ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 9 and 86

[AMS–FRL–5908–8]

RIN 2060–AF76

Control of Emissions of Air Pollution From Highway Heavy-Duty Engines

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The new standards and related provisions contained in this final rule will result in significant progress throughout the country in protecting public health and the environment. In this action, EPA is adopting a new emission standard and related provisions for diesel heavy-duty engines (HDEs) intended for highway operation, beginning with the 2004 model year. The new standard represents a large reduction (approximately 50 percent) in emission of oxides of nitrogen (NO_x), as well as reductions in hydrocarbons (HC) from diesel trucks and buses. The reduction in NO_x will also result in significant reductions in secondary nitrate particulate matter (PM) in areas where levels of nitrate PM are high. For diesel HDEs, EPA is also finalizing changes to the existing averaging, banking, and trading program that provide additional flexibility for manufacturers in complying with the stringent new standards. EPA is also adopting several provisions to increase the durability of emission controls, help ensure proper levels of maintenance, and prevent tampering, including during engine rebuilding. The resulting emission reductions will translate into significant, long-term improvements in air quality in many areas of the U.S. This will provide much-needed assistance to states and regions facing ozone and particulate air quality problems that are causing a range of adverse health effects for their citizens, especially in terms of respiratory impairment and related illnesses.

Although EPA proposed new standards and related averaging, banking, and trading provisions for otto-cycle HDEs (e.g., gasoline-fueled engines), EPA is not taking final action for that category of engines at this time. EPA received several comments urging the Agency to adopt more stringent control measures for these engines than those proposed in the NPRM (June 27, 1996). EPA continues to evaluate the comments received regarding otto-cycle engines and plans to issue a Supplemental Notice of Proposed Rulemaking to address otto-cycle engines specifically.

DATES: This regulation is effective December 22, 1997. The incorporation by reference of a certain publication listed in the regulations is approved by the Director of the Federal Register as of December 22, 1997.

ADDRESSES: Materials relevant to this final rule have been placed in Public Docket No. A–95–26. The docket is located at the Air Docket Section, U.S. Environmental Protection Agency, 401 M Street SW, Washington, DC 20460 (Telephone 202–260–7548; Fax 202–260–4400) in Room M–1500, Waterside Mall, and may be inspected weekdays between 8:00 a.m. and 5:30 p.m. A reasonable fee may be charged by EPA for copying docket materials.

FOR FURTHER INFORMATION CONTACT: Chris Lieske, U.S. EPA, Engine Programs and Compliance Division, 2565 Plymouth Rd., Ann Arbor, Michigan 48105. Telephone: (313) 668–4584. Fax: (313) 741–7816.

SUPPLEMENTARY INFORMATION:

Regulated Entities

Entities potentially regulated by this action are those that sell new motor vehicles heavy-duty engines in the United States and entities who rebuild/remanufacture such engines. Regulated categories and entities include:

Category	Examples of regulated entities
Industry	New motor vehicle heavy-duty engine manufacturers.
Industry	Heavy-duty engine rebuilders/remanufacturers.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in the table could also be regulated. To determine whether your activities are regulated by this action, you should carefully examine the applicability criteria in 40 CFR 86.094–1 and, for engine rebuilders/remanufacturers, § 86.004–40 of the rule. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

Obtaining Electronic Copies of the Regulatory Documents

The preamble, Summary and Analysis of Comments, regulatory language and Regulatory Impact Analysis are also available electronically from the EPA Internet Web site. This service is free of charge, except for any cost you already incur for internet connectivity. The electronic **Federal Register** version is made available on the day of publication on the primary Web site listed below. The EPA Office of Mobile Sources also publishes these notices on the secondary Web site listed below.

Internet (Web)

http://www.epa.gov/docs/fedrgstr/EPA–AIR/
(either select desired date or use Search feature)

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.

Outline and List of Acronyms

The Supplementary Information section of this final rule is organized as follows:

List of Acronyms and Abbreviations

ABT Averaging, banking, and trading
ANPRM Advance Notice of Proposed Rulemaking
ARB Air Resources Board
ATA American Trucking Association
CAA or Act Clean Air Act as amended in 1990
CFR Code of Federal Regulations
DDC Detroit Diesel Corporation
EGR Exhaust gas recirculation
EPA United States Environmental Protection Agency
FRM Final Rulemaking
GVWR Gross vehicle weight rating
HC Hydrocarbons
HDDEs Heavy-duty diesel engines
HDEs Heavy-duty engines
HDVs Heavy-duty vehicles
HHDDEs Heavy heavy-duty diesel engines
HHDVs Heavy heavy-duty vehicles
ICR Information Collection Request
I/M Inspection and Maintenance
LEV Low emissions vehicle
LHDDEs Light heavy-duty diesel engines
LHDVs Light heavy-duty vehicles
MHDDEs Medium heavy-duty diesel engines
MOU Memorandum of Understanding
NAAQS National Ambient Air Quality Standard
NESCAUM Northeast States for Coordinated Air Use Management
NLEV National Low Emissions Vehicle
NMHC Nonmethane hydrocarbons
NO_X Oxides of nitrogen
NPRM Notice of Proposed Rulemaking
NRDC Natural Resources Defense Council
OBD On-bourd diagnotics
OMB Office of Management and Budget
OTAG Ozone Transport Assessment Group
PM Particulate matter
R&D Research and development
RIA Regulatory Impact Analysis
ROM Regional Oxidant Model
SAE Society of Automotive Engineers
SEA Selective Enforcement Audit
SOP Statement of Principles
UAM Urban Airshed Model
VOC Volatile organic compounds

I. Introduction/Summary of Proposal

Air pollution continues to represent a serious threat to the health and well-being of millions of Americans and a large burden to the U.S. economy. This threat exists despite the fact that, over the past two decades, great progress has been made at the local, state and national levels in controlling emissions from many sources of air pollution. As a result of this progress, many individual emission sources, both stationary and mobile, pollute at only a fraction of their pre-control rates. However, continued industrial growth and expansion of motor vehicle usage threaten to reverse these past achievements. Today, many states are finding it difficult to meet the current ozone and PM National Ambient Air Quality Standards (NAAQSs) by the deadlines established in the Act.[1] Furthermore, other states which are approaching or have reached attainment of the current ozone and PM NAAQSs will likely see those gains lost if current trends persist.

In recent years, significant efforts have been made on both a national and state level to reduce air quality problems associated with ground-level ozone, with a focus on its main precursors, oxides of nitrogen (NO_X) and volatile organic compounds (VOCs).[2] In addition, airborne particulate matter (PM) has been a major air quality concern in many regions. As discussed below, ozone and PM have been linked to a range of serious respiratory health problems and a variety of adverse environmental effects.

The states have jurisdiction to implement a variety of stationary source emission controls. In most regions of the country, states are implementing significant stationary source NO_X controls (as well as stationary source VOC controls) for controlling acid rain, ozone, or both. In many areas, however, these controls will not be sufficient to reach and maintain the current ozone standard without significant additional NO_X reductions from mobile sources. Generally, the Clean Air Act specifies that standards for controlling NO_X, HC, and PM emissions from new motor vehicles must be established at the federal level.[3] Thus, the states look to the national mobile source emission control program as a complement to their efforts to meet air quality goals. The concept of common emission standards for mobile sources across the nation is strongly supported by manufacturers, which often face serious production inefficiencies when different requirements apply to engines or vehicles sold in different states or areas.

Motor vehicle emission control programs have a history of technological success that, in the past, has largely offset the pressure from constantly growing numbers of vehicles and miles traveled in the U.S. The per-vehicle rate of emissions from new passenger cars and light trucks has been reduced to very low levels. As a result, increasing attention is now focused on heavy-duty trucks (ranging from large pickups to tractor-trailers), buses, and nonroad equipment.

Since the 1970s, manufacturers of heavy-duty engines for highway use have developed new technological approaches in response to periodic increases in the stringency of emission standards.[4] However, the technological characteristics of heavy-duty engines, particularly diesel engines, have thus far prevented achievement of emission levels comparable to today's light-duty gasoline vehicles. While diesel engines provide advantages in terms of fuel efficiency, reliability, and durability, controlling NO_X emissions is a greater challenge for diesel engines than for gasoline engines. Similarly, control of PM emissions, which are very low for gasoline engines, represents a substantial challenge for diesel engines. Part of this challenge is that most traditional NO_X control approaches tend to increase PM, and vice versa.

Despite these technological challenges, there is substantial evidence of the ability for heavy-duty highway engines to achieve significant additional emission reductions. In their successful efforts to reach lower NO_X and PM levels over the past 20 years, heavy-duty highway diesel engine manufacturers have identified new technologies and approaches that offer promise for significant new reductions. The emerging technological potential for much cleaner diesel heavy-duty engines is discussed elsewhere in this preamble and in the Regulatory Impact Analysis (RIA) associated with this final rule.

Recognizing the need for additional NO_X and PM control measures to address air quality concerns in several

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

[2] VOCs consist mostly of hydrocarbons (HC).

[3] The CAA limits the role states may play in regulating emissions from new motor vehicles. California is permitted to establish emission control standards for new motor vehicles, and other states may adopt California's programs (Sections 209 and 177 of the Act).

[4] Highway heavy-duty engines, sometimes referred to as highway HDEs, are used in heavy-duty vehicles, which EPA defines as highway vehicles with a gross vehicle weight rating over 8,500 pounds.

parts of the country and the growing contribution of the heavy-duty engine sector to ozone and PM problems, EPA, the California Air Resources Board, and engine manufacturers representing over 90 percent of annual nationwide engine sales signed a Statement of Principles (SOP) in July of 1995. The SOP established a framework for a proposed rulemaking, setting out goals and conditions supported by the signatories. EPA sought early comment on the general regulatory framework laid out in the SOP in an Advance Notice of Proposed Rulemaking (ANPRM) on August 31, 1995 (60 FR 45580) and issued a Notice of Proposed Rulemaking (NPRM) on June 27, 1996 (61 FR 33421).

The centerpiece of EPA's proposal was a new NO_X plus nonmethane hydrocarbon standard (NMHC) of 2.4 g/bhp-hr (or 2.5 g with a 0.5 g NMHC cap) for 2004 and later model years, which represents over a 50 percent reduction from the 1998 NO_X and HC standard of 4.0 g/bhp-hr and 1.3 g/bhp-hr, respectively. EPA proposed the standard for both diesel and otto-cycle (primarily gasoline-fueled) engines. EPA requested comment on options for more stringent control of emissions from otto-cycle engine in response to comments received by the Agency on the ANPRM. Because the standards would require the use of technologies not yet fully developed and proven, EPA also proposed to reopen the rulemaking in 1999 and review the appropriateness of the standards.

In addition, EPA proposed several other provisions. To provide critical flexibility to the manufacturers and help ease their transition to the new standards, EPA proposed a modified averaging, banking, and trading (ABT) program. The proposed program was viewed to be tied directly to the stringency of the standard. In the NPRM, the Agency stressed that the program changes would allow manufacturers to reasonably achieve a more stringent standard earlier than without the changes. EPA proposed a modified program for model years 1998 through 2006, with the current ABT program resuming in 2007. Under the proposed modified program, engine manufacturers could earn undiscounted, unlimited life NO_X and PM credits for use in meeting the 2004 standards. The current program requires a one-time 20 percent discount on any credits traded or banked for future use and limits credit life to 3 years. For the modified program, EPA also proposed that manufacturers maintain at least a 5 percent compliance margin, unless they had data to support the use of a smaller margin.

EPA also proposed several provisions to help ensure adequate durability of emissions controls and proper maintenance and repair of emissions controls during the life of the engine, including during engine rebuilding. EPA viewed the proposals as necessary because the proposed standards would likely prompt manufacturers to add emissions control technologies, such as exhaust gas recirculation and exhaust aftertreatment. The failure of such systems would not necessarily cause decreased engine performance. Thus, EPA could not be certain that failure of emissions control systems would prompt the owner to perform repairs. Additionally, the proposed changes were intended to update existing requirements to consider recent increases in engine life.

The primary proposals for updating existing regulations included a proposed increase in the useful life mileage interval for heavy heavy-duty engines from 290,000 miles to 435,000 miles, an increase in the minimum allowable maintenance intervals for several emissions related components, and changes in the emissions defect and performance warranties. EPA also proposed provisions to help ensure that emission controls are properly addressed during the process of engine rebuilding and not removed or otherwise dismantled.

This preamble is organized as follows: Section II. describes the need for control and air quality benefits associated with the final rule, Section III. describes in detail the standards and all other provisions being finalized; Section IV. describes each of the proposals, key comments received by EPA, and any changes to the proposals as a result of those comments; Section V. reviews the results of EPA's economic analyses; The remaining preamble sections pertain to administrative requirements, statutory authority, judicial review, and more information on how to obtain copies of rulemaking documents. The actual regulatory language follows the preamble.

II. Need for Control and Air Quality Benefits of This Rule

The new emission standards for highway HDEs that EPA is issuing today represent a major step in reducing the human health and environmental impacts of ground-level ozone and a significant contribution to reducing secondary nitrate particulate matter (PM). This section summarizes the air quality rationale for these new standards and their anticipated impact on heavy-duty vehicle emissions.

A. Ozone

There is a large body of evidence showing that ozone (which is caused by the photochemical reaction of NO_X and VOCs) causes harmful respiratory effects including chest pain, coughing, and shortness of breath, affecting people with compromised respiratory systems and children most severely. In addition, NO_X itself can directly harm human health. Beyond their human health effects, other negative environmental effects are also associated with ozone and NO_X. Ozone has been shown to injure plants and materials; NO_X contributes to the secondary formation of PM (nitrates), acid deposition, and the overgrowth of algae in coastal estuaries. These environmental effects, as well as the health effects noted above, are described in the Regulatory Impact Analysis. (Additional information may be found in EPA's ''staff papers'' and ''air quality criteria'' documents for ozone and nitrogen oxides[5 6 7 8]).

Today, many states are finding it difficult to show how they can meet or maintain compliance with the current National Ambient Air Quality Standard (NAAQS) for ozone by the deadlines established in the Act.[9] There are 66 areas currently designated ''nonattainment'' for ozone.

Local, state and federal organizations charged with delivering cleaner air have mounted significant efforts in recent years to reduce air quality problems associated with ground-level ozone, and there are signs of partial success. The main precursors of ozone, oxides of nitrogen (NO_X) and volatile organic compounds (VOCs)[10] appear to have been reduced, and average levels of ozone seem to have begun gradually decreasing. However, this progress is in jeopardy. EPA projects that reductions in ozone precursors that will result from the full implementation of current emission control programs will fall far short of what would be needed to offset the normal emission increases that accompany economic expansion. By the middle of the next decade, the Agency expects that the downward trends will have reversed, primarily due to

[5] U.S. EPA, 1996, Review of National Ambient Air Quality Standards for Ozone, Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA–452/R–96–007.

[6] U.S.EPA, 1996, Air Quality Criteria for Ozone and Related Photochemical Oxidants, EPA/600/P–93/004aF.

[7] U.S. EPA, 1995, Review of National Ambient Air Quality Standards for Nitrogen Dioxide, Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA–452/R–95–005.

[8] U.S.EPA, 1993, Air Quality Criteria for Oxides of Nitrogen, EPA/600/8–91/049aF.

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

[10] VOCs consist mostly of hydrocarbons (HC).

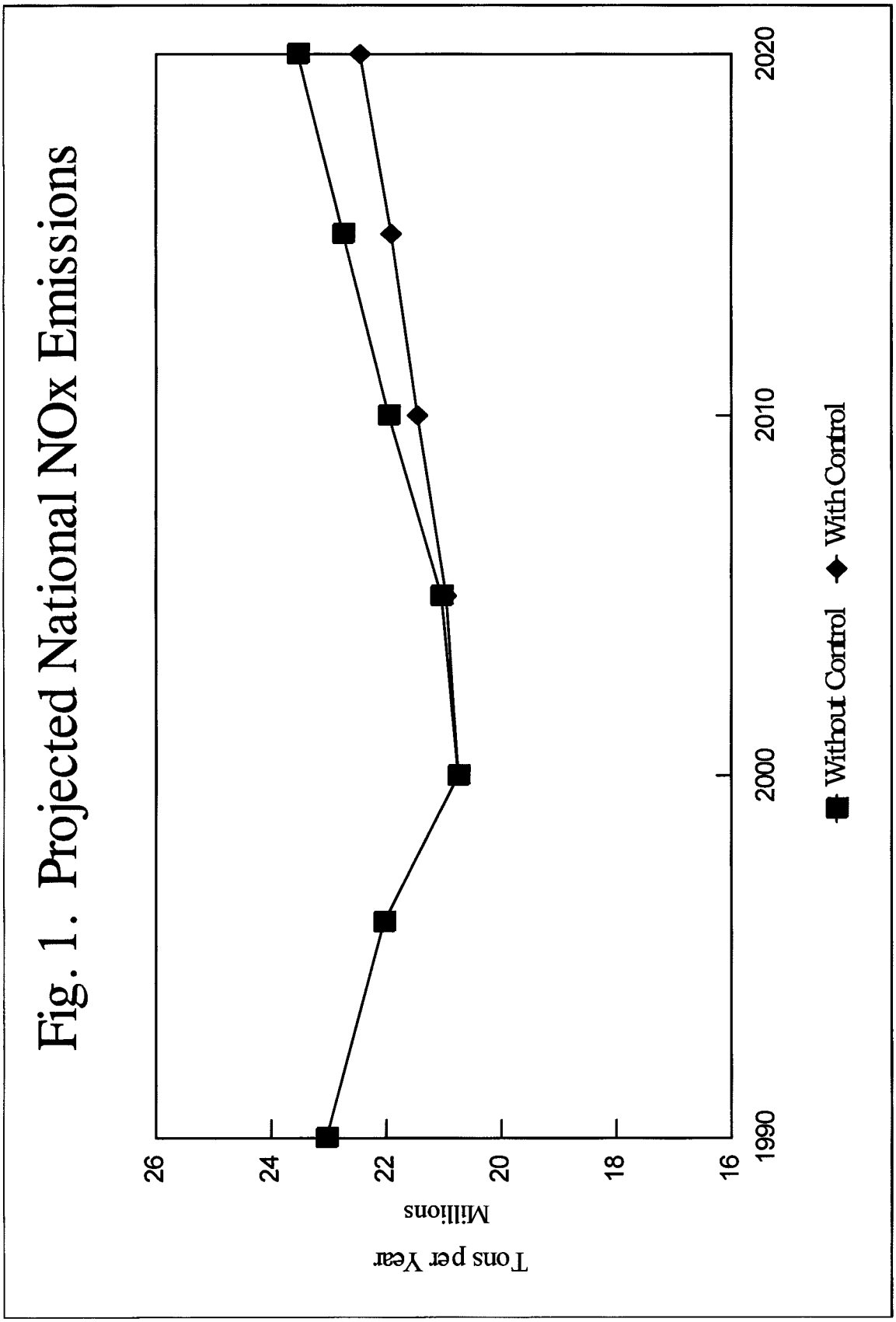
increasing numbers of emission sources. By around 2020, EPA expects that NO_X levels will have returned to current levels in the absence of significant new reductions.[11] To the extent that some areas are seeing a gradual decrease in ozone levels in recent years, EPA believes that the expected increase in NO_X will likely result in an increase in ozone problems in the future.

NO_X controls are an effective strategy for reducing ozone where its levels are relatively high over a large region (as in the Northeast and much of the Midwest, Southeast, and California). EPA and states see control of NO_X emissions as a key to improving regional-scale air quality in many parts of the country, in addition to local-scale VOC and NO_X controls. Specifically, EPA believes that regional-scale reductions in NO_X emissions will be necessary for many areas to attain and maintain compliance with the current ozone NAAQS. For the regions listed above, the NO_X reductions needed are very large (greater than 50 percent from base 1990 emissions in many cases). New programs to control emissions from both stationary and mobile sources will be necessary in most of these areas, since it is unlikely that cost effective controls of this magnitude can be achieved with either source category alone. Although in some locations and circumstances moderate reductions in local NO_X emissions may be associated with localized increases in ozone, the Agency is convinced that the ultimate attainment goal of all nonattainment areas necessitates continued reduction of regional-scale NO_X emissions.

The new emission standards for highway HDEs issued in today's rule are intended to address the effects of ozone (and also PM, as discussed below) through substantial regional-scale reductions in NO_X throughout the country. EPA projects that the nationwide NO_X reduction by 2020 will be approximately 1.1 million tons per year, or about 9.5 percent of projected 2020 mobile source NO_X emissions and 4.5 percent of all 2020 NO_X emissions. This is shown in Figure 1 and is discussed in detail in the RIA for this rule. The Agency also expects that small NMHC reductions will also result from this program. EPA has designed this program to play a significant role in reducing ozone levels in many areas of the country in concert with other mobile source and stationary source ozone reduction programs at the federal, state, and local levels.

BILLING CODE 6560–50–P

[11] See Chapter 2 of the Regulatory Impact Analysis associated with this rule.



BILLING CODE 6560–50–C

B. Particulate Matter

Particulate matter, like ozone, has been linked to a range of serious respiratory health problems. Particles are deposited deep in the lungs and result in effects including premature death, increased hospital admissions and emergency room visits, increased respiratory symptoms and disease, decreased lung function (particularly in children and individuals with asthma), and alterations in lung tissue and structure and in respiratory tract defense mechanisms. These effects are discussed further in the RIA for this rule. (Additional information may be found in EPA's ''staff paper'' and ''air quality criteria document'' for particulate matter.[12] [13])

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 mobile sources are also expected to rise in the future. EPA believes that this projected increase will occur both because of the expected increase in numbers of PM sources, including diesel engines, and because NO_X from heavy-duty diesels and other sources is transformed in the atmosphere into fine secondary nitrate particles.

Secondary nitrate PM accounts for a substantial fraction of the airborne particulate in some areas of the country, especially in the West. Measurements of ambient PM in some western U.S. urban areas that are having difficulty meeting the current NAAQS for PM–10 have indicated that secondary PM is a very important component of the problem. Secondary nitrate PM (consisting mostly ammonium nitrate) is the major constituent of this secondary PM. For example, in Denver, on days when PM levels are high, about 25 percent of the measured PM–2.5 is ammonium nitrate. In the Provo/Salt Lake City area, secondary PM comprises about 40 percent of the measured PM–10. Similarly, in the Los Angeles Basin, secondary nitrate PM levels represent about 25 percent of measured PM–10.[14] Nitrate PM constitutes a smaller, but often important, fraction of PM in other areas of the country.

Because the atmospheric chemistry of secondary PM formation has common attributes to that of ozone, secondary PM also tends to be a regional, rather than a strictly local phenomenon. For this reason, EPA believes that regional-scale NO_X controls, including control of mobile NO_X sources, are very effective in reducing secondary PM over a significant area. For example, California's PM SIPs for serious areas conclude that secondary formation of nitrate particulate due to regional-scale NO_X emissions contributes to the particulate problem in the South Coast Air Basin, Coachella Area, and the San Joaquin Valley.[15] EPA and the State of California believe that reduction of this fraction of the total PM will require additional regional-scale reductions in NO_X emissions.

The primary effect of the standards promulgated in this Notice on ambient PM levels will occur as a result of the large anticipated reductions in NO_X. EPA expects that the resulting reductions in secondary PM will be significant, especially in areas of the West where nitrate PM is a major contributor to overall PM levels. In the proposal, EPA estimated on the basis of existing information that 100 tons of NO_X will on average result in the formation of about 4 tons of nitrate PM. EPA recently evaluated this effect in more detail.[16] The report's conclusions confirmed EPA's earlier estimate, also concluding that 100 tons of NO_X reduction will on average result in about 4 tons of secondary PM reduction. (The conversion rate varies from region to region, and is greatest in the West.). Based on the average conversion rate, EPA estimates that the approximately 1.1 million tons per year of NO_X reduction from today's rule by 2020 will result in a national average reduction in secondary PM of about 44,000 tons per year. This estimated average nitrate PM reduction is similar in magnitude to that which would result from reducing the diesel PM emission standard by half.[17]

III. Content of the Final Rule

The following is a concise description of the regulations being adopted in this final rule, with any changes from the proposal also noted. A summary of the proposal is contained in preamble Section I., above. A full description of the proposals, supporting rationale for these actions, and response to comments are contained in the Summary and Analysis of Comments for the rule. Preamble section IV., Public Participation, also provides additional information.

A. Emission Standards

1. Standard Levels

EPA is adopting the proposed NMHC+NO_X emission standards for on-highway heavy-duty diesel-cycle engines fueled by diesel, methanol, and gaseous fuels and their blends. These standards apply to model year 2004 and later. Engine manufacturers will have the choice of certifying heavy-duty diesel engines to either of two optional sets of standards:

2.4 g/bhp-hr NMHC+NO^x, or
2.5 g/bhp-hr NMHC+NO_X with a limit of 0.5 g/bhp-hr on NMHC.

All emissions standards other than NMHC and NO_X applying to 1998 and later model year heavy-duty engines continue at their 1998 levels. No new standards are being finalized for on-highway heavy-duty otto-cycle engines.

2. 1999 Review

EPA is also finalizing today a regulatory provision providing for 1999 review of the standard levels finalized in this rule. As proposed, this review will reassess the appropriateness of the standards under the Clean Air Act including the need for and technical and economical feasibility of the standards based on information available in 1999. If during the review EPA concludes that a revision is appropriate, a rulemaking will be conducted to determine the appropriate level for the model year 2004 and later standards. The standards finalized today will stay in effect unless revised by this subsequent rulemaking procedure. In addition, EPA, together with the oil and engine industries, is engaged in assessing the potential impact of fuel changes on emissions from 2004 and later model year diesel engine technology.

The 1999 review process has the potential of either tightening or relaxing the standards finalized today. If due to new information in 1999 EPA finds the standards to not be technologically feasible for model year 2004 or otherwise not in accordance with the Act, then EPA expects to propose adjusted standards which do not exceed the following:

[12] U.S. EPA, 1996, Review of National Ambient Air Quality Standards for Particulate Matter, Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA–452/R–96–013.

[13] U.S.EPA, 1996, Air Quality Criteria for Particulate Matter, EPA/600/P–95/001aF.

[14] Summary of Local-Scale Source Characterization Studies, EPA–230–S–95–002, July, 1994.

[15] Memorandum to the docket from Carol Bohnenkamp, EPA Region 9, regarding regional nature of secondary nitrate PM in California, July 30, 1997. Docket A–95–27.

[16] Benefits of Mobile Source NO_X Related Particulate Matter Reductions, October 1996, EPA Contract No. 68–C5–0010.

[17] Based on the following calculation: The difference between the 1998 and 2004 HDE NO_X standards is nominally 2.0 g/bhp-hr (4.0 vs. 2.0 g/bhp-hr). Using the above estimated average factor of 4% of NO_X being converted to secondary PM, an equivalent reduction in secondary PM of 0.08 g/bhp-hr can be estimated. This reduction in secondary PM compares to the roughly 0.05 g/bhp-hr that potentially would result from a reduction in the HDE PM standard from 0.1 to 0.05 g/bhp-hr.

2.9 g/bhp-hr NMHC+NO^x or

3.0 g/bhp-hr NMHC+NO^x with a limit of 0.6 g/bhp-hr NMHC

EPA believes that the 2004 model year standards being finalized today are technologically feasible without any changes to diesel fuel. As part of the 1999 review, EPA will evaluate in light of any new information whether diesel fuel improvements are needed for the standards to be appropriate for 2004. If EPA finds that diesel fuel changes are needed to meet the standards finalized here and if EPA believes such changes would be a cost-effective method for reducing emissions and appropriate under section 211 of the Clean Air Act, then EPA will address the potential for fuel improvements through a separate rulemaking which will include a separate cost-effectiveness analysis and opportunity for public comment. However, if EPA were to determine in the 1999 review that the feasibility of the standards requires diesel fuel changes and EPA does not engage in a rulemaking to require such changes, EPA expects to propose adjusted standards which do not exceed the following:

3.4 g/bhp-hr NMHC+NO^x or

3.5 g/bhp-hr NMHC+NO^x with a limit of 0.7 g/bhp-hr on NMHC

Based on the technical analysis in the RIA, the levels described above represent upper limits for any potential revisions. Because EPA does not at this point predict further breakthroughs in innovative emission reduction technology for mass production in the 2004 time frame which would allow for a standard lower than that being finalized, a lower limit is not predicted at this time. However, if EPA determines that lower standards are technologically feasible and appropriate under the Clean Air Act, EPA expects to propose those lower standards.

3. NMHC Measurement

For heavy-duty diesel engines, EPA is allowing three options to the measurement procedures currently in place for alternative fueled engines. They are as follows: (1) Use a THC measurement in place of an NMHC measurement; (2) use a measurement procedure specified by the manufacturer with prior approval of the Administrator; or (3) subtract two percent from the measured THC value to obtain an NMHC value. The methodology must be specified at time of certification and will remain the same for the engine family throughout the engines' useful life.

For natural gas vehicles, EPA is allowing the option of measuring NMHC through direct quantification of individual species by gas chromatography.

4. Non-Conformance Penalties

Section 206(g) of the Clean Air Act requires EPA to allow a HDE manufacturer to receive a certificate of compliance for an engine family which exceeds the applicable standard (but does not exceed an upper limit) if the manufacturer pays a non-conformance penalty established by EPA through rulemaking. The NCP program established through rulemaking is codified in Subpart L of 40 CFR Part 86. EPA plans to address provisions related to NCPs for the 2004 model year standards in conjunction with the 1999 review discussed above.

B. In-Use Emissions Control Elements

EPA is finalizing provisions to enhance the control of emissions from in-use vehicles subject to the new model year 2004 standards. Where noted, some of the provisions below also apply to 2004 and later model year otto-cycle engines. The in-use provisions include both: (1) Revisions of existing regulations, including useful life, emissions-related maintenance, and emissions defect and performance warranties, and (2) new provisions regarding maintenance and repair of emissions controls after the end of the useful life, including manufacturer requirements and engine rebuild provisions. All of the following changes to the regulations are effective beginning with the 2004 model year.

1. Useful Life

EPA is finalizing a revised useful life for the heavy heavy-duty diesel engine service class of 435,000 miles, 22,000 hours, or 10 years, whichever occurs first, for all pollutants beginning in model year 2004.[18] In response to comments, EPA has modified the useful life for heavy heavy-duty engines from the proposal by increasing the hours interval and removing a minimum mileage interval. EPA proposed a useful life of 435,000 miles, 13,000 hours, or ten years whichever occurred first, but in no case less than 290,000 miles. As proposed, EPA is also establishing a useful life years interval of 10 years for all heavy-duty engine service classes, otto-cycle and diesel-cycle, and all pollutants.

2. Emissions Related Maintenance

EPA is finalizing the changes to emission related maintenance intervals shown in Table 1, with compliance beginning in 2004. The intervals are in miles or hours, whichever occurs first. The term ''Add-on emissions-related component'' is being defined as a component whose sole or primary purpose is to reduce emissions or whose failure will significantly degrade emissions control and whose function is not integral to the design and performance of the engine. EPA is not changing the interval for EGR filters and coolers from its current interval of 50,000 miles (1,500 hours). The maintenance interval changes are being finalized as proposed.

TABLE 1—CHANGES TO MINIMUM EMISSION-RELATED MAINTENANCE INTERVALS

Intended service class	Component or system	Change to minimum maintenance interval
Otto-cycle engines	EGR system (except filters and coolers).	Increase from 50,000 miles (1,500 hours) to 100,000 miles (3,000 hours).
Light HDDEs	EGR system (except filters and coolers).	Increase from 50,000 miles (1,500 hours) to 100,000 miles (3,000 hours).
	—Add-on emission-related components.	Establish 100,000 mile (3,000 hour) interval.
	—Catalytic converter	
Medium and heavy HDDEs	EGR system (except filters and coolers).	Increase from 50,000 miles (1,500 hours) to 150,000 miles (4,500

[18] Note that for an individual engine, if the useful life hours interval is reached before the engine reaches 10 year or 100,000 miles, the useful life shall become 10 years/100,000 miles, whichever occurs first, as required under Clean Air Act section 202(d). EPA believes that this provision will be used only very rarely, if ever, given the usage patterns of affected vehicles.

TABLE 1—CHANGES TO MINIMUM EMISSION-RELATED MAINTENANCE INTERVALS—Continued

Intended service class	Component or system	Change to minimum maintenance interval
	—Add-on emission-related components. —Catalytic converter	Establish 150,000 mile (4,500 hour) interval.

3. Emissions Defect and Performance Warranties

Currently, the emissions defect and emissions performance warranty periods are specified in hours and miles intervals. The regulations also provide that the warranty periods for highway HDEs may in no case be less than the manufacturer's basic mechanical warranty period for the engine family.[19] However, manufacturers often provide extended warranties for individual engines. EPA proposed that the warranty period be at least as long as the basic mechanical warranty of the engine, whether it be the published warranty for the engine family or a longer warranty provided to the engine purchaser. In response to comments, EPA is revising the regulations regarding the warranty period as follows. The warranty period shall not be less than the basic mechanical warranty of the particular engine as provided to the purchaser. Thus, the warranty shall be longer than that published for the engine family in cases where a manufacturer provides to the customer a longer basic mechanical warranty for a particular engine. Extended warranties on select parts do not extend the emissions warranty requirements for the entire engine but only for those parts. Also, in cases where responsibility for an extended mechanical warranty is shared between the owner and the manufacturer, the manufacturer is responsible only for their share of the emissions warranty per the warranty agreement. These changes to the warranty provisions apply to both diesel and otto-cycle engines.

4. Additional Manufacturer Requirements

EPA proposed modest new manufacturer requirements which may increase the likelihood of emissions related maintenance being performed when needed after the end of the engine's useful life by providing information to the vehicle owner. EPA received only supportive comments on these proposals. Therefore, all of the following manufacturer requirements are being finalized as proposed for both diesel and otto-cycle engines.

Engine manufacturers provide owners with manuals specifying maintenance needed to ensure proper engine operation. Starting in 2004, EPA is requiring that manufacturers include in the engine service manual, maintenance which may be needed for emissions related components after the end of the engine's regulatory useful life, including mileage/hours intervals and procedures for determining whether or not maintenance or repair is needed. The recommended practices must also include instructions for accessing and responding to any emissions-related diagnostic codes that may be stored in on-board monitoring systems. The recommended maintenance practices may be based on engineering analysis or other sound technical rationale. In the event that an emission-related component is designed not to need maintenance during the full life of the vehicle, the manual would need to contain, at a minimum, a description of the component, noting its purpose, and a statement that the component is expected to last the life of the vehicle without maintenance or repair. In addition, manufacturers are required to include in the manual the rebuild provisions being adopted by the Agency, as described below, to ensure that owners and rebuilders are aware of the requirements.

Under existing regulations, manufacturers must ensure that critical emissions-related scheduled maintenance has a reasonable likelihood of being performed in-use. Manufacturers may elect to provide such assurance by using some form of on-board driver notification when maintenance is needed on a critical emission related component.[20] The signal may be triggered either based on mileage intervals or component failure. It is currently considered a violation of the Clean Air Act's prohibition on tampering (Section 203(a)(3)) to disable or reset the signal without also performing the indicated maintenance procedure.[21]

EPA is finalizing a requirement that manufacturers of 2004 and later model year engines electing to use such signal systems to ensure that critical emissions-related maintenance has a reasonable likelihood of being performed must design the systems so that they do not cease to function at or beyond the end of the regulatory useful life. For example, if the signal is designed to be actuated based on mileage intervals, it must be designed to continue to signal the driver at the same intervals after the end of the useful life. EPA will not, however, hold the manufacturer responsible or liable for recall due to signal failure in instances where the signal fails to function as designed beyond the end of the useful life. Manufacturer recall liability is limited to failures during the regulatory useful life under section 207 of the Clean Air Act. (The manufacturer is also not responsible for repairs when the signal does function after the end of the useful life unless such repairs are covered by the emission warranty.)

5. Engine Rebuilding Provisions

Clean Air Act section 203(a)(3) states that it is prohibited for ''any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine'' in compliance with regulations, either before or after its sale and delivery to the ultimate purchaser. 42 U.S.C. 7522 (a)(3)(A). EPA commonly refers to violations of this provision of the Clean Air Act as tampering. Engine rebuilding practices are currently addressed in general terms under EPA policies established under Clean Air Act section 203(a)(3) regarding tampering. The Agency has established a policy that when switching heavy-duty engines the new engine must be ''identical to a certified configuration of a heavy-duty engine of the same or newer model year''.[22] EPA has also established policies regarding the use of aftermarket parts during rebuild.[23] EPA is codifying these policies as they apply to engine rebuilding, and also finalizing new measures, as follows, for both diesel and otto-cycle engines.

[19] 40 CFR 86.094–2(f).

[20] 40 CFR 86.094–25(b)(6)(ii)(C).

[21] 40 CFR 86.094–25(b)(6)(iii).

[22] Engine Switching Fact Sheet, April 2, 1991. Docket A–95–27, II–B–6.

[23] ''Interim Tampering Enforcement Policy'', Mobile Source Enforcement Memorandum No. 1A., June 25, 1974. Docket A–95–27, II–B–5.

Under the regulatory provisions finalized today, parties involved in the process of rebuilding or remanufacturing model year 2004 and later engines (which may include the removal of the engine, rebuilding, assembly, reinstallation and other acts associated with engine rebuilding) must follow the provisions described below to avoid the actions being characterized as tampering with the engine and its emissions controls:

(1) 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, specifications) and the model year(s) of the engine configuration must be identified. A reasonable basis would exist if:

(a) Parts used when rebuilding an engine, whether the part is new, used, or rebuilt, is such that a person familiar with the design and function of motor vehicle engines would reasonably believe that the part performs the same function with respect to emissions control as the original part, *and*

(b) 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.

(2) When an engine is being rebuilt and remains installed or is reinstalled in the same vehicle, 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, emissions-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 EPA requirements under 40 CFR 86.094–25 or for other reasons and regardless of form or interface. 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 emissions-related components not otherwise addressed by the above provisions must be checked and cleaned, repaired, or replaced where necessary, following manufacturer recommended practices.

Any person or entity engaged in the process, in whole or in part, of rebuilding engines who fails to comply with the above provisions shall be liable for tampering in violation of CAA section 203(a)(3). Parties are responsible for the activities over which they have control and as such 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 finalizing any certification or in-use emissions requirements for the rebuilder or engine owner.

In response to comments, EPA has removed proposed provisions requiring that the rebuilder or remanufacturer rebuild engines to the same or newer model year configuration when the engine is not going to be placed back into the original vehicle. EPA has also modified rebuild provision (2) which, in the proposal, read ''A replacement engine must be of (or rebuilt to) a configuration of the same or later model year engine. Thus, in addition, under the proposed regulations a party supplying a rebuilt engine would be prohibited from supplying a replacement engine that is not rebuilt to a configuration of the same or later model year as the trade-in engine.'' Provision (2) was modified because the language regarding ''a party supplying a rebuilt engine'' could be construed to mean an engine remanufacturer or other party not working directly with the vehicle. EPA believes that parties not working directly with the vehicle should not have an obligation to ensure that the correct engine is placed in the vehicle.

EPA is adopting minor recordkeeping requirements which EPA believes are in-line with customary business practices and which will assist EPA in assessing compliance with the new rebuild provisions. The records shall be kept by persons involved in the process of heavy-duty engine rebuilding or remanufacturing and shall include the mileage and/or hours 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, emissions related codes and signals that are responded to and reset and the response to the signals and codes, and work performed as described in item (4) of the rebuild provisions above. EPA is requiring such records to be kept for two years after the engine is rebuilt.

Parties may keep the information in whatever format or system they choose, provided that the information can be understood by an EPA enforcement officer. Parties are not required to keep information that they do not have access to as part of normal business practices.

If 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 recordkeeping practices would satisfy these requirements. Rebuilders can use records such as build lists, parts lists, and engineering parameters that they keep for the engine families being rebuilt rather than on individual engines, provided each engine is rebuilt in the same way to those specifications. In addition, rebuilders are not required to keep information on each individual emissions related diagnostic code that might be reset if the codes are always addressed through a set of uniform procedures that are followed during the rebuilding process. For example, if an engine is equipped with a sensor that monitors the EGR flow rate, the rebuilder may keep on record the specifications and procedures used to rebuild the EGR system in all instances. EPA expects that engine remanufacturers currently keep these types of records in order to control the quality of their products.

In the NPRM, EPA explained that it was considering adopting minor recordkeeping requirements in the final rule. In response to comments, EPA has modified the contemplated recordkeeping requirements to: (1) Further clarify that records may be kept on an engine family basis, (2) allow parties to keep information in whatever format or system they choose, provided that the information can be understood by an EPA enforcement officer, and (3) not require parties to keep information that they do not have access to as part of normal business practices.

C. Revised Averaging, Banking, and Trading Provisions

EPA is finalizing with revisions various modifications to the ABT program. EPA believes this program is an important element in making the stringent emissions standards adopted today appropriate with regard to technological feasibility, lead time, and cost. The ABT program provides important flexibility to manufacturers, helping them to transition their entire product lines to the new standards. The ABT program also encourages the early

introduction of cleaner engines, thus securing earlier emissions benefits. The modified ABT program being implemented by EPA for 1998 and later model year engines applies only to diesel cycle engines. EPA proposed but is not finalizing the modified ABT program for otto-cycle engines. (The ABT program implemented in 1990 remains in effect for otto-cycle engines). The provisions being finalized for the modified ABT program are described below. As proposed, the modified program and current program are separate and engines cannot participate in both programs. Credits generated under the modified program may be used only in 2004 and later model years. As was proposed, credits generated between 1998 and 2003 are based on NO_X only, not NMHC+NO_X, and are calculated against the 4.0 g/BHP-hr NO_X emission standard. Diesel PM credits are based on reductions beyond the 0.10 g/BHP-hr emission standard for truck engines and the 0.05 g/BHP-hr emission standard for urban buses. Credits earned under the modified program may be transferred to the current program but would then be subject to the current program's credit life limit of three years from model year of generation and a one-time 20 percent discount.

For the modified program between 1998 and 2003, for engine families certified at NO_X levels ≤3.5 g/BHP-hr, no discount will be applied to any NO_X or PM credits generated for banking or trading. For engine families certified at NO_X levels above 3.5 g/BHP-hr, a one-time 10 percent discount will be applied to all credits generated for banking and trading against the model year 2004 standards, both NO_X and PM. For example, if an engine family is certified to a NO_X level of 3.7 in the modified program, the manufacturer will earn only 0.27 g/bhp-hr (0.3x.9) credit for use in meeting the 2004 standard. The credit life for credits under the modified program is unlimited.

Beginning in 2004, the form of the standard changes from separate HC and NO_X standards to a combined NMHC+NO_X standard. Therefore, starting in 2004, credits will be based on combined NMHC+NO_X values. NMHC+NO_X credits will be generated against the 2.4 g/BHP-hr standard. Diesel PM credits will continue to be generated against the 0.10 g/BHP-hr emission standard for truck engines and the 0.05 g/BHP-hr emission standard for urban buses. For engine families certified with NMHC+NO_X levels at or below 1.9 g/BHP-hr, credits will not be discounted. Credits for banking and trading will be discounted by 10 percent for engines with certification levels above 1.9 g/bhp-hr NMHC+NO_X with the following exception: carry-over engine families certified prior to 2004 with NO_X+NMHC certification levels below the 2004 standards may earn undiscounted credits through model year 2006. For model year 2007 and thereafter, the 10 percent discount applies. As with credits generated in the modified program prior to 2004, there will be no limit on credit life for credits generated after 2004 under the modified program. As proposed, the upper limits for NMHC+NO_X and PM certification will be 4.5 g/BHP-hr and 0.25 g/BHP-hr, respectively. That is, no engine family may use credits to establish FELs above either of these levels.

For reasons discussed later in this document, as well as in the Summary and Analysis of Comments, the provisions regarding credit life and discounting differ somewhat from those proposed. EPA proposed no discounting or credit life limits for the modified program. EPA also proposed that the modified program end in 2007 and that all credits thereafter would be generated under the current program which includes a one-time discount of 20 percent and a three year credit life limit. Under the final rule, the modified program does not end in 2007, but continues indefinitely. In addition, as noted above, credits for engine families certified above the appropriate trigger level will have a 10 percent discount.

There are several other provisions which apply to the modified program beginning in model year 1998. First, as proposed, EPA is eliminating the ''buy high-sell low'' conversion factor provision of 86.094–(c)(2) and replacing it with the production-weighted average value. Under the current buy high-sell low provision, families generating credits use the lowest horsepower configuration factor and those using credits use the highest horsepower configuration factor in the formula to establish the number of credits generated or used. In the modified program, the production-weighted average value will be used in both cases. Second, because the 2004 standards apply in all fifty states, beginning in 2004, the California and federal programs will harmonize and ABT will be applicable to all federal certifications. Third, EPA is finalizing provisions to allow manufacturers the option to make the NO_X and PM credits generated by their engines available to other persons for use outside the ABT program instead of limiting credits to only manufacturers.

Based on comments received EPA is not finalizing two provisions which had been proposed. First, EPA is not finalizing its proposal for pre-2004 model years to allow NO_X credits to be generated based on a useful life of 435,000 miles while retaining the actual useful life for the engine family at 290,000 mile interval for all other program purposes. EPA proposed to allow manufacturers to establish an FEL based on simple extrapolation of the deterioration factor for NO_X from 290,000 miles to 435,000 miles and earn credits up to 435,000 miles without incurring any additional in-use liability for the mileage between 290,000 mile and 435,000 miles. Because EPA is not finalizing the proposed change, all credits must be based on the useful life of the engine family, which is the current Agency requirement. Manufacturers wanting to generate credits up to 435,000 miles will be required to establish the 435,000 mile interval as the official useful life for the engine family. Second, EPA is not finalizing its proposal to require a compliance margin (i.e., the difference between the engine certification level and the FEL) of at least 5 percent under the modified ABT program. All of the above changes to the modified ABT program are being made for the reasons explained in the Summary and Analysis of Comment document for this rule.

D. Display of OMB Control Numbers

EPA is also amending the table of currently approved information collection request (ICR) control numbers issued by OMB for various regulations. This amendment updates the table to accurately display those information requirements contained in this final rule. This display of the OMB control numbers and their subsequent codification in the Code of Federal Regulations satisfies the requirements of the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*) and OMB's implementing regulations at 5 CFR 1320.

The ICR was previously subject to public notice and comment prior to OMB approval. As a result, EPA finds that there is ''good cause'' under section 553(b)(B) of the Administrative Procedure Act (5 U.S.C. 553(b)(B)) to amend this table without prior notice and comment. Due to the technical nature of the table, further notice and comment would be unnecessary.

IV. Public Participation

Following the NPRM, EPA held a public hearing on August 12, 1996, and accepted written comments on the proposals. This preamble section provides an overview of certain key issues raised in the NPRM, a summary of comments on these issues, and EPA's response to the comments, including

any significant changes to the rulemaking as a result of the comments. For EPA's detailed analysis of the comments received on the NPRM, the reader is directed to the Summary and Analysis of Comments document for the rulemaking. For information on how to obtain copies of the public hearing transcript, written comments, and the Summary and Analysis of Comments document, please see the **ADDRESSES** section above.

A. EPA's Air Quality Justification for the Proposed Program

In the NPRM, EPA expressed its belief that improvements in air quality in many parts of the country will continue to be necessary in the future. Specifically, the Agency presented the results of analyses indicating that the emissions of key pollutants can be expected to increase without further controls and that air quality (in the case of both ozone and particulate matter) is likely to worsen as a result. In proposing new standards for highway HDEs, the Agency relied on these projections in concluding that it should proceed with regulatory action as soon as possible.

Some commenters questioned this conclusion, disputing whether the available information in fact justifies establishing new standards for highway HDEs. Others argued the opposite—that immediate action is indeed justified. Those questioning EPA's analysis raised several issues. First, some commenters argued that currently available computer modeling is not of sufficient quality to draw conclusions about the future need for NO_X control. Second, several commenters had differing opinions about how much EPA national ozone reduction policy should be affected by the fact that NO_X reductions can cause increases in ozone under localized conditions. EPA stated its belief in the proposal that the large expected benefits of NO_X control over broad areas within and surrounding nonattainment areas should be pursued even if these NO_X reductions have a neutral or negative effect in localized portions of some nonattainment areas. Third, one commenter presented an analysis of ozone monitors concluding that the number of national ozone exceedances has been steadily decreasing over time (when adjusted for ambient temperatures). These issues are discussed below.

1. Modeling

The emissions and air quality modeling to which the commenters refer falls into two related categories that are generally performed sequentially. The first major step is to develop emission inventories simulating the atmospheric loading of ozone precursors in future years. These inventories are useful for projecting trends in emissions over time and for understanding the relative importance of various emission sources. The second major step is to input specially prepared inventories into a complex grid-based air quality model which simulates the photochemistry of ozone formation over a geographic area for the same future years. Modelers have been able to gradually improve the quality of both of these types of modeling over many years, and improvements continue.

As discussed more fully in the Summary and Analysis of Comments document, EPA believes that the available computer modeling of emissions and air quality, while of necessity complex and continually undergoing improvement, clearly provides a legitimate basis for today's rule. The Agency believes that its modeling projects with reasonable accuracy that, absent new control programs, NO_X emissions would increase in the future and that the expected result would be increased ozone problems for many areas.

2. Possible Ozone Increases From NO_X Reduction

In the ANPRM and NPRM, EPA discussed the well known phenomenon that reducing NO_X emissions in a local area may in certain circumstances result in an increase in ozone in limited parts of the area. Some commenters suggested that, as a result of this phenomenon, any proposed action to reduce NO_X emission would be unwise or premature. After consideration of all comments received on this subject, EPA believes that nothing in the comments warrants a different course of action than that proposed by the Agency. In fact, air quality modeling work done since the analysis presented in the NPRM shows that the Agency's justification for pursuing the proposed program is appropriate.

The OTAG addressed the complex issue of regional impacts due to transport of NO_X and VOC emissions. The OTAG modeling results indicate that urban NO_X reductions produce widespread decreases in ozone concentrations on high ozone days. In addition, urban NO_X reductions also produce limited increases in ozone concentrations locally, but the magnitude, time, and location of these increases generally do not cause or contribute to high ozone concentrations. Most urban ozone increases modeled in OTAG occur in areas already below the ozone standard and, thus, in most cases, urban ozone increases resulting from NO_X reductions do not cause exceedance of the ozone standard. There are a few days in a few urban areas where NO_X reductions are predicted to produce ozone increases in portions of an urban area with high ozone concentrations. In these circumstances, additional VOC control measures may be needed to offset associated ozone increases due to NO_X emissions decreases in local areas.

Nonetheless, modeling analyses conducted as part of the OTAG process indicated that, in general, NO_X reduction disbenefits are inversely related to ozone concentration. On the low ozone days leading up to an ozone episode (and sometimes the last day or so) the increases are greatest, and on the high ozone days, the increases are least (or nonexistent); the ozone increases occur on days when ozone is low and the ozone decreases occur on days when ozone is high. This indicates that, in most cases, urban ozone increases may not produce detrimental effects. Overall, OTAG modeling thus demonstrates that the ozone reduction benefits of NO_X control outweigh the disbenefits of urban ozone increases in both magnitude of ozone reduction and geographic scope.

The Agency has concluded that the overall benefit of large regional reductions in NO_X, like those that would occur with the HDE standards finalized today, warrant such controls even where localized ozone increases may occur.[24] [25]

3. Trends in Ozone Levels

EPA is aware of data indicating gradual improvements in ozone levels over the past several years. The Agency attributes this apparent trend to the success of past NO_X and VOC control programs. Since the Agency has concluded that NO_X levels will continue downward for several years but then level off and begin to rise, the welcome downward trend in ozone cannot, unfortunately, be expected to continue without new emission reductions. EPA does not agree with the commenter that the current trends indicate that new NO_X control programs are not necessary. Rather, these data help show that NO_X control can be very effective in reducing ozone. Moreover, the data reinforce EPA's belief (as discussed in Section II. above) that there will likely be an

[24] "EPA Staff Observations from Recent Air Quality Modeling," Memorandum from Norm Possiel to Tad Wysor, August, 1997.

[25] Also see EPA's notice of denial of API petition for reconsideration of the Phase II reformulated gasoline NO_X standard. (62 FR 11346 (March 12 1997)).

upward trend in NO_X emissions and ozone in the future if further NO_X controls are not implemented. The Agency believes, therefore, that further NO_X controls, including the HDE standards issued today, must be vigorously pursued.

B. Level of Standards

1. Diesel Engines—NO_X Plus NMHC

EPA proposed a combined NMHC+NO_X standard of 2.4 g/bhp-hr with an option to manufacturers of 2.5 g/bhp-hr with a NMHC cap of 0.5 g/bhp-hr. The emission standards proposed in the NPRM for diesel-cycle engines were based on what EPA considered to be the greatest achievable reductions from technology expected to be available in 2004, giving appropriate consideration to cost, energy, and safety. Commenters showed general support for the alternative NMHC+NO_X standards proposed by EPA. The manufacturers commented that the proposed NMHC+NO_X standards will be feasible for most highway heavy-duty diesel engines in 2004, provided that PM standards do not change. Manufacturers expressed specific support for the standards as they were proposed, including the optional 2.5 g/bhp-hr standard with 0.5 g/bhp-hr NMHC cap. EPA did not receive comment recommending another level for the standard for diesel engines.

Based on current information, EPA has determined that the proposed revision of NO_X and NMHC standards is appropriate for 2004. The assessment of feasibility in the NPRM remains unchanged. An overview of the engine changes manufacturers are expected to make to meet the standards can be found in the Economic Impact discussion later in the preamble and in the Regulatory Impact Analysis.

2. Highway Diesel Engine—PM

In the NPRM, EPA proposed to leave the diesel engine PM standards at their current levels: 0.10 g/bhp-hr for truck engines and 0.05 g/bhp-hr (0.07 in-use) for urban buses. State, health, and environmental groups were unanimous in their comments exhorting EPA to move forward with additional control of diesel PM from on-highway heavy-duty diesel engines. These commenters focused on the need for control of diesel PM in the context of health effects from PM exposure and EPA's recent proposal to revise the National Ambient Air Quality Standard for PM. The groups also noted that the urban bus standard for PM was 0.05 g/bhp-hr and argued that all diesel HDEs could meet that level. In contrast, the manufacturers commented that even meeting the current diesel PM standards while reducing NO_X emissions by 50 percent presents a significant technical challenge. The manufacturers commented that further reduction in the PM standard would threaten the overall feasibility and cost-effectiveness of the 2004 NMHC plus NO_X standards. In the case of urban buses, manufacturers asked for a relaxation in the level of the PM standard to be able to meet the new levels for NMHC+NO_X emissions.

EPA understands the concerns that have been raised by the state, environmental, and health commenters and has an interest in pursuing further control of PM emissions if appropriate. As discussed in more detail above and in the Regulatory Impact Analysis, PM emissions can cause risks to public health and welfare, including a range of respiratory illnesses and aggravation of cardiovascular disease. EPA is reviewing and will continue to review many strategies for reducing harmful emissions of PM, including reduction of emissions from internal combustion engines. In fact, the reductions in NO_X emissions resulting from this rule will significantly lower secondary formation of nitrate PM.[26]

However, based on the information available today and the statutory factors set forth in section 202(a)(3)(A) of the Clean Air Act, EPA has determined that the current diesel PM standards are the lowest appropriate levels in 2004 in the context of an approximate 50 percent reduction in NO_X. Because of the trade-off between NO_X and PM emissions, manufacturers will have to undertake considerable effort to keep PM emissions below the current standard while essentially halving NO_X emissions. EPA cannot be certain at this time that any further reductions in PM emissions can be realized in manner that is durable, reliable for the majority of the fleet, and cost-effective. As discussed below and in the Summary and Analysis of Comments, the ability of urban buses to meet a more stringent standard for PM does not necessarily mean that such a standard is feasible and appropriate for all heavy duty diesel engines.

Open issues regarding control technology and strategy have contributed to EPA's decision not to lower PM standards at this time. To date, most medium heavy-duty and all heavy heavy-duty diesel engine families have been successful in meeting the 0.10 g/bhp-hr diesel PM standard using in-cylinder or engine-based control strategies. However, most of the light heavy-duty diesel engines have employed the use of aftertreatment devices such as oxidation catalysts to reach this level. All urban bus engines have used aftertreatment to achieve the applicable 0.05 g/bhp-hr diesel PM standard, albeit at somewhat higher cost and cost effectiveness values than for truck engines. While there are clearly different emission control strategy philosophies among the manufacturers and differences among engines technologies that lead to these variations in technological approach, further work is needed to identify and evaluate what set of control strategies have the greatest potential to achieve full life emission control at diesel PM levels less than 0.10 g/bhp-hr while also reducing NO_X to approximately 2 g/bhp-hr. This ultimate set of strategies may involve aftertreatment techniques similar to those currently used on light heavy-duty diesel engines and urban buses or could be a technology still in research and development. However, at this time, it is uncertain whether potential methods for reduction of PM and NO_X from heavy-duty engines are capable of reducing emission levels for the great majority of the heavy-duty engine fleet below the standards promulgated today in a manner that is reliable for the full useful life of the engines. Further discussion regarding technological feasibility can be found in the Summary and Analysis of Comments and the Regulatory Impact Analysis.

Closely related are the issues of cost and cost effectiveness. The purchase and operating cost implications of any additional control technology must be considered as part of further evaluation, as should the cost-effectiveness of further reductions in new engine emission standards. This is best evaluated in the context of the possible control technologies as discussed above.

There are other open scientific and technical issues that EPA plans to consider prior to the 1999 review. One issue is related to the form of the diesel particulate standard. Current EPA diesel particulate standards are based on mass per unit work (g/BHP-hr), and EPA continues to believe that this is the appropriate form for setting standards. Recently, an issue of a potential impact of technology on particle size distribution has arisen. Virtually all diesel particulate matter has a diameter less than 1.0 micron and is thus fully respirable by humans. A recent study sponsored by the Health Effects Institute on two similar and recent engine models (one of a later technology)

[26] Benefits of Mobile Source NO_X Related Particulate Matter Reductions, October 1996, EPA Contract No. 68–C5–0010.

indicated that while the total mass of PM emissions was lower in the newer technology engine, the remaining particles from the new engine were smaller in diameter and more numerous.[27] The implications of this information are not clear either with regard to technology or health effects. While EPA continues to believe that mass-based emission standards for PM are the most appropriate form, more information on the impact of any advanced engine and emission control technology on diesel PM size, particle count, and chemical constituents as well as the health effects of any changes in these particle characteristics would be helpful.

Another issue is related to the magnitude of the directly-emitted diesel PM inventory and its relative air quality impact. Unlike nonroad diesel engines PM emissions, highway diesel engine PM emissions have been controlled since 1988, and current standards require an 80 to 90 percent reduction over uncontrolled levels. Nonetheless, it is clear that control of diesel PM emissions is important, and more data on the percentage of highway engine diesel PM in the various urban areas and nonattainment area inventories and the in-use performance of controlled highway diesels would be helpful in guiding the Agency's future initiatives with regard to potential highway diesel engine PM control strategies. In any case, tightening NO_x standards alone results in lower levels of ambient PM due to the accompanying reduction in secondary formation of nitrate PM, as discussed elsewhere in this preamble.

EPA considers further control of highway diesel engine PM emissions to be an important air quality goal and plans to further study these issues and others over the next two years, and to reassess the diesel PM standard in the 1999 review. In that context, EPA encourages continued research and development on PM control technology and seeks input in all of the areas described above.

Urban bus engines are and will continue to be a special case because they have unique operating characteristics, are used in only a limited range of vehicle applications, and are treated differently than other heavy duty engines under the Clean Air Act. Urban buses experience a typical duty cycle for which engines can relatively easily be designed; other heavy duty engines, in contrast, can be applied to several different types of truck applications and can experience a much wider range of duty cycles. The duty cycle that engines will see is important because manufacturers must design engines to meet the standards over their full useful lives. Moreover, the particular emphasis on PM reductions in section 219 of the Act indicates that Congress was especially interested in such reductions from urban bus engines and considered more stringent standards appropriate for such engines, even if costs are higher relative to other HDEs. For these reasons, EPA believes that the new NMHC+NO_x standard along with the more stringent urban bus PM standard will be feasible and appropriate for urban buses. As part of the 1999 review, EPA will reevaluate the appropriateness of the urban bus standards.

3. Otto-Cycle Engines

In response to the ANPRM, environmental groups provided comments highlighting manufacturers' certification data for the 1996 model year, which included some engine families with emission levels considerably below the standards proposed for the 2004 model year. While EPA proposed to adopt more stringent emission standards applicable to both diesel and otto-cycle (which are primarily gasoline-fueled) heavy-duty engines, EPA also requested comment on the possibility of adopting more stringent emission standards for heavy-duty gasoline engines. Certification data for 1997 showed a larger number of engine families emitting at or below the 2004 levels, with some engines certified at emission levels only ten to twenty percent of the 2004 emission standards.

At this point, EPA is not yet ready to take final action on the issues associated with otto-cycle HDEs and is not finalizing any revised standards for heavy-duty otto-cycle engines. EPA intends to issue a Supplemental Notice of Proposed Rulemaking to address these engines specifically. A variety of options are under consideration for inclusion in the supplemental proposal. First, as described in the initial proposal, EPA may pursue a more stringent numerical standard using the existing test on an engine dynamometer. Second, EPA will evaluate the appropriateness of adopting emission standards for some otto-cycle heavy-duty vehicles based on testing with a chassis dynamometer. Chassis testing, and associated standards, could be patterned after the program adopted by the California Air Resources Board for medium-duty vehicles. Alternatively, EPA could develop a test and standard using the chassis test cycle specified in 40 CFR Part 86, subpart M for heavy-duty gasoline vehicles.

C. In-Use Emissions Control and Compliance

1. In-Use Emissions Control Regulatory Elements

The NPRM contained several proposals which involved modifications to existing regulations, including regulations for the useful life of the engine, emissions performance and defect warranties, and maintenance requirements. These proposals would update the existing requirements, which were established several years ago, to better align them with current industry experience of longer lasting engines. EPA also proposed some elementary provisions regarding engine rebuilding to help ensure that rebuilding does not result in the removal of emissions control equipment or the reconfiguring of the engine in a way that would result in a significant increase in emissions. EPA's final actions on these items are described in section III.B. of this preamble. The reader is directed to the Summary and Analysis of Comments for a full discussion of comments received by EPA on its in-use emissions related proposals and EPA analysis and response to those comments.

2. State Inspection and Maintenance Programs

EPA noted in the preamble to the NPRM its intention to develop a guidance document for states to follow in designing inspection and maintenance programs for heavy-duty trucks and buses. Several commenters urged EPA to issue guidance to states quickly regarding how to conduct in-use inspection and maintenance programs. Commenters noted that several states and regions are working on in-use emissions programs and EPA guidance is critical to help ensure consistent programs from state-to-state. Commenters requested that EPA evaluate the Society of Automotive Engineers (SAE) test procedure J–1667 and move rapidly to endorse its use in road-side smoke inspection programs. State organizations recommended, further, that EPA move to adopt the J–1667 procedure or other short test procedures as certification short test procedures and develop correlations between the short tests and the full certification tests. This would allow states and EPA to determine vehicle compliance in the field. NESCAUM noted that research is needed on the relationship between smoke opacity and particulate emissions. NRDC

[27] K.J. Baumgard, J.H. Johnson, ''The Effect of Fuel and Engine Design on Diesel Exhaust Particle Size Distributions,'' Society of Automotive Engineers, 960131, 1996.

commented that the smoke test will be inadequate for verifying compliance with the standard proposed in the rule.

EPA recognizes the importance of providing guidance to states in these matters. EPA has been working informally with stakeholders including representatives from States, the trucking industry, engine manufacturers, and EPA Regions, among others, in its development of such guidance. As a result of this effort, EPA has recently issued guidance to states recommending the SAE J–1667 test procedure for their I/M programs.[28] EPA plans to continue working with stakeholders to address other concerns related to the smoke test procedure such as the establishment of appropriate cut-points. The correlation of test cycles, establishment of certification short tests, and short tests for emissions other than smoke emissions, are complex in nature and must be studied further. For these reasons and also because I/M was not a subject of any proposals in the NPRM, the Agency is not adopting such programs or requirements in this rule.

3. In-use Compliance Issues

EPA received comments in several areas related to in-use emissions control, but not related to any specific proposals contained in the NPRM. Several commenters expressed substantial concern over what they believe to be EPA's lack of a practical in-use compliance program for heavy-duty engines. They contend that EPA relies entirely on self certification and selective enforcement audits for heavy-duty compliance due to the impracticality and high cost of in-use engine testing. Commenters expressed concern that a number of HDEs have failed the SEA testing in recent years. The commenters urged EPA to develop an effective in-use compliance testing program including a viable recall program to ensure that engines comply with applicable standards over their useful lives. One commenter noted that the threat of in-use deterioration will increase as the standards are lowered. Commenters recommended that the Agency develop a supplemental certification test, such as a loaded chassis test, which could be used for in-use compliance and one commenter urged the Agency commit to a schedule for development and implementation.

EPA received comments urging the Agency to adopt requirements for manufacturers to install on-board diagnostics (OBD) systems in heavy-duty vehicles. Commenters believe that OBD could be a valuable tool in improving maintenance practices and assessing the in-use performance of heavy-duty engines. State organizations who commented are interested in having OBD systems available as a tool for inspection and maintenance programs.

EPA also received comment that a more representative test cycle is a key to controlling excess emissions associated with high speeds and loads typical of real world conditions not currently represented in the federal test procedure (i.e., off cycle emissions). The commenter also believes that the increasing use of onboard computers to control the operation of engines further exacerbates the need for different and more variable test cycles. The commenter notes that onboard computers can be used to change the engine operating conditions to optimize fuel economy at the expense of emissions in modes of operation that are not well represented in the EPA test procedure. The commenter urged EPA to evaluate its current heavy-duty engine test procedure and consider such options as a random test cycle to minimize the impact of off-cycle emissions.

While EPA believes that the new standards will achieve the emissions reductions estimated in section II of this preamble, EPA also recognizes that improvements in the understanding of in-use emissions and the need to establish a viable in-use compliance presence are essential. To address these concerns EPA has recently engaged in a number of activities to address in-use emissions. EPA has signed a Memorandum of Understanding (MOU) with the California Air Resources Board (ARB) and the Northeast States for Coordinated Air Use Management (NESCAUM) to develop a better understanding of in-use emissions from heavy-duty vehicles.[29]

Under the context of this MOU, EPA has recently implemented a small-scale chassis-based screening program for in-use HDV's that will establish a viable in-use compliance presence. The screening program seeks to identify high emitting engines or technologies, and the causes of high emissions. The screening program is initially focused on light heavy-duty gasoline engines, although EPA plans to work with ARB and NESCAUM to expand the program to all sectors of the on-highway heavy-duty industry in the next several months and include on-road emissions measurements. Such a screening program will allow EPA to identify high-emitting engine families, potentially signaling the need for recall action under section 207 of the Clean Air Act. In addition, the in-use screening program will allow EPA to enforce certain provisions of section 203 of the Act, including the prohibition against manufacturer-designed strategies or devices that defeat the operation of the emissions control system, and the prohibition against tampering with the emissions control system. Lastly, the screening program will allow EPA to assess in-use deterioration of HDE's by testing trucks at various mileages. Although the screening program will also provide important information regarding off-cycle emissions, EPA understands that further work in this area may be necessary to fully address the off-cycle concern.

In addition to the screening program and engine testing conducted under the MOU, EPA will continue to work with state groups and others to develop tools for states to reduce in-use HDV emissions. Many states are implementing, or are considering implementing, inspection and maintenance (I/M) programs for HDV's. As noted above, EPA has recently issued guidance regarding an in-use I/M smoke test procedure, and plans to follow-up that guidance with recommended pass/fail cut-points. In addition, the EPA plans to study the benefits and feasibility of on-board diagnostics (OBD) and other concepts that may prove to be useful I/M tools.

EPA is also committed to working with states and industry to implement a voluntary retrofit program aimed at reducing emissions from older in-use vehicles that would be modeled after EPA's Urban Bus Retrofit/Rebuild Program. Such a program could lead to emission reductions from the in-use fleet beyond those required by the applicable standards through the retrofit of advanced emission control technologies.

In response to EPA and commenter concerns about the growing number of engines which fail SEA testing, EPA believes that a viable long-term in-use recall presence will provide the necessary assurances that new production engines will comply with applicable standards. In the near-term, EPA plans to engage the industry in constructive dialogue aimed at better understanding production processes and variability, manufacturer-based

[28] ''Guidance to States on In-use Smoke Test Procedure For Highway Heavy-duty Diesel Vehicles'', United States Environmental Protection Agency, April 3, 1997. Docket A–95–27.

[29] ''Developing an Understanding of In-use Emissions from Heavy-duty Diesel Engines'', Memorandum of Understanding, United States Environmental Protection Agency, Northeast States for Coordinated Air Use Management, California Air Resources Board, March 1997, Docket A–95–27.

production line testing programs, and methodologies used determine deterioration factors. Through these discussions, EPA believes that incremental improvements in SEA performance can be achieved. EPA is committed to further review of its compliance programs, and revisions to its regulatory programs if needed.

EPA believes that these near-term actions will begin to address many of the concerns raised by commenters with respect to in-use emissions, and that changes in the HDV compliance program could result from these near-term actions. In addition, continued long-term study of in-use HDV emissions will further enhance our understanding and will provide a basis for future programmatic, regulatory, or other changes to ensure the emissions reductions from more stringent standards are reflected in the in-use emissions from HDV's.

D. Averaging, Banking, and Trading

As discussed above, EPA proposed a modified ABT program as part of the transition to more stringent emissions standards for NOx and NMHC in 2004. Many comments were received on the ABT provisions of the NPRM. As discussed in the Summary and Analysis of Comments supporting this final rule, EPA has considered the comments received on the proposal and revised the provisions as appropriate. The ABT program EPA is implementing is consistent with the goals of the ABT concept as discussed in the NPRM. The modified ABT program being implemented in this rule provides the manufacturers the incentive to achieve improvements on current technology and pull ahead 2004-era technology to generate early emission reductions. These early reductions provide a near-term benefit to the environment and the emission credits generated provide the manufacturers significant compliance flexibility. As stated by the manufacturers, this compliance flexibility is a significant factor in the manufacturers' ability to certify a full line of engines in 2004 and helps to allow implementation of the new more stringent standard as soon as permissible under the Clean Air Act.

1. Applicability

The NPRM proposed a modified ABT program for both diesel and otto-cycle engines. However, as noted above, EPA received comment regarding whether EPA's proposed otto-cycle standards and ABT provisions were appropriate. As a result of EPA's evaluation of these comments, EPA is not promulgating final standards for otto-cycle HDEs in this rule. EPA is also not finalizing a modified ABT program for otto-cycle HDEs. EPA will address such standards and ABT provisions in a Supplemental Notice of Proposed Rulemaking in the future. The modified ABT program being implemented by EPA for 1998 through 2003 and the modified program finalized for 2004 and later apply only to diesel-cycle engines.

2. The Modified ABT Program Diesel-Cycle Engines (1998–2003)

As will be discussed further below, the current ABT program will be retained for credit generation and use by production otto-cycle engines and credit use by diesel-cycle engines during the 1998–2003 model years. Effective for the 1998 model year, EPA is implementing a modified certification ABT program designed to help ensure compliance with the NMHC+NO_X and PM standards beginning in 2004. The provisions of this program are described below.

Credits generated under the modified program may be used only in 2004 and later model years. Manufacturers may not use credits generated in the current program on engines generating credits under the modified program. However, credits generated under the modified program may be used before 2004, subject to the regulatory provisions of the current ABT program. As was proposed, credits generated between 1998 and 2003 under this modified program are based on NO_X only and are calculated against the 4.0 g/bhp-hr NO_X emission standard. The NMHC levels of most heavy-duty engines are well below the present standard and would result in windfall credits if the credit calculation included NMHC. Diesel PM credits are based on reductions beyond the model year 0.10 g/bhp-hr emission standard for truck engines and the 0.05 g/bhp-hr emission standard for urban buses.

In the NPRM, EPA proposed that there be no discounts for credits banked under the modified program. However, in response to comments and further consideration by EPA on the best way to align this program with the general goals of the ABT program and other EPA market incentive programs, EPA is finalizing somewhat different provisions. To better align the ABT program with the goal of pull-ahead technology, EPA has decided to implement a trigger concept as a mechanism to distinguish engine families eligible for no discount. For engine families certified at NO_X levels less than 3.5 g/bhp-hr NO_X, no discount will be applied to any NO_X or PM credits generated for banking. The 3.5 g/bhp-hr cut-point was suggested by commenters and EPA judges this level to be a reasonable discriminator for pull-ahead technology. It is similar in stringency to the California LEV standard for these engines and only three federal 1997 heavy-duty diesel families are certified below this level. For engine families certified at NO_X levels above 3.5 g/bhp-hr, a 10 percent discount will be applied to all credits generated, both NO_X and PM. EPA has decided to retain a discount for this portion of the program because smaller incremental reductions such as this are less likely to represent the pull-ahead technology which ABT is designed to encourage. These smaller credits nonetheless represent early reductions and are appropriate given the stringency of the model year 2004 standard, consistent with the ABT concept.

As was mentioned above, the modified program includes a 10 percent discount for engines certified above the trigger. This level of discount was selected based on a combination of factors. Several commenters stated that a discount should be retained, some suggesting 10 percent, some implying the current 20 percent level. Other commenters supported the Agency's proposal to eliminate all credit discounts. In attempting to design a program which meets all of the goals of ABT, the Agency selected 10 percent. The manufacturers comments indicated that a 20 percent discount was far too large and created a significant disincentive for the introduction of new or improved technology. Conversely, EPA believes that eliminating the discount for all credits as was proposed would have reduced the incentive to develop and implement significantly cleaner technology. A 10 percent discount for credits generated at FELs above 3.5 g/bhp-hr, strikes a balance between these views, and aligns the discount in the heavy-duty engine ABT program with others in the mobile source program such as the National Low Emission Vehicle program.

Some commenters opposed allowing PM credits to be generated and used in the modified program because the PM standard is not changing. In response, EPA believes that it is appropriate to include PM in the modified ABT program. For most in-cylinder control technologies, there is a strong inverse relationship between NO_X and PM which makes it difficult to control both pollutants at the same time. The control technologies expected to be used to reduce NO_X to model year 2004 levels are likely to increase PM. Therefore, EPA believes that applying the ABT modifications to PM as well as NO_X allows the manufacturer more flexibility

in addressing the technology issues involved with reducing NO_X emissions to the NO_X plus NMHC standard being finalized in this rule, while maintaining PM emissions at 0.10 g/bhp-hr. The Agency has decided to apply the NO_X trigger to PM emissions because engines generating PM credits at NO_X levels below the trigger in this time frame are likely to employ new, or at least significantly improved, PM control technology, because of the natural trade-off between NO_X and PM emissions.

EPA proposed that the 3 year credit life restriction in the current ABT program not apply in the modified program. After considering comments, EPA is finalizing this provision as proposed. Even though several commenters believed that the credit life limit should be retained, EPA believes that an unlimited credit life is consistent with the emission reduction goal of ABT, not only because of the increased manufacturer flexibility in meeting the new standards but also because it eliminates the ''use or lose'' aspect of the current program's limit on credit life, which creates the perverse incentive for manufacturers to use credits as quickly as possible. Unused credits are extra emission reductions beyond what the EPA regulations require. The only concern with unlimited credit life is that a manufacturer could stockpile a large number of credits and delay the effectiveness of a new standard in the future. This certainly would be a concern in a situation where standards are less stringent and not technology-forcing. However, 2.4 g/bhp-hr NMHC+NO_X and 0.10 g/bhp-hr PM (0.05 g/bhp-hr for buses) are quite challenging for diesel engines; EPA expects most pre-2004 credits will be needed in the first few years of the new standard.

3. The Modified ABT Program 2004 and Later

EPA proposed that the current program be reinstated for 2007 and later models years, including the 20 percent discount and 3 year credit life. Some commenters who opposed the modified program urged the Agency to reinstate the current program beginning in 2004. Manufacturers argued that the current program should not be reinstated because the current program would remove much of the incentive to pull-ahead technology in the post 2004 time-frame.

EPA considered the comments carefully and decided to implement, beginning in 2004, a modified program which will fully and permanently replace the current ABT program for diesel-cycle engines, though with significant changes from the proposal. Many of the same concepts that appear in the 1998–2003 ABT program will be employed beginning in 2004, but modifications have been made as appropriate. Beginning in 2004, the form of the standard changes from separate HC and NO_X standards to a combined NMHC+NO_X standard. Therefore in 2004, credits will be based on combined NMHC+NO_X values. For diesel engines, NMHC+NO_X credits will be generated against the 2.4 g/bhp-hr standard. Diesel PM credits will continue to be generated against the 0.10 g/bhp-hr emission standard for truck engines and the 0.05 g/bhp-hr emission standard for urban buses. For the same basic reasons as laid out above, the trigger concept will continue to be applied to the discount for NMHC+NO_X and PM credits. This trigger will be set at 1.9 g/bhp-hr NMHC+NO_X. There are currently no diesel-fueled engines certified even close to this level.

As above, there will be no limit on credit life. Removing discounts and credit life limits for the cleaner engines will provide maximum incentive for the development and introduction of petroleum- and alternative-fueled diesel-cycle engines with emission levels approaching the 1.0 g/bhp-hr NO_X and 0.05 g/bhp-hr PM research objectives of the 1995 SOP.

Credit use in 2004 and later years will follow the same pattern as under the current program. As proposed, the upper limits for NMHC+NO_X and PM certification will be 4.5 g/bhp-hr and 0.25 g/bhp-hr, respectively. That is, no engine family may be certified above either of these levels using credits. These limits provide the manufacturers adequate compliance flexibility while protecting against the introduction of unnecessarily high emitting engines.

4. Other Changes for the Modified ABT Program

Five other provisions were proposed or were discussed with requests for comment which impact the modified ABT program. EPA is implementing three of these and not finalizing two of the proposed modifications.

Of the three being finalized, first, EPA proposed to eliminate the ''buy high—sell low'' provision of § 86.094–15(c)(2) and to replace it with the production-weighted average value. Under this existing provision, families generating credits use the lowest horsepower configuration factor and those needing credits use the highest horsepower configuration factor. In the modified program the production-weighted average value will be used in both cases, as proposed. There was no adverse comment on this change. The second area relates to geographical applicability. The 2004 standards apply in all fifty states. California is not included in the current ABT program because they have a separate control program. Beginning in 2004 the California and federal programs will harmonize and ABT will be applicable for all federally certified HDEs without restrictions based on geographical limitations on the certificate. Prior to 2004, the current ABT program remains limited to HDEs certified for sale outside California. There was no adverse comment on this issue.

The third change EPA is finalizing is related to the ownership of credits. EPA requested comment on the concept that manufacturers be given the option to make the NO_X and PM credits generated by their engines available parties other than the manufacturers for use in other programs. This provision was supported by those who commented, so the regulatory language accompanying the rule includes provisions to permit credits to be excluded from the ABT program by the manufacturer in order to be used by engine purchasers or other parties, while preventing double counting. The ability to transfer credits out of this program does not of course imply that these credits can be used without restriction in other programs. Credits purchased for use in other programs must meet the use requirements of the emission programs for which they are purchased. For example, local emission programs will likely have limits on their geographic scope which may limit the use of emission credits that are used to trade out of local emission requirements.

One provision not being finalized is related to the impact of the change in useful life for heavy heavy-duty diesel engines in 2004 on credit generation and use. The useful life value is a factor in determining the amount of credits earned or used by an engine family. Beginning in 2004 for these engines, the minimum useful life increases 50 percent from 290,000 miles to 435,000 miles. If a manufacturer uses the minimum useful life value of 290,000 miles to calculate credits generated prior to 2004, 50 percent more credits will be needed in 2004 to cover an engine certified with a useful life of 435,000 miles. EPA sought comments on two options to address this issue for NO_X and PM. These included for NO_X allowing manufacturers to base their FEL on an emission level determined from a simple extrapolation of the deterioration factor for NO_X from 290,000 miles to 435,000 miles and to

earn credits up to 435,000 miles. Under such an approach, engine families would continue to have a useful life of 290,000 miles and manufacturers would be liable for emissions only up to the end of the useful life. EPA also sought comment on requiring manufacturers to apply for a longer useful life under the provisions of § 86.094–21(f) if they wanted to earn NO_X credits based on a useful life of more than 290,000 miles. This second option is allowed under the current regulations. For PM, EPA did not propose the use of the former approach proposed for NO_X credits, only the latter approach, due to concerns about the potential for deterioration of PM emissions.

EPA received comments from manufacturers supporting the simple extrapolation of the NO_X deterioration factor for calculating credits and comments arguing that PM deterioration in in-use vehicles was negligible and predictable and that the extrapolation proposed for NO_X should be extended to PM. EPA also received comments that the Agency should not allow credits to be generated over a period where the manufacturer is not liable for emissions control.

As discussed in the Summary and Analysis of Comments, EPA has decided not to finalize the simple deterioration factor extrapolation method for either NO_X or PM. In general, it would be inconsistent with current EPA credit program policy to allow credits without accompanying liability, even if the program is transitional. Furthermore, for both NO_X and PM there is some concern that deterioration after the useful life may not be linear, especially for engines using EGR or aftertreatment. Therefore, manufacturers desiring credits for the longer useful life will have to certify to the longer life for those pollutants as allowed under § 86.094–21(f) of the current regulations.

Finally, EPA is not finalizing the mandatory compliance margin provisions proposed in the NPRM. EPA had proposed these provisions as a means to address concerns that compliance margins (the difference between the family emission limit and the certification level) had been shrinking over time, and that the modified ABT program could provide an incentive to shave margins inappropriately to gather additional credits. One commenter provided examples where margins were reduced by manufacturers in order to earn additional credits. Commenters recommended margins of 10–15 percent due to concerns over margin shaving. Other commenters believed that the best way to ensure that manufacturers set appropriate margins would be through the use of EPA's audit and compliance programs to target suspect engine families. Manufacturers noted that they can improve their manufacturing processes to allow for small margins while still complying with the FEL and should not be penalized with a mandatory compliance margin.

Valid comments were presented on both sides of this issue, but the Agency has concluded that the issue of the size of the compliance margin is not solely an ABT issue. Indeed, compliance margins are important in non-ABT families as well. Thus, the Agency has concluded that any actions to address this issue are better implemented as part of improvements in the overall compliance program, discussed above, rather than as a regulatory fix in the context of a modified ABT program. Moreover, EPA's final regulations, which implement a discount on credits earned by engine families that are less than 0.5 g/bhp-hr below the applicable NO_X or $NMHC+NO_X$ standard should reduce the concern evidenced in the comments regarding the possibility that the modified program will further erode compliance margins.

V. Economic Impact and Cost-effectiveness

The engine manufacturers, by signing the Statement of Principles, have committed themselves to challenging, long-term design targets. This provides manufacturers fully eight years to allocate resources and conduct planning for a very thorough long-term R&D program. Manufacturers have expressed a confidence that several years of research will provide them opportunity to develop a complying engine that they can market with full confidence. EPA's analysis of the costs of complying with the new standards anticipates a significant degree of technological development during this period.

The technologies described in the RIA together show a good deal of promise for controlling emissions, but also make clear that much effort remains to optimize for maximum emission-control effectiveness with minimum negative impacts on engine performance, durability, and fuel consumption. On the other hand, it has become clear that manufacturers have a great potential to advance beyond the current state of understanding by identifying aspects of the key technologies that contribute most to hardware or operational costs or other drawbacks and pursuing improvements, simplifications, or alternatives to limit those burdens. To reflect this improvement and long-term cost saving potential, the cost analysis includes an estimated $270 million (net present value in 1995) in R&D outlays for heavy-duty engine emission control over several years. The cost analysis accordingly presumes extensive improvements on the current state of technology from these future developments. The 1999 program review provides an opportunity to reassess EPA's projected costs in light of new information. EPA will revisit the analysis of the full life-cycle costs as part of the 1999 review. EPA and manufacturers will then confirm whether or not technology development is progressing as needed to meet the 2004 model year emission standards.

In assessing the economic impact of changing the emission standards, EPA has used a current best judgement of the combination of technologies that an engine manufacturer might use to meet the new standards at an acceptable cost. Full details of EPA's cost and cost-effectiveness analyses, including information not presented here, can be found in the Regulatory Impact Analysis in the public docket. EPA received a variety of comments on the cost analysis, either stating generally that the estimated costs were too low or recommending changes to specific details of the analysis. EPA made several minor changes to the analysis in response to comments received on the proposal. The most significant change was to include a broader use of EGR cooling. Further investigation of the EGR and EGR cooling led to revised cost estimates for those technologies. All the comments related to the cost projections and the associated changes are described in the Summary and Analysis of Comments.

Estimated cost increases are broken into purchase price and total life-cycle operating costs. The incremental purchase price for new engines is comprised of variable costs (for hardware and assembly time) and fixed costs (for R&D, retooling, and certification). Total operating costs include any expected increases in maintenance or fuel consumption. Cost estimates based on these projected technology packages represent an expected incremental cost of engines in the 2004 model year. Costs in subsequent years would be reduced by several factors, as described below. Separate projected costs were derived for engines used in three service classes of heavy-duty diesel engines. All costs are presented in 1995 dollars. Life-cycle costs have been discounted to the year of sale.

A. Engine Costs

It is difficult to make a distinction between technologies that are needed to reduce NO_X emissions for compliance with 2004 model year standards and those technologies that offer other benefits for improved fuel economy and engine performance or for better control of particulate emissions. This is because several NO_X control methods such as the use of EGR can have negative impacts on these items for which the manufacturer must then compensate. EPA believes that manufacturers, in the absence of 2004 model year standards, would continue research on and eventually deploy numerous technological upgrades to improve engine performance or more cost-effectively control emissions. EPA therefore believes that a small set of technologies represent the primary changes manufacturers must make to meet the 2004 model year standards. Other technologies applied to heavy-duty engines, before or after implementation of new emission standards, will make relatively minor positive contributions to controlling NO_X emissions and are therefore considered secondary improvements for this analysis. In this category are design changes such as improved oil control, variable-geometry turbochargers, optimized catalyst designs, and variable-valve timing. Lean NO_X catalysts are also considered here to be secondary technologies, not because NO_X control is an incidental benefit, but rather because it is not clear at this time that they will be part of 2004 model year technology packages. Modifications to fuel injection systems will also continue independently of new standards, though some further development with a focus on reducing NO_X emissions would be evaluated.

Several technological improvements are projected for complying with the 2004 model year emission standards. The fact that manufacturers have several years before implementation of the new standards virtually ensures that the technologies used to comply with the standards will develop significantly before reaching production. This ongoing 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 we would predict 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 drawbacks, such as increased fuel consumption or maintenance costs, in an effort to minimize or overcome any potential negative effects.

A combination of primary technology upgrades are anticipated for the 2004 model year. Achieving very low NO_X emissions will require basic research on reducing in-cylinder NO_X and HC while at least holding PM levels below 0.10 g/bhp-hr. Modifications to basic engine design features can be used to improve intake air characteristics and distribution during combustion. Manufacturers are also expected to utilize upgraded electronics and advanced fuel-injection techniques and hardware to modify various fuel injection parameters, including injection pressure, further rate shaping and some split injection. EPA also expects that many engines will incorporate cool EGR that is carefully tailored to an engine's different operating modes.

If not developed and implemented properly, EGR has the potential to increase operating costs, either by increasing fuel consumption or requiring additional maintenance to avoid accelerated engine or component wear. While it is possible to develop scenarios and estimate the impact on operating costs of current diesel EGR concepts, this is of minimal value due to the expected continuing development of these technologies. Nevertheless, EPA has assessed the potential for increased operating costs for EGR-related maintenance and for fuel economy. EPA understands that manufacturers will make a great effort to minimize any potential new maintenance burden for the end user, investing in research to design an engine acceptable to users. The cost to address the durability concern is therefore included both as a maintenance item and as a fixed cost. An additional maintenance cost is anticipated for EGR systems—EPA expects engine rebuilding will include preventive maintenance to clean or replace EGR components.

With respect to fuel economy, several of the secondary technologies described below may lead to cost savings, while EGR has the potential to incur a fuel economy penalty. As with potential new maintenance cost burdens, EPA believes manufacturers will focus their research efforts on overcoming any negative impact on fuel economy caused by EGR. An EGR cooler, which EPA expects to be commonly used, would alone mitigate much of the potential increase in fuel consumption caused by recirculating exhaust gases. In light of the potential fuel economy improvements from some technologies and the anticipated use of cooled EGR systems, it would not be appropriate to include a penalty for increased fuel consumption as part of the cost analysis at this time. EPA will reexamine this issue as part of the 1999 review analysis.

Meeting the new NO_X+NMHC standard will somewhat increase the challenge to control particulate emissions from diesel engines. Manufacturers might use a variety of technologies to maintain control of particulate emissions; however, EPA believes that the fuel system improvements described above will be sufficient to prevent any potential particulate-emission increase while meeting the target levels for NO_X and NMHC. In fact, manufacturers are attempting to lessen the cost of meeting current particulate emission standards over the next several years by decreasing their reliance on catalysts. This underscores EPA's belief that 2004 model year engines will be able to control particulate emissions without major technological innovation.

The costs of these new technologies for meeting the 2004 model year standards are itemized in the Regulatory Impact Analysis and summarized in Table 2. For light heavy-duty vehicles, the cost of a new 2004 model year engine is estimated to increase by $258; operating costs over a full life-cycle increase by about $7. For medium heavy duty vehicles the purchase price of a new engine is estimated to increase by $397, with life-cycle operating costs increasing $62. Similarly, for heavy heavy-duty engines, the initial purchase price is expected to increase by $467, while estimated additional life-cycle operating costs are $131.

For the long term, EPA has identified various factors that would cause cost impacts to decrease over time. First, the analysis incorporates the expectation that manufacturers will apply ongoing research to making emission controls more effective and less costly over time. This expectation is similar to manufacturers' stated goal of decreasing their reliance on catalysts to meet emission standards in the future. Research in the costs of manufacturing has consistently shown that as manufacturers gain experience in production, they are able to apply innovations to simplify machining and assembly operations, use lower cost materials, and reduce the number or

complexity of component parts.[30] The analysis incorporates the effects of this learning curve by projecting that the variable costs of producing the low-emitting engines decreases by 20 percent starting with the third year of production (2006 model year) and by reducing variable costs again by 20 percent starting with the sixth year of production. Finally, since fixed costs are assumed to be recovered over a five-year period, these costs are not included in the analysis after the first five model years. Table 2 lists the projected schedule of costs for each category of vehicle over time.

TABLE 2—PROJECTED DIESEL ENGINE COST AND PRICE INCREASES

[1995 dollars discounted to year of sale]

Vehicle class	Model year	Purchase price	Life-cycle operating cost
Light heavy-duty	2004	258	7
	2009 and later	109	7
Medium heavy-duty	2004	397	62
	2009 and later	136	62
Heavy heavy-duty	2004	467	131
	2009 and later	180	131

B. Aggregate Costs to Society

The above analysis develops per-vehicle cost estimates for each vehicle class. Using current data for the size and characteristics of the heavy-duty vehicle fleet and making projections for the future, these costs can be used to estimate the total cost to the nation for the new emission standards in any year. The result of this analysis is a projected total cost starting at $270 million in 2004. Per-vehicle costs savings over time reduce projected costs to a minimum value of $140 million in 2009, after which the growth in truck population leads to an increase in costs to $205 million in 2020. Total costs for these years are presented by vehicle class in Table 3. The calculated total costs represent a combined estimate of fixed costs as they are allocated over fleet sales, variable costs assessed at the point of sale, and operating costs as they are incurred in each calendar year.

TABLE 3—ESTIMATED ANNUAL COSTS FOR IMPROVED HEAVY-DUTY VEHICLES

[Millions of dollars]

Category	2004	2009	2020
Light heavy-duty	71	41	49
Medium heavy-duty	64	26	38
Heavy heavy-duty	107	56	93
Total	242	123	180

C. Cost-effectiveness

EPA has estimated the per-vehicle cost-effectiveness (i.e., the cost per ton of emission reduction) of the NO_X plus NMHC standard over the typical lifetime of heavy-duty diesel vehicles covered by today's rule. The RIA contains a more detailed discussion of the cost-effectiveness analyses. No significant comments were received on the cost-effectiveness analysis presented in the proposal and the methodology for estimating the cost-effectiveness remains the same as used in the proposal.

EPA has examined the cost-effectiveness by two different methodologies. The first methodology yields a nationwide cost-effectiveness in which the total cost of compliance is divided by the nationwide emission benefits. The second methodology yields a regional ozone strategy cost-effectiveness in which the total cost of compliance is divided by the emission benefits attributable to the regions that impact ozone levels in ozone nonattainment areas.[31]

In addition to the benefits of reducing ozone within and transported into urban ozone nonattainment areas, the NO_X reductions from the new engine standards are expected to have beneficial impacts with respect to crop damage, secondary particulate, acid deposition, eutrophication, visibility, and forests.[32] Due to the difficulty in accurately 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 the large NO_X reductions under this action will likely be greater than the estimated compliance costs.[33]

As described above in the cost section, the cost of complying with the standards will vary by model year. 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 standards are shown in Table 4 for the same model years discussed above in the cost section. The cost-effectiveness results contained in Table 4 present the range in cost-effectiveness resulting from the two cost-effectiveness scenarios described above.

[30] ''Learning Curves in Manufacturing,'' Linda Argote and Dennis Epple, Science, February 23, 1990, Vol. 247, pp. 920–924.

[31] The RIA contains a detailed description of areas included in the regional control strategy.

[32] For further discussion of these benefits, the reader is directed to Chapter 2 of the RIA.

[33] ''Benefits of Reducing Mobile Source NO_X Emissions,'' prepared by ICF Incorporated for Office of Mobile Sources, U.S. EPA, Draft Final, September 30, 1996.

TABLE 4—DISCOUNTED PER-VEHICLE COSTS, EMISSION REDUCTIONS AND COST-EFFECTIVENESS OF THE NO_X PLUS NMHC STANDARD

Vehicle class	Model year	Discounted lifecycle costs	Discounted lifetime reductions (tons)		Discounted cost-effectiveness ($/ton)
			NO_X	NMHC	
Light—Heavy-Duty Diesel Vehicles	2004	$265	0.242	0.003	$1,100–$1,200
	2009 and later	117			500
Medium—Heavy-Duty Diesel Vehicles	2004	459	1.002	0.014	500
	2009 and later	198			200
Heavy—Heavy-Duty Diesel Vehicles	2004	598	3.059	0.043	200
	2009 and later	311			100
All—Heavy-Duty Diesel Vehicles	2004	422	1.377	0.019	300
	2009 and later	202			100–200

VI. Administrative Requirements

A. Administrative Designation and Regulatory Analysis

Under Executive Order 12866 (58 FR 51735 (Oct. 4, 1993)), the Agency must determine whether this regulatory action is ''significant'' and therefore subject to OMB review and the requirements of the Executive Order. 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 rule is a ''significant regulatory action'' because the standards and other regulatory provisions have an annual effect on the economy in excess of $100 million. A Regulatory Impact Analysis has been prepared and is available in the docket associated with this rulemaking. This action was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12866. Any written comments from OMB and any EPA response to OMB comments are in the public docket for this rule.

B. Compliance With Regulatory Flexibility Act

The Regulatory Flexibility Act of 1980 requires federal agencies to identify potentially adverse impacts of federal regulations upon small entities. In instances where significant impacts are possible on a substantial number of these entities, agencies are required to perform a Regulatory Flexibility Analysis.

The Agency has determined that it is not necessary to prepare a regulatory flexibility analysis in connection with this final rule. The Agency has also determined that the new emission standards and related provisions will not have a significant impact on a substantial number of small entities, since none of the engine manufacturers affected by these regulations is a small business entity (see Chapter 3 of the Final Regulatory Impact Analysis for the rule).

This action also contains provisions clarifying what would and would not be considered a prohibited act (tampering) under CAA Section 203 during the heavy-duty engine rebuilding processes. Also, the rule contains basic recordkeeping requirements for rebuilders which are consistent with current customary rebuilding practices. Small businesses are integral to the heavy-duty engine rebuilding industry as noted in comments provided by the Automotive Engine Rebuilders Association.[34] However, EPA does not believe that the requirements related to engine rebuilding will have a significant impact on a substantial number of these small entities for the following reasons. EPA is defining how a broad existing requirement (CAA Section 203) applies specifically to the process of rebuilding/remanufacturing engines, but EPA is not creating a new program. These requirements are consistent with current customary practices in this industry. During the development of the proposal, EPA consulted with the Engine Manufacturers Association, the Automotive Engine Rebuilders Association, and the Production Engine Rebuilders Association, associations which together represent a substantial portion of the engine rebuilding and related businesses. These organizations did not raise concerns that the proposal may have a significant impact on small businesses. Furthermore, organizations representing small rebuilders submitted only supportive comments during the public comment period for the rulemaking. Finally, an EPA contractor conducted an industry characterization which further supports that engine rebuilding practices are consistent with the requirements and would not be changed as a result of the requirements[35].

[34] EPA Docket A–95–27, II-D–41.

C. Compliance With Paperwork Reduction Act

The Office of Management and Budget (OMB) has approved the information collection requirements contained in this rule under the provisions of the *Paperwork Reduction Act,* 44 U.S.C. 3501 *et seq.* and has assigned OMB control number 2060–0104.

EPA is finalizing requirements to collect certification results, durability, maintenance, and averaging, banking and trading information, and is formalizing recordkeeping procedures for engine rebuilding companies which are consistent with current industry practices. This information will be used to ensure compliance with and enforce the provisions in this rule. Section 208 (a) of the CAA requires that manufacturers provide information the Administrator may reasonably require to determine compliance with the regulations, therefore submission of the

[35] ''Industry Characterization: On-road Heavy-duty Diesel Engine Rebuilders'', ICF Incorporated, Contract number 68–C5–0010, Work assignment 102, January 3, 1997, Docket A–95–27.

information is mandatory. The confidentiality of any information submitted to EPA will be protected to the full extent provided in 40 CFR Part 2.

EPA estimates the average first year hours burden per response to be 4,670, the frequency of response to be annual, and the estimated number of likely respondents to be twenty. EPA estimates the aggregate first year hours burden to be 93,410. EPA estimates the annual first year cost to be $5,603,280, including the annualized capital and start-up costs. Subsequent year burdens are estimated to be one-tenth of the first year estimates due to the practice of engine family carry-over from model year-to-model year. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or 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; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a 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 listed in 40 CFR Part 9 and 48 CFR Chapter 15. EPA is amending the table in 40 CFR Part 9 of currently approved ICR control numbers issued by OMB for various regulations to list the information requirements contained in this final rule.

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 for 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.

Today's rule contains no Federal mandates (under the regulatory provisions of Title II of the UMRA) for State, local, or tribal governments. The rule imposes no enforceable duties on any of these governmental entities. Nothing in the program would significantly or uniquely affect small governments. EPA has determined that this rule contains federal mandates that may result in expenditures of $100 million or more in any one year for the private sector. EPA believes that the program represents the least costly, most cost-effective approach to achieving the air quality goals of the rule. EPA has performed the required analyses. The reader is directed to the Regulatory Impact Analysis for further information regarding these analyses.

E. Submission to Congress and the General Accounting Office

Under 5 U.S.C. 801(a)(1)(A) as added by the Small Business Regulatory Enforcement Reform Act of 1996, EPA submitted a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the General Accounting Office prior to publication of the rule in today's **Federal Register**. OMB has designated this a ''major rule'' as defined in 5 U.S.C. 804(2).

VII. Statutory Authority

Section 202(a)(3) authorizes EPA to establish emissions standards for new heavy-duty motor vehicle engines. See 42 U.S.C. 7521(a)(3). These standards are to reflect the greatest reduction achievable through the application of technology which the Administrator determines will be available, giving appropriate consideration to cost, energy, and safety factors associated with the application of such technology. This provision also establishes the lead time and stability requirements for these standards. Pursuant to Sections 202(a)(1) and 202(d), these emissions standards apply for the useful life period established by the Agency. See 42 U.S.C. 7521(a)(1), 7521(d). Other provisions of Title II of the Act, along with Section 301, are additional authority for the measures finalized in this action.

VIII. Judicial Review

Under section 307(b)(1) of the Act, EPA hereby finds that these regulations are of national applicability. Accordingly, judicial review of this action is available only by filing of a petition for review in the United States Court of Appeals for the District of Columbia Circuit within 60 days of publication in the **Federal Register**. Under section 307(b)(2) of the Act, the requirements which are the subject of today's Notice may not be challenged later in judicial proceedings brought by EPA to enforce these requirements. This rulemaking and any petitions for review are subject to the provisions of section 307(d) of the Clean Air Act.

IX. Copies of Rulemaking Documents

Copies of documents related to this rulemaking are available in the public docket for the rule and over the internet as described in the **ADDRESSES** section above.

List of Subjects

40 CFR Part 9

Environmental protection, Reporting and recordkeeping requirements.

40 CFR Part 86

Administrative practice and procedure, Confidential business information, Incorporation by reference, Labeling, Motor vehicle pollution, Reporting and recordkeeping requirements.

Dated: October 6, 1997.

Carol M. Browner,

Administrator.

APPENDIX TO THE PREAMBLE—TABLE OF CHANGES MADE TO PART 9 AND SUBPARTS A AND N OF PART 86

Section	Change	Reason
1. § 9.1	Revised to add OMB approval numbers.	New OMB approval numbers.
1. Authority	None.	
2. § 86.1	Revised to add document reference.	Updated ASTM methodology for significant digits.
3. § 86.098–3	Revised to include new abbreviations.	Add abbreviations for terms averaging, banking and trading and heavy-duty engines.
4. § 86.098–10	Revision of references	Revise references to averaging, banking, and trading programs.
5. § 86.098–11	Revision of references	Revise references to averaging, banking, and trading programs.
6. § 86.098–15	Add § 86.098–15	Incorporation of revisions to NO_X and particulate averaging, banking and trading programs.
7. § 86.098–23	Revise § 86.098–23	Incorporate changes due to new standards and ABT programs.
8. § 86.098–30	Revise § 86.098–30	Incorporate changes due to new ABT programs.
9. § 86.099–11	Revise § 86.099–11	Revise references to averaging, banking, and trading programs.
10. § 86.001–23	Revise § 86.001–23	Incorporate references to § 98.098–23.
11. § 86.001–30	Revise § 86.001–30	Incorporate references to § 98.098–30.
12. § 86.004–2	Add § 86.004–2	Incorporation of new useful life for heavy heavy-duty diesel engines.
13. § 86.004–11	Add § 86.004–11	Incorporation of new NO_X plus NMHC standards for diesel heavy-duty engines.
14. § 86.004–15	Add § 86.004–15	Incorporation of revisions to NO_X and particulate averaging, banking and trading program.
15. § 86.004–21	Add § 86.004–21	Incorporate changes due to new standards and ABT programs.
16. § 86.004–25	Add § 86.004–25	Incorporation of revisions to maintenance requirements.
17. § 86.004–28	Revise § 86.004–28	Incorporate changes in deterioration factors due to new standards and allow options to NMHC measurement for diesel engines.
18. § 86.004–30	Revise § 86.004–30	Incorporate changes due to new standards and ABT programs.
19. § 86.004–38	Add § 86.004–38	Incorporation of maintenance instruction requirements.
20. § 86.004–40	Add § 86.004–40	Incorporation of engine rebuild practices provisions.
21. § 86.1311–94	Revise Section 86.004–40(3)	Incorporate allowance for direct NMHC measurement using a GC for NGVs.
22. § 86.1344–94	Revise Section 86.1344–94(e)(22).	Incorporation of NMHC test data requirement.

For the reasons set out in the preamble, chapter I, title 40 is amended as follows:

Part 9 [Amended]

1. The authority citation for part 9 continues to read as follows:

Authority: 7 U.S.C. 135 *et seq.*, 136–136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601–2671; 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251 *et seq.*, 1311, 1313d, 1314, 1318, 1321, 1326, 1330, 1342, 1344, 1345 (d) and (e), 1361; E.O. 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–1, 300j–2, 300j–3, 300j–4, 300j–9, 1857 *et seq.*, 6901–6992k, 7401–7671q, 7542, 9601–9657, 11023, 11048.

2. Section 9.1 is amended by adding the new entries in numerical order under the indicated heading to the table to read as follows:

§ 9.1 OMB approvals under the Paperwork Reduction Act.

* * * * *

40 CFR citation	OMB control No.
* * * * * * *	
Control of Air Pollution From New and In-Use Motor Vehicles and New and In-Use Motor Vehicle Engines: Certification and Test Procedures	
86.004.38	2060–0104
86.004.40	2060–0104
* * * * *	

PART 86—CONTROL OF AIR POLLUTION FROM NEW AND IN-USE MOTOR VEHICLES AND NEW AND IN-USE MOTOR VEHICLE ENGINES: CERTIFICATION AND TEST PROCEDURES

1. The authority citation for part 86 continues to read as follows:

Authority: 42 U.S.C. 7401–7671q.

2. In § 86.1 the table in paragraph (b)(1) is amended by adding a new entry to the end of the table to read as follows:

§ 86.1 Reference materials.

* * * * *

(b) * * *

(1) * * *

Document No. and name	40 CFR part 86 reference
* * * * * * *	
ASTM E29–93a, Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications	86.098–15, 86.004–15

* * * * *

3. Section 86.098–3 is revised to read as follows:

§ 86.098–3 Abbreviations.

(a) The abbreviations in § 86.096–3 continue to apply. The abbreviations in this section apply beginning with the 1998 model year.

(b) The abbreviations of this section apply to this subpart, and also to subparts B, E, F, G, K, M, N, and P of this part, and have the following meanings:

T_D—Dispensed fuel temperature
ABT—Averaging, banking, and trading
HDE—Heavy-duty engine

4. Section 86.098–10 is amended by revising the first sentence in paragraphs (a)(1)(i)(C)(*2*), (a)(1)(i)(C)(*3*), (a)(1)(ii)(C)(*2*), (a)(1)(ii)(C)(*3*), (a)(1)(iii)(C)(*2*), (a)(1)(iv)(C)(*2*), (a)(1)(v)(C)(*2*), (a)(1)(vi)(C)(*2*) to read as follows:

§ 86.098–10 Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.

* * * * *

(a)(1) * * *

(i) * * *

(C) * * *

(*2*) A manufacturer may elect to include any or all of its gasoline-fueled Otto-cycle HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

(*3*) A manufacturer may elect to include any or all of its liquified petroleum gas-fueled Otto-cycle HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

(ii) * * *

(C) * * *

(*2*) A manufacturer may elect to include any or all of its gasoline-fueled Otto-cycle HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

(*3*) A manufacturer may elect to include any or all of its liquified petroleum gas-fueled Otto-cycle HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

(iii) * * *

(C) * * *

(*2*) A manufacturer may elect to include any or all of its methanol-fueled Otto-cycle HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

(iv) * * *

(C) * * *

(*2*) A manufacturer may elect to include any or all of its methanol-fueled Otto-cycle HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

(v) * * *

(C) * * *

(*2*) A manufacturer may elect to include any or all of its natural gas-fueled Otto-cycle HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

(vi) * * *

(C) * * *

(*2*) A manufacturer may elect to include any or all of its natural gas-fueled Otto-cycle HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

5. Section 86.098–11 is amended by revising the first sentence in paragraphs (a)(3)(ii) and (a)(4)(iii) introductory text to read as follows:

§ 86.098–11 Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.

(a) * * *

(3) * * *

(ii) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

(4) * * *

(iii) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the particulate ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

6. A new § 86.098–15 is added to subpart A to read as follows:

§ 86.098–15 NO_X and particulate averaging, trading, and banking for heavy-duty engines.

Section 86.098–15 includes text that specifies requirements that differ from § 86.094–15. Where a paragraph in § 86.094–15 is identical and applicable to § 86.098–15, this may be indicated by specifying the corresponding paragraph and the statement ''[Reserved]. For guidance see § 86.094–15.''

(a) through (b) [Reserved] For guidance see § 86.094–15.

(c)(1) For each participating engine family, NO_X and particulate emission credits (positive or negative) are to be calculated according to one of the following equations and rounded, in accordance with ASTM E29–93a, to the nearest one-tenth of a Megagram (MG). Consistent units are to be used throughout the equation.

(i) For determining credit need for all engine families and credit availability for engine families generating credits for averaging programs only:

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

(ii) For determining credit availability for engine families generating credits for trading or banking programs:

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

(iii) For purposes of the equations in paragraphs (c)(1)(i) and (ii) of this section:

Std = the current and applicable heavy-duty engine NO_X or particulate emission standard in grams per brake horsepower hour or grams per Megajoule.

FEL = the NO_X or particulate family emission limit for the engine family in grams per brake horsepower hour or grams per Megajoule.

CF = a transient cycle conversion factor in BHP-hr/mi or MJ/mi, as given in paragraph (c)(2) of this section.

UL = the useful life, or alternative life as described in paragraph (f) of § 86.094–21, for the given engine family in miles.

Production = the number of engines produced for U.S. sales within the given engine family during the model year. Quarterly production projections are used for initial certification. Actual production is used for end-of-year compliance determination.

Discount = a one-time discount applied to all credits to be banked or traded within the model year generated. The discount applied here is 0.8. Banked credits traded in a subsequent model year will not be subject to an additional discount. Banked credits used in a subsequent model year's averaging program will not have the discount restored.

(2)(i) The transient cycle conversion factor is the total (integrated) cycle brake horsepower-hour or Megajoules, divided by the equivalent mileage of the applicable transient cycle. For Otto-cycle heavy-duty engines, the equivalent mileage is 6.3 miles. For

diesel heavy-duty engines, the equivalent mileage is 6.5 miles.

(ii) When more than one configuration is chosen by EPA to be tested in the certification of an engine family (as described in § 86.085–24), the conversion factor used is to be based upon a production weighted average value of the configurations in an engine family to calculate the conversion factor.

(d) through (i) [Reserved] For guidance see § 86.094–15.

(j) *Optional program for early banking.* Provisions set forth in paragraphs (a) through (i) of this section apply except as specifically stated otherwise in paragraph (j) of this section.

(1) To be eligible for the optional program described in paragraph (j) of this section, the following must apply:

(i) Credits are generated from diesel cycle heavy-duty engines.

(ii) During certification, the manufacturer shall declare its intent to include specific engine families in the program described in this paragraph (j). Separate declarations are required for each program and no engine families may be included in both programs in the same model year.

(2) *Credit generation and use.* (i) Credits shall only be generated by 1998 and later model year engine families.

(ii) Credits may only be used for 2004 and later model year heavy-duty diesel engines. When used with 2004 and later model year engines, NO_X credits may be used to meet the NO_X plus NMHC standard, except as otherwise provided in § 86.004–11(a)(1)(i)(D).

(iii) If a manufacturer chooses to use credits generated under paragraph (j) of this section prior to model year 2004, the averaging, trading, and banking of such credits shall be governed by the program provided in paragraphs (a) through (i) of this section and shall be subject to all discounting, credit life limits and all other provisions contained therein. In the case where the manufacturer can demonstrate that the credits were discounted under the program provided in paragraph (j) of this section, that discount may be accounted for in the calculation of credits described in paragraph (c) of this section.

(3) *Program flexibilities.* (i) NO_X and PM credits that are banked until model year 2004 under this paragraph (j) may be used in 2004 or any model year thereafter without being forfeited due to credit age. This supersedes the requirement in paragraph (f)(2)(i) of this section.

(ii) There are no regional category restraints for averaging, trading, and banking of credits generated under the program described in paragraph (j) of this section. This supersedes the regional category provisions described in the opening text of paragraphs (d) and (e) of this section.

(iii) *Credit discounting.* (A) For NO_X and PM credits generated under this paragraph (j) from engine families with NO_X certification levels greater than 3.5 grams per brake horsepower-hour for oxides of nitrogen, a Discount value of 0.9 shall be used in place of 0.8 in the credit availability equation in paragraph (c)(1) of this section.

(B) For NO_X and PM credits generated under this paragraph (j) from engine families with NOx certification levels less than or equal to 3.5 grams per brake horsepower-hour for oxides of nitrogen, a Discount value of 1.0 shall be used in place of 0.8 in the credit availability equation in paragraph (c)(1) of this section.

(iv) *Credit apportionment.* At the manufacturers option, credits generated under the provisions described in this section may be sold to or otherwise provided to another party for use in programs other than the averaging, trading and banking program described in this section.

(A) The manufacturer shall pre-identify two emission levels per engine family for the purposes of credit apportionment. One emission level shall be the FEL and the other shall be the level of the standard that the engine family is required to certify to under § 86.098–11. For each engine family, the manufacturer may report engine sales in two categories, ''ABT-only credits'' and ''nonmanufacturer-owned credits''.

(*1*) For engine sales reported as ''ABT-only credits'', the credits generated must be used solely in the ABT program described in this section.

(*2*) The engine manufacturer may declare a portion of engine sales ''nonmanufacturer-owned credits'' and this portion of the credits generated between the standard and the FEL, based on the calculation in paragraph (c)(1) of this section, would belong to another party. For ABT, the manufacturer may not generate any credits for the engine sales reported as ''nonmanufacturer-owned credits''. Engines reported as ''nonmanufacturer-owned credits'' shall comply with the FEL and the requirements of the ABT program in all other respects.

(B) Only manufacturer-owned credits reported as ''ABT-only credits'' shall be used in the averaging, trading, and banking provisions described in this section.

(C) Credits shall not be double-counted. Credits used in the ABT program may not be provided to an engine purchaser for use in another program.

(D) Manufacturers shall determine and state the number of engines sold as ''ABT-only credits'' and ''nonmanufacturer-owned credits'' in the end-of-model year reports required under § 86.098–23.

7. Section 86.098–23 is amended by revising paragraphs (a), (b)(1), (b)(3), (b)(4)(i), (b)(4)(ii), (c) through (e)(2), (f) through (l), the first sentence of (m)(1), paragraphs (m)(2)(i) and (m)(2)(iv) to read as follows:

§ 86.098–23 Required data.

* * * * *

(a) The manufacturer shall perform the tests required by the applicable test procedures and submit to the Administrator the information described in paragraphs (b) through (m) of this section, provided, however, that if requested by the manufacturer, the Administrator may waive any requirement of this section for testing of a vehicle (or engine) for which emission data are available or will be made available under the provisions of § 86.091–29.

(b) *Durability data.* (1)(i) The manufacturer shall submit exhaust emission durability data on such light-duty vehicles tested in accordance with applicable test procedures and in such numbers as specified, which will show the performance of the systems installed on or incorporated in the vehicle for extended mileage, as well as a record of all pertinent maintenance performed on the test vehicles.

(ii) The manufacturer shall submit exhaust emission deterioration factors for light-duty trucks and HDEs and all test data that are derived from the testing described under § 86.094–21(b)(5)(i)(A), as well as a record of all pertinent maintenance. Such testing shall be designed and conducted in accordance with good engineering practice to assure that the engines covered by a certificate issued under § 86.098–30 will meet each emission standard (or family emission limit, as appropriate) in § 86.094–9, § 86.098–10, § 86.098–11 or superseding emissions standards sections as appropriate, in actual use for the useful life applicable to that standard.

* * * * *

(3) For heavy-duty vehicles equipped with gasoline-fueled or methanol-fueled engines, the manufacturer shall submit evaporative emission deterioration factors for each evaporative emission family-evaporative emission control system combination identified in accordance with § 86.094–21(b)(4)(ii).

Furthermore, a statement that the test procedure(s) used to derive the deterioration factors includes, but need not be limited to, a consideration of the ambient effects of ozone and temperature fluctuations, and the service accumulation effects of vibration, time, and vapor saturation and purge cycling. The deterioration factor test procedure shall be designed and conducted in accordance with good engineering practice to assure that the vehicles covered by a certificate issued under § 86.098–30 will meet the evaporative emission standards in §§ 86.096–10 and 86.098–11 or superseding emissions standards sections as applicable in actual use for the useful life of the engine. Furthermore, a statement that a description of the test procedure, as well as all data, analyses, and evaluations, is available to the Administrator upon request.

(4)(i) For heavy-duty vehicles with a Gross Vehicle Weight Rating of up to 26,000 lbs and equipped with gasoline-fueled or methanol-fueled engines, the manufacturer shall submit a written statement to the Administrator certifying that the manufacturer's vehicles meet the standards of § 86.098–10 or § 86.098–11 or superseding emissions standards sections as applicable as determined by the provisions of § 86.098–28. Furthermore, the manufacturer shall submit a written statement to the Administrator that all data, analyses, test procedures, evaluations, and other documents, on which the requested statement is based, are available to the Administrator upon request.

(ii) For heavy-duty vehicles with a Gross Vehicle Weight Rating of greater than 26,000 lbs and equipped with gasoline-fueled or methanol-fueled engines, the manufacturer shall submit a written statement to the Administrator certifying that the manufacturer's evaporative emission control systems are designed, using good engineering practice, to meet the standards of § 86.096–10 or § 86.098–11 or superseding emissions standards sections as applicable as determined by the provisions of § 86.098–28. Furthermore, the manufacturer shall submit a written statement to the Administrator that all data, analyses, test procedures, evaluations, and other documents, on which the requested statement is based, are available to the Administrator upon request.

* * * * *

(c)(1) [Reserved] For guidance see § 86.095–23.

(c)(2) Certification engines. (i) The manufacturer shall submit emission data on such engines tested in accordance with applicable emission test procedures of this subpart and in such numbers as specified. These data shall include zero-hour data, if generated, and emission data generated for certification as required under § 86.098–26(c)(4). These data shall also include, where there is a combined standard (e.g., NMHC + NO_x), emissions data for the individual pollutants as well as for the pollutants when combined. In lieu of providing emission data on idle CO emissions or particulate emissions from methanol-fueled diesel-cycle certification engines, or on CO emissions from petroleum-fueled or methanol-fueled diesel certification engines the Administrator may, on request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with the applicable emission standards of § 86.094–11 or superseding emissions standards sections as applicable. In lieu of providing emission data on smoke emissions from methanol-fueled or petroleum-fueled diesel certification engines, the Administrator may, on the request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with the applicable emissions standards of § 86.098–11 or superseding emissions standards sections as applicable, except for engines with a particulate matter certification level exceeding 0.25 grams per brake horsepower-hour. In lieu of providing emissions data on smoke emissions from petroleum-fueled or methanol-fueled diesel engines when conducting Selective Enforcement Audit testing under 40 CFR part 86, subpart K, the Administrator may, on separate request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with the applicable smoke emissions standards of § 86.098–11 or superseding emissions standards sections as applicable, except for engines with a particulate matter certification level exceeding 0.25 grams per brake horsepower-hour.

(ii) For heavy-duty diesel engines, a manufacturer may submit hot-start data only, in accordance with subpart N of this part, when making application for certification. However, for confirmatory, Selective Enforcement Audit, and recall testing by the Agency, both the cold-start and hot-start test data, as specified in subpart N of this part, will be included in the official results.

(d) The manufacturer shall submit a statement that the vehicles (or engines) for which certification is requested conform to the requirements in § 86.090–5(b), and that the descriptions of tests performed to ascertain compliance with the general standards in § 86.090–5(b), and that the data derived from such tests, are available to the Administrator upon request.

(e)(1) The manufacturer shall submit a statement that the test vehicles (or test engines) for which data are submitted to demonstrate compliance with the applicable standards (or family emission limits, as appropriate) of this subpart are in all material respects as described in the manufacturer's application for certification, that they have 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 vehicles (or engines) conform to the requirements of this part. If such statements cannot be made with respect to any vehicle (or engine) tested, the vehicle (or engine) shall be identified, and all pertinent data relating thereto shall be supplied to the Administrator. If, on the basis of the data supplied and any additional data as required by the Administrator, the Administrator determines that the test vehicles (or test engine) were not as described in the application for certification or were 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 vehicle (or engine) does not meet the applicable standards (or family emission limits, as appropriate). The provisions of § 86.098–30(b) shall then be followed.

(2) For evaporative and refueling emission durability, or light-duty truck or HDE exhaust emission durability, the manufacturer shall submit a statement of compliance with paragraph (b)(1)(ii),(b)(2), (b)(3) or (b)(4) of this section, as applicable.

* * * * *

(f) through (g) [Reserved] For guidance see § 86.095–23.

(h) Additionally, manufacturers participating in any of the emissions ABT programs under § 86.098–15 or superseding ABT sections for HDEs shall submit for each participating family the items listed in paragraphs (h)(1) through (3) of this section.

(1) *Application for certification.* (i) The application for certification will

include a statement that the engines for which certification is requested will not, to the best of the manufacturer's belief, when included in any of the ABT programs, cause the applicable emissions standard(s) to be exceeded.

(ii) The application for certification will also include identification of the section of this subpart under which the family is participating in ABT (i.e., § 86.098–15 or superseding ABT sections), the type (NOX, NO_X+NMHC, or particulate) and the projected number of credits generated/needed for this family, the applicable averaging set, the projected U.S. (49-state or 50 state, as applicable) production volumes, by quarter, NCPs in use on a similar family and the values required to calculate credits as given in the applicable ABT section. Manufacturers shall also submit how and where credit surpluses are to be dispersed and how and through what means credit deficits are to be met, as explained in the applicable ABT section. The application must project that each engine family will be in compliance with the applicable emission standards based on the engine mass emissions and credits from averaging, trading and banking.

(2) [Reserved]

(3) *End-of-year report.* The manufacturer shall submit end-of-year reports for each engine family participating in any of the ABT programs, as described in paragraphs (h)(3)(i) through (iv) of this section.

(i) These reports shall be submitted within 90 days of the end of the model year to: Director, Engine Programs and Compliance Division (6405J), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460.

(ii) These reports shall indicate the engine family, the averaging set, the actual U.S. (49-state or 50-state, as applicable) production volume, the values required to calculate credits as given in the applicable ABT section, the resulting type and number of credits generated/required, and the NCPs in use on a similar NCP family. Manufacturers shall also submit how and where credit surpluses were dispersed (or are to be banked) and how and through what means credit deficits were met. Copies of contracts related to credit trading must also be included or supplied by the broker if applicable. The report shall also include a calculation of credit balances to show that net mass emissions balances are within those allowed by the emission standards (equal to or greater than a zero credit balance). Any credit discount factor described in the applicable ABT section must be included as required.

(iii) The production counts for end-of-year reports shall be based on the location of the first point of retail sale (e.g., customer, dealer, secondary manufacturer) by the manufacturer.

(iv) Errors discovered by EPA or the manufacturer in the end-of-year report, including changes in the production counts, may be corrected up to 180 days subsequent to submission of the end-of-year report. Errors discovered by EPA after 180 days shall be corrected if credits are reduced. Errors in the manufacturer's favor will not be corrected if discovered after the 180 day correction period allowed.

(i) Failure by a manufacturer participating in the ABT programs to submit any quarterly or end-of-year report (as applicable) in the specified time for all vehicles and engines that are part of an averaging set is a violation of section 203(a)(1) of the Clean Air Act (42 U.S.C. 7522(a)(1)) for each such vehicle and engine.

(j) Failure by a manufacturer generating credits for deposit only in the HDE banking programs to submit their end-of-year reports in the applicable specified time period (i.e., 90 days after the end of the model year) shall result in the credits not being available for use until such reports are received and reviewed by EPA. Use of projected credits pending EPA review will not be permitted in these circumstances.

(k) Engine families certified using NCPs are not required to meet the requirements outlined in paragraphs (f) through (j) of this section.

(l) [Reserved]. For guidance see § 86.095–23.

(m) * * *

(1) In the application for certification the projected sales volume of evaporative families certifying to the respective evaporative test procedure and accompanying standards as set forth or otherwise referenced in §§ 86.090–8, 86.090–9, 86.091–10 and 86.094–11 or as set forth or otherwise referenced in §§ 86.096–8, 86.096–9, 86.096–10 and 86.098–11 or as set forth or otherwise referenced in superseding emissions standards sections. * * *

(2) * * *

(i) These end-of-year reports shall be submitted within 90 days of the end of the model year to: For heavy-duty engines—Director, Engine Programs and Compliance Divisions (6403J), For vehicles—Director, Vehicle Compliance and Programs Division (6405J), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460.

* * * * *

(iv) Failure by a manufacturer to submit the end-of-year report within the specified time may result in certificate(s) for the evaporative family(ies) being voided ab initio plus any applicable civil penalties for failure to submit the required information to the Agency.

* * * * *

8. Section 86.098–30 is amended by revising paragraphs (a)(4)(iv)(A) through (a)(12) to read as follows:

§ 86.098–30 Certification.

* * * * *

(a)(4)(iv)(A) through (a)(9) [Reserved]. For guidance see § 86.094–30.

(a)(10)(i) For diesel-cycle light-duty vehicle and diesel-cycle light-duty truck families which are included in a particulate averaging program, the manufacturer's production-weighted average of the particulate emission limits of all engine families in a participating class or classes shall not exceed the applicable diesel-cycle particulate standard, or the composite particulate standard defined in § 86.090–2 as appropriate, at the end of the model year, as determined in accordance with this part. The certificate shall be void ab initio for those vehicles causing the production-weighted FEL to exceed the particulate standard.

(ii) For all heavy-duty diesel-cycle engines which are included in the particulate ABT programs under §§ 86.094–15, 86.098–15, or superseding ABT sections, the provisions of paragraphs (a)(10)(ii) (A) through (C) of this section apply.

(A) All certificates issued are conditional upon the manufacturer complying with all applicable ABT provisions and the ABT related provisions of other applicable sections, both during and after the model year production.

(B) Failure to comply with all applicable ABT provisions will be considered to be a failure to satisfy the conditions upon which the certificate was issued, and the certificate may be deemed void ab initio.

(C) The manufacturer shall bear the burden of establishing to the satisfaction of the Administrator that the conditions upon which the certificate was issued were satisfied or excused.

(11)(i) For light-duty truck families which are included in a NO_X averaging program, the manufacturer's production-weighted average of the NO_X emission limits of all such engine families shall not exceed the applicable NO_X emission standard, or the composite NO_X emission standard defined in § 86.088–2, as appropriate, at the end of the model year, as determined in accordance with this

part. The certificate shall be void ab initio for those vehicles causing the production-weighted FEL to exceed the NO_X standard.

(ii) For all HDEs which are included in the NO_X or NO_X plus NMHC ABT programs under § 86.098–15 or superseding ABT sections, the provisions of paragraphs (a)(11)(ii) (A) through (C) of this section apply.

(A) All certificates issued are conditional upon the manufacturer complying with all applicable ABT provisions and the ABT related provisions of other applicable sections, both during and after the model year production.

(B) Failure to comply with all applicable ABT provisions will be considered to be a failure to satisfy the conditions upon which the certificate was issued, and the certificate may be deemed void ab initio.

(C) The manufacturer shall bear the burden of establishing to the satisfaction of the Administrator that the conditions upon which the certificate was issued were satisfied or excused.

(a)(12) [Reserved]. For guidance see § 86.094–30.

* * * * *

9. Section 86.099–11 is amended by revising the first sentence of paragraphs (a)(3)(ii) and (a)(4)(iii) introductory text to read as follows:

§ 86.099–11 Emission standards for 1999 and later model year diesel heavy-duty engines and vehicles.

(a) * * *

(3) * * *

(ii) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the NO_X or NO_X plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

(4)* * *

(iii) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the particulate ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. * * *

* * * * *

10. Section 86.001–23 is amended by revising paragraphs (a) through (b)(1), (b)(3), (b)(4), (c), (d), (e)(1), (e)(2), and (f) through (m) to read as follows:

§ 86.001–23 Required data.

* * * * *

(a) through (b)(1) [Reserved]. For guidance see § 86.098–23.

* * * * *

(b)(3) and (b)(4) [Reserved]. For guidance see § 86.098–23.

(c)(1) [Reserved]. For guidance see § 86.095–23.

(c)(2) through (e)(1) [Reserved]. For guidance see § 86.098–23.

(e)(2) For evaporative and refueling emissions durability, or light-duty truck or HDE exhaust emissions durability, a statement of compliance with paragraph (b)(2) of this section or § 86.098–23 (b)(1)(ii), (b)(3), or (b)(4) as applicable.

* * * * *

(f) and (g) [Reserved]. For guidance see § 86.095–23.

(h) through (m) [Reserved]. For guidance see § 86.098–23.

11. Section 86.001–30 is amended by revising paragraphs (a)(4)(iv)(A) through (a)(12) to read as follows:

§ 86.001–30 Certification.

* * * * *

(a) * * *

(4) * * *

(a)(4)(iv)(A) through (a)(9) [Reserved]. For guidance see § 86.094–30.

(a)(10) and (a)(11) [Reserved]. For guidance see § 86.098–30.

(a)(12) [Reserved]. For guidance see § 86.094–30.

* * * * *

12. A new § 86.004–2 is added to subpart A to read as follows:

§ 86.004–2 Definitions.

The definitions of § 86.001–2 continue to apply to 2001 and later model year vehicles. The definitions listed in this section apply beginning with the 2004 model year.

Useful life means:

(1) For light-duty vehicles, and for light light-duty trucks not subject to the Tier 0 standards of § 86.094–9(a), intermediate useful life and/or full useful life. Intermediate useful life is a period of use of 5 years or 50,000 miles, whichever occurs first. Full useful life is a period of use of 10 years or 100,000 miles, whichever occurs first, except as otherwise noted in § 86.094–9. The useful life of evaporative and/or refueling emission control systems on the portion of these vehicles subject to the evaporative emission test requirements of § 86.130–96, and/or the refueling emission test requirements of § 86.151–98, is defined as a period of use of 10 years or 100,000 miles, whichever occurs first.

(2) For light light-duty trucks subject to the Tier 0 standards of § 86.094–9(a), and for heavy light-duty truck engine families, intermediate and/or full useful life. Intermediate useful life is a period of use of 5 years or 50,000 miles, whichever occurs first. Full useful life is a period of use of 11 years or 120,000 miles, whichever occurs first. The useful life of evaporative emission and/or refueling control systems on the portion of these vehicles subject to the evaporative emission test requirements of § 86.130–96, and/or the refueling emission test requirements of § 86.151–98, is also defined as a period of 11 years or 120,000 miles, whichever occurs first.

(3) For an Otto-cycle HDE family:

(i) For hydrocarbon and carbon monoxide standards, a period of use of 10 years or 110,000 miles, whichever first occurs.

(ii) For the oxides of nitrogen standard, a period of use of 10 years or 110,000 miles, whichever first occurs.

(iii) For the portion of evaporative emission control systems subject to the evaporative emission test requirements of § 86.1230–96, a period of use of 10 years or 110,000 miles, whichever first occurs.

(4) For a diesel HDE family:

(i) For light heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbons emissions standards, a period of use of 10 years or 110,000 miles, whichever first occurs.

(ii) For medium heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbons emission standards, a period of use of 10 years or 185,000 miles, whichever first occurs.

(iii) For heavy heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbon emissions standards, a period of use of 10 years or 435,000 miles, or 22,000 hours, whichever first occurs, except as provided in paragraphs (4)(iv) and (4)(v) of this definition.

(iv) The useful life limit of 22,000 hours in paragraph (4)(iii) of this definition is effective as a limit to the useful life only when an accurate hours meter is provided by the manufacturer with the engine and only when such hours meter can reasonably be expected to operate properly over the useful life of the engine.

(v) For an individual engine, if the useful life hours limit of 22,000 hours is reached before the engine reaches 10 years or 100,000 miles, the useful life shall become 10 years or 100,000 miles, whichever occurs first, as required under Clean Air Act section 202(d).

(5) As an option for both light-duty trucks under certain conditions and HDE families, an alternative useful life period may be assigned by the Administrator under the provisions of § 86.094–21(f).

Warranty period, for purposes of HDE emissions defect warranty and emissions performance warranty, shall

be a period of 5 years/50,000 miles, whichever occurs first, for Otto-cycle HDEs and light heavy-duty diesel engines. For all other heavy-duty diesel engines the aforementioned period shall be 5 years/100,000 miles, whichever occurs first. However, in no case may this period be less than the basic mechanical warranty period that the manufacturer provides (with or without additional charge) to the purchaser of the engine. Extended warranties on select parts do not extend the emissions warranty requirements for the entire engine but only for those parts. In cases where responsibility for an extended warranty is shared between the owner and the manufacturer, the emissions warranty shall also be shared in the same manner as specified in the warranty agreement.

13. A new § 86.004–11 is added to subpart A to read as follows:

§ 86.004–11 Emission standards for 2004 and later model year diesel heavy-duty engines and vehicles.

(a)(1) Exhaust emissions from new 2004 and later model year diesel HDEs shall not exceed the following:

(i)(A) *Oxides of Nitrogen plus Non-methane Hydrocarbons (NO_X + NMHC) for engines fueled with either petroleum fuel, natural gas, or liquefied petroleum gas,* 2.4 grams per brake horsepower-hour (0.89 gram per megajoule), as measured under transient operating conditions.

(B) *Oxides of Nitrogen plus Non-methane Hydrocarbon Equivalent (NO_X + NMHCE) for engines fueled with methanol,* 2.4 grams per brake horsepower-hour (0.89 gram per megajoule), as measured under transient operating conditions.

(C) *Optional Standard.* Manufacturers may elect to certify to an Oxides of Nitrogen plus Non-methane Hydrocarbons (or equivalent for methanol-fueled engines) standard of 2.5 grams per brake horsepower-hour (0.93 gram per megajoule), as measured under transient operating conditions, provided that Non-methane Hydrocarbons (or equivalent for methanol-fueled engines) do not exceed 0.5 grams per brake horsepower-hour (0.19 gram per megajoule) NMHC (or NMHCE for methanol-fueled engines), as measured under transient operating conditions.

(D) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the emissions ABT programs for HDEs, within the restrictions described in § 86.004–15 or superseding applicable sections. If the manufacturer elects to include engine families in any of these programs, the NO_X plus NMHC (or NO_X plus NMHCE for methanol-fueled engines) FELs may not exceed 4.5 grams per brake horsepower-hour (1.7 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, banking, or trading programs. Additionally, families certified to the optional standard contained in paragraph (a)(1)(i)(C) of this section shall not exceed 0.50 grams per brake horsepower-hour (0.19 gram per megajoule) NMHC (or NMHCE for methanol-fueled engines) through the use of credits.

(E) No later than December 31, 1999, the Administrator shall review the emissions standards set forth in paragraph (a)(1)(i) of this section and determine whether these standards continue to be appropriate under the Act.

(ii) *Carbon monoxide.* (A) 15.5 grams per brake horsepower-hour (5.77 grams per megajoule), as measured under transient operating conditions.

(B) 0.50 percent of exhaust gas flow at curb idle (methanol-, natural gas-, and liquefied petroleum gas-fueled diesel HDEs only).

(iii) *Particulate.* (A) For diesel engines to be used in urban buses, 0.05 gram per brake horsepower-hour (0.019 gram per megajoule) for certification testing and selective enforcement audit testing, and 0.07 gram per brake horsepower-hour (0.026 gram per megajoule) for in-use testing, as measured under transient operating conditions.

(B) For all other diesel engines, 0.10 gram per brake horsepower-hour (0.037 gram per megajoule), as measured under transient operating conditions.

(C) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the particulate ABT programs for HDEs, within the restrictions described in § 86.004–15 or superseding applicable sections. If the manufacturer elects to include engine families in any of these programs, the particulate FEL may not exceed 0.25 gram per brake horsepower-hour (0.093 gram per megajoule).

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over the operating schedule set forth in paragraph (f)(2) of appendix I to this part, and measured and calculated in accordance with the procedures set forth in subpart N or P of this part, except as noted in § 86.098–23(c)(2) or superceding sections.

(b)(1) The opacity of smoke emission from new 2004 and later model year diesel HDEs shall not exceed:

(i) 20 percent during the engine acceleration mode.

(ii) 15 percent during the engine lugging mode.

(iii) 50 percent during the peaks in either mode.

(2) The standards set forth in paragraph (b)(1) of this section refer to exhaust smoke emissions generated under the conditions set forth in subpart I of this part and measured and calculated in accordance with those procedures.

(3) Evaporative emissions (total of non-oxygenated hydrocarbons plus methanol) from heavy-duty vehicles equipped with methanol-fueled diesel engines shall not exceed the following standards. The standards apply equally to certification and in-use vehicles. The spitback standard also applies to newly assembled vehicles.

(i) For vehicles with a Gross Vehicle Weight Rating of up to 14,000 lbs:

(A)(1) For the full three-diurnal test sequence described in § 86.1230–96, diurnal plus hot soak measurements: 3.0 grams per test.

(2) For the supplemental two-diurnal test sequence described in § 86.1230–96, diurnal plus hot soak measurements: 3.5 grams per test.

(B) Running loss test: 0.05 grams per mile.

(C) Fuel dispensing spitback test: 1.0 gram per test.

(ii) For vehicles with a Gross Vehicle Weight Rating of greater than 14,000 lbs:

(A)(1) For the full three-diurnal test sequence described in § 86.1230–96, diurnal plus hot soak measurements: 4.0 grams per test.

(2) For the supplemental two-diurnal test sequence described in § 86.1230–96, diurnal plus hot soak measurements: 4.5 grams per test.

(B) Running loss test: 0.05 grams per mile.

(iii)(A) For vehicles with a Gross Vehicle Weight Rating of up to 26,000 lbs, the standards set forth in paragraph (b)(3) of this section refer to a composite sample of evaporative emissions collected under the conditions and measured in accordance with the procedures set forth in subpart M of this part. For certification vehicles only, manufacturers may conduct testing to quantify a level of nonfuel background emissions for an individual test vehicle. Such a demonstration must include a description of the source(s) of emissions and an estimated decay rate. The demonstrated level of nonfuel background emissions may be subtracted from emission test results from certification vehicles if approved in advance by the Administrator.

(B) For vehicles with a Gross Vehicle Weight Rating of greater than 26,000 lbs., the standards set forth in paragraph

(b)(3)(ii) of this section refer to the manufacturer's engineering design evaluation using good engineering practice (a statement of which is required in § 86.091–23(b)(4)(ii)).

(iv) All fuel vapor generated during in-use operations shall be routed exclusively to the evaporative control system (e.g., either canister or engine purge). The only exception to this requirement shall be for emergencies.

(4) Evaporative emissions from 2004 and later model year heavy-duty vehicles equipped with natural gas-fueled or liquefied petroleum gas-fueled HDEs shall not exceed the following standards. The standards apply equally to certification and in-use vehicles.

(i) For vehicles with a Gross Vehicle Weight Rating of up to 14,000 pounds for the full three-diurnal test sequence described in § 86.1230–96, diurnal plus hot soak measurements: 3.0 grams per test.

(ii) For vehicles with a Gross Vehicle Weight Rating of greater than 14,000 pounds for the full three-diurnal test sequence described in § 86.1230–96, diurnal plus hot soak measurements: 4.0 grams per test.

(iii)(A) For vehicles with a Gross Vehicle Weight Rating of up to 26,000 pounds, the standards set forth in paragraph (b)(4) of this section refer to a composite sample of evaporative emissions collected under the conditions set forth in subpart M of this part and measured in accordance with those procedures.

(B) For vehicles with a Gross Vehicle Weight Rating greater than 26,000 pounds, the standards set forth in paragraphs (b)(3)(ii) and (b)(4)(ii) of this section refer to the manufacturer's engineering design evaluation using good engineering practice (a statement of which is required in § 86.091–23(b)(4)(ii)).

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any new 2004 or later model year methanol-, natural gas-, or liquefied petroleum gas-fueled diesel, or any naturally-aspirated diesel HDE. For petroleum-fueled engines only, this provision does not apply to engines using turbochargers, pumps, blowers, or superchargers for air induction.

(d) Every manufacturer of new motor vehicle engines subject to the standards prescribed in this section shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicle engines in accordance with applicable procedures in subpart I or N of this part to ascertain that such test engines meet the requirements of paragraphs (a), (b), (c), and (d) of this section.

14. A new § 86.004–15 is added to subpart A to read as follows:

§ 86.004–15 NO_X and particulate averaging, trading, and banking for heavy-duty engines.

(a)(1) Heavy-duty engines eligible for NO_X, NO_X plus NMHC, and particulate averaging, trading and banking programs are described in the applicable emission standards sections in this subpart. All heavy-duty engine families which include any engines labeled for use in clean-fuel vehicles as specified in 40 CFR part 88 are not eligible for these programs. Participation in these programs is voluntary.

(2)(i) Engine families with FELs exceeding the applicable standard shall obtain emission credits in a mass amount sufficient to address the shortfall. Credits may be obtained from averaging, trading, or banking, within the averaging set restrictions described in this section.

(ii) Engine families with FELs below the applicable standard will have emission credits available to average, trade, bank or a combination thereof. Credits may not be used for averaging or trading to offset emissions that exceed an FEL. Credits may not be used to remedy an in-use nonconformity determined by a Selective Enforcement Audit or by recall testing. However, credits may be used to allow subsequent production of engines for the family in question if the manufacturer elects to recertify to a higher FEL.

(iii) Credits scheduled to expire in the earliest model year shall be used, prior to using other available credits, to offset emissions of engine families with FELs exceeding the applicable standard.

(b) Participation in the NO_X, NO_X plus NMHC, and/or particulate averaging, trading, and banking programs shall be done as follows.

(1) During certification, the manufacturer shall:

(i) Declare its intent to include specific engine families in the averaging, trading and/or banking programs. Separate declarations are required for each program and for each pollutant (i.e., NO_X, NO_X plus NMHC, and particulate).

(ii) Declare an FEL for each engine family participating in one or more of these three programs.

(A) The FEL must be to the same level of significant digits as the emission standard (one-tenth of a gram per brake horsepower-hour for NO_X, NO_X plus NMHC, emissions and one-hundredth of a gram per brake horsepower-hour for particulate emissions).

(B) In no case may the FEL exceed the upper limit prescribed in the section concerning the applicable heavy-duty engine NO_X, NO_X plus NMHC, and particulate emission standards.

(iii) Calculate the projected emission credits (positive or negative) based on quarterly production projections for each participating family and for each pollutant, using the applicable equation in paragraph (c) of this section and the applicable factors for the specific engine family.

(iv)(A) Determine and state the source of the needed credits according to quarterly projected production for engine families requiring credits for certification.

(B) State where the quarterly projected credits will be applied for engine families generating credits.

(C) Credits may be obtained from or applied to only engine families within the same averaging set as described in paragraph (d) or (e) of this section. Credits available for averaging, trading, or banking as defined in § 86.090–2, may be applied exclusively to a given engine family, or reserved as defined in § 86.091–2.

(2) Based on this information each manufacturer's certification application must demonstrate:

(i) That at the end of model year production, each engine family has a net emissions credit balance of zero or more using the methodology in paragraph (c) of this section with any credits obtained from averaging, trading or banking.

(ii) The source of the credits to be used to comply with the emission standard if the FEL exceeds the standard, or where credits will be applied if the FEL is less than the emission standard. In cases where credits are being obtained, each engine family involved must state specifically the source (manufacturer/engine family) of the credits being used. In cases where credits are being generated/supplied, each engine family involved must state specifically the designated use (manufacturer/engine family or reserved) of the credits involved. All such reports shall include all credits involved in averaging, trading or banking.

(3) During the model year manufacturers must:

(i) Monitor projected versus actual production to be certain that compliance with the emission standards is achieved at the end of the model year.

(ii) Provide the end-of-model year reports required under § 86.001–23.

(iii) For manufacturers participating in emission credit trading, maintain the quarterly records required under § 86.091–7(c)(8).

(4) Projected credits based on information supplied in the certification

application may be used to obtain a certificate of conformity. However, any such credits may be revoked based on review of end-of-model year reports, follow-up audits, and any other compliance measures deemed appropriate by the Administrator.

(5) Compliance under averaging, banking, and trading will be determined at the end of the model year. Engine families without an adequate amount of NO_X, NO_X plus NMHC, and/or particulate emission credits will violate the conditions of the certificate of conformity. The certificates of conformity may be voided ab initio for engine families exceeding the emission standard.

(6) If EPA or the manufacturer determines that a reporting error occurred on an end-of-year report 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 balances may be adjusted by EPA for retroactive use.

(i) 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 for that engine family to zero, using the discount specified in paragraph (c)(1) of this section on the ratio of credits purchased for every credit needed to bring the balance to zero. If sufficient credits are not available to bring the credit balance for the family in question to zero, EPA may void the certificate for that engine family ab initio.

(ii) 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 (i.e., resulting in a positive credit balance) or if the manufacturer discovers such an error within 180 days of EPA receipt of the end-of-year report, the credits will be restored for use by the manufacturer.

(c)(1) For each participating engine family, NO_X, NO_X plus NMHC, and particulate emission credits (positive or negative) are to be calculated according to one of the following equations and rounded, in accordance with ASTM E29–93a, to the nearest one-tenth of a Megagram (Mg). Consistent units are to be used throughout the equation.

(i) For determining credit need for all engine families and credit availability for engine families generating credits for averaging programs only:

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

(ii) For determining credit availability for engine families generating credits for trading or banking programs:

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

(iii) For purposes of the equations in paragraphs (c)(1) (i) and (ii) of this section:

Std = the current and applicable heavy-duty engine NO_X, NO_X plus NMHC, or particulate emission standard in grams per brake horsepower hour or grams per Megajoule.

FEL = the NO_X, NO_X plus NMHC, or particulate family emission limit for the engine family in grams per brake horsepower hour or grams per Megajoule.

CF = a transient cycle conversion factor in BHP-hr/mi or MJ/mi, as given in paragraph (c)(2) of this section.

UL = the useful life described in § 86.004–2, or alternative life as described in paragraph (f) of § 86.004–21, for the given engine family in miles.

Production = the number of engines produced for U.S. sales within the given engine family during the model year. Quarterly production projections are used for initial certification. Actual production is used for end-of-year compliance determination.

Discount = a one-time discount applied to all credits to be banked or traded within the model year generated. Except as otherwise allowed in paragraph (k) of this section, the discount applied here is 0.9 for diesel-cycle engines. The discount applied here is 0.8 for all Otto-cycle engines. Banked credits traded in a subsequent model year will not be subject to an additional discount. Banked credits used in a subsequent model year's averaging program will not have the discount restored.

(2)(i) The transient cycle conversion factor is the total (integrated) cycle brake horsepower-hour or Megajoules, divided by the equivalent mileage of the applicable transient cycle. For Otto-cycle heavy-duty engines, the equivalent mileage is 6.3 miles. For diesel heavy-duty engines, the equivalent mileage is 6.5 miles.

(ii) When more than one configuration is chosen by EPA to be tested in the certification of an engine family (as described in § 86.085–24), the conversion factor used is to be based upon a production weighted average value of the configurations in an engine family to calculate the conversion factor.

(d) *Averaging sets for NO_X and for NO_X plus NMHC emission credits.* The averaging and trading of NO_X emission credits for Otto-cycle engines and NO_X plus NMHC emission credits for diesel-cycle engines will only be allowed between heavy-duty engine families in the same averaging set. The averaging sets for the averaging and trading of NO_X and NO_X plus NMHC emission credits for heavy-duty engines are defined as follows:

(1) For NO_X credits from Otto-cycle heavy-duty engines:

(i) Otto-cycle heavy-duty engines constitute an averaging set. Averaging and trading among all Otto-cycle heavy-duty engine families is allowed. There are no subclass restrictions.

(ii) Gasoline-fueled heavy-duty vehicles certified under the provisions of § 86.085–1(b) may not average or trade with gasoline-fueled heavy-duty Otto-cycle engines, but may average or trade credits with light-duty trucks.

(iii) The averaging and trading of NO_X emission credits will only be allowed between heavy-duty engine families in the same regional category. Otto-cycle engines produced for sale in California constitute a separate regional category than engines produced for sale in the other 49 states. Banking and trading are not applicable to engines sold in California.

(2) For NO_X plus NMHC credits from diesel-cycle heavy-duty engines:

(i) Each of the three primary intended service classes for heavy-duty diesel engines, as defined in § 86.004–2, constitute an averaging set. Averaging and trading among all diesel-cycle engine families within the same primary service class is allowed.

(ii) Urban buses are treated as members of the primary intended service class where they otherwise would fall.

(e) *Averaging sets for particulate emission credits.* The averaging and trading of particulate emission credits will only be allowed between diesel cycle heavy-duty engine families in the same averaging set. The averaging sets for the averaging and trading of particulate emission credits for diesel cycle heavy-duty engines are defined as follows:

(1) Engines intended for use in urban buses constitute a separate averaging set from all other heavy-duty engines. Averaging and trading between diesel cycle bus engine families is allowed.

(2) For heavy-duty engines, exclusive of urban bus engines, each of the three primary intended service classes for heavy-duty diesel cycle engines, as defined in § 86.004–2, constitute an averaging set. Averaging and trading between diesel-cycle engine families within the same primary service class is allowed.

(3) Otto cycle engines may not participate in particulate averaging, trading, or banking.

(f) *Banking of NO_X, NO_X plus NMHC, and particulate emission credits.* (1) *Credit deposits.* (i) NO_X, NO_X plus NMHC, and particulate emission credits may be banked from engine families produced in any model year.

(ii) Manufacturers may bank credits only after the end of the model year and after actual credits have been reported to EPA in the end-of-year report. During the model 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.

(2) *Credit withdrawals.* (i) After being generated, banked NO_X credits shall be available for use within three model years following the model year in which they were generated. NO_X credits from Otto-cycle HDE families not used within the period specified above shall be forfeited. NO_X plus NMHC and particulate credits from diesel-cycle HDE families do not expire.

(ii) Manufacturers withdrawing banked NO_X, NO_X plus NMHC, and/or particulate credits shall indicate so during certification and in their credit reports, as described in § 86.091–23.

(3) *Use of banked emission credits.* The use of banked credits shall be within the averaging set and other restrictions described in paragraphs (d) and (e) of this section, and only for the following purposes:

(i) Banked credits may be used in averaging, or in trading, or in any combination thereof, during the certification period. Credits declared for banking from the previous model year but not reported to EPA may also be used. However, if EPA finds that the reported credits can not be proven, they will be revoked and unavailable for use.

(ii) Banked credits may not be used for NO_X, NO_X plus NMHC, or particulate averaging and trading to offset emissions that exceed an FEL. Banked credits may not be used to remedy an in-use nonconformity determined by a Selective Enforcement Audit or by recall testing. However, banked credits may be used for subsequent production of the engine family if the manufacturer elects to recertify to a higher FEL.

(iii) Banked NO_X credits from 2003 and prior may be used in place of NO_X plus NMHC credits after 2003 provided that they are used in the correct averaging set and the NO_X credits have not expired.

(g)(1) For the purposes of paragraph (g) of this section, the following paragraphs assume NO_X, NO_X plus NMHC, and particulate nonconformance penalties (NCPs) will be available for the 2004 and later model year HDEs.

(2) Engine families using NO_X, NO_X plus NMHC, and/or particulate NCPs but not involved in averaging:

(i) May not generate NO_X, NO_X plus NMHC, or particulate credits for banking and trading.

(ii) May not use NO_X, NO_X plus NMHC, or particulate credits from banking and trading.

(3) If a manufacturer has any engine family to which application of NCPs and banking and trading credits is desired, that family must be separated into two distinct families. One family, whose FEL equals the standard, must use NCPs only while the other, whose FEL does not equal the standard, must use credits only.

(4) If a manufacturer has any engine family in a given averaging set which is using NO_X, NO_X plus NMHC, and/or particulate NCPs, none of that manufacturer's engine families in that averaging set may generate credits for banking and trading.

(h) In the event of a negative credit balance in a trading situation, both the buyer and the seller would be liable.

(i) Certification fuel used for credit generation must be of a type that is both available in use and expected to be used by the engine purchaser. Therefore, upon request by the Administrator, the engine manufacturer must provide information acceptable to the Administrator that the designated fuel is readily available commercially and would be used in customer service.

(j) *Credit apportionment.* At the manufacturers option, credits generated from diesel-cycle heavy-duty engines under the provisions described in this section may be sold to or otherwise provided to the another party for use in programs other than the averaging, trading and banking program described in this section.

(1) The manufacturer shall pre-identify two emission levels per engine family for the purposes of credit apportionment. One emission level shall be the FEL and the other shall be the level of the standard that the engine family is required to certify to under § 86.004–11. For each engine family, the manufacturer may report engine sales in two categories, ''ABT-only credits'' and ''nonmanufacturer-owned credits''.

(i) For engine sales reported as ''ABT-only credits'', the credits generated must be used solely in the ABT program described in this section.

(ii) The engine manufacturer may declare a portion of engine sales ''nonmanufacturer-owned credits'' and this portion of the credits generated between the standard and the FEL, based on the calculation in (c)(1) of this section, would belong to the engine purchaser. For ABT, the manufacturer may not generate any credits for the engine sales reported as ''nonmanufacturer-owned credits''. Engines reported as ''nonmanufacturer-owned credits'' shall comply with the FEL and the requirements of the ABT program in all other respects.

(2) Only manufacturer-owned credits reported as ''ABT-only credits'' shall be used in the averaging, trading, and banking provisions described in this section.

(3) Credits shall not be double-counted. Credits used in the ABT program may not be provided to an engine purchaser for use in another program.

(4) Manufacturers shall determine and state the number of engines sold as ''ABT-only credits'' and ''nonmanufacturer-owned credits'' in the end-of-model year reports required under § 86.001–23.

(k) *Additional Flexibility*. If a diesel-cycle engine family meets the conditions of either paragraph (k)(1) or (2) of this section, a Discount of 1.0 may be used in the trading and banking calculation, for both NO_X plus NMHC and for particulate, described in paragraph (c)(1) of this section.

(1) The engine family certifies with a certification level of 1.9 g/bhp-hr NO_X plus NMHC or lower for all diesel-cycle engine families.

(2) All of the following must apply to the engine family:

(i) Diesel-cycle engines only;

(ii) 2004, 2005, and 2006 model years only;

(iii) Must be an engine family using carry-over certification data from prior to model year 2004 where the NO_X plus the HC certification level prior to model year 2004 is below the NO_X plus NMHC or NO_X plus NMHCE standard set forth in § 86.004–11. Under this option, the NO_X credits generated from this engine family prior to model year 2004 may be used as NO_X plus NMHC credits.

15. A new § 86.004–21 is added to subpart A to read as follows:

§ 86.004–21 Application for certification.

Section 86.004–21 includes text that specifies requirements that differ from § 86.094–21 or § 86.096–21. Where a paragraph in § 86.094–21 or § 86.096–21 is identical and applicable to § 86.004–21, this may be indicated by specifying the corresponding paragraph and the statement ''[Reserved]. For guidance see § 86.094–21.'' or ''[Reserved]. For guidance see § 86.096–21.''.

(a) through (b)(3) [Reserved]. For guidance see § 86.094–21.

(b)(4)(i) For light-duty vehicles and light-duty trucks, a description of the test procedures to be used to establish the evaporative emission and/or refueling emission deterioration factors, as appropriate, required to be determined and supplied in § 86.001–23(b)(2).

(b)(4)(ii) through (b)(5)(iv) [Reserved]. For guidance see § 86.094–21.

(b)(5)(v) For light-duty vehicles and applicable light-duty trucks with non-integrated refueling emission control systems, the number of continuous UDDS cycles, determined from the fuel economy on the UDDS applicable to the test vehicle of that evaporative/refueling emission family-emission control system combination, required to use a volume of fuel equal to 85% of fuel tank volume.

(6) *Participation in averaging programs*—(i) *Particulate averaging.* (A) If the manufacturer elects to participate in the particulate averaging program for diesel light-duty vehicles and/or diesel light-duty trucks or the particulate averaging program for heavy-duty diesel engines, the application must list the family particulate emission limit and the projected U.S. production volume of the family for the model year.

(B) The manufacturer shall choose the level of the family particulate emission limits, accurate to hundredth of a gram per mile or hundredth of a gram per brake horsepowerhour for HDEs.

(C) The manufacturer may at any time during production elect to change the level of any family particulate emission limit(s) by submitting the new limit(s) to the Administrator and by demonstrating compliance with the limit(s) as described in §§ 86.090–2 and 86.094–28(b)(5)(i).

(ii) *NO_X and NO_X plus NMHC averaging.* (A) If the manufacturer elects to participate in the NO_X averaging program for light-duty trucks or otto-cycle HDEs or the NO_X plus NMHC averaging program for diesel-cycle HDEs, the application must list the family emission limit and the projected U.S. production volume of the family for the model year.

(B) The manufacturer shall choose the level of the family emission limits, accurate to one-tenth of a gram per mile or to one-tenth of a gram per brake horsepower-hour for HDEs.

(C) The manufacturer may at any time during production elect to change the level of any family emission limit(s) by submitting the new limits to the Administrator and by demonstrating compliance with the limit(s) as described in §§ 86.088–2 and 86.094–28(b)(5)(ii).

(b)(7) and (b)(8) [Reserved]. For guidance see § 86.094–21.

(b)(9) For each light-duty vehicle, light-duty truck, evaporative/refueling emission family or heavy-duty vehicle evaporative emission family, a description of any unique procedures required to perform evaporative and/or refueling emission tests, as applicable, (including canister working capacity, canister bed volume, and fuel temperature profile for the running loss test) for all vehicles in that evaporative and/or evaporative/refueling emission family, and a description of the method used to develop those unique procedures.

(10) For each light-duty vehicle or applicable light-duty truck evaporative/refueling emission family, or each heavy-duty vehicle evaporative emission family:

(i) Canister working capacity, according to the procedures specified in § 86.132–96(h)(1)(iv);

(ii) Canister bed volume; and

(iii) Fuel temperature profile for the running loss test, according to the procedures specified in § 86.129–94(d).

(c) through (j) [Reserved]. For guidance see § 86.094–21.

(k) and (l) [Reserved]. For guidance see § 86.096–21.

16. A new § 86.004–25 is added to subpart A to read as follows:

§ 86.004–25 Maintenance.

Section 86.004–25 includes text that specifies requirements that differ from § 86.094–25 or § 86.098–25. Where a paragraph in § 86.094–25 or § 86.098–25 is identical and applicable to § 86.004–25, this may be indicated by specifying the corresponding paragraph and the statement ''[Reserved]. For guidance see § 86.094–25.'' or ''[Reserved]. For guidance see § 86.098–25.''.

(a)(1) Applicability. This section applies to light-duty vehicles, light-duty trucks, and HDEs.

(2) Maintenance performed on vehicles, engines, subsystems, or components used to determine exhaust, evaporative or refueling emission deterioration factors, as appropriate, is classified as either emission-related or non-emission-related and each of these can be classified as either scheduled or unscheduled. Further, some emission-related maintenance is also classified as critical emission-related maintenance.

(b) Introductory text through (b)(3)(ii) [Reserved]. For guidance see § 86.094–25.

(b)(3)(iii) For otto-cycle heavy-duty engines, the adjustment, cleaning, repair, or replacement of the items listed in paragraphs (b)(3)(iii) (A) through (E) of this section shall occur at 50,000 miles (or 1,500 hours) of use and at 50,000-mile (or 1,500-hour) intervals thereafter.

(A) Positive crankcase ventilation valve.

(B) Emission-related hoses and tubes.

(C) Ignition wires.

(D) Idle mixture.

(E) Exhaust gas recirculation system related filters and coolers.

(iv) For otto-cycle light-duty vehicles, light-duty trucks and otto-cycle heavy-duty engines, the adjustment, cleaning, repair, or replacement of the oxygen sensor shall occur at 80,000 miles (or 2,400 hours) of use and at 80,000-mile (or 2,400-hour) intervals thereafter.

(v) For otto-cycle heavy-duty engines, the adjustment, cleaning, repair, or replacement of the items listed in paragraphs (b)(3)(v) (A) through (H) of this section shall occur at 100,000 miles (or 3,000 hours) of use and at 100,000-mile (or 3,000-hour) intervals thereafter.

(A) Catalytic converter.

(B) Air injection system components.

(C) Fuel injectors.

(D) Electronic engine control unit and its associated sensors (except oxygen sensor) and actuators.

(E) Evaporative emission canister.

(F) Turbochargers.

(G) Carburetors.

(H) Exhaust gas recirculation system (including all related control valves and tubing) except as otherwise provided in paragraph (b)(3)(iii)(E) of this section.

(b)(3)(vi)(A) through (b)(3)(vi)(D) [Reserved]. For guidance see § 86.094–25.

(b)(3)(vi)(E) through (b)(3)(vi)(J) [Reserved]. For guidance see § 86.098–25.

(4) For diesel-cycle light-duty vehicles, light-duty trucks, and HDEs, emission-related maintenance in addition to or at shorter intervals than that listed in paragraphs (b)(4) (i) through (iv) of this section will not be accepted as technologically necessary, except as provided in paragraph (b)(7) of this section.

(i) For diesel-cycle heavy-duty engines, the adjustment, cleaning, repair, or replacement of the items listed in paragraphs (b)(4)(i) (A) through (C) of this section shall occur at 50,000 miles (or 1,500 hours) of use and at 50,000-mile (or 1,500-hour) intervals thereafter.

(A) Exhaust gas recirculation system related filters and coolers.

(B) Positive crankcase ventilation valve.

(C) Fuel injector tips (cleaning only).

(ii) For diesel-cycle light-duty vehicles and light-duty trucks, the adjustment, cleaning, repair, or

replacement of the positive crankcase ventilation valve shall occur at 50,000 miles of use and at 50,000-mile intervals thereafter.

(iii) The adjustment, cleaning, repair, or replacement of items listed in paragraphs (b)(4)(iii) (A) through (G) of this section shall occur at 100,000 miles (or 3,000 hours) of use and at 100,000-mile (or 3,000-hour) intervals thereafter for light heavy-duty diesel engines, or, at 150,000 miles (or 4,500 hours) intervals thereafter for medium and heavy heavy-duty diesel engines.

(A) Fuel injectors.

(B) Turbocharger.

(C) Electronic engine control unit and its associated sensors and actuators.

(D) Particulate trap or trap-oxidizer system (including related components).

(E) Exhaust gas recirculation system (including all related control valves and tubing) except as otherwise provided in paragraph (b)(4)(i)(A) of this section.

(F) Catalytic converter.

(G) Any other add-on emissions-related component (i.e., a component whose sole or primary purpose is to reduce emissions or whose failure will significantly degrade emissions control and whose function is not integral to the design and performance of the engine.)

(iv) For disel-cycle light-duty vehicles and light-duty trucks, the adjustment, cleaning, repair, or replacement shall occur at 100,000 miles of use and at 100,000-mile intervals thereafter of the items listed in paragraphs (b)(4)(iv) (A) through (G) of this section.

(A) Fuel injectors.

(B) Turbocharger.

(C) Electronic engine control unit and its associated sensors and actuators.

(D) Particulate trap or trap-oxidizer system (including related components).

(E) Exhaust gas recirculation system including all related filters and control valves.

(F) Catalytic converter.

(G) Superchargers.

(5) [Reserved]

(6)(i) The components listed in paragraphs (b)(6)(i) (A) through (H) of this section are currently defined as critical emission-related components.

(A) Catalytic converter.

(B) Air injection system components.

(C) Electronic engine control unit and its associated sensors (including oxygen sensor if installed) and actuators.

(D) Exhaust gas recirculation system (including all related filters, coolers, control valves, and tubing).

(E) Positive crankcase ventilation valve.

(F) Evaporative and refueling emission control system components (excluding canister air filter).

(G) Particulate trap or trap-oxidizer system.

(H) Any other add-on emissions-related component (i.e., a component whose sole or primary purpose is to reduce emissions or whose failure will significantly degrade emissions control and whose function is not integral to the design and performance of the engine.)

(ii) All critical emission-related scheduled maintenance must have a reasonable likelihood of being performed in-use. The manufacturer shall be required to show the reasonable likelihood of such maintenance being performed in-use, and such showing shall be made prior to the performance of the maintenance on the durability data vehicle. Critical emission-related scheduled maintenance items which satisfy one of the conditions defined in paragraphs (b)(6)(ii) (A) through (F) of this section will be accepted as having a reasonable likelihood of the maintenance item being performed in-use.

(A) 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 driving.

(B) Survey data are submitted which adequately demonstrate to the Administrator that, at an 80 percent confidence level, 80 percent of such engines already have this critical maintenance item performed in-use at the recommended interval(s).

(C) A clearly displayed visible signal system approved by the Administrator is installed to alert the vehicle driver 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 mileage 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. For HDEs, the system must not be designed to deactivate upon the end of the useful life of the engine or thereafter.

(D) 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 (b)(6)(ii)(B) 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.

(E) The manufacturer provides the maintenance free of charge, and clearly informs the customer that the maintenance is free in the instructions provided under § 86.087–38.

(F) Any other method which the Administrator approves as establishing a reasonable likelihood that the critical maintenance will be performed in-use.

(iii) Visible signal systems used under paragraph (b)(6)(ii)(C) 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 under section 203(a)(3) of the Clean Air Act (42 U.S.C. 7522(a)(3)).

(b)(7) through (h) [Reserved]. For guidance see § 86.094–25.

17. Section 86.004–28 of Subpart A is amended by revising paragraphs (c) and (d) to read as follows:

§ 86.004–28 Compliance with emission standards.

* * * * *

(c)(1) Paragraph (c) of this section applies to heavy-duty engines.

(2) The applicable exhaust emission standards (or family emission limits, as appropriate) for Otto-cycle engines and for diesel-cycle engines apply to the emissions of engines for their useful life.

(3) Since emission control efficiency generally decreases with the accumulation of service on the engine, deterioration factors will be used in combination with emission data engine test results as the basis for determining compliance with the standards.

(4)(i) Paragraph (c)(4) of this section describes the procedure for determining compliance of an engine with emission standards (or family emission limits, as appropriate), based on deterioration factors supplied by the manufacturer. Deterioration factors shall be established using applicable emissions test procedures. NO_X plus NMHC deterioration factors shall be established based on the sum of the pollutants. When establishing deterioration factors for NO_X plus NMHC, a negative deterioration (emissions decrease from

the official exhaust emissions test result) for one pollutant may not offset deterioration of the other pollutant. Where negative deterioration occurs for NO_X and/or NMHC, the official exhaust emission test result shall be used for purposes of determining the NO_X plus NMHC deterioration factor.

(ii) Separate exhaust emission deterioration factors, determined from tests of engines, subsystems, or components conducted by the manufacturer, shall be supplied for each engine-system combination. For Otto-cycle engines, separate factors shall be established for transient NMHC (NMHCE), CO, NO_X, NO_X plus NMHC, and idle CO, for those engines utilizing aftertreatment technology (e.g., catalytic converters). For diesel-cycle engines, separate factors shall be established for transient NMHC (NMHCE), CO, NO_X, NO_X plus NMHC and exhaust particulate. For diesel-cycle smoke testing, separate factors shall also be established for the acceleration mode (designated as ''A''), the lugging mode (designated as ''B''), and peak opacity (designated as ''C'').

(iii)(A) Paragraphs (c)(4)(iii)(A) (*1*) and (*2*) of this section apply to Otto-cycle HDEs.

(*1*) Otto-cycle HDEs not utilizing aftertreatment technology (e.g., catalytic converters). For transient NMHC (NMHCE), CO, NO_X, the official exhaust emission results for each emission data engine at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(*2*) Otto-cycle HDEs utilizing aftertreatment technology (e.g., catalytic converters). For transient NMHC (NMHCE), CO, NO_X, and for idle CO, the official exhaust emission results for each emission data engine at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

(B) Paragraph (c)(4)(iii)(B) of this section applies to diesel-cycle HDEs.

(*1*) Diesel-cycle HDEs not utilizing aftertreatment technology (e.g., particulate traps). For transient NMHC (NMHCE), CO, NO_X, NO_X plus NMHC, and exhaust particulate, the official exhaust emission results for each emission data engine at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(*2*) Diesel-cycle HDEs utilizing aftertreatment technology (e.g., particulate traps). For transient NMHC (NMHCE), CO, NO_X, NO_X plus NMHC, and exhaust particulate, the official exhaust emission results for each emission data engine at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

(*3*) Diesel-cycle HDEs only. For acceleration smoke (''A''), lugging smoke (''B''), and peak smoke (''C''), the official exhaust emission results for each emission data engine at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(iv) The emission values to compare with the standards (or family emission limits, as appropriate) shall be the adjusted emission values of paragraph (c)(4)(iii) of this section, rounded to the same number of significant figures as contained in the applicable standard in accordance with ASTM E 29–93a (as referenced in § 86.094–28 (a)(4)(i)(B)(2)(ii)), for each emission data engine.

(*5*) and (*6*) [Reserved].

(*7*) Every test engine of an engine family must comply with all applicable standards (or family emission limits, as appropriate), as determined in paragraph (c)(4)(iv) of this section, before any engine in that family will be certified.

(*8*) For the purposes of setting an NMHC plus NO_x certification level or FEL for a diesel-fueled engine family, the manufacturer may use one of the following options for the determination of NMHC for an engine family. The manufacturer must declare which option is used in its application for certification of that engine family.

(i) THC may be used in lieu of NMHC for the standards set forth in § 86.004–11.

(ii) The manufacturer may choose its own method to analyze methane with prior approval of the Administrator.

(iii) The manufacturer may assume that two percent of the measured THC is methane (NMHC = 0.98 × THC).

(d)(1) Paragraph (d) of this section applies to heavy-duty vehicles equipped with gasoline-fueled or methanol-fueled engines.

(2) The applicable evaporative emission standards in this subpart apply to the emissions of vehicles for their useful life.

(3)(i) For vehicles with a GVWR of up to 26,000 pounds, because it is expected that emission control efficiency will change during the useful life of the vehicle, an evaporative emission deterioration factor shall be determined from the testing described in § 86.098–23(b)(3) for each evaporative emission family-evaporative emission control system combination to indicate the evaporative emission control system deterioration during the useful life of the vehicle (minimum 50,000 miles). The factor shall be established to a minimum of two places to the right of the decimal.

(ii) For vehicles with a GVWR of greater than 26,000 pounds, because it is expected that emission control efficiency will change during the useful life of the vehicle, each manufacturer's statement as required in § 86.098–23(b)(4)(ii) shall include, in accordance with good engineering practice, consideration of control system deterioration.

(4) The evaporative emission test results, if any, shall be adjusted by the addition of the appropriate deterioration factor, provided that if the deterioration factor as computed in paragraph (d)(3) of this section is less than zero, that deterioration factor shall be zero for the purposes of this paragraph.

(5) The emission level to compare with the standard shall be the adjusted emission level of paragraph (d)(4) of this section. Before any emission value is compared with the standard, it shall be rounded, in accordance with ASTM E 29–93a (as referenced in § 86.094–28 (a)(4)(i)(B)(2)(ii)), to two significant figures. The rounded emission values may not exceed the standard.

(6) Every test vehicle of an evaporative emission family must comply with the evaporative emission standard, as determined in paragraph (d)(5) of this section, before any vehicle in that family may be certified.

* * * * *

18. Section 86.004–30 is amended by revising paragraphs (a)(3), (a)(4)(i), (a)(4)(ii), and (a)(4)(iv)(A) through (a)(12) to read as follows:

§ 86.004–30 Certification.

* * * * *

(a)(3)(i) One such certificate will be issued for each engine family. For gasoline-fueled and methanol-fueled light-duty vehicles and light-duty trucks, and petroleum-fueled diesel cycle light-duty vehicles and light-duty trucks not certified under § 86.098–

28(g), one such certificate will be issued for each engine family-evaporative/refueling emission family combination. Each certificate will certify compliance with no more than one set of in-use and certification standards (or family emission limits, as appropriate).

(ii) For gasoline-fueled and methanol fueled heavy-duty vehicles, one such certificate will be issued for each manufacturer and will certify compliance for those vehicles previously identified in that manufacturer's statement(s) of compliance as required in § 86.098–23(b)(4) (i) and (ii).

(iii) For diesel light-duty vehicles and light-duty trucks, or diesel HDEs, included in the applicable particulate averaging program, the manufacturer may at any time during production elect to change the level of any family particulate emission limit by demonstrating compliance with the new limit as described in § 86.094–28(a)(6), § 86.094–28(b)(5)(i), or § 86.004–28(c)(5)(i). New certificates issued under this paragraph will be applicable only for vehicles (or engines) produced subsequent to the date of issuance.

(iv) For light-duty trucks or HDEs included in the applicable NO_X averaging program, the manufacturer may at any time during production elect to change the level of any family NO_X emission limit by demonstrating compliance with the new limit as described in § 86.094–28(b)(5)(ii) or § 86.004–28(c)(5)(ii). New certificates issued under this paragraph will be applicable only for vehicles (or engines) produced subsequent to the day of issue.

(4)(i) For exempt light-duty vehicles and light-duty trucks under the provisions of § 86.094–8(j) or § 86.094–9(j), an adjustment or modification performed in accordance with instructions provided by the manufacturer for the altitude where the vehicle is principally used will not be considered a violation of section 203(a)(3) of the Clean Air Act (42 U.S.C. 7522(a)(3)).

(ii) A violation of section 203(a)(1) of the Clean Air Act (42 U.S.C. 7522(a)(1)) occurs when a manufacturer sells or delivers to an ultimate purchaser any light-duty vehicle or light-duty truck, subject to the regulations under the Act, under any of the conditions specified in paragraph (a)(4)(ii) of this section.

(A) When a light-duty vehicle or light-duty truck is exempted from meeting high-altitude requirements as provided in § 86.090–8(h) or § 86.094–9(h):

(*1*) At a designated high-altitude location, unless such manufacturer has reason to believe that such vehicle will not be sold to an ultimate purchaser for principal use at a designated high-altitude location; or

(*2*) At a location other than a designated high-altitude location, when such manufacturer has reason to believe that such motor vehicle will be sold to an ultimate purchaser for principal use at a designated high-altitude location.

(B) When a light-duty vehicle or light-duty truck is exempted from meeting low-altitude requirements as provided in § 86.094–8(i) or § 86.094–9(i):

(*1*) At a designated low-altitude location, unless such manufacturer has reason to believe that such vehicle will not be sold to an ultimate purchaser for principal use at a designated low-altitude location; or

(*2*) At a location other than a designated low-altitude location, when such manufacturer has reason to believe that such motor vehicle will be sold to an ultimate purchaser for principal use at a designated low-altitude location.

(a)(4)(iv)(A) through (a)(9) [Reserved]. For guidance see § 86.094–30.

(10)(i) For diesel-cycle light-duty vehicle and diesel-cycle light-duty truck families which are included in a particulate averaging program, the manufacturer's production-weighted average of the particulate emission limits of all engine families in a participating class or classes shall not exceed the applicable diesel-cycle particulate standard, or the composite particulate standard defined in § 86.090–2 as appropriate, at the end of the model year, as determined in accordance with this part. The certificate shall be void ab initio for those vehicles causing the production-weighted FEL to exceed the particulate standard.

(ii) For all heavy-duty diesel-cycle engines which are included in the particulate ABT programs under § 86.098–15 or superseding ABT sections as applicable, the provisions of paragraphs (a)(10)(ii) (A) through (C) of this section apply.

(A) All certificates issued are conditional upon the manufacturer complying with the provisions of § 86.098–15 or superseding ABT sections as applicable and the ABT related provisions of other applicable sections, both during and after the model year production.

(B) Failure to comply with all provisions of § 86.098–15 or superseding ABT sections as applicable will be considered to be a failure to satisfy the conditions upon which the certificate was issued, and the certificate may be deemed void ab initio.

(C) The manufacturer shall bear the burden of establishing to the satisfaction of the Administrator that the conditions upon which the certificate was issued were satisfied or excused.

(11)(i) For light-duty truck families which are included in a NO_X averaging program, the manufacturer's production-weighted average of the NO_X emission limits of all such engine families shall not exceed the applicable NO_X emission standard, or the composite NO_X emission standard defined in § 86.088–2, as appropriate, at the end of the model year, as determined in accordance with this part. The certificate shall be void ab initio for those vehicles causing the production-weighted FEL to exceed the NO_X standard.

(ii) For all HDEs which are included in the NO_X plus NMHC ABT programs contained in § 86.098–15, or superseding ABT sections as applicable, the provisions of paragraphs (a)(11)(ii) (A) through (C) of this section apply.

(A) All certificates issued are conditional upon the manufacturer complying with the provisions of § 86.098–15 or superseding ABT sections as applicable and the ABT related provisions of other applicable sections, both during and after the model year production.

(B) Failure to comply with all provisions of § 86.098–15 or superseding ABT sections as applicable will be considered to be a failure to satisfy the conditions upon which the certificate was issued, and the certificate may be deemed void ab initio.

(C) The manufacturer shall bear the burden of establishing to the satisfaction of the Administrator that the conditions upon which the certificate was issued were satisfied or excused.

(a)(12) [Reserved]. For guidance see § 86.094–30.

* * * * *

19. A new § 86.004–38 is added to subpart A to read as follows:

§ 86.004–38 Maintenance instructions.

Section 86.004–38 includes text that specifies requirements that differ from § 86.094–38. Where a paragraph in § 86.094–38 is identical and applicable to § 86.004–38 this may be indicated by specifying the corresponding paragraph and the statement ''[Reserved]. For guidance see § 86.094–38.''.

(a) The manufacturer shall furnish or cause to be furnished to the purchaser of each new motor vehicle (or motor vehicle engine) subject to the standards prescribed in § 86.099–8, § 86.004–9, § 86.004–10, or § 86.004–11, as applicable, written instructions for the proper maintenance and use of the vehicle (or engine), by the purchaser consistent with the provisions of

§ 86.004–25, which establishes what scheduled maintenance the Administrator approves as being reasonable and necessary.

(1) The maintenance instructions required by this section shall be in clear, and to the extent practicable, nontechnical language.

(2) The maintenance instructions required by this section shall contain a general description of the documentation which the manufacturer will require from the ultimate purchaser or any subsequent purchaser as evidence of compliance with the instructions.

(b) Instructions provided to purchasers under paragraph (a) of this section shall specify the performance of all scheduled maintenance performed by the manufacturer on certification durability vehicles and, in cases where the manufacturer performs less maintenance on certification durability vehicles than the allowed limit, may specify the performance of any scheduled maintenance allowed under § 86.004–25.

(c) Scheduled emission-related maintenance in addition to that performed under § 86.004–25(b) may only be recommended to offset the effects of abnormal in-use operating conditions, except as provided in paragraph (d) of this section. The manufacturer shall be required to demonstrate, subject to the approval of the Administrator, that such maintenance is reasonable and technologically necessary to assure the proper functioning of the emission control system. Such additional recommended maintenance shall be clearly differentiated, in a form approved by the Administrator, from that approved under § 86.004–25(b).

(d) Inspections of emission-related parts or systems with instructions to replace, repair, clean, or adjust the parts or systems if necessary, are not considered to be items of scheduled maintenance which insure the proper functioning of the emission control system. Such inspections, and any recommended maintenance beyond that approved by the Administrator as reasonable and necessary under paragraphs (a), (b), and (c) of this section, may be included in the written instructions furnished to vehicle owners under paragraph (a) of this section: Provided, That such instructions clearly state, in a form approved by the Administrator, that the owner need not perform such inspections or recommended maintenance in order to maintain the emissions defect and emissions performance warranty or manufacturer recall liability.

(e) The manufacturer may choose to include in such instructions an explanation of any distinction between the useful life specified on the label, and the emissions defect and emissions performance warranty period. The explanation must clearly state that the useful life period specified on the label represents the average period of use up to retirement or rebuild for the engine family represented by the engine used in the vehicle. An explanation of how the actual useful lives of engines used in various applications are expected to differ from the average useful life may be included. The explanation(s) shall be in clear, non-technical language that is understandable to the ultimate purchaser.

(f) If approved by the Administrator, the instructions provided to purchasers under paragraph (a) of this section shall indicate what adjustments or modifications, if any, are necessary to allow the vehicle to meet applicable emission standards at elevations above 4,000 feet, or at elevations of 4,000 feet or less.

(g) [Reserved]. For guidance see § 86.094–38.

(h) The manufacturer shall furnish or cause to be furnished to the purchaser of each new motor engine subject to the standards prescribed in § 86.004–10 or § 86.004–11, as applicable, the following:

(1) Instructions for all maintenance needed after the end of the useful life of the engine for critical emissions-related components as provided in § 86.004–25(b), including recommended practices for diagnosis, cleaning, adjustment, repair, and replacement of the component (or a statement that such component is maintenance free for the life of the engine) and instructions for accessing and responding to any emissions-related diagnostic codes that may be stored in on-board monitoring systems;

(2) A copy of the engine rebuild provisions contained in § 86.004–40.

20. A new § 86.004–40 is added to subpart A to read as follows:

§ 86.004–40 Heavy-duty engine rebuilding practices.

The provisions of this section are applicable to engines subject to the standards prescribed in § 86.004–10 or § 86.004–11 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 also may include the removal of the engine from the vehicle and other acts associated with rebuilding an engine. Any deviation from the provisions contained in this section is a prohibited act under section 203(a)(3) of the Clean Air Act (42 U.S.C. 7522(a)(3)).

(a) 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 emissions 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.

(b) When an engine is being rebuilt and remains installed or is reinstalled in the same vehicle, 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.

(c) At time of rebuild, emissions-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 § 86.004–25 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.

(d) When conducting a rebuild without removing the engine from the vehicle, or during the installation of a rebuilt engine, all critical emissions-related components listed in § 86.004–25(b) not otherwise addressed by paragraphs (a) through (c) of this section must be checked and cleaned, adjusted, repaired, or replaced as necessary, following manufacturer recommended practices.

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

21. Section 86.1311–94 is amended by revising paragraph (b)(3) to read as follows:

§ 86.1311–94 Exhaust gas analytical system; CVS bag sample.

* * * * *

(b) * * *

(3)(i) Using a methane analyzer consisting of a gas chromatograph combined with a FID, the measurement of methane shall be done in accordance with SAE Recommended Practice J1151, ''Methane Measurement Using Gas Chromatography.'' (Incorporated by reference pursuant to § 86.1(b)(2).)

(ii) For natural gas vehicles, the manufacturer has the option of using gas chromatography to measure NMHC through direct quantitation of individual hydrocarbon species. The manufacturer shall conform to standard industry practices and use good engineering judgement.

* * * * *

22. Section 86.1344–94 is amended by revising paragraph (e)(22) to read as follows:

§ 86.1344–94 Required information.

* * * * *

(e) * * *

(22) Brake specific emissions (g/BHP–hr) for HC, CO, NO_X, and, if applicable NMHC, NMHCE, THCE, CH_3OH, and HCHO for each test phase (cold and hot).

* * * * *

[FR Doc. 97–27494 Filed 10–20–97; 8:45 am]

BILLING CODE 6560–50–P