Final Report

of the

Small Business Advocacy Review Panel

on EPA's Planned Proposed Rule

Control of Emission of Air Pollution From Land-Based Nonroad Compression Ignition Engines

December 23, 2002

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1. INTRODUCTION

This report is presented to the Small Business Advocacy Review Panel (SBAR Panel or Panel) convened for the proposed rulemaking on the Control of Emissions of Air Pollution From Land-Based Nonroad Compression Ignition Engines, currently being developed by the U.S. Environmental Protection Agency (EPA). Under Section 609(b) of the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), a Panel is required to be convened prior to publication of the initial regulatory flexibility analysis (IRFA) should an agency be required to prepare that document under the RFA. In addition to EPA's Small Business Advocacy Chair, the Panel consists of the Deputy Office Director of EPA's Office of Transportation and Air Quality (OTAQ), the Administrator of the Office of Information and Regulatory Affairs within the Office of Management and Budget, and the Chief Counsel for Advocacy of the Small Business Administration.

This report includes the following:

- background information on the proposed rule under development;
- information on the types of small entities that would be subject to the proposed rule;
- a summary of the Panel's outreach activities; and
- the comments and recommendations of the Small Entity Representatives (SERs).

Section 609(b) of the RFA directs the Panel to report on the comments of small entity representatives and make findings on issues related to identified elements of the IRFA under section 603 of the RFA. Those elements of an IRFA are:

- a description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply;
- projected reporting, record keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirements and the type of professional skills necessary for preparation of the report or record;
- an identification to the extent practicable, of all other relevant Federal rules which may duplicate, overlap, or conflict with the proposed rule;
- any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities; and
- any impacts on small entities of the proposed rule or significant alternatives to the proposed rule.

The purpose of the Panel is to gather information to identify potential impacts on small businesses and to develop options to mitigate these concerns. Once completed, the Panel report is provided to the Agency and included in the rulemaking record. In light of the Panel report, and where appropriate, the Agency is to make changes to the draft proposed rule, to the IRFA for the proposed rule, or to the decision on whether an IRFA is required.

It is important to note that the Panel's findings and discussion will be based on the information available at the time the final Panel report is drafted. EPA will continue to conduct analyses relevant to the proposed rule, and may develop or obtain additional information during the remainder of the rule development process. The Panel makes its report at a preliminary stage of rule development and its report should be considered in that light. At the same time, the report provides the Panel and the Agency with an opportunity to identify and explore potential ways of shaping the proposed rule to minimize the burden of the rule on small entities while achieving the rule's purposes.

Any options identified by the Panel for reducing the rule's regulatory impact on small entities may require further analysis and/or data collection to ensure that the options are practicable, enforceable, environmentally sound, and, of course, consistent with the Clean Air Act.

2. BACKGROUND AND REGULATORY HISTORY

2.1 Regulatory History

Controlling emissions from nonroad engines and equipment, in conjunction with diesel fuel quality controls, has important public health and welfare benefits. With the advent of more stringent controls on highway vehicles and their fuels, emissions from nonroad sources will contribute significantly more harmful pollution than on-highway sources. The following sections describe in more detail the effects and regulatory history of nonroad diesel engines, equipment, and fuels.

2.1.1 Nonroad Diesel Engines and Equipment

Diesel engines used in nonroad equipment are significant sources of emissions of particulate matter (PM), nitrogen oxides (NOx), and other pollutants throughout the country. The term "nonroad diesel" as used in this document means the diesel-powered nonroad engines subject to emissions standards in 40 CFR Part 89. This includes large and small land-based diesel engines as well as small marine diesel engines. Nonroad diesel fuel means diesel fuel intended for or used by these engines. This is generally #2 diesel fuel.

Almost all of the PM emitted by these engines is in the form of fine PM (the usual metric being PM 2.5, meaning PM measuring 2.5 microns or less). Inhalation of fine particles is associated with adverse health effects, including increased hospital admissions and premature mortality for individuals with cardiopulmonary and respiratory system problems. Inhalation of fine particles is associated with serious adverse health effects to the general public including premature death and illness severe enough to require hospital admission. Exposure at lower concentrations can result in the same serious health effects in "sensitive" populations including children, the elderly, and people with cardiovascular and respiratory disease (61 FR 65641 at 44 (December 13, 1996)). NOx emissions are a key precursor to the formation of ground-level ozone, which is also associated with adverse respiratory health effects. NOx and SOx emissions are also precursors for nitrate and sulfate PM formation in the atmosphere and thus contribute to overall ambient PM levels. Many areas of the country continue to have PM and ozone levels that exceed the health-based national ambient air quality standards. In addition, nonroad diesel emissions have other toxic effects on human health. Diesel exhaust is likely to be carcinogenic to humans by inhalation at levels of environmental exposures. Moreover, nonroad diesel emissions also include the known carcinogens formaldehyde and benzene.

Emissions controls on nonroad engines will contribute significantly to protecting public health and the environment. The first set of EPA emission controls for nonroad diesels were adopted in 1996. These were based on the emission control technologies that manufacturers had already applied to highway engines. EPA adopted the next set of standards, known as Tier 2 and Tier 3 controls, in 1998. These controls are now being phased in as is shown in Figure 1. EPA believes that the emission control technologies that manufacturers will use to meet the 2007 heavy-duty highway emission standards can be successfully transferred to many nonroad diesel applications provided that low sulfur diesel fuel is available for these applications. EPA discussed Tier 2 and Tier 3 emission control technologies it believes are feasible for nonroad engine applications in a document titled "Nonroad Diesel Emissions Standards Staff Technical Paper" (October 30, 2001).

By contrast, representatives from the non-road diesel engine and equipment manufacturing industry have questioned whether emission control technologies developed for highway vehicles can successfully and cost-effectively be transferred to nonroad engines, especially smaller engines. All participating nonroad diesel engine and equipment manufacturers believe that EPA did not demonstrate the feasibility of transferring highway emission control technologies to nonroad engines and equipment in its "Nonroad Diesel Emissions Standards Staff Technical Report." These manufacturers noted specific problems with the transfer of aftertreatment technologies to nonroad engines and equipment, including: the necessity of turbocharging currently naturally-aspirated engines; the typical bulkiness of aftertreatment devices in relatively small equipment platforms; the probability of vibration damage from aftertreatment controls, and the need for increased maintenance of those controls; and, increased costs which would lead to the elimination of the equipment from the market.

Indeed, a detailed evaluation completed in 2002 of two key emission control technologies at the heart of the Tier 3 highway diesel rule – diesel PM filters and NOx adsorbers – concluded that further technical challenges will have to be addressed before these technologies can be relied upon in the highway context; particularly in the case of NOx adsorbers. The EPA's Clean Air Act Advisory Committee issued a Final Report, entitled, "Meeting Technology Challenges for the 2007 Heavy-Duty Highway Diesel Rule," in which there was agreement that it is likely these challenges can be overcome. The report noted that remaining technical challenges include adsorbers' temperature range requirement, adsorber durability, and the fact that the adsorber must be desulfated periodically. Challenges confronting the highway use of Catalyzed Diesel Particulate Filters (CDPFs) include designing filters capable of active regeneration, that can minimize ash loading, and that can avoid pressure drops.

Similarly, a 2002 study conducted by EUROMOT and the Engine Manufacturers Association on both American and European Union regulation, entitled "Investigations into the Feasibility of PM Filters for Nonroad Mobile Machinery," concludes that the primary challenges in applying diesel PM filters to nonroad diesel engine use relate to filter regeneration and the integration of aftertreatment systems to engine controls. The report observes that active, automatic diesel PM filters are "not currently available at a sufficient level of developmental maturity and commercial viability" for use in nonroad diesel engines. The report further states that the PM filter systems being developed for highway truck applications "are not directly transferable to [nonroad diesel engines] due to the narrower range of operation of such vehicles, providing . . . more conducive conditions for PM Filter regeneration." *Id* at 5. Likewise, a report prepared by VTT Processes entitled "Feasibility Study on a Third Stage of Emission Limits for Compression Ignition Engines with a Power Output Between 18 and 560 kW" notes that "[NOx adsorber catalyst] possess a promising technology for the future NOx standards, but more detailed studies are needed to address the long-term operation of the NOx adsorber catalyst." *Id* at 70.

The Panel expects that pursuant to sections 213(a)(3) and (a)(4), EPA will fully consider issues of technical feasibility in developing standards for new nonroad diesel engines.

2.1.2 Nonroad Diesel Fuel

In recent years, the recognition of the close relationship between effective advanced emission control devices on engines and the sulfur content of the fuel the engines use has led to a "systems" approach to emission control, meaning essentially that successful emissions control requires control not only of emissions but of sulfur levels in diesel fuel. This approach was recently used in EPA's Tier 2 light-duty automotive control program and in the new highway heavy-duty diesel emission control requirements. In the case of highway heavy-duty engines, reductions in highway diesel fuel sulfur (starting in June of 2006) will occur in tandem with new stringent emission standards for engines (starting in model year 2007). Sulfur levels in highway

diesel fuel are currently limited to a maximum of 500 parts per million (ppm), and the new standard will require refiners to limit sulfur levels to 15 parts per million (ppm).

EPA does not currently regulate nonroad diesel fuel sulfur levels, and sulfur levels of this fuel often exceed 3000 ppm. To enable the same types of emission control technology to be applied to nonroad diesel engines as will be used on highway diesel engines, low-sulfur nonroad diesel fuel (i.e., 15 ppm) would be needed. Reducing sulfur in nonroad diesel fuel will also reduce primary and secondary PM emissions from the current fleet of nonroad diesel engines (i.e. even engines without aftertreatment), although the emissions reductions will obviously not be as extensive as from engines equipped with aftertreatment.

2.2 Description of Rule and its Scope

2.2.1 Statutory Basis

Section 213(a)(3) of the Clean Air Act requires EPA to regulate NOx emissions from nonroad engines and vehicles upon an EPA determination that nonroad engines contribute to emissions in a nonattainment area. In part, section 213(a)(3) authorizes EPA to promulgate standards for designated pollutants (including NOx) that require the greatest degree of emission reduction achievable from application of technology to nonroad engines (or vehicles) while giving "appropriate consideration to the cost of applying such technology within the period of time available to manufacturers and to noise, energy, and safety factors associated with the application of such technology." Section 213(a)(4) applies to all pollutants not specifically identified in section 213(a)(3), and authorizes EPA to promulgate "appropriate" standards for such pollutants, taking into account "costs, noise, safety, and energy factors associated with the application of technology which the Administrator determines will be available" for those engines (or vehicles). Controls on PM implement this provision.

Section 211(c)(1) authorizes EPA to regulate fuels if any emission product of the fuel causes or contributes to air pollution that may endanger public health or welfare, or that may impair the performance of emission control technology on engines and vehicles. EPA believes that the opportunity for cost effective emission reductions on a large scale appears to exist. Therefore, EPA has begun developing a proposed rule that would set new, more stringent standards for nonroad engines and lower nonroad diesel fuel sulfur levels.

2.2.2 General Rule Description

EPA is developing a proposed rule that would, like the earlier highway heavy-duty diesel rule, take a systems approach – setting new stringent standards for nonroad diesel engines and very low sulfur standards for the fuel used in these engines. Consistent with sections 213 (a)(3) and (4), and 211 (c) of the Act, and appropriate consideration of costs and other factors, EPA

believes it needs to promulgate a program that achieves the cleanest technologically feasible emission levels for appropriate classes, and on the earliest possible time line(s). Similarly, EPA expects to propose that refiners provide very low sulfur fuel for these engines as early as possible to enable these control technologies. EPA also recognizes that it may not be appropriate to apply the same stringency of emission standards or the same time line across all of the power range categories of nonroad diesel engines, taking into account environmental need, cost, feasibility, and other considerations as required by statute. Clearly, manufacturers of nonroad engines face different technological and cost challenges for different engines based on engine configuration, horsepower, current level of emission control technology, etc. Thus, as discussed below, EPA is considering proposing to require aftertreatment based standards that would become effective at different times and, for some engines, perhaps to require only engine based emission controls. EPA also discusses below alternatives to reducing sulfur levels in all nonroad diesel fuel to 15 ppm at the same time.

As with current nonroad diesel regulations, under the proposed program manufacturers of nonroad equipment using diesel engines would be required to install engines complying with applicable emission standards. Thus, equipment manufacturers would have to consider what changes in their equipment design would be necessary to account for differences in the physical and operating characteristics of the new engines, when they would be able to receive this information from the engine manufacturers, and when they could receive production prototypes from the engine manufacturers. As described below, different approaches to the implementation of the engine standards could have different effects on the difficulty of compliance for small equipment manufacturers.

Businesses that distribute and market nonroad diesel fuel encompass a wide range of operations such as bulk terminals, bulk plants, fuel oil dealers, and diesel fuel trucking operations, and EPA believes that most of them would meet SBA's small entity criteria. As with all fuel quality programs, a nonroad diesel fuel program would establish requirements related to compliance and ensuring fuel quality as the fuel is carried throughout the distribution system.

EPA does not plan to propose new emission standards for the engines used in locomotives and in marine applications in this rule, although such standards could be appropriate in the future. EPA is considering, however, possible changes to the sulfur content level in diesel fuel for locomotive and marine engines.

2.3 Related Federal Rules

The primary federal rules that are related to the proposed Nonroad Diesel rule under consideration are the current Nonroad Diesel rule (*Federal Register Vol. 63, p. 56968, Oct. 23, 1998*), the earlier fuel sulfur rules for gasoline (*Federal Register Vol. 65, p. 6698, Feb. 10, 2000*) and diesel fuel (*Federal Register Vol. 66, p. 5002, Jan. 18, 2001*), the highway diesel rule

discussed above, and the Nonroad Diesel Certification Fees proposal (*Federal Register Vol. 67, p. 51402, Aug. 7, 2002*). While it does not overlap, duplicate, or conflict, the certification fees proposal, published in August 2002, will revise the rule assigning fees to be paid by entities required to certify engines for certification activities and apply this requirement for the first time to the nonroad sector.

2.4 Related European Regulations

2.4.1 Current European Union Non-Road Diesel Regulation

EU Directive 97/68/EC sets limits for diesel engines used in nonroad mobile machinery (NRMM) and 2000/25/EC sets limits for diesel engines used in agricultural and forestry tractors. 97/68/EC has been recently amended (Directive 2001/63/EC) to establish limits for spark-ignited engines and diesel engines used in constant-speed applications. The limit values for diesel engines are aligned in all three Directives but implementation dates differ, primarily because of when the directive was developed. The Directives establish limit values for NOx, HC, CO, and PM for engines between 18 and 560 kW. The EU believes that engines below 18 kW and above 560 kW do not contribute sufficiently to emissions in the EU to be included in their regulations. The EU directives currently set Stage I and Stage II standards covering years 1999 through 2004 and specifies that a more stringent proposal should be examined in the future. One of the EU directive's objectives is to harmonize the EU with global regulations.

The limits for emissions included in the EU's Stage I are shown in the following table. Implementation dates were 1999 for NRMM and 2001 for agricultural and forestry tractors. EPA's Tier 1 regulations for these power categories were the same for NOx, and EPA did not have Tier 1 PM standards for engines between 19 and 37 kW.

EU Stage I:

Engine Power Class (kW)	**NOx (g/kWh)**	**PM (g/kWh)**
130-560	9.2	0.54
75-130	9.2	0.70
37-75	9.2	0.85

EU's "Stage II" regulations are shown in the following table, with implementation in 2001-2004 for NRMM and 2002-2004 for agricultural tractors. Stage II takes effect in 2007 for constant-speed engines. EPA's Tier 2 regulations were similar in level, with slightly different

power categories and a one-year difference in implementation dates for some of those power categories.

	1/00	1/01	1/02	1/03	1/04
Engine Size Class	**NOx/PM (g/kWh)**	**NOx/PM (g/kWh)**	**NOx/PM (g/kWh)**	**NOx/PM (g/kWh)**	**NOx/PM (g/kWh)**
>560	Not Covered				
130-560			6 NOx/ 0.2 PM		
75-130				6 NOx/ 0.3 PM	
37-75					7 NOx /0.4 PM
18-37		8 NOx/ 0.8 PM			
<19	Not Covered				

In summary, EU Stages I and II are similar to the EPA Tiers I and II regulations for engines between 19 and 560 kW.

2.4.2 EU Staff Proposal to Further Amend 97/68

The EU Commission is completing work on a proposal to amend 97/68/EC and is expected to release the proposal to the Parliament and Council early in 2003. It is reported that 2000/25/EC will be similarly amended. The proposal is expected to include Stage IIIA standards aligned with EPA Tier 3 for engines between 37 and 560 kW, and the same implementation dates as well (2006-2008). Stage IIIA will include limit values for 19-37 kW, that differ in both levels and dates from those in the EPA regulations. The proposed standards and implementation dates are shown in the following two tables:

Engine Power Class (kW)	**NOx (g/kWh)**	**PM (g/kWh) (Unchanged)**
A: 130-560	4.0	0.2
B: 75-130	4.0	0.3

C: 37-75	4.7	0.4
D: 19-37	7.5	0.6

Engine Power Class (P)	**Entry into force dates**
A: 130-560 kW	31 December 2005
B: 75-130 kW	31 December 2006
C: 37-75 kW	31 December 2007
D: 19-37 kW	31 December 2006

The EU plans for a second step (Stage IIIB) are less clear. It is expected to require the addition of PM aftertreatment, at least for some engines. Plans to require additional NOx reduction are less clear. The EU plans to address these issues further in a 2006 Technical Review, and improved alignment with the EPA may result from that review. Consistent with earlier Stages, Stage IIIB will not require emissions reductions from engines below 19 kW and above 560 kW but this will be addressed in the 2006 technology review. The staff stated that its own emissions inventory would not justify such regulation. EPA's emissions reductions timetable (Figure 1) can be used as a point of reference for comparison with the above information.

The second round of emissions reductions over the current program would be contained within "Stage IIIB", which would be most akin to the EPA's draft Tier IV. The staff indicates that at this point, they are only considering PM aftertreatment, to further reduce PM emissions using PM filters. However, these restrictions will, at least at this stage, apply only to engines with greater than 37 kW. This appears to be based upon the assumption that applications above 37 kW would be able to use on-road emissions reduction technology. The limits are illustrated below:

Engine Power Class (kW)	**NOx (g/kWh) (Unchanged)**	**PM (g/kWh)**
E: 130-560	4.0	0.025
F: 75-130	4.0	0.025
G: 37-75	4.7	0.025

Table: Stage III B- Limit values

These emissions reductions would take effect along the following timetable:

Category: Net Power (P)	**Entry into force dates**
E: 130-560 kW	31 December 2010
F: 75-130 kW	31 December 2010
G: 37-75 kW	31 December 2011

Table: Stage III B- Entry into force dates (placing on the market dates)

Currently, EPA is considering PM filters for all classes of engines, including the classes the EU has exempted to date. However, the EU staff does agree with the U.S. that PM filters may be available for NR applications for engines between 19 and 560 kW.

The staff has so far declined to consider NOx aftertreatment requirements in Stage IIIB for any engines, but will revisit with a technology review. The staff has indicated that it is difficult to see the global alignment as long as the technical solutions on the two sides of the Atlantic differ. It seems now as if the European manufacturers of on-road engines will go for Selective Catalytic Reduction (SCR) while the use of NOx adsorbers for the moment being is favored by EPA.

Further, the EU staff is awaiting a EU Euro V technical review (on-highway) on NOx emissions reduction for Europe, expected out by the end of 2002. This review will likely determine the feasibility of NOx aftertreatment technology for EU use. Also, the report serves as the basis for any determination by EU staff upon further NOx emissions reductions. For these reasons, the staff stated it would be inappropriate to regulate without a determination of feasibility, or even a determination that the ultimate goal of NOx emission reduction should be attempted. This is, in effect, allowing highway regulations to lead nonroad diesel.

The EU staff is planning a technology review in 2006 to verify the availability and cost-effectiveness of the PM filters, and it is considering addressing the issue of further NOx reduction by the use of after-treatment equipment. If, as a result of this review, EU reconsiders the availability or cost-effectiveness of these approaches, the EU may on the one hand provide certain exemptions and/or postponements of the applicable dates for the particulate emission limits and on the other hand include future more stringent NOx limit values.

The EU staff, based on its contractor studies, also indicated that its own estimates of costs per engine were higher than EPA's estimates.

Finally, in describing Stage IIIA/B, the staff has outlined flexibilities which could assist small manufacturers in compliance. Previously, the EU staff considered allowing engine manufacturers four years of transition during which they would be allowed to manufacture up to 20% of a one year production or a maximum number of units within an engine class complying with the previous EU regime, rather than the new, more stringent standards. The duration of the EU Flexibility period is no longer limited to four years, it will last as long as the period between two stages of limit values. This point is now reflected in Annex VIII of the EU Commission draft proposal for amending 97/68/EC Emission Directive.

3. OVERVIEW OF PROPOSAL UNDER CONSIDERATION

3.1 Potential Requirements and Guidelines of the Proposal

As discussed below, EPA is considering several alternative approaches for fuel and engine standards. For each of these alternatives for fuel and engine standards, EPA sought input on what compliance flexibilities would be appropriate for small fuel, engine, and equipment entities, if a specific alternative were to be adopted. EPA also sought input on what impact each of these alternative approaches would have on small entities, such as cost, equipment design, lead time needed, and other relevant impacts on small entities. This information helped EPA in evaluating these alternatives, and will help EPA in developing the most appropriate compliance provisions for the approach that ends up being adopted.

3.1.1 Nonroad Diesel Engines

EPA believes that, in the future, emissions from nonroad diesel engines may represent approximately 50 percent of mobile source PM and NOx emissions. This category represents a significant contribution to ambient air quality problems in many areas in the United States. Controlling emissions from this sector would lead to substantial improvements in local air quality, especially of PM and the pollutants to which NOx is a precursor, and would contribute to attainment of the national ambient air quality standards related to these pollutants in many areas. Since diesel exhaust is a likely human lung carcinogen, control of emissions would provide additional benefits even in areas attaining the national ambient air quality standards and in occupational settings.

The technologies envisioned for the next step in the regulation of nonroad diesel engines depend on the level of NOx/PM control required. By 2010, all engines will need to incorporate the Tier 2/Tier 3 technology mix (e.g. electronic fuel systems for dynamic fuel control, some electronic engine controls, and more sophisticated engine aspiration control). Tier 4 will likely require engine manufacturers to incorporate aftertreatment controls such as PM traps and NOx adsorbers and active control methods (such as regeneration systems) to ensure robust emissions

control by optimizing the performance of PM and NOx aftertreatment technology. It is also worth noting here that the further PM control envisioned in the Tier 3/4 PM standards is based on a new transient test cycle already agreed to by EPA and by the industry. The aftertreatment technology requires diesel fuel sulfur control to levels of no greater than 15 ppm.

The approach recently adopted for highway diesel engine emissions control is based on the performance of aftertreatment technologies that achieve 90%+ reductions in PM and NOx emissions from that category beginning in 2007 with enabling ultra low sulfur diesel fuel available in 2006. As a base case, EPA is considering moving forward with similar standards on the same time line for nonroad diesel engines and fuels. These standards would entail PM aftertreatment in 2009 and NOx aftertreatment in 2011.

If EPA were to apply the same standards with slightly different timing, the PM and NOx standards would be staged in as shown in Approach 1 of Figure 2. This is dependent upon the availability of ultra low sulfur nonroad diesel fuel in 2008.

EPA is also contemplating a variant on Approach 1, called Approach 1a, which implements the fuel program in 2008, segments the market by horsepower as has been used in the previous nonroad rules, and applies standards and control differently in some segments. First, aftertreatment control would be staged-in based on a number of factors including a recognition of the similarities between heavy-duty highway diesel engines and some of the nonroad engine models. EPA believes that for 70 hp (50 kW) and above nonroad diesel engines, highway engine technology could be readily transferred to these engine sizes and ratings. The engines in this range are more “highway like” in design than engines below this power level. EPA also believes that the same control technology can probably be adapted to engines below 70 hp, although the transfer may not be as straightforward as with greater than 70 hp engines. EPA further believes that the advancements of the technology and demonstrated effectiveness of many heavy-duty diesel strategies in the light-duty diesel highway regime, make the transfer of the technology to smaller power categories of nonroad applications in the foreseeable future feasible. This is subject to remaining engineering uncertainties and cost considerations.

As part of this approach, EPA also is considering an option of basing NOx/PM standards for lower horsepower limits on levels that could be achieved without aftertreatment. EPA’s initial technical judgment is that, approximately 25 hp (19 kW) appears to be a power level below which engine control technology costs as a percentage of equipment cost could effectively prohibit the use of aftertreatment technology. Thus, EPA is considering delaying or not requiring aftertreatment control for certain horsepower categories of the smaller engines pending further study of the feasibility and utilization of these controls for such engines. However, EPA believes that further control of NOx and PM emissions from these smaller engines – engines up to approximately 70 hp --without aftertreatment is feasible. EPA believes that combustion chamber improvements, exhaust gas recirculation, charge air cooling, and charge control through

turbocharging and fuel system improvements, which are envisioned for the larger engines for Tier 3, could each be applied to smaller engines in total or in some combination to reach lower engine out emissions limits. Improvements in fuel injection allow for independent control of fuel quantity, rate, pressure, and timing such that NOx and PM could both be reduced.

EPA is also contemplating Approaches 2 and 2a as summarized in Figure 3. These vary from Approaches 1 and 1a primarily in timing due to the nature of the diesel fuel program. In approaches 2 and 2a, diesel fuel sulfur drops to 500 ppm in mid 2007 and 15 ppm in mid 2010. Thus, since the aftertreatment technology depends on low sulfur diesel fuel, the T4 PM standards would be delayed two years in approaches 2 and 2a. The Tier 3 PM standards would be accelerated by one year to help offset the PM control lost due to the delay.

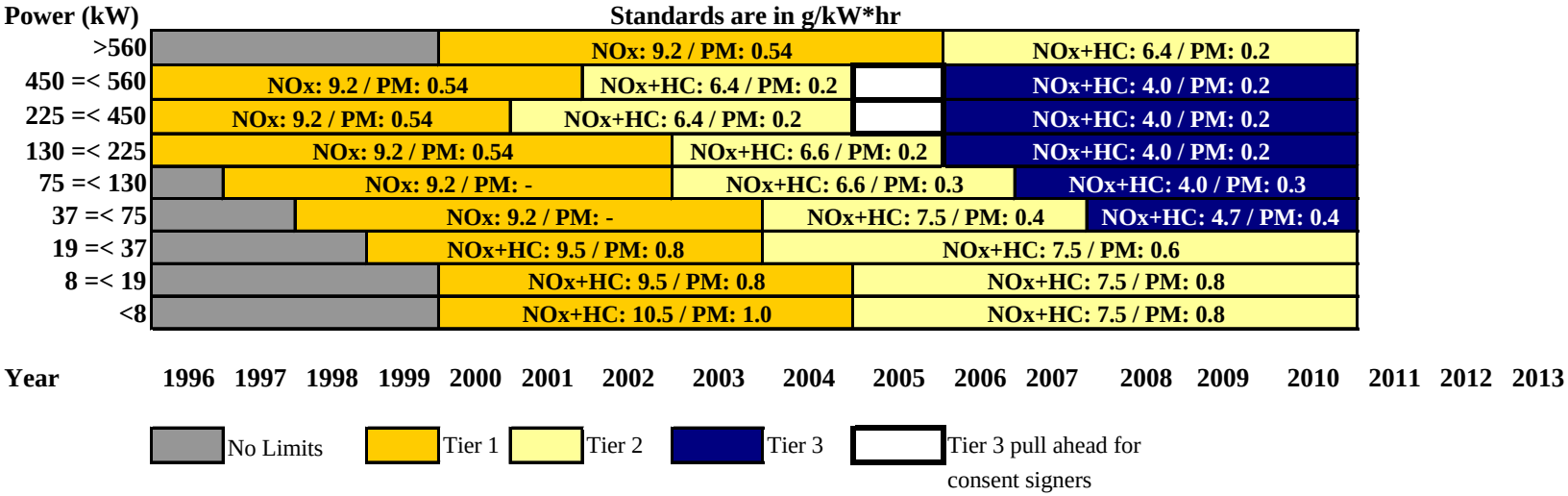
EPA has examined most closely the regulatory approaches discussed above (Approaches 1, 1a, 2, and 2a), but other approaches are also being considered. Two additional approaches are illustrated in Figures 4 and 5. Under Approach 3, which is a variant from Approach 2, no further engine out control would be required of any engine less than 70 hp (50 kW). The requirements would stay the same as promulgated in 1998 (see Figure 1). For engines over 70 hp, the timing and technology would be the same as Approach 2a. For all engine classes, diesel fuel desulfurization requirements would be the same as in Approach 2. Approach 4 is another variant on Approach 2a. Under Approach 4, engines below 70 hp would need to meet T3 PM standards but would have no further NOx controls. The remainder of Approach 2 would stay in place, including the fuel provisions, for all engine categories.

Figures 6 and 7 show the potential impact of the six approaches on the nonroad diesel engine NOx and PM emission inventories. For the sake of completeness, these figures include the baseline projection, plus the effect of only reducing fuel sulfur levels on PM emissions.

Figure 1. Currently Promulgated Emission Regulations for Nonroad Mobile Machines

28-Oct-02

USA EPA Regulation



*To convert (g/kW*hr) to (g/hp*hr), divide number by 1.33*

Figure 2. Approaches 1 and 1a

APPROACH 1							
Power Ranges	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
<175 hp (<130 kW)			T4 PM [2]		T4 NOx [4]		
> 175 hp (>130 kW)		T4 PM [2]		T4 NOx [4]			
diesel fuel sulfur (ppm)	15						
APPROACH 1A							
Power Ranges	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
<25 hp		T3 PM [1]					
25–70 hp		T3 PM [1]				T3 NOx [3] and T4 PM [2]	
70-175 hp			T4 PM [2]		T4 NOx [4]		
>175 hp		T4 PM [2]		T4 NOx [4]			
diesel fuel sulfur (ppm)	15						

Figure 3. Approaches 2 and 2a

APPROACH 2							
Power Ranges	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
< 175 hp (< 130 kW)						T4 NOx [4] and PM [2]	
> 175 hp (>130 kW)					T4 NOx [4] and PM [2]		
diesel fuel sulfur (ppm)	500 (mid 2007)			15 (mid 2010)			
APPROACH 2A							
Power Ranges	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
< 25 hp (<19 kW)		T3 PM [1]					
25 to 50 hp (19 to 37 kW)		T3 PM [1]					T3 NOx [3] and T4 PM [2]
50 to 70 hp (37 to 50 (kW)		T3 PM [1]					T4 PM [2]
70 to 175 hp (50 to 130 kW)						T4 NOx [4] and PM [2]	
> 175 hp (>130 kW)					T4 NOx [4] and PM [2]		
diesel fuel sulfur (ppm)	500 (mid 2007)			15 (mid 2010)			

Figure 4. Approach 3

Power Ranges	2007	2008	2009	2010	2011	2012	2013
< 70 hp (<50 kW)							
70 to 175 hp (50 to 130 kW)						T4 NOx [4] and PM [2]	
> 175 hp (>130 kW)					T4 NOx [4] and PM [2]		
diesel fuel sulfur (ppm)	500 (mid 2007)			15 (mid 2010)			

Figure 5. Approach 4

Power Ranges	2007	2008	2009	2010	2011	2012	2013
< 25 hp (<19 kW)		T3 PM [1]					
25 to 50 hp (19 to 37 kW)		T3 PM [1]					
50 to 70 hp (37 to 50 kW)		T3 PM [1]					
70 to 175 hp (50 to 130 kW)						T4 NOx [4] and PM [2]	
> 175 hp (>130 kW)					T4 NOx [4] and PM [2]		
diesel fuel sulfur (ppm)	500 (mid 2007)			15 (mid 2010)			

Footnotes for Figures 1-5

[1] T3 PM = 0.30 g/kW-hr
[2] T4 PM = 0.01 g/kW-hr
[3] T3 NOx = 4.0 g/kW-hr
[4] T4 NOx = 0.4 g/kW-hr

For Approaches 1 through 4, if a new standard is not otherwise listed, the previous standard applies.

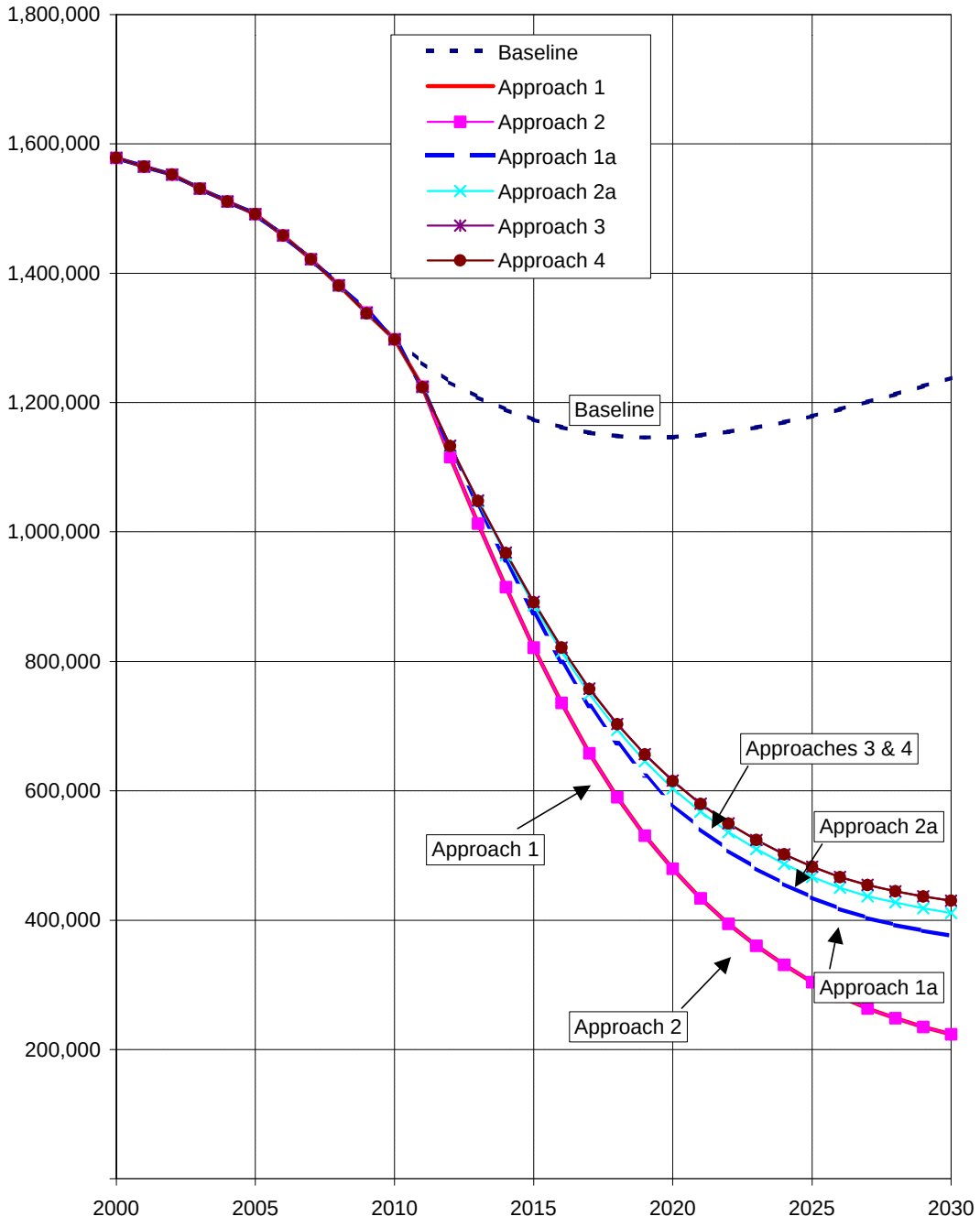
For all values in Figures 1, 2, 3, and 4 above, Tiers 2 and 3 (T2 and T3) refer to engines without aftertreatment. Tier 4 (T4) refers to engines that will have aftertreatment technology. Approaches 1a and 2a include the concept for lower power engines.

3.1.2 Nonroad Diesel Equipment

Under the previously described approaches, EPA believes that equipment manufacturers would need to undertake only one redesign cycle, and clearly this is critical. Thus, both the engine operating and equipment design aspects of PM and NOx aftertreatment would need to be addressed at the same time even under approaches above where PM and NOx standards would be phased in at different times. The equipment manufacturers of nonroad diesel equipment would need to accommodate integration of aftertreatment into the design process for their equipment in much the way other auxiliary devices such as radiators, fans, and separate circuit aftercoolers are addressed today. The Panel recognizes potential problems for non-integrated equipment manufacturers. As manufacturers of engines supply non-vertically integrated equipment manufacturers with engines and emissions control systems, design constraints will need to be provided in much the same way as is currently done for setting backpressure, inlet restriction, and other parameters. In addition to the need for a working relationship between engine and equipment manufacturers, suppliers of emissions control components will play a role in helping to facilitate the introduction of the devices into the nonroad market. EPA recognizes that compliance costs can be reduced if equipment manufacturers only undertake one redesign cycle; the design of regulatory approaches and flexibilities should consider this issue.

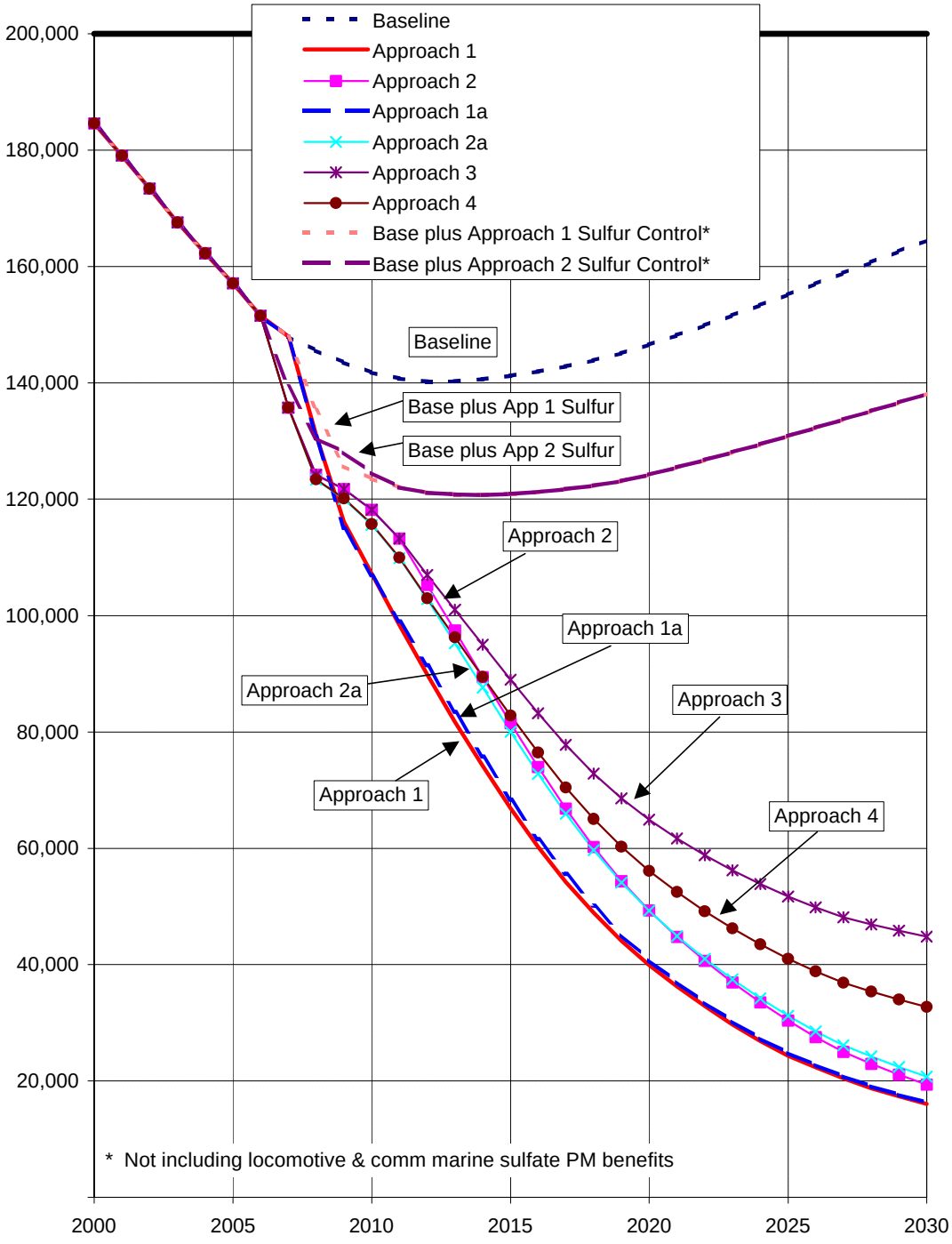
In prior rulemakings, EPA has implemented a flexibility program for equipment manufacturers that have been used by a range of Original Equipment Manufacturers (OEMs). EPA believes that the current flexibility program has been well received by the industry and EPA envisions a similar range of flexibilities being made available to accommodate introduction of the cleaner technology in a time frame that helps mitigate cost impacts. The issue of design concerns associated with incorporating new NOx/PM control technology that would be coupled with existing or similar-to-existing technology can be addressed through an implementation strategy that incorporates some level of flexibility in the timing of the introduction of full (i.e. aftertreatment-based) control.

Figure 6. Nonroad Diesel NOx tons/year
SBREFA Approaches



* Approach 1 requires use of aftertreatment on all engines

Figure 7. Nonroad Diesel PM tons/year
SBREFA Approaches



3.1.3 Nonroad Diesel Fuels

Nonroad diesel fuel sulfur levels of 15 ppm or less will be needed to enable the in-use operation of the very sulfur-sensitive emission control technologies discussed above. The program under consideration would require refiners to produce 15 ppm sulfur fuel for nonroad uses in either one or two steps. In Approach 1 (1-step approach), refiners would produce 15 ppm fuel beginning in mid-2008. In the stepped program of Approaches 2, 3, and 4 (2-step approach), refiners would first meet a 500 ppm sulfur standard, starting in mid-2007, followed by a final step down to 15 ppm in the mid-2010 time frame. (Note that Approaches 2, 3, and 4 include the same nonroad fuel program provisions, but have different engine provisions).

EPA believes that the design of a particular timeline for desulfurization requirements should reflect consideration of several issues. One issue is that the timing of a 15 ppm sulfur level requirement affects when aftertreatment devices can be implemented successfully. A second issue is that introduction of reduced sulfur levels (to either 500 ppm or 15 ppm) results in emission reductions from existing nonroad engines, even if they do not have aftertreatment devices. In view of this, EPA is considering whether it would be appropriate to have a different desulfurization schedule for locomotive and marine diesel fuels, since these engines would not be subject to new emission standards under this rule and thus would not have sulfur-sensitive emission controls. However, sulfur reductions in fuel used in existing locomotive and marine engines can have significant health benefits even before new standards are implemented, since current nonroad diesel fuel has such high sulfur levels. This means that even in the early years of the program, when the number of new engines with advanced emission controls is still relatively small, the availability of 500 or 15 ppm sulfur fuel would result in very significant reductions in the sulfate component of particulate matter (generally about half of total particulate mass). Therefore, the degree of loss of emission control needs to be considered if less stringent sulfur standards are to be included in the proposed rule. The emissions projections in Figure 8 show the significance of the sulfate PM benefits related to locomotive and marine diesel fuel sulfur control.

If EPA were to propose different standards for locomotive and marine fuel (e.g., 500 ppm) that would apply after the aftertreatment-based standards for other nonroad engines were in effect (that is, after mid-2010 in Approaches 2, 3, and 4), this fuel would have to be segregated from 15 ppm diesel fuel to avoid poisoning the emission controls on new nonroad engines (and conceivably highway engines) through misfueling or contamination in the distribution system.

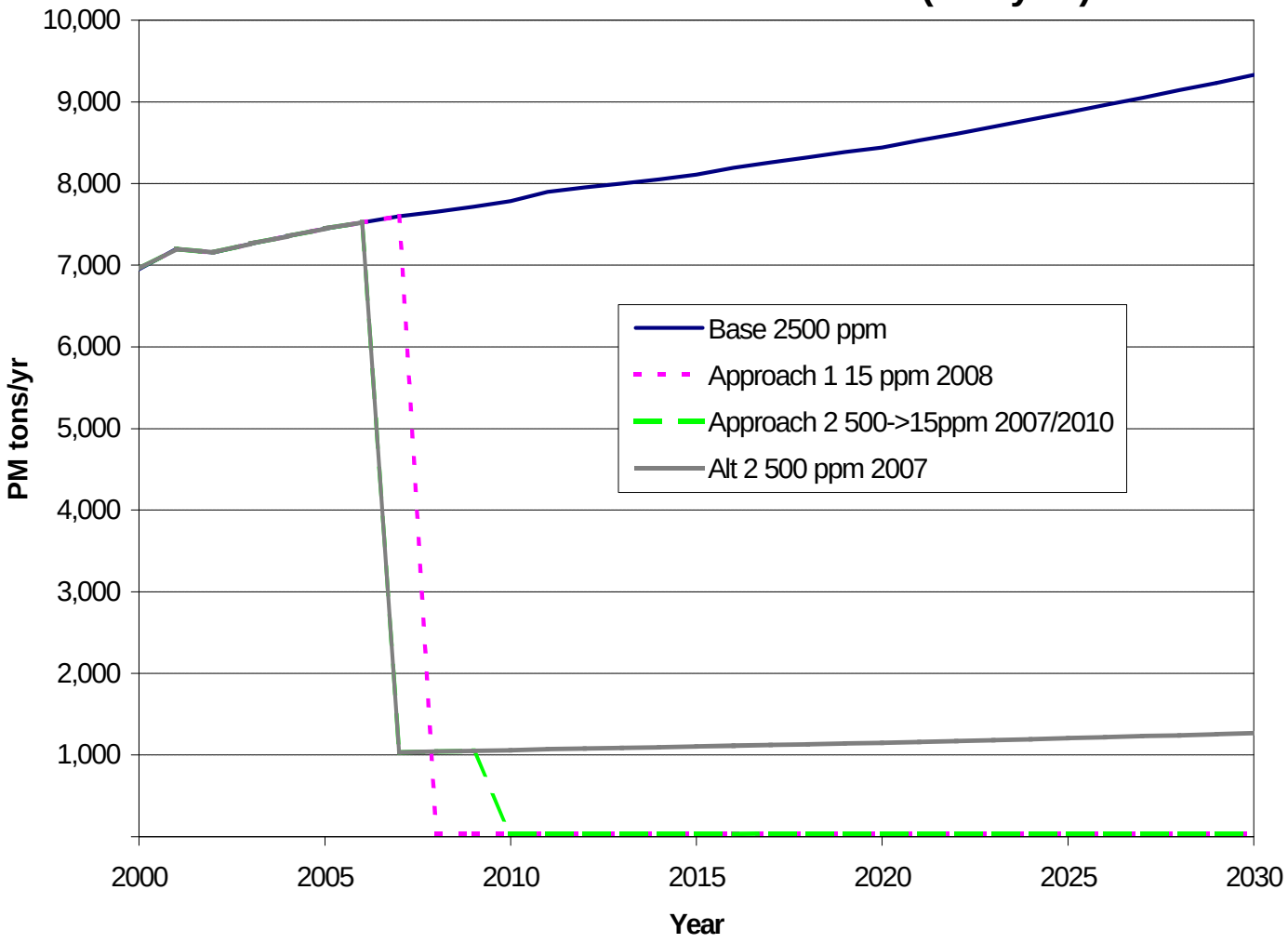
EPA is also considering how a credit trading program might be structured under the 2-step approach. For example, such a program might allow refiners to generate credits for producing 15 ppm or 500 ppm fuel earlier than required, while other refiners might be able to use those credits to delay desulfurization investments for some period of time. The Panel does not

believe that this would compromise the overall supply of low sulfur diesel fuel for either highway or nonroad uses.

To meet either a 500 ppm or a 15 ppm sulfur standard, most refiners would need to install additional desulfurization equipment for the high-sulfur streams that comprise their nonroad diesel fuel. Conventional refinery technologies are capable of reducing sulfur to very low levels. In general, these technologies are the same as those that refiners will be using to meet the 15 ppm highway diesel sulfur standard by 2006. Also, largely in response to the highway diesel rule, more advanced refinery processes are being developed that could also be applied to nonroad diesel sulfur control and reduce the costs of sulfur reduction.

Based on early comments received from small refiners, it appears that either the 1-step or 2-step approach to nonroad fuel sulfur control discussed above would likely provide a feasible pathway to compliance for at least some small refiners. However, as discussed below, we are recommending that EPA also propose provisions for additional flexibility for small refiners aimed at easing their transition to low sulfur fuel requirements.

Figure 8.
Locomotive & Comm Marine Sulfate PM (tons/year)



3.2 Options Considered

The following discussion represents the status of EPA's thinking at the time of the Panel's outreach meeting with Small Entity Representatives during the SBREFA process. As the Panel recommendations later in this document indicate, comments from the SERs helped to narrow the range of options in some cases.

3.2.1 Alternative Technological Approaches for Nonroad Diesel Engines and Equipment

The alternative technological approaches outlined in section 2.1.1 would impose different requirements over different time frames. These alternative approaches consider not including very small nonroad engines and different required technologies for engines in different horsepower categories. One or more of these approaches may offer substantial burden reductions for engine and equipment manufacturers. Additionally, EPA is entertaining additional flexibilities for small engine and equipment manufacturers (see below).

3.2.1.1 Technology Review

The Panel received information during the process which indicated that technology review before implementation would be appropriate. EPA used a technology review in its 2007 heavy duty diesel rule and the 1998 nonroad rule. As previously outlined, the EU is considering implementing nonroad diesel PM aftertreatment conditioned upon a technical review to be completed in 2006 before requiring compliance with its rules. Since EPA and international regulators have used such technology review to ensure reasonable application of rules related to diesel emissions reductions, such review may be appropriate for consideration in this case. Thus, SBA recommends that EPA undertake a technical review of the application of aftertreatment technology for NOx and PM emissions reduction in nonroad diesel applications on a time frame allowing for ameliorative action should the technology not advance as planned. In order to allow EPA to take positive action based upon the results of any information on technology, SBA recommends that EPA consider conducting a technical review of aftertreatment technology for NOx and PM emissions by 2008, or in sufficient time for the results of the review to be applied to the rulemaking aimed at the first model year which would otherwise require aftertreatment devices.

3.2.2 Burden Reduction Measures for Nonroad Diesel Engines and Equipment

The 1998 rule included a provision for engine manufacturers that redefined how engine families are classified for engines in the under 50 horsepower range – a provision meant to

address concerns from the small engine manufacturer that was affected by the rule. (This company is under new ownership and is one of the four engine manufacturers meeting small business criteria under the proposed rule that is the subject of this proceeding.) The "existing inventory" provision of the flexibilities provided in the 1998 Final Rule allowed manufacturers to sell existing production inventory after the Tier 2 emission standard took effect and to sell replacement engines that are comparable to the original engine (i.e. no significant changes that may alter the emissions of the replacement engine).

For nonroad equipment manufacturers, the 1998 rule included several flexibility provisions that were designed to be of particular assistance to small manufacturers but were applied to all manufacturers. These provisions were the percent-of-production allowance and the small volume allowance. The percent-of-production allowance offers a cumulative 80 percent exemption from the Tier 2 standards, per engine family, over a period of seven years. An extension of that provision is the small volume allowance. The small volume allowance enables manufacturers to exceed the percent-of-production allowance if the manufacturer exempts less than 700 engines (in each power category) over the seven year period. With this provision, up to 200 engines can be exempted per year.

The 1998 rulemaking also included a hardship provision that allows manufacturers to apply for hardship relief if circumstances occur that are outside of the OEM's control and cause the specified level of hardship. EPA is considering provisions similar to those described above in the proposed Tier 4 rulemaking.

3.2.3 Potential Burden Reduction Measures for Nonroad Diesel Fuels

3.2.3.1 Refiners

For each of the earlier fuel sulfur programs (gasoline and highway diesel), EPA included special small refiner provisions, generally involving interim periods during which less stringent sulfur standards could apply. For the nonroad diesel sulfur program, EPA again expects to propose small refiner flexibility provisions that involve some delay in meeting the standards of the program. For example, in a 1-step program (Approaches 1 and 1a, where refiners would meet a 15 ppm standard in mid-2008), small refiners could be allowed to postpone all or part of their desulfurization for an additional period of time, for example, for four years, until mid-2012.

Under a 2-step program (Approaches 2, 2a, 3, and 4, where refiners would meet a standard for diesel fuel of 500 ppm in mid-2007 and 15 ppm in mid-2010), small refiners could be allowed to postpone compliance with sulfur requirements until after the program's first (500 ppm) step of sulfur reduction, continuing to produce high-sulfur fuel during that period. Under such a small refiner provision, the first nonroad diesel sulfur requirements for these refiners would begin with the second (15 ppm) step of the program, in mid-2010. At this point, small

refiners could be required to meet the 15 ppm standard. Alternatively, they could be required instead to meet a 500 ppm standard for a period of time, for example four years (until mid-2014), and then meet the 15 ppm standard. Finally, if the program requires marine and locomotive diesel fuel to meet the 15 ppm standard, either in mid-2010 or at some later time, small refiners could be allowed to produce marine and locomotive diesel at 500 ppm for an additional period of time. Alternatively, if EPA proposes that a standard of 500 ppm continue indefinitely for marine and locomotive fuel for all refiners, small refiners would not need such a provision. The following table illustrates these potential options for special small refiner provisions.

Figure 9. Small Refiner Options Under Potential 1-Step and 2-Step Nonroad Diesel Base Programs Recommended Sulfur Standards (in parts per million, ppm)*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015+
Under 1-Step Program										
Non-Small**	--	--	15	15	15	15	15	15	15	15
Small	**--**	**--**	**--**	**–**	**–**	**–**	**15**	**15**	**15**	**15**
Under 2-Step Program										
Non-Small***	--	500	500	500	15	15	15	15	15	15
Small	**--**	**--**	**--**	**--**	**500**	**500**	**500**	**500**	**15**	**15**

* New standards are assumed to take effect June 1 of the applicable year.

** Assumes 500 ppm standard for marine + locomotive fuel for non-small refiners for 2008, and for small refiners for 2012 and later.

*** Assumes 500 ppm standard for marine + locomotive fuel for non-small refiners for 2007, and for small refiners for 2010 and later.

As discussed earlier, any program design that allowed fuel to be produced above 15 ppm after nonroad engine emission standards required advanced emission control devices (requiring the use of 15 ppm diesel fuel) would likely require additional provisions to protect the new devices. Thus, EPA expects to propose provisions to require that fuel higher than 15 ppm be segregated and sold only for use in older nonroad engines (those lacking advanced emission control devices) or in marine or locomotive applications. These segregation provisions would likely be modeled after those of the highway diesel program (e.g., product transfer document and labeling requirements) to prevent contamination and misfueling.

In addition, to the extent the program may incorporate some kind of a credit system to provide incentives for early compliance and flexibility for refineries, it may be possible and useful to expand such a credit system in ways that specifically help small refiners .

An option for small refiners that was included in the highway diesel rule allowed a tradeoff between gasoline and diesel desulfurization investments for refiners that produce both products. Under this provision, a small refiner that met the highway diesel standard of 15 ppm with the rest of the industry in June of 2006, instead of choosing to delay highway diesel compliance as allowed under the small refiner options, could further delay its gasoline sulfur

compliance. That is, the refiner could continue to comply with its interim gasoline sulfur standard under the small refiner provisions for three additional years, until January 2011. EPA included this provision because the June 2006 diesel requirement was followed so closely by the January 2008 gasoline requirement that would otherwise have applied for small refiner compliance with the stringent gasoline sulfur standard. This would have required refiner investments in desulfurization to occur close together. As described in Section 9 below, the Panel recommends a different type of provision under which certain small refiners could get additional relief under their gasoline sulfur requirements.

3.2.3.2 Fuel Distributors/Marketers

As with the highway diesel program, the nature of the regulatory requirements on distributors and marketers of nonroad diesel fuel would focus on ensuring that fuel quality -- and accountability for fuel quality -- is maintained throughout the distribution system. In order for fuel sulfur programs to work, all distributors must uniformly comply with these requirements. Therefore, as with the highway diesel program, EPA does not expect to create unique flexibility options for small distributors and marketers.

However, we believe that small entities participating in the development of this rule will help EPA understand better how to construct the overall program and what provisions may be necessary to ensure integrity of the fuel program across the distribution industry. For example, in the highway diesel rule EPA established requirements to prevent downgrading of 15 ppm fuel to a higher sulfur grade. EPA is considering whether similar restrictions are needed for the nonroad program. In the case of a nonroad diesel rule, it may not be necessary to have provisions to prevent downgrading, since concerns about availability of 15 ppm fuel in all parts of the country may be less than that under the highway diesel rule. EPA expects that most of the existing recordkeeping requirements (e.g., the generation and maintenance of product transfer documents) required in the previous fuel programs will be a model for the proposed nonroad diesel program as well and should not pose new burdens on members of the distribution and marketing industry.

4. APPLICABLE SMALL ENTITY DEFINITIONS

As set by SBA, the categories of small entities in the nonroad diesel sector that will potentially be affected by this rulemaking are defined in the following table:

Industry	Defined as small entity by SBA if:	Major SIC Codes
Engine manufacturers	Less than 1,000 employees	Major Group 35

Equipment manufacturers:		
- construction equipment	Less than 750 employees	Major Group 35
- industrial truck manufacturers (i.e. forklifts)	Less than 750 employees	Major Group 35
- all other nonroad equipment manufacturers	Less than 500 employees	Major Group 35
Fuel refiners	Less than 1500 employees *	2911
Fuel distributors	<varies>	<varies>

* EPA has included in past fuels rulemakings a provision that, in order to qualify for the small refiner flexibilities, a refiner must also have a company-wide crude refining capacity of no greater than 155,000 barrels per calendar day. EPA expects to include this criterion in the small refiner definition for a nonroad diesel sulfur program as well. .

To assess how many engine and equipment manufacturers potentially affected by the proposed rule may meet these small entity criteria, EPA first created a database comprised of firms listed in the Power Systems Research (PSR) database and compared this with the list of companies from the analysis performed for the 1998 nonroad rulemaking along with membership lists from trade organizations. EPA then found sales and employment data for the parent companies of these firms using databases such as the Thomas Register and Dun and Bradstreet. Due to the wide variety in the types of equipment which used nonroad diesel engines, there are numerous SIC codes in which the equipment manufacturers report their sales, though the majority of the firms are listed under the SIC major group 35xx- *Industrial and Commercial Machinery and Computer Equipment*.

The analysis that EPA is developing for the refining industry is built on analyses that were performed for the gasoline and highway diesel sulfur programs in recent years. Information about the characteristics of refiners comes from sources including the Energy Information Administration within the U.S. Department of Energy, and from oil industry literature. EPA's current assessment is that the refining industry is located primarily in SIC 2911. In both the gasoline sulfur and highway diesel sulfur rules, EPA applied specific small refiner flexibilities to refiners that have no more than 1500 employees and no greater than 155,000 barrels per calendar day (bpcd) crude capacity. EPA is also working to characterize the industry that transports, distributes, and markets nonroad diesel fuel. Trade groups are the key sources thus far for information about this industry. This industry sector includes several types of businesses that fall into several different SBA small entity criteria; EPA's preliminary assessment is that the vast majority of these entities are small.

5. SMALL ENTITIES THAT MAY BE SUBJECT TO THE PROPOSED REGULATION

5.1 Engine and Equipment Manufacturers

EPA conducted a preliminary industry profile to identify the engine and equipment manufacturers that are in the nonroad diesel sector. EPA identified over 1,000 businesses that fit this description; however, due to a lack of sales or employment data, some of these entities could not be confirmed for consideration in the analysis. The following gives more detail on this information and its usefulness to the analysis.

5.1.1 Engine Manufacturers

In most cases, more stringent emission standards for nonroad diesel engines would increase engine manufacturers' costs to produce these engines. Further, meeting the new emission standards could also require engine manufacturers to change the shape and dimensions of these engines.

Using information from the preliminary industry profile that was conducted for the nonroad diesel sector, EPA identified a total of 61 engine manufacturers. The top 10 engine manufacturers comprise 80 percent of the total market, while the other 51 companies make up the remaining 20 percent[1]. Of the 61 manufacturers, four fit the SBA definition of a small entity. These four manufacturers were Anadolu Motors, Farymann Diesel GMBH, Lister-Petter Group, and V & L Tools (parent company of Wisconsin Motors LLC, formerly 'Wis-Con Total Power'). These businesses comprise 8 percent of the total engine sales for the year 2000.

Wisconsin Motors produces diesel engines for a small niche market and is currently serving as a potential SER to speak to the needs of small engine manufacturers.

5.1.2 Equipment Manufacturers

Equipment manufacturers would likely have increased costs as a result of the need to make changes to their equipment to accommodate changes to the engine size and the addition of an aftertreatment package as a result of the rule. The vast majority of equipment manufacturers are not integrated companies, meaning that they do not make the engines they install. Thus, most equipment manufacturers are largely dependent on engine manufacturers for the availability of pre-production information about the new engines and for a sufficient supply of the engines once production begins. Equipment manufacturers that are small businesses may, in general, face a disproportionate degree of hardship in adapting to these types of changes in design and increased costs of new, cleaner engines.

[1] All sales information used for this analysis was 2000 data.

To determine the number of equipment manufacturers, EPA also used the preliminary industry profile that was conducted. From this, EPA identified over 700 manufacturers with sales and/or employment data that could be included in the screening analysis. These businesses included manufacturers in the construction, agricultural, and outdoor power equipment (mainly, lawn and garden equipment) sectors of the nonroad diesel market. The equipment produced by these manufacturers ranged from small (sub-25 hp walk-behind equipment) to large (in excess of 750 hp, such as mining and construction equipment). Of these manufacturers, EPA believes that small equipment manufacturers represent approximately 71 percent of total equipment manufacturers (and these manufacturers account for 11 percent of nonroad diesel equipment industry sales). Thus, the majority of the small entities that could potentially experience a significant impact as a result of this rulemaking are in the nonroad equipment manufacturing sector.

5.2 Nonroad Diesel Fuel

5.2.1 Fuel Refiners

EPA's current assessment is that 26 refiners (collectively owning 33 refineries) meet SBA's definition of a small business for the refining industry. The 33 refineries appear to meet both of the employee number and production volume criteria mentioned above, out of a total of 91 nonroad refineries. These small refiners currently produce approximately 6% of the total high-sulfur diesel fuel. It should be noted that because of the dynamics in the refining industry (e.g., mergers and acquisitions), the actual number of refiners that ultimately qualify for small refiner status under a future nonroad diesel sulfur program could be different than this initial estimate.

5.2.2 Fuel Distributors

The industry that transports, distributes, and markets nonroad diesel fuel encompasses a wide range of businesses, including bulk terminals, bulk plants, fuel oil dealers, and diesel fuel trucking operations, and totals thousands of entities that have some role in this activity. More than 90 percent of these entities would meet small entity criteria. Common carrier pipeline companies are also a part of the distribution system; 10 of them are small businesses.

6. SUMMARY OF SMALL ENTITY OUTREACH

6.1 Small Entity Outreach

Before beginning the formal SBREFA process, EPA actively engaged in talking to entities that would potentially be affected by the upcoming rulemaking. With knowledge learned from the highway diesel rulemaking, we began conducting phone conferences and face-to-face

meetings with small fuel refiners that produce diesel fuel well in advance of the SBREFA process. This led to the selection of a set of potential SERs that represent a cross-section of all small refiners. EPA also had begun conversations with representatives of small nonroad fuel distributors in order to better understand that industry sector, and identified three potential SERs in this process.

For the engine and equipment manufacturers, an industry profile of businesses that manufacture nonroad diesel engines and equipment was prepared. From this study, EPA was able to determine the small entities that could potentially be affected by this rulemaking. EPA began talking to manufacturers to locate potential SERs to participate in SBREFA; we also contacted some of the SERs that were involved in the previous nonroad diesel rulemaking SBREFA process in 1997.

EPA provided each business with EPA/SBAC fact sheets on the SBREFA process and background information on the nonroad diesel sector and the rulemaking process. Once potential SERs were identified, EPA began having more discussions to better understand the needs of the small entities in more detail. Outreach meetings were held with the SERs on September 16, 2002 and November 13, 2002 and EPA distributed outreach materials (briefings and information on the upcoming rulemaking programs) prior to each meeting. Following the outreach meetings, comments were received from the SERs. A summary of these comments can be found in Section 8 (the comments are presented in their entirety in Appendix B).

6.2 Summary of EPA's First Outreach Meeting with (Potential) Small Entity Representatives on Nonroad Diesel Engines, Equipment, and Fuels

On September 16, 2002 EPA held two separate two-hour meetings with groups of potential Small Entity Representatives (potential SERs) representing the engine and equipment manufacturing industry and the fuels industry. Fifteen potential SERs participated in the meetings. These outreach meetings were held to solicit feedback from the potential SERs on the upcoming rulemaking.

Each section of the outreach meeting consisted of background on the rulemaking process and an explanation of the SBREFA Panel process and how it fits into the rulemaking schedule from EPA's Small Business Advocacy Chair. Following this was a presentation by EPA staff giving a short regulatory history on nonroad diesel engines, equipment, and fuels. The Panel then began a discussion on previous alternatives used in nonroad and recent gasoline and diesel fuel rulemakings and potential ways to modify those alternatives for the upcoming rulemaking, as well as the addition of new alternatives and flexibilities. (See *Convening Document- Appendix A* for the materials sent to potential SERs and *Convening Document- Appendix B* for the complete meeting summary.) The Panel asked that the potential SERs provide comments-

including feedback on the flexibilities provided in the previous nonroad diesel rulemaking and recent gasoline and diesel fuel rulemakings, specifically which flexibilities worked best for small entities (and which did not), the extent to which they used the flexibilities, and how the flexibilities could be made more useful- to EPA by September 27, 2002.

Following EPA's presentation and a brief question and answer period, a discussion of the issues related to this rulemaking ensued. Issues that were raised during the discussion included: lack of assistance given to small entities on how to implement flexibilities given in previous rulemakings, potential increased costs as a result of the rulemaking, and feedback on the utility and value of the flexibilities that were given these industries from the 1998 nonroad diesel rulemaking.

6.3 Summary of EPA's Second Outreach Meeting with Small Entity Representatives on Nonroad Diesel Engines, Equipment, and Fuels

EPA held two separate two-hour meetings with groups of Small Entity Representatives (SERs) on November 13, 2002. These SERs represented the engine and equipment manufacturing and fuels industries. A total of 20 SERs participated in the meetings either in person or by telephone.

Both outreach meetings began with an opening by Alex Cristofaro, the new Small Business Advocacy Chair, explaining the SBREFA process in more detail and the role that we expect the SERs to play in this process. In both meetings, discussions began with the information sent to the SERs in the outreach packet and then a discussion was had with all parties present on the impacts, and ways to mitigate those impacts, on small businesses. Issues raised during the discussions included applicability of previous flexibilities, impacts of aftertreatment technology for small equipment manufacturers, timing/delay of standards for small refiners, harmonization of U.S. standards with other countries (for manufacturers that also export products), and unique issues that were specific to certain industries or manufacturers.

SERs were then made aware of their opportunities to provide comments and feedback both in the SBREFA process, and in the rulemaking process. Their attention was called to the outreach packet that they were given in which questions were posed that EPA would like the SERs to try to answer- to provide EPA with more information about the SERs' respective industries and the needs of small businesses. SERs were asked to provide feedback, including their answers to the questions (both the Initial Regulatory Flexibility Analysis questions and questions in Section D of the Outreach Packet, which is located in Appendix A) to EPA by November 26, 2002. A summary of the comments that SERs provided is located in Section 8 of this document, the comments in their entirety are located in Appendix B.

7. LIST OF SMALL ENTITY REPRESENTATIVES

The following is a list of the SERs that were included in the Panel process:
(Note: All trade group representatives participating in this process are doing so in the interests of their small business members.)

Engine Manufacturers:
Wisconsin Motors
Josh Sutherland
Memphis, TN

Equipment Manufacturers:
Association of Equipment Manufacturers (AEM)
Emmett Barker and Darrin Drollinger
Chicago, IL

Outdoor Power Equipment Institute (OPEI)
Adam Cramer and Bill Guerry
Old Town Alexandria, VA

Sweepster, Inc.
Bob Ball, Phil Jenkins, Eric Ramsey and Mike Spear
Dexter, MI

Northern Lights (Alaska Diesel)
Doug McElroy, Garry Cummins, and Dick Gee
Seattle, WA

Westerbeke
Greg Haidemenos
Avon, MA

Fuel Refiners:
Calcasieu Refining Co.
Rod Nelson
Lake Charles, LA

Countrymark Cooperative
John Stern
Indiana

Gary-Williams Energy Corporation
Sally Allen
Denver, CO & Wynnewood, OK

PetroStar, Inc.
Jim Boltz
Anchorage, AK

Southland Oil Co.
Ronald Renz
Jackson, MS

Holly Corporation
Randy Howes
Dallas, TX

Western Independent Refiners Association (WIRA)
Craig Moyer
Los Angeles, CA

Fuel Distributors:
Buckeye Pipe Line Co.
Gretchen Wendtland
Emmaus, PA

Gresham Petroleum Co.
Walton Gresham
Indianol, MS

Petroleum Marketers Association of America (PMAA)
Laura Tague and Holly Tuminola
Arlington, VA

8. SUMMARY OF COMMENTS FROM SMALL ENTITY REPRESENTATIVES

Following the November 13 SER outreach meeting, SERs were asked to provide comments on the meeting itself and the materials presented to them in the outreach packet. SERs were asked to focus on the IRFA-related questions and the questions posed in Section D of the packet, however comments were also received on additional issues that SERs felt were relevant

to the issues concerning small businesses and their respective industries. EPA received 11 sets of comments from seven different small entities and those comments are summarized in this section. The comments in their entirety are located in Appendix B of this report.

8.1 Number and Types of Entities Affected

SERs representing both small equipment manufacturers and small refiners agreed with EPA's characterization of the magnitude of the number of entities that would potentially be affected in their respective industries. Further, SERs generally did not disagree with EPA's characterization of the types of entities that may be affected (see Section 5).

8.2 Potential Reporting, Recordkeeping, and Compliance

In general SERs, representing all potentially affected industries, stated that ample lead times to comply with the new emission standards would be key to small businesses.

Two fuel refiner SERs are concerned about any provisions that specifically identify small refiner fuel, as they believe that such provisions may disadvantage small refiners due to pipeline distribution restrictions and possible anti-small-refiner fuel marketing campaigns. In general, they note that reporting and record-keeping requirements are disproportionately difficult for small refiners due to their more limited resources. As compared with non-small refiners, small refiners state that the capital costs and increased operating costs facing them are disproportionately higher, and that many small refiners are considering whether they can stay in business.

A SER representing the fuel distributors and marketers stated that the reporting and recordkeeping requirements of a nonroad diesel rule (i.e., the requirements of a fuel program that directly apply to their members) would not likely be a problem. This SER also commented that if EPA does establish separate standards for large and small refiners, it would support an anti-downgrading provision to ensure an adequate supply of 15 ppm sulfur diesel fuel.

An equipment manufacturer SER stated that the increase in engine size due to the addition of an aftertreatment package would render their products useless. The SER also states that if, due to the upcoming regulations, any of the engine models or products that they make attachments for become obsolete, this will reduce the demand for much of their product line as well. Further, they state that a requirement for equipment manufacturers to assist in the design or application of the new technology would be beyond their engineering capability. This idea was echoed by another SER representing equipment manufacturers, who stated that smaller equipment manufacturers will not necessarily be in a position to design and do all that is required for aftertreatment on their own.

The first equipment manufacturer SER stated that they believe that they can technically achieve the standards, though the cost associated with certification to the new standards will be extremely burdensome (see Section 8.5.1.2). (Only engine manufacturers certify- equipment manufacturers use those engines certified by engine manufacturers, however this is a direct comment that was received from one SER.) The second equipment manufacturer SER also stated that a 10-25% increase in costs due to feasible technological changes could critically alter its market position. Finally, the third SER representing small equipment manufacturers commented that although technically achievable, it believed absorbing the cost increases could be beyond the ability of the market's overall price elasticity, causing end users to refrain from purchasing new equipment or shift to spark ignition-powered equipment designs en masse.

One SER stated that all of the rulemaking program approaches presented by EPA in the outreach materials given to SERs would be easier to meet with lower sulfur fuel.

One SER provided a presentation given at the Diesel Technology Issues Forum which affirms the need for low sulfur fuel and further states that a globally harmonized regulatory approach is needed to ensure that low-sulfur fuel will be readily available before regulations relying on use of aftertreatment are mandated.

A SER representing small equipment manufacturers commented that they believe that highway engine technology cannnot be readily or cost effectively transferred to nonroad diesel engines not exceeding 70 hp. The SER also believes that this technology cannot be reasonably (or cost effectively) applied to smaller engines in the foreseeable future. The SER further stated that the contemplated engine technologies may not function properly in environments where severe vibration, significant amounts of flammable debris, and tight heat, weight, and space constraints exist.

The aforementioned SER also stated that the members of its industry would face unique design problems as these smaller pieces of equipment must be fitted with enclosed exhaust systems on a case-by-case basis. The SER raised the issue that the excessive amounts of heat generated by aftertreatment systems could likely conflict with the product safety requirements-- namely temperature requirements-- that its industry must comply with.

8.3 Related Federal Rules

Two refiner SERs mentioned possible interaction with other federal rules. Without elaboration, they stated that the gasoline sulfur and highway diesel sulfur regulations might duplicate, overlap, or conflict with a nonroad diesel sulfur rule. They also state that New Source Review permitting as well as revisions to air toxics formulae may require capital investment or increased operating costs on small refiners also facing costly desulfurization rules.

One fuel marketing SER raised the issue of an Internal Revenue Service (IRS) rule that levies taxes on highway diesel fuel only. The rule requires that nonroad diesel (un-taxed) fuel be dyed so that regulators and customers will know which type of fuel is which. The SER raised the issue that when a marketer delivers non-dyed fuel to a nonroad customer, the process of getting a tax refund from the IRS is laborious, expensive, defeats the purpose of the IRS dying system, and encourages tax evasion. The SER also stated that if a customer misuses the fuel, the IRS usually looks upstream to find fault – so a marketer must prove that he had no knowledge that the fuel would be used for unlawful purposes. Therefore, fuel marketers must maintain two segregated tanks for both nonroad and highway diesel fuels. One refiner SER also echoed the concern that the IRS dying requirements may result in the need for costly additional tankage at wholesale and retail points of sale. This in turn could limit the distribution of some grades of fuel and severely challenge the ability of some small refiners to market fuel.

Though not a Federal rule, one manufacturer SER suggests that the European Noise Directive also be taken into consideration, stating that manufacturers can not afford to develop and validate their products twice within a two year time period.

8.4 Regulatory Flexibility Alternatives

8.4.1 Engine and Equipment Manufacturer Alternatives

8.4.1.1 Exemptions

One SER provided information that the various products manufactured by its company are produced in virtually every horsepower category and stated that a narrow band exemption by horsepower would not be helpful to its business. A SER representing many small equipment manufacturers also raised this concern. A report entitled “Investigations into the Feasibility of PM Filter for Nonroad Mobile Machinery” (see Appendix B for full report) sent in by one SER suggests that further studies be initiated to determine the need to defer introduction or exempt particular products or categories of products from PM filter-based emission standards.

An equipment manufacturer SER specifically requested an exemption for engines and equipment specifically designed for export to markets without readily available low-sulfur diesel fuel supplies. This SER stated that high sulfur fuels would clog aftertreatment devices; therefore, provisions would have to be made for use overseas.

Another SER representing a group of small equipment manufacturers commented that it endorses Approach 3, which contemplates no significant additional regulation for nonroad engines or equipment not exceeding 70 hp. Further, the SER commented that it believes that approaches 1 and 1a would have substantial adverse impact on its small businesses.

8.4.1.2 Additional Compliance Time

All of the SERs representing equipment manufacturers stated that they believe that the Panel recommendations should include language that allows for flexibility that may include augmentation of emissions targets and compliance timeframes.

8.4.1.3 Technology Review

All engine and equipment SERs involved commented that, due to the uncertainty of economic and technical issues surrounding aftertreatment technology, a technical review process should be established. One SER suggested language in the upcoming rulemaking proposal that would establish a review by mid-2005, with semi-annual reviews conducted after that point. Another SER stated that this should be an independent review.

8.4.1.4 Current Flexibilities

One SER did provide information on suggested levels of regulatory alternatives (in regards to the flexibilities that are currently in place for manufacturers under the current nonroad diesel standards), the SER affirmed that the current levels are sufficient and state that its company would specifically chose to employ the percent of production and existing inventory allowances along with the additional compliance time of five years to meet the upcoming standards.

A SER representing small equipment manufacturers believes that the existing flexibilities are not helpful. The SER commented that the flexibilities require a level of sophistication that many small businesses do not have and engine manufacturers do not have a significant amount of incentive to produce small volumes of "grandfathered engines". The SER stated that, absent the creation of a flexibility program that will genuinely offer solutions to small businesses, the third regulatory option presented is the only way it believes that the adverse impacts on small businesses can be mitigated.

The aforementioned SER further commented that EPA's contemplated flexibilities would not reduce burdens on small equipment manufacturers because engine manufacturers would cease to produce sufficient numbers of "grandfathered engines" due to uncertain demand.

8.4.1.5 Hardship Relief

A SER commented on the concern with engine manufacturers not being able to provide a certified package to meet the equipment manufacturers' needs. While this SER does not specifically discuss hardship, the SER questions whether or not a compliance mechanism will be put in place with clearly defined consequences to the verifiers if promises/needs are not met.

8.4.2 Refiner and Fuel Marketer/Distributor Alternatives

8.4.2.1 Standards

A diverse group representing 14 small refiners endorsed a common set of potential regulatory flexibilities. This group indicated that their working principle is to recognize their differences while agreeing to endorse regulatory flexibilities that may help some of them. In so doing, they recognize that few, if any, of these flexibilities would apply to the entire group at the same time. The group also expects endorsements from other small refiners and believes they represent the position of the majority of small refiners.

These small refiners prefer a one-step nonroad diesel sulfur control program, since they expect it will be most economical to install desulfurization equipment only once, with the capability of meeting a 15 ppm sulfur standard. They do not expect to derive any economic benefit from an interim step to 500 ppm sulfur. With that, they support the approach that EPA suggested during the panel process, with non-small refiners subject to a 15 ppm standard starting in 2008 and small refiners subject to the same standard four years later, in 2012, provided that an exclusive standard of 500 ppm remain applicable indefinitely to small refiners for marine and locomotive fuel. However, if EPA pursues a two-step program, these SERs support an approach that would delay the first step (to 500 ppm sulfur) for small refiners for 5 years, until 2012, and the second step (to 15 ppm) until at least 2015. These SERs also believe that a standard of 500 ppm should remain for small refiner marine and locomotive fuel as long as market demand continues.

Another SER that produces a large fraction of its diesel fuel for the marine diesel market reinforced the general comment about continued ability to sell 500 ppm marine (and locomotive) diesel fuel after a 15 ppm standard becomes effective for other fuel. This SER claims that a new connection to a nearby pipeline, to provide an alternate outlet for higher sulfur fuel, is not economically feasible for this refiner.

The SER representing the fuel marketers and distributors is strongly opposed to any nonroad diesel program that allows more than one nonroad diesel fuel to be produced and sold at the same time, such as separate standards for small refiners. The SER states that its members would need to obtain additional storage tanks in order to continue to serve all of their current markets and that this would represent a large cost for small businesses.

8.4.2.2 Credit Program

SERs representing the small refiners support a special sulfur credit program, available only to small refiners, that would provide an incentive for early compliance. They propose that small refiners be able to earn credits by meeting sulfur standards earlier than required, calculated

against a 1998-1999 diesel sulfur baseline. These credits in turn could be used to allow higher-sulfur gasoline during the small refiner gasoline sulfur interim program; used to allow production of nonroad diesel fuel above 15 ppm sulfur, including "off-spec" batches, for use in older nonroad engines; and/or sold to "any other market, including stationary sources."

8.4.2.3 Hardship Relief

A SER representing the small refiners supports a provision for temporary hardship relief for small refiners.

8.4.2.4 Gasoline Sulfur Relief

Two refiner SERs proposed a credit system for early compliance with the nonroad diesel rule which could be applied to some interim gasoline sulfur flexibility. Specifically, these refiners suggested that small refiners that choose to incur the high costs of desulfurizing both highway and nonroad diesel to 15 ppm by the June 2006 highway diesel start date should be able to offset that investment slightly by some relaxation in the interim gasoline standards. These refiners claim that this approach would help offset the increased operating costs they will incur to comply with the gasoline sulfur interim standards.

8.5 Additional Comments from SERs

Many SERs also offered additional information on how the upcoming rulemaking may affect their business and a few SERs bolstered their comments with specific data on how aftertreatment based standards may affect them financially. Their comments are summarized below.

8.5.1 Engine and Equipment Manufacturers

8.5.1.1 Technology Transfer from Highway to Nonroad

One SER believes that too much credence has been given to the 'technology transfer' from highway to nonroad applications. The SER states that the variety in size, functionality, and environments represents markets with differing economic elasticities, suggesting that further regulations for nonroad applications could render products or market segments extinct. Another SER adds that the idea of technology transfer needs to be validated, especially due to the fact that nonroad diesel equipment generally has a long useful life and this should be taken into account in discussing the ability to directly transfer highway technology to nonroad applications.

A SER stated that the conclusion made by EPA that "for 70 hp and above, highway engine technology could be readily transferred to nonroad diesel engines" is supported by neither the engine nor the equipment manufacturers that the SER represents.

Another SER submitted an in-depth study of PM aftertreatment technology performed by an entity representing engine manufacturers ("Investigations into the Feasibility of PM Filters for Nonroad Mobile Machinery", see Appendix B for full report) which stated that PM filter technology did not currently exist in on-highway applications that could be used in nonroad applications. The report submitted by this SER recommended that no PM aftertreatment be required before 2010 due to this lack of transferrable technology.

One SER commented that active and automatic PM exhaust filter systems are not currently available at a sufficient level of developmental maturity and commercial availability for general application to nonroad equipment.

A SER commented that in conjunction with EPA, the U.S. Department of Energy is currently engaged in a $33 million project studying the diesel fuel sulfur reduction and NOx aftertreatment technologies currently under consideration by EPA in an on-highway context. This commenter recommended that EPA use these data in its efforts.

A SER representing small equipment manufacturers commented that it believes that highway engine technology cannnot be readily or cost effectively transferred to nonroad diesel engines not exceeding 70 hp, further the SER also believes that this technology cannot be reasonably (or cost effectively) applied to smaller nonroad diesel engines in the foreseeable future.

8.5.1.2 Costs of Compliance

One SER submitted an in-depth report by an entity representing engine manufacturers in the U.S. and Europe ("Investigations into the Feasibility of PM Filters for Nonroad Mobile Machinery", see Appendix B for full report), which stated that per machine engine costs for PM filters were significantly higher than EPA's initial estimates. This report asserted that per unit PM filter costs for the smallest of engines (below about 25 HP) could be ten times the estimated cost provided to the SERs for comment. The report also stated that costs of PM aftertreatment were higher as a proportion of engine costs for manufacturers producing fewer engines by a factor of 4 or 5 from the largest manufacturers through the smallest.

One SER is concerned that the incremental cost of the new aftertreatment technology will be borne mainly by equipment manufacturers, because engine suppliers and aftertreatment companies will pass their costs through to the equipment manufacturers. Further, the SER states that its customers will not view this new technology as a product enhancement and therefore will

not be willing to pay for its increased cost. The SER is concerned that the cost of implementing the upcoming regulations will adversely affect its company. This SER also stated that the costs presented by EPA seem conservative, and this is especially the case for horsepower ranges above 70 hp. The SER believes that the increased manufacturing costs will significantly impact its company's prices, as engines are priced based on horsepower and aftertreatment technology will be sold on a similar basis.

Another equipment SER believes that the cost estimates presented by EPA are reasonable for large-scale manufacturers, but are very conservative (underestimated) for small businesses. The SER further states that small businesses could face disproportionate costs due to low product volumes and multiple platforms and the research and development expenses would become severe. The SER believes that the cost of compliance will be too burdensome for the company to realize sales growth, which would cause it to lose market share (This SER also provided cost data. See Appendix B.)

One SER stated that several machinery manufacturers believe that the low end for cost effectively requiring aftertreatment is around 175 hp, in contrast with 25 hp suggested by EPA in the outreach materials. The SER states that the notion that OEM installation recovery costs will be passed through the pipeline with a 4% mark up is unrealistic, though no data was provided to illustrate this. Further, the SER states that some manufacturers believe that implementation costs will be 2.5 to 3 times higher that those presented by EPA. This SER believes that the true costs to equipment manufacturers are not reflected in EPA's cost estimates.

In a presentation to the Diesel Technology Issues Forum (see Appendix B for complete presentation), one SER stated that customers may not be willing to accept the increased costs of equipment and may instead choose to rebuild and continue to use their current equipment or shift, especially in lower horsepower ranges, to using gasoline-powered equipment.

One SER representing small equipment manufacturers stated that the low retail costs and annual production of some diesel powered equipment in smaller horsepower ranges makes it very difficult for manufacturers to recoup costs associated with the first two regulatory approaches presented by EPA to the SERs. The SER further stated that for the manufacturers that it represents, a cost increase to the manufacturer results in a doubling of the relevant product's retail price- the SER believes that the first two approaches could result in a 30-50% increase in the retail price of the equipment. The SER added that an increase of this magnitude would result in a customer delaying a purchase or purchasing a less expensive model, thus forcing an OEM to spread out and recover engineering costs or discontinue an equipment model.

8.5.1.3 Timing of Standards

One SER is concerned the emission targets and timeframes being determined may not coincide with the technology development and is primarily concerned with the situation that progress could be delayed outside of its control.

A SER stated that regulations forcing the use of particulate filters for nonroad diesel engines should not be considered for introduction before 2010 and consideration needs to be given to the various categories of engines and equipment before developing a regulatory schedule. In support of this position, the SER provided a report titled "Investigations into the Feasibility of PM Filters for Nonroad Mobile Machinery" (see Appendix B for full report) written by the Engine Manufacturers Association (EMA) and Euromot.

8.5.1.4 Competitive Disadvantage

One equipment manufacturer SER is concerned with competition in foreign markets that are not harmonized with U.S. regulations. The SER's concern lies in the fact that some of these foreign businesses may not be 'policed' adequately and compliance may not be assured, this would allow the foreign manufacturers/distributors to sell non-compliant products to customers (at lower prices) and thus put the SER's small business at a competitive disadvantage.

An equipment manufacturer SER that typically bids with other manufacturers for contracts for their equipment raises the concern that a 10-25% increase in cost and/or price could put the company at a competitive disadvantage and cause it to lose a contract.

One equipment manufacturer SER stated that the real difference between large and small manufacturers is that, both percentage-wise and in absolute dollars, a small manufacturer would spend more (since costs are borne over a smaller volume) bringing products to market thus making them non-competitive in the market.

One equipment manufacturer SER stressed the importance of ensuring that the full costs of PM filters be included in that EPA must be within the price elasticity affecting decisions on whether to rebuild or replace diesel units.

8.5.1.5 Harmonization

One SER raises the issue of exporting products to countries with no access to low-sulfur fuels. The SER questions whether or not its company would be allowed to legally produce non-compliant products for the purposes of export only as the use of high-sulfur fuels could clog up aftertreatment devices.

8.5.1.6 Availability of Engines

One SER is concerned that there is no guarantee to equipment manufacturers that aftertreatment technology will be developed specifically for their product needs (by engine manufacturers), the SER illustrates the example of producing a product for which there is no acceptable engine technology available.

8.5.1.7 Products Used in Niche Markets

One SER that produces products for a niche market stated that reliability is its most important selling point and that if a product fails it could be fatal. The SER raises the concern of how proposed emission changes could affect the reliability of products.

A SER representing equipment manufacturers stated that the costs associated with the first two regulatory approaches presented are greater than its entire industry could absorb. The SER believes that this will not only affect small businesses, but this could also significantly impact the industries that cannot function without the use of these specific products.

8.5.1.8 PM Aftertreatment Market Acceptance

One SER commented that any PM aftertreatment must contain active and automatic regeneration to prevent end users from defeating the systems. The SER also stated that the devices should not require regular maintenance for the same reason.

8.5.2 Refiners and Fuel Marketers/Distributors

8.5.2.1 Off-Specification Fuel and Misfueling

The small refiner SERs highlight the disposition of off-specification fuel as a central issue and support some type of compliance tolerance for fuel above the sulfur standard. They believe that a solution may be applied to all small refiners or on a case-by-case basis.

A SER that is also a farmer cooperative expressed concern about the potential need to segregate higher and lower sulfur fuel to prevent misfueling of new engines with higher sulfur fuel. The limited availability of storage capacity for multiple grades of fuel would present a challenge to coop members. Another SER expressed a similar concern with respect to pipeline restrictions on the number of grades of fuel that would be accepted.

8.5.2.2 Costs of Compliance

SERs representing the small refiners believe that EPA's estimated average difference between costs for small vs. non-small refiners are underestimated for their refineries, although they recognize that different assumptions about the types of capital equipment will affect these

numbers, as do the degree to which nonroad diesel desulfurization is undertaken in conjunction with highway diesel sulfur compliance. SERs did not highlight any specific problems with EPA's analysis.

One SER believes that, in the cases of earlier fuels regulations (gasoline lead and highway diesel sulfur), the market did not provide a reasonable recovery of investment for refinery equipment. This prospect for nonroad diesel fuel, it believes, will make it difficult to obtain financing. The SER also has access to only a small percentage of the marine and locomotive markets and would not have a large market for high sulfur fuel after nonroad diesel regulations became effective. This SER further states that it would not benefit from a credit program that applied to the gasoline sulfur program since they do not produce gasoline.

9. PANEL FINDINGS AND DISCUSSIONS

9.1 Number and Types of Entities Affected

Section 5 of this report, "Small Entities That May Be Subject to the Proposed Regulation", provides a description of an estimate of the number and types of entities that may likely be affected by the proposed rulemaking. These entities include nonroad diesel engine and equipment manufacturers and refiners, marketers, and distributors of nonroad diesel fuel.

9.2 Potential Reporting, Record Keeping, and Compliance

At this point in the rulemaking process, EPA has not yet fully defined a program of reporting and record keeping requirements or compliance assurance for the engine and equipment entities that may be subject to the proposed rule. As with any emission control program, EPA must have the assurance that the regulated entities will meet the emissions standards and all related provisions.

For engine and equipment manufacturers, EPA expects to propose to continue the reporting, recordkeeping, and compliance requirements prescribed for these categories in 40 CFR 89. Key among these are certification requirements and provisions related to reporting of production, emissions information, flexibility use, etc.

For any fuel control program, EPA must have assurance that fuel produced by refiners meets the applicable standard, and that the fuel continues to meet the standard as it passes downstream through the distribution system to the ultimate end user. This is particularly important in the case of diesel fuel, where the aftertreatment technologies expected to be used to meet the engine standards under consideration are highly sensitive to sulfur. EPA expects that recordkeeping, reporting and compliance provisions of the proposed rule will be fairly consistent

with those in place today for other fuel programs, including the current 15 ppm highway diesel regulation. For example, recordkeeping likely would involve the use of product transfer documents, which are already required under the 15 ppm highway diesel sulfur rule.

If EPA adopts a provision allowing small refiners to continue selling 500 ppm sulfur fuel when the rest of the industry is producing 15 ppm, there would need to be certain safeguards to prevent contamination of the 15 ppm sulfur fuel, and to prevent misfueling of new nonroad engines and equipment (to prevent potential damage to the emissions control equipment). Under such a flexibility option, the EPA Panel member envisions that refiners as well as downstream parties would be subject to enforceable measures to prevent contamination and misfueling (e.g., general segregation requirements, labeling at pump stands), which would be modeled largely after similar provisions of the highway diesel program.

9.3 Related Federal Rules

The Panel is aware of a few other current or proposed Federal rules that are related to the upcoming proposed rule. EPA's proposed certification fees rule, through the Certification and Compliance Division (CCD), may have some impact on the upcoming rule, and the Panel recommends that the program office take into consideration the effects this rule may have on small businesses.

The fuel regulations that EPA expects to propose would be similar in many respects to the existing sulfur standard for highway diesel fuel. The Panel is not aware of any area where the regulations under consideration would directly duplicate or overlap with the existing federal, state, or local regulations. The Panel notes, however, that several small refiners also will be subject to the gasoline sulfur and highway diesel sulfur control requirements, as well as air toxics requirements.

The Panel also notes that more stringent nonroad diesel sulfur standards may require some refiners to obtain permits from state and local air pollution control agencies under the Clean Air Act's New Source Review program prior to constructing the desulfurization equipment needed to meet the standards.

he Panel notes that the Internal Revenue Service (IRS) has an existing rule that levies taxes on highway diesel fuel only. The rule requires that nonroad diesel (un-taxed) fuel be dyed so that regulators and customers will know which type of fuel is which. Because of the need to separate dyed from undyed diesel fuel, some marketers may choose to install extra tanks. Therefore, fuel marketers have claimed that, if two grades of nonroad fuel are allowed in the marketplace, they may decide to maintain two segregated tanks for both nonroad (dyed 500 ppm and dyed 15 ppm) and highway diesel fuels (undyed 500 ppm and undyed 15 ppm), during the transition periods for both of these fuels.

9.4 Regulatory Flexibility Alternatives

Due to the potential cost and technology challenges that small businesses may face as a result of the upcoming rulemaking, the Panel recommends that EPA continue to seek and consider comments on flexibility alternatives that would help to mitigate any negative impacts on small businesses. Alternatives discussed throughout the Panel process include those offered in previous or current EPA rulemakings, as well as alternatives suggested by SERs and Panel members, and the Panel recommends that all are considered in the development of the upcoming rule.

9.4.1 Engine Manufacturers

The Panel identified four engine manufacturers that qualify as small entities under the SBA definition. Two of these four companies certified engines in 2002. One of these two companies participated as a SER. This SER raised the main concern that meeting the standards of the upcoming rulemaking would impose a significant financial burden on its company, as the company is rebuilding from bankruptcy. The SER also expressed concern that it does not have the personnel to devote to the research and development that would be required to meet the Tier 4 standards. The Panel believes that the other small engine manufacturers are likely to have similar concerns. The Panel recommends two regulatory alternatives and also a hardship provision for these manufacturers; these are described in more detail below.

9.4.1.1 Regulatory Flexibility Options for Small Engine Manufacturers

Currently, certified nonroad diesel engines produced by small manufacturers all have a rating of 80 hp (60 kW) or less. The flexibilities to be considered depend upon what approach, or approaches, EPA proposes. If EPA proposes an approach with two phases of standards, the engine manufacturer could skip the first phase and comply on time with the second. Or, alternatively, the manufacturer could delay compliance with each phase of standards. If the approach entails only one phase of standards, the manufacturer could opt to delay compliance. The Panel recommends that the length of the delay be a three year period; the Panel is also recommending that EPA take comment on whether this delay period should be two, three, or four years. Each delay would be pollutant specific (i.e., the delay would apply to each pollutant as it is phased in).

EPA believes that these options offer an opportunity to reduce the burden on small manufacturers while at the same time meeting the regulatory goals of the Agency. Further, these options will not put small manufacturers at a significant disadvantage as they will be in compliance with the Tier 4 standards in the long run and the options will give them more lead time to comply. EPA also feels that a complete exemption from the upcoming standards (even

assuming that such an exemption could be justified legally) will put these manufacturers at a competitive disadvantage as the rest of the market will be producing compliant engines and eventually there will not be equipment designed to accommodate their engines.

9.4.1.2 Hardship Provisions for Small Engine Manufacturers

The Panel is also recommending that two types of hardship provisions be extended to small engine manufacturers. These provisions are:

1. For the case of a catastrophic event, or other extreme unforseen circumstances, beyond the control of the manufacturer that could not have been avoided with reasonable discretion (i.e. fire, tornado, supplier not fulfilling contract, etc.); and
2. For the case where a manufacturer has taken all reasonable business, technical, and economic steps to comply but cannot do so.

Either relief provision would provide lead time for up to 2 years-- in addition to the flexibilities listed above in Section 9.4.1.1-- and a manufacturer would have to demonstrate to EPA's satisfaction that failure to sell the noncompliant engines would jeopardize the company's solvency. EPA may require that the manufacturer make up the lost environmental benefit through the use of programs such as supplemental environmental projects.

For the flexibilities listed above in Sections 9.4.1.1 and 9.4.1.2, the Panel recommends that engine manufacturers and importers must have certified engines in model year 2002 or earlier in order to take advantage of these provisions. Each manufacturer would be limited to 2500 units per year. This number allows for some market growth. The Panel is recommending these provisions in order to prohibit the misuse of these flexibilities as a tool to enter the nonroad diesel market or to gain unfair market position relative to other manufacturers.

9.4.1.3 Other Small Engine Manufacturer Issues

The Panel also recommends that an averaging, banking, and trading (ABT) program be included as part of the overall rulemaking program, the Panel also recommends that EPA take comment on the inclusion of a specific ABT provision for small engine manufacturers.

Based on the SERs' concerns about the technical feasibility of the Tier 4 standards, and the technical information discussed in this Report, SBA recommends that EPA include a technological review of the standards in the 2008 timeframe in the rulemaking proposal. The Panel recommends that EPA consider this recommendation.

9.4.1.4 Consideration of Engine Regulatory Approaches

As described earlier in more detail in Section 2.2, EPA has authority to control NOx and PM emissions from nonroad engines, after appropriate consideration of costs, available

technology and other factors. Using the applicable legal standards, EPA must make findings to set the emission standards on engines of various sizes and applications. Six basic approaches have been outlined in Section 3.1.1. Each of these alternatives to Approach 1 offers a less burdensome approach to the affected small engine and small equipment manufacturers.

The Panel recommends that EPA carefully consider information obtained through outreach to SERs regarding the design of flexibilities and regulatory approaches for nonroad engine standards. One issue highlighted by SERs is the cost associated with various levels of emission controls considered in each of the several regulatory approaches already described. For example, there are several studies that were conducted on nonroad engines indicating control costs that are higher than those currently estimated by EPA. The difference in cost also varies depending on the power category to which emission controls are being applied. While there currently is insufficient basis to make a definitive conclusion regarding comparisons between various cost estimates, the Panel notes that there exists uncertainty in the cost estimates. The Panel recommends that EPA further scrutinize these various cost estimates to help guide the Agency in targeting flexibilities for small businesses and in selecting regulatory approaches.

The SBA Office of Advocacy panel member offers the following observations about these approaches. While the other panel members do not join in these observations, the panel recommends that EPA carefully consider these points and examine further the factual, legal and policy questions raised here in making final determinations regarding the proposal to regulate nonroad engines.

9.4.1.4.1 Engines Under 50 kW

Initially, the Chief Counsel for Advocacy of SBA believes, based on the currently available information, that EPA does not have sufficient basis to move forward with a proposal that would require nonroad engines under 50kW to use aftertreatment devices. As part of its regulatory development under section 213, EPA has to take into account numerous factors, including projected costs and control technologies. Equipment manufacturer SERs generally questioned the applicability of such devices to the smaller horsepower engines. First, there is substantial doubt that the aftertreatment technology can be designed, with the required lead time, for the wide diversity of applications and operating conditions, and resolve substantial engineering challenges, such as the tight height, weight and space constraints, and safety and durability requirements. Second, the low retail cost and annual production for many of these applications make it extremely difficult for the equipment manufacture to absorb these additional costs. Third, given the small size of these engines, and the typically small useful life, and the fact that these engines are already subject to Tier 2 regulations, the environmental reductions attributable to such engines would be relatively small. One SER submitted comments supporting approach 3, which excludes engines under 50 kW from regulation beyond the Tier 2 standards. Based on these comments, the Office of Advocacy surmises that the retail price of the equipment

which included the Tier 4 aftertreatment devices (either PM filters or NOx adsorbers) would increase by about 30-50 percent, leading to the elimination of much of this equipment from the market. In turn, such an impact would incur potentially significant adverse effects on the equipment manufacturers and other affected retailers and distributors. However, such an impact could be reduced by equipment flexibilities, the averaging program, and hardship provisions. Furthermore, requiring additional control beyond the more stringent Tier 2 standards in 2004 and 2005 would contribute little additional emission reductions to the overall regulation. Perhaps most importantly, applying aftertreatment devices on these smaller engines, again, as detailed in one SER's comments, raises very substantial technical problems, including the possibility of serious safety concerns (albeit there are technologies such as the use of heat shields or double-wall catalysts that have been used successfully in other applications and EPA believes may address these safety issues), which counterbalance the relatively small emission reductions that can be realized with aftertreatment controls. More detailed discussion of the technical feasibility issues are found in several documents cited elsewhere in the panel report. These issues are even more pronounced for the smaller engine categories, because there is a wider variety of applications and operating conditions for these engines.

9.4.1.4.2 SBA General Discussion of Approaches 1-4: Applicability of Aftertreatment Devices

The differences among approaches 1-4 revolve about whether aftertreatment devices are required for certain size engines and, if so, how quickly these controls should be applied. At the low cost end, approach 3 does not require any post-Tier 2/3 requirements on engines with less than 70 hp. At the other end, approach 1 requires aftertreatment devices on all engines of all sizes, beginning phase-in as early as 2009. Based on information provided in the panel process, EPA estimates the total cost of adding aftertreatment devices to smaller hp engines (approach 1 vs. approach 3) at approximately $800 million annually. The emissions reduction difference between these two approaches in emissions is approximately 18,000 tons of PM and 116,000 tons of NOx nationwide. (These cost and emission reduction values are based on the total costs and emission reductions of model years engines over their collective lifetime.) EPA will need to consider, consistent with the legal and policy considerations involving sections 213(a)(3) and (4), and given other opportunities to reduce NOx and PM emissions, nonroad and otherwise, whether this is the best use of the Nation's resources.

Further, the EU, Euromot, and EMA have extensively explored the nonroad issue in reports and papers issued in the last six months. These organizations have tentatively concluded that NOx adsorbers should not be considered at this time for any size engines due to concern about the technical feasibility issues surrounding their applicability to nonroad applications. In a recent policy document, the EU asserts that significant technical hurdles also remain regarding the application of PM filters to nonroad equipment. Further, the EU believes that EPA significantly underestimates the technology costs. Thus, SBA advises that the Administrator

carefully examine the cost, technical feasibility, and emission reduction issues during the development of the proposal.

EMA/Euromot specifically advised against the introduction of PM filters until 2010 or later, given the leadtime necessary to perform the R&D work. EU is considering only the application of PM filters to engines above 37 kW. (This will be reviewed in a 2006 technological review.) VTT, the EU contractor, concluded that, using a benefit figure of 14,000 euros/ton of PM, that costs did not justify regulation of PM for engines with under 130 kW.[2] Regulation of under 37 kW was not warranted for reasons similar to those outlined above. Further, the VTT cost estimates for the PM filters substantially exceed EPA's preliminary estimates for NOx adsorbers and PM filters combined, although this may, in part or in whole, reflect a difference in baseline. Unlike EPA's estimates, the EU contractor finds that it is more cost-effective to regulate larger engines than smaller engines. VTT specifically found that "emissions reductions seems to be especially cost-effective only in engines with large power output and high lifetime running hours." VTT report, page 77.

Finally, EPA's cost figures are based on the average size engine family for its analysis of the fixed costs of this regulation--costs of research and development, certification, tooling, etc. However, for about one half of the engine models, the number of engines in a engine family are well below the average size. For those with engine family sizes of one tenth of the average size, the fixed costs/engine could be ten times larger than EPA's estimates. This situation is most common for small engine and equipment manufacturers.

One of the options put forth by EPA recognizes the issue about the applicability of the aftertreatment devices to the smallest engines, and the agency plans to examine this issue more closely. The smallest engines (under 50 kW) contribute about 20 percent of the total emissions inventory. The panel also notes that the panel members have only had a very limited time to consider the above observations, and will need additional time to find and analyze additional facts to further explore these issues. The panel recommends that EPA thoroughly explore these issues during the development of the proposal.

9.4.2 Equipment Manufacturers

Based on discussions with SERs throughout this process and EPA's analysis of the equipment manufacturer use of currently available flexibilities, EPA believes that the flexibilties that were offered in the previous nonroad rulemaking may also be applicable to small businesses in the upcoming rulemaking. These flexibilities, discussed above in Sections 2 and 3, are currently available to all businesses affected by the 1998 rulemaking. The Panel recommends that EPA take this information into account when developing regulatory alternatives for the

[2] "The benefits of emission reductions are based on average emission cost values commonly used for the 15 EU countries, being 4200 E and 14,000 E for 1 tonne of NOx and PM reduced, respectively." VTT report at page 75.

proposed rulemaking. In addition, the Panel recommends that EPA consider including hardship relief for small entities.

9.4.2.1 Regulatory Flexibility Options for Small Equipment Manufacturers

Experience gained in implementing the Tier 1 and 2 nonroad diesel engine emission standards indicates that providing equipment manufacturers some flexibility as to which Tier of engines they use (new or previous Tier) provides significant opportunity for manufacturers to phase-in equipment redesigns by aligning their redesign efforts with more normal business practice. For example, these flexibilities allow equipment manufacturers to postpone any redesign needed on low sales volume or difficult equipment packages, thus saving both money and strain on limited engineering staffs. Within limits, equipment manufacturers would be able to continue to use the current engine/equipment configuration and avoid out-of-cycle equipment redesign until the allowances are exhausted or the time limit passes. The Panel recommends that EPA propose to continue these flexibilities, as set out in 89 CFR section 102, with some potential modifications. The recommended flexibilities are:

1. Percent of Production Allowance: Over a seven model year period, equipment manufacturers may install engines not certified to the new emission standards in an amount of equipment equivalent to 80 percent of one year's production. This is to be implemented by power category with the average determined over the period in which the flexibility is used.
2. Small Volume Allowance: A manufacturer may exceed the 80 percent allowance in seven years as described above, provided that the previous Tier engine use does not exceed 700 total over seven years, and 200 in any given year. This is limited to one family per power category. Alternatively, at the manufacturer's choice by hp category, a program that eliminates the "single family provision" restriction with revised total and annual sales limits as shown below:

   For categories ≤175 hp - 525 previous Tier engines (over 7 years) with annual cap of 150 units (these engine numbers are separate for each hp category defined in the regulations)
   For categories of > 175hp - 350 previous Tier engines (over 7 years) with annual cap of 100 units (these engine numbers are separate for each hp category defined in the regulations)

   The Panel recommends that EPA seek comment on the total number of engines and annual cap values listed above.

   In contrast to the Tier 2/Tier3 rule promulgated in 1998, SBA expects the

transition to the Tier 4 technology will be more costly and technically difficult. Therefore, the small equipment manufacturers may need more liberal flexibility allowances especially for equipment using the lower hp engines. The Panel's recommended flexibility may not adequately address the approximately 50 percent of small business equipment models where the annual sales per model is less than 300 and the fixed costs are higher. Thus, SBA and OMB recommend that EPA seek comment on implementing the small volume allowance (700 engine provision) for small equipment manufacturers without a limit on the number of engine families which could be covered in any hp category.

3. In addition, due to the changing nature of the technology as the manufacturers transition from Tier 2 to Tier 3 and Tier 4, the Panel recommends that the equipment manufacturers be permitted to borrow from the Tier3/Tier 4 flexibilities for use in the Tier 2/Tier 3 time frame.

To maximize the likelihood that the application of these flexibilities will result in the availability of previous Tier engines for use by the small equipment manufacturers, the Panel recommends that these three flexibilities be provided to all equipment manufacturers.

An issue has been raised requesting that EPA establish a provision which would allow manufacturers to request limited "application specific" alternative standards for equipment configurations which present unusually challenging technical issues for compliance. The three flexibilities recommended above would provide latitude, at least in the near term, and a properly structured averaging, banking, and trading (ABT) emission credit program for the engine manufacturers would provide long-term latitude. Even if one were to assume that these flexibilities provide insufficient leeway (which may not be the case), application specific standards would still be cumbersome for both the small equipment manufacturers and for EPA. Nonetheless, the Panel recommends that EPA seek comment on the need for and value of special application specific standards for small equipment manufacturers.

9.4.2.2 Hardship Provisions for Small Equipment Manufacturers

The Panel is also recommending that two types of hardship provisions be extended to small equipment manufacturers. These provisions are:

For the case of a catastrophic event, or other extreme unforseen circumstances, beyond the control of the manufacturer that could not have been avoided with reasonable discretion (i.e. fire, tornado, supplier not fulfilling contract, etc.); and

For the case where a manufacturer has taken all reasonable business, technical, and economic steps to comply but cannot. In this case relief would have to be sought before

there is imminent jeopardy that a manufacturer's equipment could not be sold and a manufacturer would have to demonstrate to EPA satisfaction that failure to sell equipment with a previous Tier engine would create a serious economic hardship. Hardship relief of this nature cannot be sought by a manufacturer which also manufactures the engines for its equipment.

Hardship relief would not be available until other allowances have been exhausted. Either relief provision would provide additional lead time for up to 2 model years based on the circumstances, but EPA may require recovery of the lost environmental benefit.

To be eligible for the hardship provisions listed above (as well as the flexibilities listed in Section 9.4.2.1), the Panel recommends that equipment manufacturers and importers must have reported equipment sales using certified engines in model year 2002 or earlier. This is being recommended to prohibit the misuse of these flexibilities as a loophole to enter the nonroad diesel equipment market or to gain unfair market position relative to other manufacturers.

9.4.3 Fuel Refiners

The Panel considered a range of options and regulatory alternatives for providing small refiners with flexibility in complying with new sulfur standards for nonroad diesel fuel. As part of the process, the Panel requested and received comment on several early ideas for flexibilities that were suggested by SERs and Panel members. Taking into consideration the comments received on these ideas, as well as additional business and technical information gathered about potentially affected small entities, the Panel recommends that EPA propose the following provisions designed to address the concerns of small refiners.

9.4.3.1 Delayed Standards for Small Refiners

EPA has not yet made a final decision on the overall approach to propose for the base nonroad diesel sulfur program. As discussed earlier in this Report, EPA is considering base program that follows either a one-step or a two-step approach. Regardless of the approach, the Panel recommends that EPA provide for delayed compliance for small refiners. Specifically, the Panel recommends the following small refiner nonroad diesel sulfur standards, depending on whether EPA proposes a one-step or two-step approach.

Small Refiner Options Under Potential 1-Step and 2-Step Nonroad Diesel Base Programs Recommended Sulfur Standards (in parts per million, ppm)*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015+

Under 1-Step Program										
Non-Small**	--	--	15	15	15	15	15	15	15	15
Small	**--**	**--**	**--**	**–**	**–**	**–**	**15**	**15**	**15**	**15**
Under 2-Step Program										
Non-Small***	--	500	500	500	15	15	15	15	15	15
Small	**--**	**--**	**--**	**--**	**500**	**500**	**500**	**500**	**15**	**15**

* New standards are assumed to take effect June 1 of the applicable year.

** Assumes 500 ppm standard for marine + locomotive fuel for non-small refiners for 2008, and for small refiners for 2012 and later.

*** Assumes 500 ppm standard for marine + locomotive fuel for non-small refiners for 2007, and for small refiners for 2010 and later.

Under the 2-step program design above, small refiners would need to reduce nonroad diesel sulfur about two years earlier than the SERs requested in their initial comments. However, in further discussions about how best to balance the need for control as early as possible with small refiners' concerns, the ad hoc small refiner coalition indicated that the compliance delays in the table above would be sufficient to meet their needs.

It appears likely that EPA will propose that once either a one-step or a two-step program begins, locomotive and marine fuel sulfur would remain at 500 ppm for all refiners, including small refiners. (Earlier in the SBREFA process (as described in Section 3 of this Report), EPA was more strongly considering the option of reducing locomotive and marine diesel sulfur to 15 ppm at the same time or shortly after other nonroad fuel was reduced to 15 ppm. It now appears less likely that EPA will propose such an approach and this option is not further discussed here.) Thus, the continued availability of a higher sulfur market, as requested by small refiners, would be provided by the base program for any refiner and would require no special provision for small refiners.

If EPA were to propose a base program approach different from the one-step and two-step approaches represented in the table above, the Panel recommends that such a proposal include small refiner delays that are equivalent to those in the table. Similarly, if EPA were to propose that locomotive and marine diesel fuel be reduced to 15 ppm in the base program, the Panel recommends that a standard of 500 ppm for this fuel be continued at least for several years for small refiners.

9.4.3.2 Incentives for Early Compliance

In addition to these standards, the Panel recommends that EPA propose certain provisions to encourage early compliance with lower sulfur standards. These options may help offset the investment for small refiners that choose to comply earlier than required. The Panel recommends that EPA propose that small refiners be eligible to select one of the two following options:

1. Credits for Early Desulfurization: EPA is considering proposing a system of sulfur credits available to all refiner that would allow refiners to generate credits for meeting lower sulfur standards earlier than required. Such credits could be used to offset higher sulfur fuel produced by that refiner or by another refiner that purchases the credits. Such a program, in conjunction with the delayed standards for small refiners recommended in the table above, could be valuable to small refiners. The Panel recommends that EPA propose a credit trading system that allows small refiners to generate and sell credits for nonroad diesel fuel that meets the small refiner standards earlier than that required in the above table.
2. Limited Relief on Small Refiner Interim Gasoline Sulfur Standards: The Panel believes that small refiners that are able to fully meet a 15 ppm sulfur standard for nonroad diesel fuel at the same time as 15 ppm is required for most highway diesel fuel (June 1, 2006) warrant an additional option of limited relief under the gasoline sulfur program. This option will help reduce operating costs of complying with the gasoline sulfur program so that those resources can instead be used to fund nonroad diesel sulfur compliance.

Specifically, the Panel recommends that a small refiner producing its entire nonroad diesel fuel pool at 15 ppm sulfur by June 1, 2006, and that chooses not to generate nonroad credits for its early compliance, receive a 20% relaxation in its assigned small refiner interim gasoline sulfur standards. However, the Panel recommends that the maximum per-gallon sulfur cap for any small refiner remain at 450 ppm. In considering the appropriate level of such a relaxation in the small refiner gasoline sulfur standards, the Panel considered what value would result in a meaningful benefit to small refiners, while at the same time minimizing the loss of the emission control in the gasoline sulfur program. Comments from the SERs initially suggested a larger value for this relaxation. However, further discussion of this comment with the primary SER expressing this concern clarified that the smaller value of 20% would meet the need of that company. This SER, who is also the main spokesperson for the ad hoc coalition of small refiners, also stated her understanding that few if any other small refiners would be in a position to use this provision and, regardless, 20% relaxation of the gasoline interim standards should be sufficient.

This limited relaxation in the interim standards would begin on January 1, 2004 and continue through the small refiner's interim program (i.e., through December 31, 2007 or, if the

small refiner extended its gasoline interim program by early highway diesel compliance, through December 31, 2010). This provision would be a unique approach; the "gasoline-for-diesel" option for small refiners in the diesel sulfur rule (40 CFR 80.552(c)) extended the duration of the small refiner interim standards but did not affect the levels of those standards.

In developing this option, the Panel expects that EPA will need to include provisions to assure that the required nonroad diesel sulfur reduction indeed occurs on schedule (in June, 2006) and that a minimum volume of nonroad diesel fuel is indeed produced.

9.4.3.3 Hardship Provisions

The Panel recommends that EPA propose refiner hardship provisions modeled after those established under the gasoline sulfur and highway diesel fuel sulfur program. (See 40 CFR 80.270 and 80.560). Specifically, the Panel recommends that EPA propose a process that, like the hardship provisions of the gasoline and highway diesel rules, allows refiners to seek case-by-case approval of applications for temporary waivers to the nonroad diesel sulfur standards, based on a demonstration to EPA of extreme hardship circumstances. This provision would allow domestic and foreign refiners, including small refiners, to request additional flexibility based on a showing of unusual circumstances that result in extreme hardship and significantly affect the ability of the refiner to comply by the applicable date, despite its best efforts.

The Panel believes that the combination of compliance delays, incentives for early compliance, and the hardship provision described above would sufficiently address small refiner concerns about dealing with "off-spec" fuel. With these provisions, small refiners will generally have access to legal higher-sulfur markets as outlets for temporary higher-sulfur batches of nonroad fuel.

9.4.4 Nonroad Diesel Fuel Distributors and Marketers

As discussed earlier in this report, the Panel recognizes that the nature of the regulatory requirements on fuel distributors and marketers need to focus on ensuring that fuel quality -- and accountability for fuel quality -- is maintained throughout the distribution system. As with the existing gasoline and highway diesel programs, all distributors and marketers of nonroad diesel fuel must uniformly comply with these requirements in order for the program to work. In comments to the Panel, a representative of small distributors and marketers stated that existing requirements for recordkeeping and document maintenance under the existing highway diesel fuel sulfur provisions can be adapted for use with nonroad diesel fuel. Thus, it appears that the direct regulatory requirements on these entities are not a significant concern and that no special provisions for small distributors and marketers of nonroad diesel fuel are needed.

A SER representing small nonroad distributors and marketers also expressed serious concerns about approaches under consideration for a proposed nonroad diesel program because they would all, in different ways, permit refiners to produce and sell more than one grade of nonroad fuel at the same time. The commenter stated that unless a program required a single grade of nonroad fuel, all bulk plant operators that chose to provide multiple grades of nonroad fuel would need to install additional storage tanks. Also since IRS tax regulations require that for nonroad fuel to not be taxed, it must be dyed once it leaves the terminal, which according to the SER would result in the need for additional tanks in order to segregate dyed and undyed nonroad diesel fuel.

As described earlier in this Report, all of the approaches EPA is considering would involve sulfur averaging under a credit program under which refiners could produce higher sulfur fuel for a period of time while others met the lower-sulfur standards. The Panel recognizes that a nonroad diesel fuel program involving more than one grade of fuel during an interim period would likely require decisions on the part of many bulk plant operators about their marketing strategies and whether to invest in additional tankage. However, for a number of reasons as described below, the Panel believes that a large majority operators will be able to avoid installing new tanks.

As with the highway diesel program set to begin in June of 2006 (and the gasoline sulfur program beginning in January of 2004), EPA does not expect to propose any requirements on which grade or grades of nonroad fuel distributors or marketers may choose to carry. However, a critical element in any nonroad diesel sulfur program would be to ensure that only 15 ppm nonroad fuel was used in new nonroad engines with sulfur-sensitive emission controls, regardless of what other grade or grades of fuel were in the marketplace. Thus, all entities in the distribution system would have a critical role in assuring that fuel produced with 15 ppm sulfur retains that level of sulfur throughout the system, from the refinery to the engines. Therefore, although no distributor would be required to carry 15 ppm fuel, any that do choose to carry this fuel would need to ensure that the sulfur content was maintained to the end user.

The Panel believes that most small distributors would be able to avoid the need for new tanks through one or more of the following options:

1) Since the marketing radius of bulk plant operators in a given area often overlaps, it is not necessary for all bulk plant operators to carry all fuels in order for end users in the area to have access to the full slate of fuels. Therefore, flexibility exists for a fraction of bulk plants in an area to elect to carry only some diesel fuels and other bulk plants carry the remaining fuels. Under such an approach, bulk plant operators would use their existing tankage to provide the selection of fuels they choose to carry.

2) Under the highway diesel rule, EPA projected that 40% of 9,200 bulk plant operators

would install an additional storage tank so that they could carry 500 ppm as well as 15 ppm highway diesel fuel. EPA concluded that the bulk plant operators that choose to put in an additional tank to carry 500 ppm as well as 15 ppm highway diesel fuel would be those that have a sufficient financial incentive to do so. To the extent that bulk plants decide to install additional tanks in response to the highway diesel program (in most cases these decisions may not yet have been made), this would increase their flexibility under a nonroad diesel program to manage their use of their existing tank service. Of course, the plant operators would have to bear the costs of installing these additional tanks.

3) Another way that bulk plants could choose to switch tank service would be by making choices between gasoline and diesel products they currently carry. For example, bulk plant operators that carry premium as well as regular gasoline might elect to discontinue carrying one grade of gasoline in favor of carrying another grade of diesel fuel. This decision could also impose costs on distributors in terms of lost gasoline sales.

4) Some bulk plant operators may choose to offer only undyed (taxed) diesel fuel that could be used in both highway and nonroad diesel engines. Under such an approach, the user of taxed fuel in nonroad applications could apply for a tax refund for the federal and state diesel fuel taxes paid. Under a nonroad diesel program, the Panel expects that an additional number of bulk plant operators would opt to avoid installing a new tank by selling only taxed fuel, passing the responsibility for seeking a tax refund to their customers.

   A similar situation exists today in some areas of the country. Largely in the western U.S., due to the lack of availability of high-sulfur fuel and other considerations, a small fraction (approximately 10%) of bulk plant operators currently only offer undyed fuel for sale to both highway and nonroad users. The nonroad users that purchase taxed fuel from such bulk plants currently seek state and federal tax refunds for the highway fuel taxes they pay. There is a substantial volume of undyed fuel used in nonroad equipment in each year on which tax refunds are sought.

The Panel believes that under any of the nonroad diesel program approaches under consideration, many bulk plant operators would choose to follow the options outlined above rather than installing additional tankage. Some bulk plants would likely find it economically advantageous to install additional tankage to serve a broader potential customer base. However, we believe that the number of such bulk plants would be small and that their choice to install such additional tankage would be based on their conclusion that the choice is financially advantageous. To the extent that distributors and marketers choose to install additional tankage, make product switches, or otherwise adjust to a market with multiple grades of nonroad diesel fuel, they could likely incur costs. As fuel distributors and marketers begin to handle low-sulfur diesel fuel, EPA intends to further evaluate the new costs incurred by these entities.

10. APPENDICES

Appendix A: List of Materials SBAR Panel Shared With SERs During Panel Outreach
Appendix B: Written Comments the SBAR Panel Received from SERs
Appendix C: Summary of SBAR Panel's First Small Entity Outreach Meeting
Appendix D: Summary of SBAR Panel's Second Small Entity Outreach Meeting