by the emissions-related defect.

(7) Number of engines actually receiving repair under the remedial plan.

(8) Number of engines determined to be unavailable for inspection or repair under the remedial plan due to exportation, scrappage, or for other reasons (specify).

(9) Number of engines determined to be ineligible for remedial action due to a failure to properly maintain or use such engines.

(10) Three copies of any service bulletins which relate to the defect to be corrected and which have not previously been reported.

(11) Three copies of all communications transmitted to engine owners which relate to the defect to be corrected and which have not previously been submitted.

(c) If the manufacturer determines that any of the information requested in paragraph (b) of this section has changed or was incorrect, revised information and an explanatory note shall be submitted. Answers to paragraphs (b)(5), (6), (7), (8), and (9) of this section shall be cumulative totals.

(d) The manufacturer shall maintain in a form suitable for inspection, such as computer information storage devices or card files, the names and addresses of engine owners:

(1) To whom notification was given;

(2) Who received remedial repair or inspection under the remedial plan; and

(3) Who were determined not to qualify for such remedial action when eligibility is conditioned on proper maintenance or use.

(e) The records described in paragraph (d) of this section shall be made available to the Administrator upon request.

§ 94.405 Alternative report formats.

(a) Any manufacturer may submit a plan for making either of the reports required by §§ 94.403 and 94.404 on computer diskettes, magnetic tape or other machine readable format. The plan shall be accompanied by sufficient technical detail to allow a determination that data requirements of these sections will be met and that the data in such format will be usable by EPA.

(b) Upon approval by the Administrator of the reporting system, the manufacturer may use such system until otherwise notified by the Administrator.

§ 94.406 Reports filing: record retention.

(a) The reports required by §§ 94.403 and 94.404 shall be sent to: Group Manager, Engine Compliance Programs Group, Engine Programs and Compliance Division, U.S. Environmental Protection Agency, 6403–J, 401 M St., S.W., Washington, D.C. 20460.

(b) The information gathered by the manufacturer to compile the reports required by §§ 94.403 and 94.404 shall be retained for not less than 8 years from the date of the manufacture of the engines and shall be made available to duly authorized officials of the EPA upon request.

§ 94.407 Responsibility under other legal provisions preserved.

The filing of any report under the provisions of this subpart shall not affect a manufacturer's responsibility to file reports or applications, obtain approval, or give notice under any provision of law.

§ 94.408 Disclaimer of production warranty applicability.

(a) The act of filing an Emission Defect Information Report pursuant to § 94.403 is inconclusive as to the existence of a defect subject to the warranty provided by section 207(a) of the Act.

(b) A manufacturer may include on each page of its Emission Defect Information Report a disclaimer stating that the filing of a Defect Information Report pursuant to these regulations is not conclusive as to the applicability of the Production Warranty provided by section 207(a) of the Act.

Subpart F—Manufacturer Production Line Testing Programs

§ 94.501 Applicability.

The requirements of this subpart of this part are applicable to manufacturers of engines subject to the provisions of Subpart A of this part.

§ 94.502 Definitions.

The definitions in Subpart A of this part apply to this subpart.

§ 94.503 General requirements.

(a) Manufacturers shall test production line engines in accordance with sampling procedures specified in § 94.505 and the test procedures specified in § 94.506.

(b) The Administrator may waive some or all of the requirements of this subpart.

(c) The requirements of this subpart apply with respect to all applicable standards and FELs of subpart A of this part, including the supplemental standards of § 94.8(e).

§ 94.504 Right of entry and access.

(a) To allow the Administrator to determine whether a manufacturer is complying with the provisions of this part, one or more EPA enforcement officers may enter during operating hours and upon presentation of credentials any of the following places:

(1) Any facility, including ports of entry, where any engine is to be introduced into commerce or any emission-related component is manufactured, assembled, or stored;

(2) Any facility where any test conducted pursuant to a manufacturer's production line testing program or any procedure or activity connected with such test is or was performed;

(3) Any facility where any test engine is present; and

(4) Any facility where any record required under § 94.509 or other document relating to this subpart is located.

(b) Upon admission to any facility referred to in paragraph (a) of this section, EPA enforcement officers are authorized to perform the following inspection-related activities:

(1) To inspect and monitor any aspect of engine manufacture, assembly, storage, testing and other procedures, and to inspect and monitor the facilities in which these procedures are conducted;

(2) To inspect and monitor any aspect of engine test procedures or activities, including test engine selection, preparation and service accumulation,

emission test cycles, and maintenance and verification of test equipment calibration;

(3) To inspect and make copies of any records or documents related to the assembly, storage, selection, and testing of an engine; and

(4) To inspect and photograph any part or aspect of any engine and any component used in the assembly thereof that is reasonably related to the purpose of the entry.

(c) EPA enforcement officers are authorized to obtain reasonable assistance without cost from those in charge of a facility to help the officers perform any function listed in this subpart and they are authorized to request the manufacturer to make arrangements with those in charge of a facility operated for the manufacturer benefit to furnish reasonable assistance without cost to EPA.

(1) Reasonable assistance includes, but is not limited to, clerical, copying, interpretation and translation services; the making available on an EPA enforcement officer's request of personnel of the facility being inspected during their working hours to inform the EPA enforcement officer of how the facility operates and to answer the officer's questions; and the performance on request of emission tests on any engine which is being, has been, or will be used for production line testing.

(2) By written request, signed by the Assistant Administrator for Air and Radiation or the Assistant Administrator for Enforcement and Compliance Assurance, and served on the manufacturer, a manufacturer may be compelled to cause the personal appearance of any employee at such a facility before an EPA enforcement officer. Any such employee who has been instructed by the manufacturer to appear will be entitled to be accompanied, represented, and advised by counsel.

(d) EPA enforcement officers are authorized to seek a warrant or court order authorizing the EPA enforcement officers to conduct the activities authorized in this section, as appropriate, to execute the functions specified in this section. EPA enforcement officers may proceed *ex parte* to obtain a warrant or court order whether or not the EPA enforcement officers first attempted to seek permission from the manufacturer or the party in charge of the facility(ies) in question to conduct the activities authorized in this section.

(e) A manufacturer is responsible for locating its foreign testing and manufacturing facilities in jurisdictions where local law does not prohibit an EPA enforcement officer(s) from conducting the activities specified in this section. EPA will not attempt to make any inspections which it has been informed local foreign law prohibits.

§ 94.505 Sample selection for testing.

(a) At the start of each model year, the manufacturer will begin to select engines from each engine family for production line testing. Each engine will be selected from the end of the production line. Testing shall be performed throughout the entire model year to the extent possible. Engines selected shall cover the broadest range of production possible.

(1)(i) The required sample size for a Category 1 engine family is one percent of projected annual production for all engine families, provided that no engine tested fails to meet applicable emission standards. The required sample size is zero if a manufacturer's projected annual production for all engine families is less than 100.

(ii) The required sample size for a Category 2 engine family is one percent of projected annual production for all engine families, with a minimum sample size of one test per model year provided that no engine tested fails to meet applicable emission standards.

(2) Manufacturers may elect to test additional engines. All additional engines must be tested in accordance with the applicable test procedures of this part.

(3) The Administrator may reject any engines selected by the manufacturer if he or she determines that such engines are not representitive of actual production.

(b) The manufacturer must assemble the test engines using the same mass production process that will be used for engines to be introduced into commerce.

(c) No quality control, testing, or assembly procedures will be used on any test engine or any portion thereof, including parts and subassemblies, that have not been or will not be used during the production and assembly of all other engines of that family, except with the approval of the Administrator.

§ 94.506 Test procedures.

(a)(1) For engines subject to the provisions of this subpart, the prescribed test procedures are those procedures described in subpart B of this part, except as provided in this section.

(2) The Administrator may, on the basis of a written application by a manufacturer, prescribe test procedures other than those specified in paragraph (a)(1) of this section for any engine he/she determines is not susceptible to satisfactory testing using procedures specified in paragraph (a)(1) of this section.

(3) If test procedures other than those in subpart B were used in certification of the engine family being tested under this subpart (other than alternate test procedures necessary for testing of a development engine instead of a low hour engine under § 94.9), the manufacturer shall use the test procedures used in certification for production line testing.

(b)(1) The manufacturer may not adjust, repair, prepare, modify, or perform any emission test on any test engine unless this adjustment, repair, preparation, modification and/or test is documented in the manufacturer's engine assembly and inspection procedures and is actually performed by the manufacturer or unless this adjustment, repair, preparation, modification and/or test is required or permitted under this subpart or is approved in advance by the Administrator.

(2) Any adjustable engine parameter must be set to values or positions that are within the range specified in the approved application for certification .

(3) The Administrator may adjust or require to be adjusted any engine parameter which the Administrator has determined to be subject to adjustment for certification and production line testing, to any setting within the specified adjustable range of that parameter, as determined by the Administrator, prior to the performance of any test.

(c) Service Accumulation/Green Engine Factor. The manufacturer shall accumulate up to 300 hours of service on the engines to be tested. In lieu of conducting such service accumulation, the manufacturer may establish a Green Engine Factor for each regulated pollutant for each engine family to be used in calculating emissions test results. The manufacturer shall obtain the approval of the Administrator prior to using a Green Engine Factor.

(d) The manufacturer may not perform any maintenance on test engines after selection for testing.

(e) If an engine is shipped to a facility other than the production facility for production line testing, and an adjustment or repair is necessary because of such shipment, the engine manufacturer must perform the necessary adjustment or repair only after the initial test of the engine, except where the Administrator has determined that the test would be impossible to perform or would permanently damage the engine.

(f) If an engine cannot complete the service accumulation (if applicable) or an emission test, because of a malfunction, the manufacturer may request that the Administrator authorize either the repair of that engine or its deletion from the test sequence.

(g) Retesting. If an engine manufacturer determines that any production line emission test of an engine is invalid, the engine must be retested in accordance with the requirements of this subpart. Emission results from all tests must be reported to EPA, including test results the manufacturer determines are invalid. The engine manufacturer must also include a detailed explanation of the reasons for invalidating any test in the quarterly report required in § 94.508(e). In the event a retest is performed, a request may be made to the Administrator, within ten days of the end of the production quarter, for permission to substitute the after-repair test results for the original test results. The Administrator will either affirm or deny the request by the engine manufacturer within ten working days from receipt of the request.

§ 94.507 Sequence of testing.

(a) If one or more engines fail a production line test, then the manufacturer must test two additional engines for each engine that fails.

(b) The two additional engines tested under paragraph (a) of this section shall be selected from either the next fifteen produced in that engine family, or from those engines produced in that engine family within 48 hours of the completion of the failed test.

§ 94.508 Calculation and reporting of test results.

(a) Manufacturers shall calculate initial test results using the applicable test procedure specified in § 94.506(a). These results must also include the Green Engine Factor, if applicable. The manufacturer shall round these results, in accordance with ASTM E29–93a (incorporated by reference at § 94.5), to the number of decimal places contained in the applicable emission standard expressed to one additional significant figure.

(b) Final test results shall be calculated by summing the initial test results derived in paragraph (a) of this section for each test engine, dividing by the number of tests conducted on the engine, and rounding in accordance with ASTM E29–93a (incorporated by reference at § 94.5) to the same number of decimal places contained in the applicable standard expressed to one additional significant figure.

(c) Manufacturers shall calculate the final test results for each test engine by applying the appropriate deterioration factors, derived in the certification process for the engine family, to the final test results, and rounding in accordance with ASTM E 29–93a (incorporated by reference at § 94.5) to the same number of decimal places contained in the applicable standard expressed to one additional significant figure.

(d) If, subsequent to an initial failure of a production line test, the average of the test results for the failed engine and the two additional engines tested, is greater than any applicable emission standard or FEL, the engine family is deemed to be in non-compliance with applicable emission standards, and the manufacturer must notify the Administrator within 2 working days of such noncompliance.

(e) Within 30 calendar days of the end of each quarter, each manufacturer must submit to the Administrator a report which includes the following information:

(1) The location and description of the manufacturer's emission test facilities which were utilized to conduct testing reported pursuant to this section;

(2) Total production and sample size for each engine family;

(3) The applicable standards and/or FELs against which each engine family was tested;

(4) A description of the test engines;

(5) For each test conducted:

(i) A description of the test engine, including:

(A) Configuration and engine family identification;

(B) Year, make, and build date;

(C) Engine identification number;

(D) Number of hours of service accumulated on engine prior to testing; and

(E) Description of Green Engine Factor; how it is determined and how it is applied;

(ii) Location(s) where service accumulation was conducted and description of accumulation procedure and schedule, if applicable;

(iii) Test number, date, test procedure used, initial test results before and after rounding, and final test results for all production line emission tests conducted, whether valid or invalid, and the reason for invalidation of any test results, if applicable;

(iv) A complete description of any adjustment, modification, repair, preparation, maintenance, and testing which was performed on the test engine, has not been reported pursuant to any other paragraph of this subpart, and will not be performed on other production engines;

(v) Any other information the Administrator may request relevant to the determination whether the new engines being manufactured by the manufacturer do in fact conform with the regulations with respect to which the certificate of conformity was issued;

(6) For each failed engine as defined in § 94.510(a), a description of the remedy and test results for all retests as required by § 94.512(g);

(7) The date of the end of the engine manufacturer's model year production for each engine family tested; and

(8) The following signed statement and endorsement by an authorized representative of the manufacturer:

This report is submitted pursuant to Sections 213 and 208 of the Clean Air Act. This production line testing program was conducted in complete conformance with all applicable regulations under 40 CFR part 94. No emission-related changes to production processes or quality control procedures for the engine family tested have been made during this production line testing program that affect engines from the production line. All data and information reported herein is, to the best of (Company Name) knowledge, true and accurate. I am aware of the penalties associated with violations of the Clean Air Act and the regulations thereunder. (Authorized Company Representative.)

§ 94.509 Maintenance of records; submittal of information.

(a) The manufacturer for any new engine subject to any of the provisions of this subpart must establish, maintain, and retain the following adequately organized and indexed records:

(1) General records. A description of all equipment used to test engines in accordance with § 94.503. The equipment requirements in subpart B of this part apply to tests performed under this subpart.

(2) Individual records. These records pertain to each production line test conducted pursuant to this subpart and include:

(i) The date, time, and location of each test;

(ii) The method by which the Green Engine Factor was calculated or the number of hours of service accumulated on the test engine when the test began and ended;

(iii) The names of all supervisory personnel involved in the conduct of the production line test;

(iv) A record and description of any adjustment, repair, preparation or modification performed on test engines, giving the date, associated time, justification, name(s) of the authorizing

personnel, and names of all supervisory personnel responsible for the conduct of the action;

(v) If applicable, the date the engine was shipped from the assembly plant, associated storage facility or port facility, and the date the engine was received at the testing facility;

(vi) A complete record of all emission tests performed pursuant to this subpart (except tests performed directly by EPA), including all individual worksheets and/or other documentation relating to each test, or exact copies thereof, in accordance with the record requirements specified in subpart B of this part;

(vii) A brief description of any significant events during testing not otherwise described under this paragraph (a)(2) of this section, commencing with the test engine selection process and including such extraordinary events as engine damage during shipment.

(3) The manufacturer must establish, maintain and retain general records, pursuant to paragraph (a)(1) of this section, for each test cell that can be used to perform emission testing under this subpart.

(b) The manufacturer must retain all records required to be maintained under this subpart for a period of eight (8) years after completion of all testing. Records may be retained as hard copy (i.e., on paper) or reduced to microfilm, floppy disk, or some other method of data storage, depending upon the manufacturer's record retention procedure; provided, that in every case, all the information contained in the hard copy is retained.

(c) The manufacturer must, upon request by the Administrator, submit the following information with regard to engine production:

(1) Projected production for each configuration within each engine family for which certification has been requested and/or approved.

(2) Number of engines, by configuration and assembly plant, scheduled for production.

(d) Nothing in this section limits the Administrator's discretion to require a manufacturer to establish, maintain, retain or submit to EPA information not specified by this section.

(e) All reports, submissions, notifications, and requests for approval made under this subpart must be addressed to: Group Manager, Engine Compliance Programs Group, Engine Programs and Compliance Division 6403-J, U.S. Environmental Protection Agency, 401 M Street SW, Washington, DC 20460.

(f) The manufacturer must electronically submit the results of its production line testing using an EPA information format.

§ 94.510 Compliance with criteria for production line testing.

(a) A failed engine is one whose final test results pursuant to § 94.508(c), for one or more of the applicable pollutants, exceed an applicable emission standard or FEL.

(b) An engine family is deemed to be in noncompliance, for purposes of this subpart, if at any time throughout the model year, the average of an initial failed engine and the two additional engines tested, is greater than any applicable emission standard or FEL.

§ 94.511 [Reserved]

§ 94.512 Suspension and revocation of certificates of conformity.

(a) The certificate of conformity is suspended with respect to any engine that fails a production line test pursuant to § 94.510(a), effective from the time the testing of that engine is completed.

(b) The Administrator may suspend the certificate of conformity for an engine family which is in noncompliance pursuant to § 94.510(b), thirty days after the engine family is deemed to be in noncompliance.

(c) If the results of testing pursuant to the regulations in this subpart indicate that engines of a particular family produced at one plant of a manufacturer do not conform to the regulations with respect to which the certificate of conformity was issued, the Administrator may suspend the certificate of conformity with respect to that family for engines manufactured by the manufacturer at all other plants.

(d) The Administrator may suspend a certificate of conformity for any engine family in whole or in part if:

(1) The manufacturer fails to comply with any of the requirements of this subpart.

(2) The manufacturer submits false or incomplete information in any report or information provided to the Administrator under this subpart.

(3) The manufacturer renders inaccurate any test data submitted under this subpart.

(4) An EPA enforcement officer is denied the opportunity to conduct activities authorized in this subpart.

(5) An EPA enforcement officer is unable to conduct activities authorized in § 94.504 for any reason.

(e) The Administrator shall notify the manufacturer in writing of any suspension or revocation of a certificate of conformity in whole or in part; a suspension or revocation is effective upon receipt of such notification or thirty days from the time an engine family is deemed to be in noncompliance under §§ 94.508(d), 94.510(a), or 94.510(b), whichever is earlier, except that the certificate is immediately suspended with respect to any failed engines as provided for in paragraph (a) of this section.

(f) The Administrator may revoke a certificate of conformity for an engine family when the certificate has been suspended pursuant to paragraph (b) or (c) of this section if the remedy is one requiring a design change or changes to the engine and/or emission control system as described in the application for certification of the affected engine family.

(g) Once a certificate has been suspended for a failed engine, as provided for in paragraph (a) of this section, the manufacturer must take the following actions before the certificate is reinstated for that failed engine:

(1) Remedy the nonconformity;

(2) Demonstrate that the engine conforms to applicable standards or family emission limits by retesting if applicable, the engine in accordance with this part; and

(3) Submit a written report to the Administrator, after successful completion of testing on the failed engine, which contains a description of the remedy and test results for each engine in addition to other information that may be required by this part.

(h) Once a certificate for a failed engine family has been suspended pursuant to paragraph (b) or (c) of this section, the manufacturer must take the following actions before the Administrator will consider reinstating the certificate:

(1) Submit a written report to the Administrator which identifies the reason for the noncompliance of the engines, describes the remedy, including a description of any quality control and/or quality assurance measures to be taken by the manufacturer to prevent future occurrences of the problem, and states the date on which the remedies will be implemented.

(2) Demonstrate that the engine family for which the certificate of conformity has been suspended does in fact comply with the regulations of this part by testing engines selected from normal production runs of that engine family. Such testing must comply with the provisions of this subpart. If the manufacturer elects to continue testing individual engines after suspension of a certificate, the certificate is reinstated for any engine actually determined to be in conformance with the applicable

standards or family emission limits through testing in accordance with the applicable test procedures, provided that the Administrator has not revoked the certificate pursuant to paragraph (f) of this section.

(i) Once the certificate has been revoked for an engine family, if the manufacturer desires to continue introduction into commerce of a modified version of that family, the following actions must be taken before the Administrator may issue a certificate for that modified family:

(1) If the Administrator determines that the change(s) in engine design may have an effect on emission performance deterioration, the Administrator shall notify the manufacturer, within five working days after receipt of the report in paragraph (h)(1) of this section, whether subsequent testing under this subpart will be sufficient to evaluate the change or changes or whether additional testing will be required; and

(2) After implementing the change or changes intended to remedy the nonconformity, the manufacturer must demonstrate that the modified engine family does in fact conform with the regulations of this part by testing engines selected from normal production runs of that engine family. When both of these requirements are met, the Administrator shall reissue the certificate or issue a new certificate, as the case may be, to include that family. If this subsequent testing reveals failing data the revocation remains in effect.

(j) At any time subsequent to an initial suspension of a certificate of conformity for a test engine pursuant to paragraph (a) of this section, but not later than 30 days (or such other period as may be allowed by the Administrator) after notification of the Administrator's decision to suspend or revoke a certificate of conformity in whole or in part pursuant to paragraphs (b), (c), or (f) of this section, a manufacturer may request a hearing as to whether the tests have been properly conducted or any sampling methods have been properly applied.

(k) Any suspension of a certificate of conformity under paragraphs (a), (b), (c) and (d) of this section:

(1) Shall be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with §§ 94.513, 94.514, and 94.515 and

(2) Need not apply to engines no longer in the possession of the manufacturer.

(l) After the Administrator suspends or revokes a certificate of conformity pursuant to this section or voids a certificate of conformity under paragraph § 94.215, and prior to the commencement of a hearing under § 94.513, if the manufacturer demonstrates to the Administrator's satisfaction that the decision to suspend, revoke, or void the certificate was based on erroneous information, the Administrator shall reinstate the certificate.

(m) To permit a manufacturer to avoid storing non-test engines while conducting subsequent testing of the noncomplying family, a manufacturer may request that the Administrator conditionally reinstate the certificate for that family. The Administrator may reinstate the certificate subject to the following condition: the manufacturer must commit to recall all engines of that family produced from the time the certificate is conditionally reinstated if the family fails subsequent testing and must commit to remedy any nonconformity at no expense to the owner.

§ 94.513 Request for public hearing.

(a) If the manufacturer disagrees with the Administrator's decision to suspend or revoke a certificate or disputes the basis for an automatic suspension pursuant to § 94.512(a), the manufacturer may request a public hearing.

(b) The manufacturer's request shall be filed with the Administrator not later than 30 days after the Administrator's notification of his or her decision to suspend or revoke, unless otherwise specified by the Administrator. The manufacturer shall simultaneously serve two copies of this request upon the Director of the Engine Programs and Compliance Division, Office of Mobile Sources and file two copies with the Hearing Clerk of the Agency. Failure of the manufacturer to request a hearing within the time provided constitutes a waiver of the right to a hearing. Subsequent to the expiration of the period for requesting a hearing as of right, the Administrator may, in his or her discretion and for good cause shown, grant the manufacturer a hearing to contest the suspension or revocation.

(c) A manufacturer shall include in the request for a public hearing:

(1) A statement as to which configuration(s) within a family is to be the subject of the hearing;

(2) A concise statement of the issues to be raised by the manufacturer at the hearing, except that in the case of the hearing requested under § 94.512(j), the hearing is restricted to the following issues:

(i) Whether tests have been properly conducted (specifically, whether the tests were conducted in accordance with applicable regulations under this part and whether test equipment was properly calibrated and functioning);

(ii) Whether there exists a basis for distinguishing engines produced at plants other than the one from which engines were selected for testing which would invalidate the Administrator's decision under § 94.512(c));

(3) A statement specifying reasons why the manufacturer believes it will prevail on the merits of each of the issues raised; and

(4) A summary of the evidence which supports the manufacturer's position on each of the issues raised.

(d) A copy of all requests for public hearings will be kept on file in the Office of the Hearing Clerk and will be made available to the public during Agency business hours.

§ 94.514 Administrative procedures for public hearing.

(a) The Presiding Officer shall be an Administrative Law Judge appointed pursuant to 5 U.S.C. 3105 (see also 5 CFR part 930).

(b) The Judicial Officer shall be an officer or employee of the Agency appointed as a Judicial Officer by the Administrator, pursuant to this section, who shall meet the qualifications and perform functions as follows:

(1) *Qualifications.* A Judicial Officer may be a permanent or temporary employee of the Agency who performs other duties for the Agency. The Judicial Officer shall not be employed by the Office of Enforcement or have any connection with the preparation or presentation of evidence for a hearing held pursuant to this subpart. The Judicial Officer shall be a graduate of an accredited law school and a member in good standing of a recognized Bar Association of any state or the District of Columbia.

(2) *Functions.* The Administrator may consult with the Judicial Officer or delegate all or part of the Administrator's authority to act in a given case under this section to a Judicial Officer, provided that this delegation does not preclude the Judicial Officer from referring any motion or case to the Administrator when the Judicial Officer determines such referral to be appropriate.

(c) For the purposes of this section, one or more Judicial Officers may be designated by the Administrator. As work requires, a Judicial Officer may be designated to act for the purposes of a particular case.

(d)(1) In the case of a hearing requested under § 94.512(j), when it clearly appears from the data and other information contained in the request for

a hearing that no genuine and substantial question of fact or law exists with respect to the issues specified in § 94.513(c)(2), the Administrator may enter an order denying the request for a hearing and reaffirming the original decision to suspend or revoke a certificate of conformity.

(2) In the case of a hearing requested under § 94.513 to challenge a suspension of a certificate of conformity for the reason(s) specified in § 94.512(d), when it clearly appears from the data and other information contained in the request for the hearing that no genuine and substantial question of fact or law exists with respect to the issue of whether the refusal to comply with this subpart was caused by conditions and circumstances outside the control of the manufacturer, the Administrator may enter an order denying the request for a hearing and suspending the certificate of conformity.

(3) Any order issued under paragraph (d)(1) or (d)(2) of this section has the force and effect of a final decision of the Administrator, as issued pursuant to § 94.516.

(4) If the Administrator determines that a genuine and substantial question of fact or law does exist with respect to any of the issues referred to in paragraphs (d)(1) and (d)(2) of this section, the Administrator shall grant the request for a hearing and publish a notice of public hearing in the **Federal Register** or by such other means as the Administrator finds appropriate to provide notice to the public.

(e) *Filing and service.* (1) An original and two copies of all documents or papers required or permitted to be filed pursuant to this section and § 94.513(c) must be filed with the Hearing Clerk of the Agency. Filing is considered timely if mailed, as determined by the postmark, to the Hearing Clerk within the time allowed by this section and § 94.513(b). If filing is to be accomplished by mailing, the documents must be sent to the address set forth in the notice of public hearing referred to in paragraph (d)(4) of this section.

(2) To the maximum extent possible, testimony will be presented in written form. Copies of written testimony will be served upon all parties as soon as practicable prior to the start of the hearing. A certificate of service will be provided on or accompany each document or paper filed with the Hearing Clerk. Documents to be served upon the Director of the Engine Programs and Compliance Division must be sent by registered mail to: Director, Engine Programs and Compliance Division 6403–J, U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460. Service by registered mail is complete upon mailing.

(f) *Computation of time.* (1) In computing any period of time prescribed or allowed by this section, except as otherwise provided, the day of the act or event from which the designated period of time begins to run is not included. Saturdays, Sundays, and federal legal holidays are included in computing the period allowed for the filing of any document or paper, except that when the period expires on a Saturday, Sunday, or federal legal holiday, the period is extended to include the next following business day.

(2) A prescribed period of time within which a party is required or permitted to do an act is computed from the time of service, except that when service is accomplished by mail, three days will be added to the prescribed period.

(g) *Consolidation.* The Administrator or the Presiding Officer in his or her discretion may consolidate two or more proceedings to be held under this section for the purpose of resolving one or more issues whenever it appears that consolidation will expedite or simplify consideration of these issues. Consolidation does not affect the right of any party to raise issues that could have been raised if consolidation had not occurred.

(h) *Hearing date.* To the extent possible hearings under § 94.513 will be scheduled to commence within 14 days of receipt of the request for a hearing.

§ 94.515 Hearing procedures.

The procedures provided in § 86.1014–84 (i) through (s) of this chapter apply for hearings requested pursuant to § 94.513 regarding suspension, revocation, or voiding of a certificate of conformity.

§ 94.516 Appeal of hearing decision.

The procedures provided in § 86.1014–84 (t) through (aa) of this chapter apply for appeals filed with respect to hearings held pursuant to § 94.515.

§ 94.517 Treatment of confidential information.

Except for information required by § 94.508(e)(2) and quarterly emission test results described in § 94.508(e), information submitted pursuant to this subpart shall be made available to the public by EPA notwithstanding any claim of confidentiality made by the submitter. The provisions for treatment of confidential information described in § 94.4 apply to the information required by § 94.508(e)(2) and quarterly emission test results described in § 94.508(e).

Subpart G [Reserved]

Subpart H—Recall Regulations

§ 94.701 Applicability.

The requirements of this subpart are applicable to all nonroad engines subject to the provisions of this part.

§ 94.702 Definitions.

The definitions in Subpart A of this part apply to this subpart.

§ 94.703 Applicability of 40 CFR part 85, subpart S.

(a) Engines subject to provisions of this part are subject to recall regulations specified in part 85, subpart S of this chapter, except for the items set forth in this section.

(b) In § 85.1801, section 216 of the Clean Air Act applies, rather than section 214 of the Act.

(c) In § 85.1802(a), section 213 of the Act applies, rather than section 202 of the Act.

(d) In § 85.1803(a) and § 85.1805(a)(1) ''family emission limits as defined in part 94 promulgated under section 213 of the Act'' applies, rather than the reference to ''family particulate emission limits as defined in part 86 promulgated under section 202 of the Act''.

(e) Throughout the subpart references to ''engines'' apply rather than references to ''vehicles or engines''.

Subpart I—Importation of Nonconforming Engines

§ 94.801 Applicability.

(a) Except where otherwise indicated, this subpart is applicable to importers of engines (and vessels containing engines) for which the Administrator has promulgated regulations under this part prescribing emission standards, that are offered for importation or imported into the United States, but which engines, at the time of importation or being offered for importation, are not covered by certificates of conformity issued under section 213 and section 206(a) of the Clean Air Act (that is, which are nonconforming engines as defined in § 94.2), and this part. Compliance with regulations under this subpart does not relieve any person or entity from compliance with other applicable provisions of the Clean Air Act.

(b) Regulations prescribing further procedures for the importation of engines into the Customs territory of the United States, as defined in 19 U.S.C. 1202, are set forth in U.S. Customs Service regulations (19 CFR Chapter I).

§ 94.802 Definitions.

The definitions of Subpart A of this part apply to this subpart.

§ 94.803 Admission.

A nonconforming engine offered for importation may be admitted into the United States pursuant to the provisions of this subpart. In order to obtain admission the importer must submit to the Administrator a written request for approval containing the following:

(a) Identification of the importer of the engine and the importer's address, telephone number, and taxpayer identification number;

(b) Identification of the engine's owner, the owner's address, telephone number, and taxpayer identification number;

(c) Identification of the engine including make, model, identification number, and original production year;

(d) Information indicating the provision in this subpart under which the engine is to be imported;

(e) Identification of the place(s) where the engine is to be stored until EPA approval of the importer's application to the Administrator for final admission;

(f) Authorization for EPA enforcement officers to conduct inspections or testing otherwise permitted by the Act or regulations thereunder; and

(g) Such other information as is deemed necessary by the Administrator.

§ 94.804 Exemptions.

(a) Unless otherwise specified, any person may apply for the exemptions allowed by this section.

(b) Notwithstanding other requirements of this subpart, a nonconforming engine that qualifies for a temporary exemption under this paragraph may be conditionally admitted into the United States if prior written approval for the conditional admission is obtained from the Administrator. Conditional admission is to be under bond. The Administrator may request that the U.S. Customs Service require a specific bond amount to ensure compliance with the requirements of the Act and this subpart. A written request for a temporary exemption from the Administrator shall contain the identification required in § 94.803 and information that demonstrates that the engines qualify for an exemption. Noncompliance with provisions of this section may result in the forfeiture of the total amount of the bond and/or exportation of the engine. The following temporary exemptions are permitted by this paragraph (b):

(1) *Exemption for repairs or alterations.* Upon written approval by EPA, a person may conditionally import under bond a nonconforming engine solely for purpose of repair(s) or alteration(s). The engine may not be operated in the United States other than for the sole purpose of repair or alteration or shipment to the point of repair or alteration and to the port of export. It may not be sold or leased in the United States and is to be exported upon completion of the repair(s) or alteration(s).

(2) *Testing exemption.* A nonconforming test engine may be conditionally imported by a person subject to the requirements of § 94.905. A test engine may be operated in the United States provided that the operation is an integral part of the test. This exemption is limited to a period not exceeding one year from the date of importation unless a request is made by the appropriate importer, and subsequently granted by EPA, concerning the engine in accordance with § 94.905 for a subsequent one-year period.

(3) *Display exemptions.* (i) A nonconforming engine intended solely for display may be conditionally imported under bond subject to the requirements of § 94.906(b).

(ii) A display engine may be imported by any person for purposes related to a business or the public interest. Such purposes do not include collections normally inaccessible or unavailable to the public on a daily basis, display of an engine at a dealership, private use, or other purpose that the Administrator determines is not appropriate for display exemptions. A display engine may not be sold or leased in the United States and may not be operated in the United States except for the operation incident and necessary to the display purpose.

(iii) A display exemption is granted for 12 months or for the duration of the display purpose, whichever is shorter. Extensions of up to 12 months each are available upon approval by the Administrator. In no circumstances, however, may the total period of exemption exceed 36 months.

(c) National security exemption. Notwithstanding any other requirement of this subpart, an engine may be permanently imported into the United States under the national security exemption found at § 94.908, if prior written approval for such permanent importation is obtained from the Administrator. A request for approval is to contain the identification information required in § 94.803 and information that demonstrates that the importer is entitled to the exemption.

(d) An application for exemption provided for in paragraphs (b) and (c) of this section shall be mailed to: Group Manager, Engine Compliance Programs Group, Engine Programs and Compliance Division, U.S. Environmental Protection Agency, 6403–J, 401 M St., SW., Washington, DC 20460, Attention: Imports.

§ 94.805 Prohibited acts; penalties.

(a) The importation of an engine (including an engine incorporated in an imported marine vessel) which is not covered by a certificate of conformity other than in accordance with this subpart and the entry regulations of the U.S. Customs Service is prohibited. Failure to comply with this section is a violation of section 213(d) and section 203 of the Act.

(b) Unless otherwise permitted by this subpart, during a period of conditional admission, the importer of an engine may not:

(1) Operate the engine in the United States; or

(2) Sell or lease or offer the engine for sale or lease.

(c) An engine conditionally admitted pursuant to § 94.804 and not otherwise permanently exempted or excluded by the end of the period of conditional admission, or within such additional time as the Administrator and the U.S. Customs Service may allow, is deemed to be unlawfully imported into the United States in violation of section 213(d) and section 203 of the Act, unless the engine has been delivered to the U.S. Customs Service for export or other disposition under applicable Customs laws and regulations by the end of the period of conditional admission. An engine not so delivered is subject to seizure by the U.S. Customs Service.

(d) An importer who violates section 213(d) and section 203 of the Act is subject to a civil penalty under section 205 of the Act and § 94.1106. In addition to the penalty provided in the Act and § 94.1106, where applicable, a person or entity who imports an engine under the exemption provisions of § 94.804 and, who fails to deliver the engine to the U.S. Customs Service by the end of the period of conditional admission is liable for liquidated damages in the amount of the bond required by applicable Customs laws and regulations.

Subpart J—Exclusion and Exemption Provisions

§ 94.901 Purpose and applicability.

The provisions of this subpart of this part identify excluded engines (i.e.,

engines not covered by the Act) and allow for the exemption of engines from certain provisions of this part. The applicability of the exclusions is described in § 94.903, and the applicability of the exemption allowances is described in §§ 94.904 through 94.909.

§ 94.902 Definitions.

The definitions of Subpart A of this part apply to this subpart.

§ 94.903 Exclusions.

(a) Upon written request with supporting documentation, EPA will make written determinations as to whether certain engines are excluded from applicability of this part. Any engines that are determined to be excluded are not subject to the regulations under this part. Requests to determine whether certain engines are excluded should be sent to: Group Manager, Engine Compliance Programs Group, Engine Programs and Compliance Division, U.S. Environmental Protection Agency, 6403–J, 401 M St., SW., Washington, DC 20460.

(b) EPA will maintain a list of models of engines that have been determined to be excluded from coverage under this part. This list will be available to the public and may be obtained by writing to the address in paragraph (a) of this section.

(c) In addition to the engines excluded in paragraph (a) of this section, certain engines are not subject to the requirements and prohibitions of this part because they are excluded from the definitions of ''marine engine'' in § 94.2.

§ 94.904 Exemptions.

(a) Except as specified otherwise in this subpart, the provisions of §§ 94.904 through 94.911 exempt certain new engines from the standards, other requirements, and prohibitions of this part, except for the requirements of this subpart and the requirements of § 94.1104.

(b)(1) Any person may request a testing exemption subject to the provisions of § 94.905.

(2) Any engine manufacturer may request a national security exemption subject to the provisions of § 94.908.

(3) Engines manufactured for export purposes are exempt without application, subject to the provisions of § 94.909, except as otherwise specified by § 94.909.

(4) Manufacturer-owned engines are exempt without application, subject to the provisions of § 94.906 (a).

(5) Display engines are exempt without application, subject to the provisions of § 94.906 (b).

(6) Engines used solely for the purpose of competition are exempt, subject to the provisions of § 94.906 (c).

(7) Auxiliary engines used on foreign trade vessels are exempt, subject to the provisions of § 94.906 (d).

(8) Engines that are identical to engines that are covered by a certificate of conformity issued under 40 CFR part 89 or 40 CFR part 92 are exempt, subject to the provisions of § 94.907.

§ 94.905 Testing exemption.

(a)(1) The Administrator may exempt from the standards and/or other requirements and prohibitions of this part new engines that are being used solely for the purpose of conducting a test program. Any person requesting an exemption for the purpose of conducting a test program must demonstrate the following:

(i) That the proposed test program has a purpose which constitutes an appropriate basis for an exemption in accordance this section;

(ii) That the proposed test program necessitates the granting of an exemption;

(iii) That the proposed test program exhibits reasonableness in scope; and

(iv) That the proposed test program exhibits a degree of oversight and control consonant with the purpose of the test program and EPA's monitoring requirements.

(2) Paragraphs (b), (c), (d), and (e) of this section describe what constitutes a sufficient demonstration for each of the four elements identified in paragraphs (a)(1)(i) through (iv) of this section.

(b) With respect to the purpose of the proposed test program, an appropriate purpose would be research, investigations, studies, demonstrations, technology development, or training, but not national security. A concise statement of purpose is a required item of information.

(c) With respect to the necessity that an exemption be granted, necessity arises from an inability to achieve the stated purpose in a practicable manner without performing or causing to be performed one or more of the prohibited acts under § 94.1103. In appropriate circumstances, time constraints may be a sufficient basis for necessity, but the cost of certification alone, in the absence of extraordinary circumstances, is not a basis for necessity.

(d) With respect to reasonableness, a test program must exhibit a duration of reasonable length and affect a reasonable number of engines. In this regard, required items of information include:

(1) An estimate of the program's duration; and

(2) The maximum number of engines involved.

(e) With respect to control, the test program must incorporate procedures consistent with the purpose of the test and be capable of affording EPA monitoring capability. As a minimum, required items of information include:

(1) The technical nature of the testing;

(2) The location(s) of the testing;

(3) The time, work, or mileage duration of the testing;

(4) The ownership arrangement with regard to the engines involved in the testing;

(5) The intended final disposition of the engines;

(6) The manner in which the engine identification numbers will be identified, recorded, and made available; and (7) The means or procedure whereby test results will be recorded.

(f) A manufacturer of new engines may request a testing exemption to cover engines intended for use in test programs planned or anticipated over the course of a subsequent two-year period. Unless otherwise required by the Director, Engine Programs and Compliance Division, a manufacturer requesting such an exemption need only furnish the information required by paragraphs (a)(1) and (d)(2) of this section along with a description of the recordkeeping and control procedures that will be employed to assure that the engines are used for purposes consistent with paragraph (a) of this section.

(g) For engines being used for the purpose of developing a fundamentally new emission control technology related either to an alternative fuel or an aftertreatment device, the Administrator may exempt the engine from some or all of the applicable standards of this part for the full useful life of the engine, subject to the provisions of paragraphs (a) through (f) of this section.

§ 94.906 Manufacturer-owned exemption, display exemption, competition exemption, and foreign trade vessel exemption.

(a) Any manufacturer-owned-owned engine, as defined by § 94.2, is exempt from § 94.1103, without application, if the manufacturer complies with the following terms and conditions:

(1) The manufacturer must establish, maintain, and retain the following adequately organized and indexed information on each exempted engine:

(i) Engine identification number;

(ii) Use of the engine on exempt status; and

(iii) Final disposition of any engine removed from exempt status.

(2) The manufacturer must provide right of entry and access to these records to EPA Enforcement Officers as outlined in § 94.208.

(3) The manufacturer must permanently affix a label to each engine on exempt status, unless the requirement is waived or an alternate procedure is approved by the Director, Engine Programs and Compliance Division. This label should:

(i) Be affixed in a readily visible portion of the engine;

(ii) Be attached in such a manner that cannot be removed without destruction or defacement;

(iii) State in the English language and in block letters and numerals of a color that contrasts with the background of the label, the following information:

(A) The label heading ''Emission Control Information'';

(B) Full corporate name and trademark of manufacturer;

(C) Engine displacement, engine family identification, and model year of engine; or person of office to be contacted for further information about the engine;

(D) The statement ''This engine is exempt from the prohibitions of 40 CFR 94.1103.''

(4) No provision of paragraph (a)(3) of this section prevents a manufacturer from including any other information it desires on the label.

(5) The engine is not used in revenue-generating service, or sold.

(b) Display exemption. An uncertified engine that is to be used solely for display purposes, and that will only be operated incident and necessary to the display purpose, and will not be sold unless an applicable certificate of conformity has been obtained for the engine, is exempt without request from the standards of this part.

(c) Competition exemption. The Administrator may exempt, upon request, engines that are used solely for the purpose of competition.

(d) Foreign trade exemption. (1) The Administrator may exempt, upon request of the vessel owner, auxiliary engines used on foreign trade vessels.

(2) Vessel owners requesting an exemption under this paragraph (d) must demonstrate to the Administrator that the vessel will spend less than 25 percent of its operating time within 320 nautical kilometers of U.S. territory.

(3) For the purpose of this paragraph (d), the term ''vessel owner'' includes any entities that have contracted to purchase a new marine vessel.

§ 94.907 Non-marine-specific engine exemption.

(a)(1) For manufacturers selling non-marine-specific engines to be used as propulsion engines in marine vessels, such engines are exempt, provided:

(i) The engines are covered by a certificate of conformity issued under 40 CFR part 89 or 40 CFR part 92;

(ii) The certified emission levels (after application of deterioration factors) are below the numerical levels of the otherwise applicable standards of this part for all pollutants;

(iii) More engines are reasonably projected to be sold and used under the certificate for non-marine use than for use in marine vessels;

(iv) The engine is sold to an engine dresser for marization prior to being placed in a vessel;

(v) The Administrator has approved the exemption as specified in paragraph (d) of this section.

(2) For the purposes of this section ''covered by a certificate of conformity issued under 40 CFR part 89 or 40 CFR part 92'' means that:

(i) The engine complies with all applicable requirements of either 40 CFR part 89 or 40 CFR part 92;

(ii) The fuel system of the engine has not been modified after the original manufacture of the engine is complete;

(iii) The engine cooling system of an installed engine meets the original manufacturer's specifications for certified engines;

(iv) No other changes are made to the engine that could reasonably be expected to adversely effect the emissions performance of the engine; and

(v) The original emissions label remains clearly visible on the engine after installation in the vessel.

(b) For manufacturers selling non-marine-specific engines to be used as auxiliary engines in marine vessels, such engines are exempt from the certification requirements of subpart C of this part and the production line testing requirements of subpart F of this part, provided that they comply with all of the requirements of paragraph (a) of this section other than the requirement of paragraph (a)(1)(iv) of this section. These engines are not exempt from the standards of subpart A of this part.

(c) Manufacturers of engines exempted under this section shall:

(1) Report annually to EPA the number of engines exempted under paragraph (a) of this section;

(2) Upon the Administrator's request, provide test data showing the emissions of the engine when it is operated over a typical marine engine cycle; and

(3) Notify purchasers that the engine a dressed non-marine specific engine (e.g., is a dressed locomotive engine) that is exempt from the requirements of this part 94.

(d)(1) Manufacturers seeking an exemption under this section shall notify the Administrator of such intent in their applications for certification under 40 CFR part 89 or 40 CFR part 92.

(2) The Administrator shall deny a non-marine-specific exemption in any case where he/she has evidence that approving such an exemption would be inappropriate because of adverse environmental or economic impacts.

§ 94.908 National security exemption.

(a)(1) Any marine engine, otherwise subject to this part, which is used in a vessel that exhibits substantial features ordinarily associated with military combat such as armor and/or permanently affixed weaponry and which will be owned and/or used by an agency of the federal government with responsibility for national defense, will be exempt from the regulations in this subpart for purposes of national security. No request for exemption is necessary.

(2) Manufacturers may request a national security exemption for any marine engine, otherwise subject to this part, which does not meet the conditions described in paragraph (a)(1) of this section. A manufacturer requesting a national security exemption must state the purpose for which the exemption is required and the request must be endorsed by an agency of the federal government charged with responsibility for national defense.

(b) EPA will maintain a list of models of marine engines (and the vessels which use them) that have been granted a national security exemption under paragraph (a)(2) of this section. This list will be available to the public and may be obtained by writing to the following address: Group Manager, Engine Compliance Programs Group, Engine Programs and Compliance Division, (6403–J) Environmental Protection Agency, 401 M Street SW, Washington, DC 20460.

§ 94.909 Export exemptions.

(a) A new engine intended solely for export, and so labeled or tagged on the outside of any container and on the engine, is subject to the provisions of § 94.1103, unless the importing country has new marine engine emission standards which differ from EPA standards.

(b) For the purpose of paragraph (a) of this section, a country having no standards whatsoever is deemed to be a

country having emission standards which differ from EPA standards.

(c) It is a condition of any exemption for the purpose of export under paragraph (a) of this section, that such exemption is void *ab initio* with respect to a new engine intended solely for export, where such engine is sold, or offered for sale, to an ultimate purchaser or otherwise distributed or introduced into commerce in the United States for purposes other than export.

§ 94.910 Granting of exemptions.

(a) If upon completion of the review of an exemption request made pursuant to § 94.905 or § 94.908, EPA determines it is appropriate to grant such an exemption, a memorandum of exemption is to be prepared and submitted to the person requesting the exemption. The memorandum is to set forth the basis for the exemption, its scope, and such terms and conditions as are deemed necessary. Such terms and conditions generally include, but are not limited to, agreements by the applicant to conduct the exempt activity in the manner described to EPA, create and maintain adequate records accessible to EPA at reasonable times, employ labels for the exempt engines setting forth the nature of the exemption, take appropriate measures to assure that the terms of the exemption are met, and advise EPA of the termination of the activity and the ultimate disposition of the engines.

(b) Any exemption granted pursuant to paragraph (a) of this section is deemed to cover any subject engine only to the extent that the specified terms and conditions are complied with. A breach of any term or condition causes the exemption to be void *ab initio* with respect to any engine. Consequently, the causing or the performing of an act prohibited under § 94.1103(a)(1) or (a)(3), other than in strict conformity with all terms and conditions of this exemption, renders the person to whom the exemption is granted, and any other person to whom the provisions of § 94.1103(a) are applicable, liable to suit under sections 204 and 205 of the Act.

§ 94.911 Submission of exemption requests.

Requests for exemption or further information concerning exemptions and/or the exemption request review procedure should be addressed to: Group Manager, Engine Compliance Programs Group, Engine Programs and Compliance Division, U.S. Environmental Protection Agency, 6403–J, 401 M St., S.W., Washington, D.C. 20460.

Subpart L—General Enforcement Provisions and Prohibited Acts

§ 94.1101 Applicability.

The requirements of this subpart are applicable to all persons with respect to engines subject to the provisions of subpart A of this part.

§ 94.1102 Definitions.

The definitions of subpart A of this part apply to this subpart.

§ 94.1103 Prohibited acts.

(a) The following acts and the causing thereof are prohibited:

(1)(i)(A) In the case of a manufacturer of new engines, the sale, the offering for sale, the introduction into commerce, the delivery for introduction into commerce, or the distribution in commerce of any new engine manufactured after December 31, 2003 (the effective date of applicable emission standards under this part), unless such engine is covered by a certificate of conformity issued (and in effect) under regulations found in this part.

(B) The manufacture of an engine for the purpose of an act listed in paragraph (a)(1)(i)(A) of this section unless such engine is covered by a certificate of conformity issued (and in effect) under regulations found in this part prior to its introduction into commerce.

(ii) In the case of any person, except as provided in Subpart I of this part, the importation into the United States of any engine manufactured on or after the implementation date of the applicable emission limits for the relevant engine, unless such engine is covered by a certificate of conformity issued (and in effect) under regulations found in this part. (2)(i) For a person to fail or refuse to permit access to or copying of records or to fail to make reports or provide information required under this part.

(ii) For a person to fail or refuse to permit entry, testing, or inspection authorized under this part.

(iii) For a person to fail or refuse to perform tests, or to have tests performed as required by this part.

(iv) For a person to fail to establish or maintain records as required under this part. (3)(i) For a person to remove or render inoperative a device or element of design installed on or in a engine in compliance with regulations under this part, or to set any adjustable parameter to a setting outside of the range specified by the manufacturer, as approved in the application for certification by the Administrator.

(ii) For a person to manufacture, sell or offer to sell, or install, a part or component intended for use with, or as part of, a engine, where a principal effect of the part or component is to bypass, defeat, or render inoperative a device or element of design installed on or in a engine in compliance with regulations issued under this part, and where the person knows or should know that the part or component is being offered for sale or installed for this use or put to such use.

(iii) For a person to deviate from the provisions of § 94.11 when rebuilding an engine (or rebuilding a portion of an engine or engine system).

(4) For a manufacturer of a new engine subject to standards prescribed under this part:

(i) To sell, offer for sale, or introduce or deliver for introduction into commerce, a new engine unless the manufacturer has complied with the requirements of § 94.1107.

(ii) To sell, offer for sale, or introduce or deliver for introduction into commerce, a new engine unless all required labels and tags are affixed to the engine in accordance with § 94.212.

(iii) To fail or refuse to comply with the requirements of § 94.1108.

(iv) Except as provided in § 94.211, to provide directly or indirectly in any communication to the ultimate purchaser or a subsequent purchaser that the coverage of a warranty under the Act is conditioned upon use of a part, component, or system manufactured by the manufacturer or a person acting for the manufacturer or under its control, or conditioned upon service performed by such persons.

(v) To fail or refuse to comply with the terms and conditions of the warranty under § 94.1107.

(5) For a manufacturer of marine vessels to distribute in commerce, sell, offer for sale, or deliver for introduction into commerce a new vessel containing an engine not covered by a certificate of conformity.

(6) For any person to install a recreational marine engine in a vessel that is manufactured on or after the implementation date of the applicable standards and that is not a recreational vessel.

(b) For the purposes of enforcement of this part, the following apply:

(1) Nothing in paragraph (a)(3) of this section is to be construed to require the use of any manufacturer's parts in maintaining or repairing a engine.

(2) Actions for the purpose of repair or replacement of a device or element of design or any other item are not considered prohibited acts under paragraph (a)(3)(i) of this section if the action is a necessary and temporary procedure, the device or element is replaced upon completion of the

procedure, and the action results in the proper functioning of the device or element of design.

(3) Where the Administrator determines that no engine produced by any manufacturer and is certified to the requirements of this part is available with the appropriate physical or performance characteristics to repower a vessel, the Administrator may allow a replacement engine to be produced without complying with all of the otherwise applicable requirements of this part. Such engine shall not be subject to the prohibitions of paragraph (a)(1) of this section, provided that:

(i) The engine requiring replacement is not certified or is certified to emission standards that are less stringent than those in effect when the replacement engine is built; and

(ii) The engine manufacturer or its agent takes ownership and possession of the engine being replaced in partial exchange for the replacement engine; and

(iii) The replacement engine is clearly labeled with the following language, or similar alternate language approved by the Administrator:

THIS ENGINE DOES NOT COMPLY WITH FEDERAL MARINE ENGINE EMISSION REQUIREMENTS. SALE OR INSTALLATION OF THIS ENGINE FOR ANY PURPOSE OTHER THAN AS A REPLACEMENT ENGINE FOR AN ENGINE MANUFACTURED PRIOR TO JANUARY 1 [INSERT APPROPRIATE YEAR] IS A VIOLATION OF FEDERAL LAW SUBJECT TO CIVIL PENALTY; and

(iv) In cases where an engine is to be imported for replacement purposes under the provisions of this paragraph (b)(3), the term ''engine manufacturer'' shall not apply to an individual or other entity that does not possess a current Certificate of Conformity issued by EPA under this part; and

(v) Where the replacement engine is intended to replace an engine that is certified to emission standards that are less stringent than those in effect when the replacement engine is built, the replacement engine shall be identical in all material respects to a certified configuration of the same or later model year as the engine being replaced; and

(vi) Engines sold pursuant to the provisions of this paragraph will neither generate nor use emission credits and will not be part of any accounting under the averaging, banking and trading program.

§ 94.1104 General enforcement provisions.

(a) *Information collection provisions.* (1)(i) Every manufacturer of new engines and other persons subject to the requirements of this part must establish and maintain records, perform tests, make reports and provide information the Administrator may reasonably require to determine whether the manufacturer or other person has acted or is acting in compliance with this part or to otherwise carry out the provisions of this part, and must, upon request of an officer or employee duly designated by the Administrator, permit the officer or employee at reasonable times to have access to and copy such records. The manufacturer shall comply in all respects with the requirements of subpart E of this part.

(ii) Every manufacturer or owner of engines exempted from the standards or requirements of this part must establish and maintain records, perform tests, make reports and provide information the Administrator may reasonably require regarding the emissions of such engines.

(2) For purposes of enforcement of this part, an officer or employee duly designated by the Administrator, upon presenting appropriate credentials, is authorized:

(i) To enter, at reasonable times, any establishment of the manufacturer, or of any person whom the manufacturer engaged to perform any activity required under paragraph (a)(1) of this section, for the purposes of inspecting or observing any activity conducted pursuant to paragraph (a)(1) of this section, and

(ii) To inspect records, files, papers, processes, controls, and facilities used in performing an activity required by paragraph (a)(1) of this section, by the manufacturer or by a person whom the manufacturer engaged to perform the activity.

(b) *Exemption provision.* The Administrator may exempt a new engine from § 94.1103 upon such terms and conditions as the Administrator may find necessary for the purpose of export, research, investigations, studies, demonstrations, or training, or for reasons of national security, or for other purposes allowed by subpart J of this part.

(c) *Importation provision.* (1) A new engine, offered for importation or imported by a person in violation of § 94.1103 is to be refused admission into the United States, but the Secretary of the Treasury and the Administrator may, by joint regulation, provide for deferring a final determination as to admission and authorizing the delivery of such a engine offered for import to the owner or consignee thereof upon such terms and conditions (including the furnishing of a bond) as may appear to them appropriate to insure that the engine will be brought into conformity with the standards, requirements, and limitations applicable to it under this part.

(2) If a engine is finally refused admission under this paragraph (c), the Secretary of the Treasury shall cause disposition thereof in accordance with the customs laws unless it is exported, under regulations prescribed by the Secretary, within 90 days of the date of notice of the refusal or additional time as may be permitted pursuant to the regulations.

(3) Disposition in accordance with the customs laws may not be made in such manner as may result, directly or indirectly, in the sale, to the ultimate consumer, of a new engine that fails to comply with applicable standards of the Administrator under this part.

(d) *Export provision.* A new engine intended solely for export, and so labeled or tagged on the outside of the container if used and on the engine, shall be subject to the provisions of § 94.1103, except that if the country that is to receive the engine has emission standards that differ from the standards prescribed under subpart A of this part, then the engine must comply with the standards of the country that is to receive the engine.

(e) *Recordkeeping.* Except where specified otherwise, records required by this part must be kept for eight (8) years.

§ 94.1105 Injunction proceedings for prohibited acts.

(a) The district courts of the United States have jurisdiction to restrain violations of § 94.1103(a).

(b) Actions to restrain violations of § 94.1103(a) must be brought by and in the name of the United States. In an action, subpoenas for witnesses who are required to attend a district court in any district may run into any other district.

§ 94.1106 Penalties.

(a) *Violations.* A violation of the requirements of this subpart is a violation of the applicable provisions of the Act, including sections 213(d) and 203, and is subject to the penalty provisions thereunder.

(1) A person who violates § 94.1103(a)(1), (a)(4), (a)(5), or (a)(6), or a manufacturer or dealer who violates § 94.1103(a)(3) (i) or (iii) is subject to a civil penalty of not more than $25,000 for each violation unless modified by the Debt Collection Improvement Act and/or regulations issued there under.

(2) A person other than a manufacturer or dealer who violates § 94.1103(a)(3) (i) or (iii) or any person who violates § 94.1103(a)(3)(ii) is subject to a civil penalty of not more

than $2,500 for each violation unless modified by the Debt Collection Improvement Act and/or regulations issued thereunder.

(3) A violation with respect to § 94.1103(a)(1), (a)(3)(i), (a)(4), or (a)(5) constitutes a separate offense with respect to each engine.

(4) A violation with respect to § 94.1103(a)(3)(ii) constitutes a separate offense with respect to each part or component. Each day of a violation with respect to § 94.1103(a)(5) constitutes a separate offense.

(5) A person who violates § 94.1103(a)(2) or (a)(5) is subject to a civil penalty of not more than $25,000 per day of violation unless modified by the Debt Collection Improvement Act and/or regulations issued there under.

(b) *Civil actions.* The Administrator may commence a civil action to assess and recover any civil penalty under paragraph (a) of this section.

(1) An action under this paragraph (b) may be brought in the district court of the United States for the district in which the defendant resides or has the Administrator's principal place of business, and the court has jurisdiction to assess a civil penalty.

(2) In determining the amount of a civil penalty to be assessed under this paragraph (b), the court is to take into account the gravity of the violation, the economic benefit or savings (if any) resulting from the violation, the size of the violator's business, the violator's history of compliance with Title II of the Act, action taken to remedy the violation, the effect of the penalty on the violator's ability to continue in business, and such other matters as justice may require.

(3) In any such action, subpoenas for witnesses who are required to attend a district court in any district may run into any other district.

(c) *Administrative assessment of certain penalties.* (1) *Administrative penalty authority.* In lieu of commencing a civil action under paragraph (b) of this section, the Administrator may assess any civil penalty prescribed in paragraph (a) of this section, except that the maximum amount of penalty sought against each violator in a penalty assessment proceeding shall not exceed $200,000, unless the Administrator and the Attorney General jointly determine that a matter involving a larger penalty amount is appropriate for administrative penalty assessment. Any such determination by the Administrator and the Attorney General is not subject to judicial review. Assessment of a civil penalty shall be by an order made on the record after opportunity for a hearing held in accordance with the procedures found at part 22 of this chapter. The Administrator may compromise, or remit, with or without conditions, any administrative penalty which may be imposed under this section.

(2) *Determining amount.* In determining the amount of any civil penalty assessed under this paragraph (c), the Administrator shall take into account the gravity of the violation, the economic benefit or savings (if any) resulting from the violation, the size of the violator's business, the violator's history of compliance with Title II of the Act, action taken to remedy the violation, the effect of the penalty on the violator's ability to continue in business, and such other matters as justice may require.

(3) *Effect of administrator's action.* (i) Action by the Administrator under this paragraph (c) does not affect or limit the Administrator's authority to enforce any provisions of the Act; except that any violation with respect to which the Administrator has commenced and is diligently prosecuting an action under this paragraph (c), or for which the Administrator has issued a final order not subject to further judicial review and for which the violator has paid a penalty assessment under this paragraph shall not be the subject of a civil penalty action under paragraph (b) of this section.

(ii) No action by the Administrator under this paragraph (c) shall affect a person's obligation to comply with a section of this part.

(4) *Finality of order.* An order issued under this paragraph (c) is to become final 30 days after its issuance unless a petition for judicial review is filed under paragraph (c)(5) of this section.

(5) *Judicial review.* A person against whom a civil penalty is assessed in accordance with this paragraph (c) may seek review of the assessment in the United States District Court for the District of Columbia or for the district in which the violation is alleged to have occurred, in which such person resides, or where the person's principal place of business is located, within the 30-day period beginning on the date a civil penalty order is issued. The person shall simultaneously send a copy of the filing by certified mail to the Administrator and the Attorney General. The Administrator shall file in the court within 30 days a certified copy, or certified index, as appropriate, of the record on which the order was issued. The court is not to set aside or remand any order issued in accordance with the requirements of this paragraph (c) unless substantial evidence does not exist in the record, taken as a whole, to support the finding of a violation or unless the Administrator's assessment of the penalty constitutes an abuse of discretion, and the court is not to impose additional civil penalties unless the Administrator's assessment of the penalty constitutes an abuse of discretion. In any proceedings, the United States may seek to recover civil penalties assessed under this section.

(6) *Collection.* (i) If any person fails to pay an assessment of a civil penalty imposed by the Administrator as provided in this part after the order making the assessment has become final or after a court in an action brought under paragraph (c)(5) of this section has entered a final judgment in favor of the Administrator, the Administrator shall request that the Attorney General bring a civil action in an appropriate district court to recover the amount assessed (plus interest at rates established pursuant to section 6621(a)(2) of the Internal Revenue Code of 1986 (26 U.S.C. 6621(a)(2)) from the date of the final order or the date of final judgment, as the case may be). In such an action, the validity, amount, and appropriateness of the penalty is not subject to review.

(ii) A person who fails to pay on a timely basis the amount of an assessment of a civil penalty as described in paragraph (c)(6)(i) of this section shall be required to pay, in addition to that amount and interest, the United States' enforcement expenses, including attorney's fees and costs for collection proceedings, and a quarterly nonpayment penalty for each quarter during which the failure to pay persists. The nonpayment penalty is an amount equal to ten percent of the aggregate amount of that person's penalties and nonpayment penalties which are unpaid as of the beginning of such quarter.

§ 94.1107 Warranty provisions.

(a) The manufacturer of each engine must warrant to the ultimate purchaser and each subsequent purchaser or owner 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 (as determined under § 94.10).

(b) For the purposes of this section, the owner of any engine warranted under this part is responsible for the proper maintenance of the engine. Proper maintenance includes replacement and/or service, as needed, at the owner's expense at a service

establishment or facility of the owner's choosing, of all parts, items, or devices which were in general use with engines prior to 1999. For diesel engines, this would generally include replacement or cleaning of the fuel delivery and injection system.

§ 94.1108 In-use compliance provisions.

(a) Effective with respect to engines subject to the requirements of this part:

(1) If the Administrator determines that a substantial number of any class or category of engines, although properly maintained and used, do not conform to the regulations prescribed under section 213 of the Act when in actual use throughout their useful life period (as defined under § 94.2), the Administrator shall immediately notify the manufacturer of such nonconformity and require the manufacturer to submit a plan for remedying the nonconformity of the engines with respect to which such notification is given.

(i) The manufacturer's plan shall provide that the nonconformity of any such engines which are properly used and maintained will be remedied at the expense of the manufacturer.

(ii) If the manufacturer disagrees with such determination of nonconformity and so advises the Administrator, the Administrator shall afford the manufacturer and other interested persons an opportunity to present their views and evidence in support thereof at a public hearing. Unless, as a result of such hearing, the Administrator withdraws such determination of nonconformity, the Administrator shall, within 60 days after the completion of such hearing, order the manufacturer to provide prompt notification of such nonconformity in accordance with paragraph (a)(2) of this section.

(2) Any notification required to be given by the manufacturer under paragraph (a)(1) of this section with respect to any class or category of engines shall be given to ultimate purchasers, subsequent purchasers (if known), and dealers (as applicable) in such manner and containing such information as required in subparts E and H of this part.

(3)(i) The certifying manufacturer shall furnish with each new engine written instructions for the proper maintenance and use of the engine by the ultimate purchaser as required under § 94.211.

(ii) The instruction under paragraph (a)(3)(i) of this section must not include any condition on the ultimate purchaser's using, in connection with such engine, any component or service (other than a component or service provided without charge under the terms of the purchase agreement) which is identified by brand, trade, or corporate name. Such instructions also must not directly or indirectly distinguish between service performed by the franchised dealers of such manufacturer, or any other service establishments with which such manufacturer has a commercial relationship, and service performed by independent engine repair facilities with which such manufacturer has no commercial relationship.

(iii) The prohibition of paragraph (a)(3)(ii) of this section may be waived by the Administrator if:

(A) The manufacturer satisfies the Administrator that the engine will function properly only if the component or service so identified is used in connection with such engine; and

(B) The Administrator finds that such a waiver is in the public interest.

(iv) In addition, the manufacturer shall indicate by means of a label or tag permanently affixed to the engine that the engine is covered by a certificate of conformity issued for the purpose of assuring achievement of emission standards prescribed under section 213 of the Act. This label or tag shall also contain information relating to control of emissions as prescribed under § 94.212.

(b) The manufacturer bears all cost obligation any dealer incurs as a result of a requirement imposed by paragraph (a) of this section. The transfer of any such cost obligation from a manufacturer to a dealer through franchise or other agreement is prohibited.

(c) If a manufacturer includes in an advertisement a statement respecting the cost or value of emission control devices or systems, the manufacturer shall set forth in the statement the cost or value attributed to these devices or systems by the Secretary of Labor (through the Bureau of Labor Statistics). The Secretary of Labor, and his or her representatives, has the same access for this purpose to the books, documents, papers, and records of a manufacturer as the Comptroller General has to those of a recipient of assistance for purposes of section 311 of the Act.

Appendix I to Part 94—Emission Related Engine Parameters and Specifications

I. Basic Engine Parameters—Reciprocating Engines.
- 1. Compression ratio.
- 2. Type of air aspiration (natural, Roots blown, supercharged, turbocharged).
- 3. Valves (intake and exhaust).
  - a. Head diameter dimension.
  - b. Valve lifter or actuator type and valve lash dimension.
- 4. Camshaft timing.
  - a. Valve opening—intake exhaust (degrees from TDC or BDC).
  - b. Valve closing—intake exhaust (degrees from TDC or BDC).
  - c. Valve overlap (degrees).
- 5. Ports—two stroke engines (intake and/or exhaust).
  - a. Flow area.
  - b. Opening timing (degrees from TDC or BDC).
  - c. Closing timing (degrees from TDC or BDC).

II. Intake Air System.
- 1. Roots blower/supercharger/turbocharger calibration.
- 2. Charge air cooling.
  - a. Type (air-to-air; air-to-liquid).
  - b. Type of liquid cooling (engine coolant, dedicated cooling system).
  - c. Performance (charge air delivery temperature (°F) at rated power and one other power level under ambient conditions of 80°F and 110°F, and 3 minutes and 15 minutes after selecting rated power, and 3 minutes and 5 minutes after selecting other power level).
- 3. Temperature control system calibration.
- 4. Maximum allowable inlet air restriction.

III. Fuel System.
- 1. General.
  - a. Engine idle speed.
- 2. Fuel injection—compression ignition engines.
  - a. Control parameters and calibrations.
  - b. Transient enrichment system calibration.
  - c. Air-fuel flow calibration.
  - d. Altitude compensation system calibration.
  - e. Operating pressure(s).
  - f. Injector timing calibration.

IV. Engine Cooling System.
- 1. Thermostat calibration.

V. Exhaust System.
- 1. Maximum allowable back pressure.

VI. Exhaust Emission Control System.
- 1. Air injection system.
  - a. Control parameters and calibrations.
  - b. Pump flow rate.
- 2. EGR system.
  - a. Control parameters and calibrations.
  - b. EGR valve flow calibration.
- 3. Catalytic converter system.
  - a. Active surface area.
  - b. Volume of catalyst.
  - c. Conversion efficiency.
- 4. Backpressure.

VII. Crankcase Emission Control System.
- 1. Control parameters and calibrations.
- 2. Valve calibrations.

VIII. Auxiliary Emission Control Devices (AECD).
- 1. Control parameters and calibrations.
- 2. Component calibration(s).

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