

Report of the
Small Business Advocacy Review Panel

on

Control of Air Pollution from New Motor Vehicle Engines:
Heavy-Duty Engine Standards and Diesel Fuel Sulfur Control
Requirements

March 24, 2000

TABLE OF CONTENTS

1.	Introduction	1
2.	Background	2
2.1	History of Heavy-Duty Diesel Engine Emission Standards	3
2.2	History of Diesel Fuel Quality Control	3
2.3	Costs	4
3.	Overview of Proposed Program Under Consideration	5
3.1	Heavy-Duty Emission Standards and the Effects of Sulfur	5
3.2	Highway Diesel Fuel Quality Standards	6
3.3	Implementing an Ultra-Low Sulfur Diesel Program	7
3.3.1	“Single Fuel” Approach	7
3.3.2	“Phase-In” Approach	7
3.3.3	Other Regulatory Approaches Considered by EPA	8
3.4	Overview of Burden Reduction Provisions Under Consideration by EPA	9
3.4.1	Allow Small Refiners to Continue Producing 500 PPM Highway Diesel	9
3.4.2	Sell Current (500 PPM) Highway Diesel to the Nonroad or Other Markets	11
4.	Industries That May Be Subject to the Proposed Regulation	11
4.1	Small Refiners	11
4.2	Small Distributors/Marketers of Highway Diesel Fuel	12
5.	Summary of Small Entity Outreach	14
5.1	Pre-Panel Outreach	14
5.2	Panel Outreach	14
6.	Small Entity Representatives	15
7.	Summary of Comments from SERs	16
7.1	SER Comments: Number and Types of Entities Affected	17
7.2	SER Comments: Potential Reporting, Recordkeeping, and Compliance Requirements	17
7.3	SER Comments: Related Federal Rules	18
7.4	SER Comments: Costs and Financing	19
7.4.1	Small Refiners	19
7.4.2	Small Distributors/Retailers	20
7.5	SER Comments: Factors Unique to Small Entities	21
7.5.1	Small Refiners	21

	7.5.2	Small Distributors/Retailers	22
7.6		SER Comments: Regulatory Alternatives	22
	7.6.1	General	22
	7.6.2	Single Fuel Approach	23
	7.6.3	Phasing In a Second Grade of Highway Fuel	26
	7.6.4	Credit/Trading Programs	29
	7.6.5	Delayed Compliance Date	29
	7.6.6	Financial Assistance	30
	7.6.7	Nonroad Diesel Markets for Small Refiners	31
8.		Panel Findings and Discussion	31
	8.1	Single Fuel Approach	32
		8.1.1 Number and Types of Small Entities	32
		8.1.2 Potential Reporting, Recordkeeping, and Compliance Requirements	32
		8.1.3 Relevance of Other Federal Rules	33
		8.1.4 Other Regulatory Alternatives: Burden Reduction Approaches that Would Provide Flexibility to Small Refiners	33
	8.2	Phase-In Approach	38
		8.2.1 Number and Types of Small Entities	38
		8.2.2 Potential Reporting, Recordkeeping, and Compliance Requirements	38
		8.2.3 Relevance of Other Federal Rules	38
		8.2.4 Other Regulatory Alternatives	39

Appendix A: Summary of Small Entity Outreach Meeting

Appendix B: Complete Written Comments Received from Small Entity Representatives

Appendix C: Documents Distributed to Small Entity Representatives

Report of the Small Business Advocacy Review Panel on Control of Air Pollution from New Motor Vehicle Engines: Heavy-Duty Engine Standards and Diesel Fuel Sulfur Control Requirements

1. Introduction

This report is presented by the Small Business Advocacy Review Panel (SBAR Panel or Panel) convened for the proposed rulemaking on heavy-duty engine standards and diesel fuel sulfur control, currently being developed by the 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) that an agency may be required to prepare under the RFA. EPA's Small Business Advocacy Chairperson convened this Panel on November 12, 1999. In addition to the Chair, the Panel consisted of the Deputy Director of EPA's Office of Transportation and Air Quality (OTAQ), the Chief Counsel for Advocacy of the Small Business Administration (SBA), and the Deputy Administrator of the Office of Information and Regulatory Affairs within the Office of Management and Budget (OMB).

This report includes the following:

- Background information on the proposed rule being developed;
- Information on the types of small entities that would be subject to the proposed rule;
- A description of efforts made to obtain the advice and recommendations of representatives of those small entities;
- A summary of the comments that have been received to date from those representatives (the complete written comments from the small entity representatives are attached to this report); and
- The findings and recommendations of the Panel.

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 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;
- A description of 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 relevant Federal rules which may duplicate, overlap, or conflict with the proposed rule; and
- A description of any significant alternative to the proposed rule which accomplishes the stated objectives of applicable statutes and which minimizes any significant economic impact of the proposed rule on small entities.

Once completed, the Panel report is provided to the agency issuing the proposed rule 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, the IRFA for the proposed rule, or 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 during the term of the Panel. EPA will continue to conduct analyses relevant to the proposed rule, and additional information may be developed or obtained 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 consistent with the statute authorizing the proposal.

2. Background

The diesel engine¹ is increasingly becoming a vital workhorse in the United States, moving much of the nation's freight, and carrying out much of its farm, construction, and other labor. Every year, about a million new diesel engines are put to work in the U.S.; and as their utility continues to grow, so too does their annual fuel consumption, now over 40 billion gallons. However, the societal benefits provided by the diesel engine have come at a price -- diesels emit millions of tons of harmful exhaust pollutants annually.

Diesel engines contribute greatly to a number of serious air pollution problems, especially the health and environmental effects of ozone and particulate matter (PM). Millions of Americans live in areas that exceed the national air quality standards for ozone or PM. Diesel emissions account for a large portion of the country's PM and nitrogen oxides (NOx), a key precursor to ozone formation. Today, heavy-duty diesel vehicles and nonroad equipment account

¹ In this report, the term "diesel engine" generally refers to diesel-fueled engines, rather than to engines operating on the diesel combustion cycle, some of which use alternative fuels, such as methanol or natural gas, instead of diesel fuel.

for most of these emissions. However, diesel light-duty vehicles may become larger contributors, as some manufacturers have announced plans to introduce more of these vehicles, including the popular sports-utility vehicles, mini vans, and pick-up trucks.

On May 13, 1999, EPA published an Advanced Notice of Proposed Rulemaking (ANPRM) on diesel fuel quality (64 FR 26142). The ANPRM described, and sought public comment on, numerous issues related to diesel engine emission standards and diesel fuel quality. The following sections summarize the history of both emission standards for heavy-duty diesel engines and quality requirements for highway diesel fuel.

2.1 History of Heavy-Duty Diesel Engine Emission Standards

Section 202(a)(3) authorizes EPA to establish emission standards for heavy-duty vehicles and engines. These standards are to reflect the greatest degree of emission reduction achievable through the application of technology which EPA determines will be available for the model year to which the standards apply. EPA is to give appropriate consideration to cost, energy, and safety factors associated with the application of such technology. Section 202(a)(3)(C) requires that promulgated standards apply for no less than three years and go into effect no less than four years after promulgation.

EPA refers to heavy-duty vehicles as those with a gross vehicle weight rating of 8,500 pounds or more. Heavy-duty engines and vehicles are used in a wide range of applications, from large full size pick-up trucks to the largest commercial trucks. Because one type of heavy-duty engine may be used in many different applications, EPA emission standards for heavy-duty vehicles historically have been based on the emissions performance of the engine (and any associated aftertreatment devices), measured as grams per brake horse-power hour (g/bhp-hr).

The current heavy-duty engine emission standard for PM is 0.10 g/bhp-hr, effective since the 1994 model year. In 1997, EPA set a new heavy-duty engine emission standard for NO_x + non-methane hydrocarbons (NMHC), to take effect for 2004 and later model years (62 FR 54694). This NO_x + NMHC standard is 2.4 g/bhp-hr (or 2.5 g/bhp-hr with a 0.5 g/bhp-hr NMHC cap). In the 1997 final rule, EPA committed to reassess the appropriateness of the standards under the Clean Air Act, including the need for and technical and economic feasibility of the standards based on information available in 1999. This provision, known as the “1999 Technology Review” was put in place because the technologies required to meet the 2004 NO_x + NMHC standard for heavy-duty diesel engines were, at the time the standard was finalized, not yet fully developed and proven. On October 29, 1999, EPA published a proposed rule proposing to reaffirm the technological feasibility, cost-effectiveness, and appropriateness under the Clean Air Act of the 2004 NO_x + NMHC standard (64 FR 58472).

2.2 History of Diesel Fuel Quality Control

Section 211(c) of the Clean Air Act allows EPA to regulate fuels where emission products of the fuel either: 1) cause or contribute to air pollution that reasonably may be

anticipated to endanger public health or welfare, or 2) will impair to a significant degree the performance of any emission control device or system which is in general use, or which the Administrator finds has been developed to a point where in a reasonable time it would be in general use were such a regulation to be promulgated.

EPA set standards for diesel fuel quality in 1990 (55 FR 34120, August 21, 1990; 40 CFR 80.29 and 80.30). These standards, effective since 1993, apply only to fuel used in highway diesel engines. The standards limit the sulfur concentration in fuel to a maximum of 500 parts per million (ppm), compared to a pre-regulation average of 2500 ppm. They also protect against any degradation in the quality of diesel fuel by setting a minimum cetane index of 40 (or, alternatively, a maximum aromatics level of 35%). EPA established these regulations in response to a joint proposal from members of the diesel engine manufacturing and petroleum refining industries to reduce emissions and enable the use of catalysts and particulate traps in meeting EPA's PM standards for diesel engines. The Clean Air Act Amendments of 1990 also included a 500 ppm sulfur level for highway diesel fuel under Section 211(i).

As a result of EPA's diesel fuel regulation, highway diesel fuel sulfur levels now average about 340 ppm outside of California, and approximately 140 ppm in California. EPA currently does not regulate diesel fuels intended for nonroad uses. Diesel fuel sold for use in most nonroad applications, such as construction and farm equipment, has sulfur levels on the order of 3300 ppm outside of California.

Under Section 211(i) of the Clean Air Act, Alaska has an exemption from EPA's existing 500 ppm limitation (permanent in some areas, temporary in others) (63 FR 49459, September 16, 1998). Alaska currently is seeking a permanent exemption for all areas of the state, for reasons including special difficulties in supplying lower sulfur diesel fuel for that market.

California set more stringent standards in 1988 for motor vehicle diesel fuels for the South Coast air basin. These standards took effect statewide in 1993. They apply to both highway and nonroad fuels (excluding marine and locomotive use), and limit sulfur levels to 500 ppm and aromatics levels to 10%, with some flexibility provisions to accommodate small refiners and alternative formulations.

2.3 Costs

EPA has made preliminary estimates of an "average" refinery cost to produce ultra-low sulfur highway diesel fuel. Although EPA is currently exploring a range of levels for a sulfur cap (between 5 and 40 ppm), for cost analysis purposes during the Panel process, EPA evaluated only a 30 ppm cap (~20 ppm average). EPA's preliminary analysis resulted in an estimate of 3.1 cents/gallon for an "average" refinery, and 4.5 cents/gallon for a typical small refiner, to desulfurize highway diesel fuel to a 30 ppm cap. The cost for individual refineries would vary, depending on how they compare with the "average" in terms of technological capabilities to reduce sulfur in diesel highway fuel. EPA did not provide to the SERs or the Panel any detailed quantification of the costs (or burdens) of meeting other levels of the sulfur cap. The Panel

believes that if the sulfur cap ultimately proposed is nearer the lower end of the range under consideration, costs could be substantially higher; the converse would be true for higher sulfur caps. More information about costs will be contained in EPA's proposed rule.

3. Overview of Proposed Program Under Consideration

There are two basic thrusts to the proposal under development:

- New exhaust emission standards for heavy-duty highway engines and vehicles², and
- New standards for the sulfur level in highway diesel fuel.

Combining these new standards into a single proposal is critical to the success of EPA's overall efforts to reduce diesel emissions, because the engine emission standards would not be feasible without the fuel changes (see discussion below). Even so, the goals of the proposal go beyond enabling new heavy-duty engine standards. Heavy-duty and light-duty vehicles both use the same diesel fuel, so the proposed fuel quality provisions could benefit the advanced technology light-duty diesel vehicles being developed to comply with EPA's recently promulgated Tier 2 standards. EPA believes that this comprehensive approach will usher in a promising new phase in the effort to reconcile the diesel engine with the environment, affecting all sizes of highway diesel engines.

3.1 Heavy-Duty Emission Standards and the Effects of Sulfur

The emission standards that EPA envisions proposing build upon EPA's proposal published on October 29, 1999 (64 FR 58472). That proposal reviewed and proposed to confirm the 2004 model year emission standards set in 1997 (62 FR 54693, October 21, 1997) and made other changes to the heavy-duty program.

This proposal looks toward the next phase of emission standards beyond 2004, based on advanced exhaust aftertreatment technologies. The new diesel emission control technologies being developed have the potential to reduce NO_x and PM emissions by almost an order of magnitude. EPA currently contemplates that these standards would take effect beginning as soon as the 2007 model year.

The effectiveness of the NO_x and PM aftertreatment technologies is closely linked to the level of sulfur in the fuel. In order to ensure regeneration of particulate filters, EPA is expecting that significant amounts of precious group metals (primarily platinum) will be used in the catalyst formulations. There are two primary mechanisms by which sulfur in diesel fuel can limit the

² EPA also currently plans to propose new emission standards for heavy-duty gasoline engines.

effectiveness or robustness of particulate filters, which rely on an oxidizing catalyst function from platinum. The first is inhibition of the oxidation of NO to NO₂ and the second is the preferential oxidation of SO₂ to SO₃ forming a precursor to sulfate particulate matter.

Several of the diesel particulate filter technologies rely on the generation of a very strong oxidant, NO₂, to ensure that the carbon that is captured by the filtering media is burned under normal operating conditions. NO₂ is produced through the oxidation of NO across a platinum catalyst. This oxidation is inhibited by the presence of SO₂ in the exhaust stream. This inhibition limits the total amount of NO₂ available for oxidation of the trapped diesel soot. Without sufficient NO₂, the amount of soot trapped in the diesel particulate filter will continue to increase and can lead to excessive exhaust back pressure and even catastrophic failure of the diesel particulate filter itself.

The increased exhaust back pressure represents increased work being done by the engine to force the exhaust gas through the increasingly restrictive particulate filter. Unless the filter is cleansed of the trapped soot frequently, this increased work can lead to significant reductions in engine performance and increases in fuel consumption. Catastrophic failure of the filter can occur when excessive amounts of soot are trapped in the filter due to a lack of NO₂ for oxidation. The failure occurs when the trapped soot begins to oxidize at high temperatures leading to a “run-away” combustion of the soot and temperatures in excess of that which can be tolerated by the particulate filter itself. This failure can take the form of a crack in the filter material, which allows significant amounts of the diesel particulate to pass through the filter without being captured. Furthermore, failure of the trap to regenerate could cause the engine to stall.

The NO_x aftertreatment technologies also are expected to utilize platinum to oxidize NO to NO₂, to improve the NO_x reduction efficiency of the catalysts at low temperatures, or as an essential part of the process of NO_x storage. This reliance on NO₂ as an integral part of the reduction process means that the NO_x technologies -- like the PM technologies -- will have similar problems with sulfur in diesel fuel.

3.2 Highway Diesel Fuel Quality Standards

EPA plans to propose that diesel fuel sold for use in highway vehicles meet a lower sulfur cap, in order for the sulfur-sensitive aftertreatment technologies to work effectively. EPA currently is considering a sulfur cap in the range of 5 to 40 ppm. The actual sulfur cap proposed will depend on EPA’s assessment of the impacts of sulfur on advanced aftertreatment technologies, and a corresponding assessment of the cost and feasibility of producing and distributing highway diesel fuel meeting sulfur standards in the range described above.

While some information on the sulfur sensitivity of diesel engine aftertreatment technology was made available to the Panel, at the time of the Panel process, EPA was unable to provide to the Panel its own assessment on the appropriateness of the standard in the 5-40 ppm range. Consequently, the Panel did not evaluate the basis for any particular sulfur cap within this range or the relative burdens of this rule on the refining and distributor/retailer sectors (with

many small businesses) and the engine-manufacturing sector (no small businesses). The Panel also was not able to evaluate the potential for less sulfur-sensitive aftertreatment technology to be developed that might allow for a higher sulfur cap. The Panel recognizes that EPA will address these issues in the proposed rule and will seek public comment on these questions. All Panel members agree that the objective of the rulemaking is to achieve a sulfur standard that is not more stringent than that necessary to meet the objectives of the Clean Air Act.

3.3 Implementing an Ultra-Low Sulfur Diesel Program

There are two key approaches being considered to implement a program for ultra-low sulfur highway diesel fuel. We will refer to these approaches as “single fuel” and “phase-in”.

3.3.1 “Single Fuel” Approach

The “single fuel” approach would maintain a single grade of highway diesel fuel, and require that refiners producing highway diesel must meet the sulfur cap by a certain date, likely mid-2006. In other words, the entire highway pool would simply change over to ultra-low sulfur, minimizing the costs of the transition downstream of refiners. Under this approach, the primary entities directly affected would be refiners. This approach is analogous to the 1993 change to 500 ppm highway diesel. To avoid some of the market disruptions that occurred with the 1993 change, EPA likely would propose a compliance date (for meeting the ultra-low sulfur cap) for refiners and terminals that precedes by several months the compliance date for retailers.

Under the single fuel approach, all diesel vehicles would be refueled with the ultra-low sulfur fuel, including older technology vehicles that don’t necessarily “need” ultra-low sulfur. The consequence of this would be that even owners of the older vehicles³ would likely pay approximately 3 cents more per gallon (if the standard were 30 ppm), according to EPA’s preliminary analysis of desulfurization costs (assuming these costs translated into a similar fuel price increase).⁴ (Of course, some owners might bear similar operational costs under a phase-in approach, although the scope of these costs is somewhat harder to predict). EPA believes, however, that there would be some benefits to using ultra-low sulfur fuel in the existing fleet, including lower sulfate PM emissions, reduced maintenance, and improved durability of the vehicles. Further, this approach would minimize the potential for misfueling new vehicles with the higher sulfur fuel.

3.3.2 “Phase-In” Approach

³ These could include owners and operators of trucks, buses, motorcoaches, and other diesel-fueled vehicles. The SBA Panel member notes as a factual matter that there are approximately 100,000 trucking firms (SIC code 4212, 4213, 4214 or NAICS 484), of which approximately 97 percent would be small business according to SBA's definition.

⁴ As noted above in Section 2.3, this cost differential would be greater for a lower standard and less for a higher standard.

The second approach to implementing the fuel program would be to phase in a second grade of highway diesel fuel into the market. Under this approach, ultra-low sulfur highway diesel would be phased in, but the current (500 ppm) highway diesel would still be available for the older vehicles for a number of years. Rather than requiring refiners to produce the ultra-low sulfur highway fuel, this approach would likely require retailers selling highway diesel also to make available the ultra-low sulfur diesel. If a phase-in approach were implemented, EPA believes this “availability requirement” would be the best way to ensure that the fuel would be widely available for the vehicles that need it. Retailers would be responsible for getting ultra-low sulfur diesel from the distribution system. The premise of this approach is that the fuel distribution system would respond to the market demands, by supplying and distributing the second grade of fuel (ultra-low sulfur) at reasonable prices in all parts of the country (without fuel shortages or extreme price spikes).

Because the phase-in approach would widely introduce an additional grade of highway diesel fuel into the market, EPA believes there would be a significant potential for misfueling. That is, customers with new vehicles that need ultra-low sulfur fuel might use the higher sulfur fuel, mistakenly or deliberately, even though it could damage their emissions control technology and possibly even their engines. Thus, in order to discourage misfueling, EPA likely would need to propose a unique nozzle interface for new vehicles, with a corresponding size and/or shape nozzle for dispensing the ultra-low sulfur diesel. This would be analogous to the nozzle interface approach used in the unleaded gasoline program. (Despite similar precautions, misfueling still occurred during the unleaded gasoline program).

This “phase-in” approach would have two distinct advantages over the single fuel approach described above. First, only owners of new vehicles may face higher fuel prices. Owners of old vehicles could continue to refuel on higher sulfur (500 ppm) diesel fuel, which would cost less to produce. Second, refiners could slowly transition their capital investments in desulfurization technology over time as the market for ultra-low sulfur diesel fuel grew, with some small refiners potentially being able to put off investments for many years. Under this phase-in approach, it is possible that the market would transition to ultra-low sulfur more quickly than the vehicle fleet turns over, because some retailers/fleets likely would decide to switch over to ultra-low sulfur rather than carrying both grades of fuel. Again, under the phase-in approach described here, there would be no regulatory requirement on refiners to produce the ultra-low sulfur fuel; instead they would respond to market demand.

While providing flexibility for refiners, this approach would rely on the ability of the fuel distribution infrastructure to accommodate a second grade of highway diesel fuel. Depending on the decisions they make under a phase-in approach, this approach potentially could affect tens of thousands of businesses - the majority of them small businesses - in the diesel fuel distribution system, including: pipelines, bulk terminals, bulk plants, petroleum marketers (who carry the fuel from bulk terminals and bulk plants via transport trucks and fuel tank wagons to retail outlets and fleet customers), fuel oil dealers, service stations, and truck stops.

3.3.3 Other Regulatory Approaches Considered by EPA

3.3.3.1 Phase-Down Sulfur Concentration in Diesel Fuel

In the recently-promulgated Tier 2/gasoline sulfur program, EPA set standards that will phase down the concentration of sulfur in gasoline over time. EPA believes that such an approach is not workable for diesel fuel, however, due to the demands of the vehicle aftertreatment technology. Based on EPA's current assessment of the technology, the efficiency of the NO_x and PM aftertreatment devices likely to be used to meet the vehicle emission standards under consideration drops off quickly if the vehicle is operated on sulfur levels even slightly higher than the levels EPA is considering proposing. Thus, there could be little, if any, emission benefit until the end of any such phase-down (i.e., when the sulfur cap ultimately would reach the level EPA is considering). Furthermore, it is possible that higher sulfur levels may hinder PM trap regeneration and cause the trap to become clogged with sulfate PM. This could not only cause the PM trap to become permanently ruined, but also could result in the vehicle stalling, a significant safety concern. Consequently, it is imperative that the ultra-low sulfur diesel fuel remain segregated throughout the distribution system to ensure that aftertreatment-equipped diesel vehicles are operated only on this fuel.

This situation contrasts with the gasoline sulfur control program where the impact of sulfur on the aftertreatment technology, while still significant, is less severe, and emission benefits will accrue even at the phased-down sulfur levels. Furthermore, with gasoline sulfur control there are considerable emission benefits to be realized by the existing fleet even at these phased-down levels.

3.4 Overview of Burden Reduction Provisions Under Consideration by EPA

As it has been developing the proposed rule, EPA has been considering provisions that could reduce the burden on small entities. Specifically, EPA has been evaluating two measures that could reduce the rule's burden on small refiners.

3.4.1 Allow Small Refiners to Continue Producing 500 PPM Highway Diesel

The first of these measures could benefit small refiners if EPA adopts a single fuel approach described in Section 3.3.1. This flexibility option would allow a small refiner, for a period of time, to continue marketing its existing grade of highway diesel (meeting the current 500 ppm sulfur cap) to the highway fuel market, provided the fuel is properly segregated from the ultra-low sulfur highway fuel in the distribution system and properly labeled (as higher sulfur highway diesel) at retail outlets and other end points. Under this option, small refiners would bear the responsibility to ensure proper segregation of the fuel, to avoid contamination with the ultra-low sulfur highway diesel fuel. To prevent misfueling, small refiners also would need to work closely with their distributors and end users (e.g., service stations, truck stops, fleet customers) to ensure the fuel was properly labeled as higher sulfur diesel.

Based on data on diesel fuel production provided by the Energy Information Administration, small refiners produce only 4.1 percent of all the highway diesel fuel produced in the U.S.; therefore, this flexibility option would involve a relatively small amount of the total fuel and would reduce opportunities for misfueling. During the initial years of the program, the new vehicle fleet would be relatively small, minimizing the potential for misfueling problems. As the new vehicle fleet continues to grow, however, the potential likelihood of misfueling concerns would increase.

Under this option for small refiner flexibility, there likely would be a demand for the current (500 ppm) highway diesel fuel, since there still would be older vehicles in the fleet for several years after implementing a national ultra-low sulfur diesel program. EPA estimates that it likely would take about five years (from the introduction of the new vehicles needing ultra-low sulfur fuel) for 50 percent of the diesel fuel volume to be used by these new vehicles. Thus, it is possible that some service stations, truck stops, and centrally-fueled fleets located near small refiners would choose to continue selling the 500 ppm highway diesel to the older technology vehicles for a few years.

This option for small refiner flexibility would be most feasible where highway diesel is distributed in a refiner's local area. As the fuel is piped or barged to remote locations, it may become more difficult to ensure proper segregation and labeling. However, initial information indicates that most small refiners distribute highway diesel in a fairly local area; only a few small refiners distribute highway diesel via pipeline or barge.⁵ Even those small refiners who distribute highway diesel via pipeline or barge also distribute fuel to the local area.

The Panel requested feedback from small entities on how best to prevent misfueling and contamination of the low sulfur fuel under this approach for small refiner flexibility. The program would need to be structured with certain safeguards to prevent misfueling and contamination of the ultra-low sulfur fuel. Examples of such safeguards could include:

- Small refiners could make an initial demonstration to EPA of how they will ensure the fuel remains segregated through the distribution system to its end use.
- There could be some limited requirements on any entities carrying the fuel downstream of the refiner, such as a condition to keep the fuel segregated and maintain records (e.g., product transfer documents).
- Retailers who choose to sell the 500 ppm fuel could have a requirement to put labels on the pump clearly indicating that the fuel is higher sulfur and should not be used on diesel vehicles requiring the ultra-low sulfur fuel.

⁵ Information on small refiners submitted to SBA and EPA by the Gary-Williams Energy Corp. on September 9, 1999, and updated on September 15, 1999.

EPA believes that safeguards such as these would add minimal burden on any party choosing to distribute or sell small refiner diesel, but would be critical to discouraging misfueling and potential damage to new vehicles. These types of safeguards are typical of EPA fuel programs where more than one fuel is introduced into commerce.

EPA also would need to craft such a flexibility to ensure that it doesn't result in a lack of availability of ultra-low sulfur highway diesel in markets served only by small refiners. For example, it may be necessary to structure any flexibility such that it is limited only to a portion of the fuel produced, or is limited only to small refiners serving markets that are also supplied by other refiners.

3.4.2 Sell Current (500 PPM) Highway Diesel to the Nonroad or Other Markets

Although it is not a regulatory alternative *per se*, small refiners would always have the option of selling their current (500 ppm) highway diesel to the nonroad or home heating oil markets, provided those markets are not already saturated. Currently, some refiners sell highway-grade diesel for nonroad applications, to satisfy customer preferences. Rather than investing in desulfurization equipment to produce ultra-low sulfur highway diesel, some refiners might choose to produce diesel solely for the nonroad or other markets, as happened in 1993 when EPA's 500 ppm sulfur cap for highway diesel became effective. Currently, the price of highway diesel is typically approximately 1.5 to 5 cents/gallon higher than nonroad diesel, depending on the geographic area and time of year. Because 500 ppm diesel is more expensive to produce, it is at an inherent cost disadvantage in the non-road market. Notwithstanding this, small refiners are able to supply the non-road market with 500 ppm fuel where they can do so more cheaply than their larger competitors. Two Panel members question whether small refiners would be able to expand their marketing of 500 ppm fuel to non-road markets, especially given that this price differential may increase in the presence of ultra-low sulfur diesel fuel.

If given the option to continue selling 500 ppm sulfur highway fuel, as described in the previous section, a small refiner might choose to continue selling the 500 ppm fuel to local markets, and, because of the increasing difficulties in maintaining segregation as the fuel is piped/barged to more remote areas, might choose to sell the 500 ppm fuel that is sold via the pipeline to the nonroad markets.

4. Industries That May Be Subject to the Proposed Regulation

A program establishing new emission standards for heavy-duty engines and new standards for the sulfur content of highway diesel fuel would directly affect manufacturers of heavy-duty engines and petroleum refiners that produce highway diesel fuel, respectively. In addition, the program potentially could directly affect diesel distributors and marketers. EPA has not identified any manufacturers of heavy-duty engines that meet SBA's definition of a small business. EPA has, however, identified several petroleum refiners that meet SBA's definition of

a small refiner, as described in Section 4.1. EPA also has identified several thousand businesses in the diesel distribution and marketing industry that meet SBA's definitions of small business, as described in Section 4.2.

4.1 Small Refiners

EPA has identified several refiners that produce highway diesel fuel and meet the SBA definition for a small petroleum refiner (Standard Industrial Classification (SIC) 2911). According to the definition for this SIC code, a petroleum refining company must have 1500 or fewer employees to qualify as an SBA small business. Of the approximately 158 refineries in the U.S. today, EPA estimates that approximately 127 produce highway diesel fuel (i.e., less than 500 ppm sulfur content). Of those 127 refineries producing highway diesel fuel, EPA estimates that approximately 22 refiners (with a combined total of 26 refineries) have 1500 or fewer employees. Two of these refineries are currently shutdown, but expect to reopen in the year 2000. Another refiner recently announced that it plans to close its refinery.

If EPA sets new diesel fuel quality requirements, some small refiners could have relatively greater difficulty complying, compared to larger refiners, due to such factors as limited operational flexibility, limited access to capital to invest in desulfurization equipment, and lack of access to alternate crude oil feedstocks. Based on data from the Energy Information Administration (EIA), EPA estimates that the 22 small refiners comprise 3.7 percent of nationwide crude capacity, and produce 4.1 percent of highway diesel fuel.

Under the "single fuel" approach (described in Section 3.3.1), EPA would establish a regulatory requirement that refiners producing highway diesel fuel must meet a lower sulfur content level, by a specified date. Therefore, small refiners would be directly regulated under this approach.

Under the "phase-in" approach for implementing the fuel program (described in Section 3.3.2), small refiners most likely would not have a regulatory requirement to produce ultra-low sulfur fuel.⁶ Rather, they would be responding to the market's demand for low and ultra-low sulfur fuel in the same way larger refiners would. Therefore, the impact on small refiners would not be as great under the phase-in approach. Nevertheless, it is likely that small refiners would still be disadvantaged relative to large refiners, even under a phase-in, because of their smaller size, and fewer economies of scale and scope.

4.2 Small Distributors/Marketers of Highway Diesel Fuel

EPA has identified several sectors within the diesel fuel distribution industry that potentially could be directly affected by the diesel fuel rule. As discussed further below,

⁶However, small refiners would still be subject to the product standard (specifying the sulfur content of the fuel) applicable to the grade of diesel fuel they chose to produce.

different sectors of this industry would be affected differently under the single fuel approach than under the “phase-in” approach to implementing the program. Table 4.2 identifies these various sectors (by SIC code) of the distribution industry, the approximate number of entities in each sector, and the approximate percent of small businesses in each sector.

Table 4.2

Industry Category	SIC Code	SBA Definition of Small Business	Universe	
			Number of Total Entities (approximations)	Percentage that are Small Firms (approximations)
<i>Distribution Industry</i>				
Refined Petroleum Pipelines	4613	≤ 1500 employees	171	42%
Bulk Stations and Terminals (includes both bulk terminals and bulk plants)	5171	≤ 100 employees	11,350	92%
Petroleum Wholesalers: Without Bulk Stations and Terminals	5172	≤ 100 employees	4000	92%
Other Terminals: Special Warehousing and Storage	4226	≤ 18.5 million	1200	90%
Fuel Oil Dealers	5983	≤ \$9 million (annual revenue)	7000	93%
Petroleum Retailers: Service Stations	5541	≤ \$6.5 million (annual revenue)	50,000	93%
Petroleum Retailers: Truck Stops	5541	≤ \$6.5 million (annual revenue)	5,000	>50%

Under the “single fuel” approach (described in Section 3.3.1) the distribution system would experience little impact, since a single grade of highway diesel fuel would be retained. Nevertheless, retailers and distributors likely would be responsible for ensuring the ultra-low sulfur standards are met downstream of the refinery. In addition, as described in Section 3.4.1, a flexibility option allowing small refiners to continue selling 500 ppm highway diesel fuel for a period of time might be structured with certain requirements on parties downstream of the refiner to prevent contamination and misfueling. The EPA Panel member believes that such requirements would add minimal burden to any entities choosing to distribute or sell small refiner diesel fuel.

The phase-in approach (described in Section 3.3.2), likely would place a specific regulatory requirement on service stations and truck stops that sell diesel fuel, requiring them to sell the ultra-low sulfur diesel. This approach would mean that truck stops and service stations would face a business decision on whether to provide 500 ppm diesel fuel as well, or to stop selling diesel fuel. Under this approach, these businesses would have the flexibility to continue

selling 500 ppm diesel fuel (as well as the ultra-low sulfur fuel), as long as they ensure segregation of the two grades of diesel fuel. Similarly, all other entities in the distribution system (e.g., pipelines, bulk terminals, bulk plants) -- while not having a regulatory requirement to carry the ultra-low sulfur fuel -- would have to decide whether and how to carry another grade of highway diesel fuel. EPA has not yet fully determined how a regulation might be structured under the phase-in approach to ensure segregation of the two grades of highway diesel fuel. Therefore, it is possible that the regulation could place specific regulatory requirements on other entities in the distribution system as well, to prevent contamination of the ultra-low sulfur fuel.

5. Summary of Small Entity Outreach

5.1 Pre-Panel Outreach

Prior to convening the Panel, EPA had several discussions, meetings, and conference calls with small entities potentially directly affected by this regulation. Approximately six small refiners and several trade associations representing the distribution industry provided public comments on EPA's diesel fuel ANPRM (Docket number A-99-06). On September 16, 1999, EPA mailed a packet of background materials about the rulemaking to small entities. During August through October 1999, EPA had several telephone discussions with small refiners, as well as several conference calls with trade associations representing the fuel distribution industry, including the Petroleum Marketers Association of America (PMAA) and the National Truck Stop Operators Association (NATSO).

On October 28, 1999, EPA held a meeting/conference call in Arlington, VA with small entities potentially directly affected by this rulemaking, including both small refiners and distribution system representatives. EPA invited all the small refiners identified to date (i.e., not only the recommended SERs) as well as small businesses and trade associations representing the diesel distribution and retail industries. EPA sent an additional package of background materials to the invited small entities on October 26, 1999. EPA presented an overview of its plans for the proposal and options being considered for small refiner flexibility. Small entities were also invited to provide written comments in response to the information presented at this meeting.

5.2 Panel Outreach

On November 23, 1999, the Panel sent a package of outreach materials to the SERs, which included an overview of various options for implementing a program for ultra-low sulfur highway diesel fuel, and a set of related questions (one set of questions for refiner SERs and another set for distributor/retailer SERs). A copy of the Panel's outreach materials are contained in Appendix C. On November 30, 1999 the Panel met with the SERs in Washington, DC to hear their comments on the preliminary options for regulatory flexibility that were included in the November 23 outreach materials. These options are summarized in Section 7 below. A summary of this meeting is contained in Appendix A. The Panel asked the SERs to submit any

written comments by December 14, 1999. A full set of the written comments received by the SERs is contained in Appendix B.

One of the small refiner SERs, the Gary-Williams Energy Corporation, invited the Panel to tour its refinery in Wynnewood, Oklahoma. Several representatives of Panel members conducted this site visit on December 17, 1999, and were pleased to have this excellent opportunity to visit a small refinery. In addition to touring the refinery, Gary-Williams also arranged with one of its jobbers a tour of a local truck stop. These site visits were valuable for representatives of the Panel members to see first hand how a small refinery and a truck stop operate. The refinery tour included all key refinery processes, as well as tank farms and the “rack” where products are distributed into transport trucks. The Panel thanks the Gary-Williams Energy Corporation for all its efforts in planning these site visits, and for their hospitality during our trip.

6. Small Entity Representatives

EPA, in consultation with SBA, invited the following Small Entity Representatives (SERs) to participate in its SBREFA process.

Table 6.0

Company	SER	Location
<i>Refining Industry</i>		
Age Refining	Bill Wiedenfeld	San Antonio, TX
Frontier Refining	Gerry Faudel	Cheyenne, WY
Gary Williams Energy	Sally V. Allen	Denver, CO
Golden Bear Oil Specialties	Jerry L. Davis	Oildale, CA
Kern Oil & Refining Co.	Chad Tuttle	Bakersfield, CA
Petro Star	Jim Boltz	Anchorage, AK
Placid Refining Co.	Ronald D. Hurst	Dallas, TX
San Joaquin Refining	Ed Starbuck	Bakersfield, CA
Transworld (Calcasieu Refining Co.)	Rod Nelson	Houston, TX
U.S. Oil & Refining	Al Cabodi	Tacoma, WA

Western Independent Refiners Association (WIRA)	Craig A. Moyer	Los Angeles, CA
<i>Distribution/Retail Industry</i>		
Petroleum Marketers Association of America (PMAA)	John J. Huber	Arlington, VA
Inland Oil Company	Gerry Ramm (PMAA Chairman of Motor Fuels Committee)	Ephrata, WA
Eastern Petroleum Corp.	Harry Younglin (Service Station Dealer)	Anapolis, MD
National Association of Truck Stop Operators (NATSO)	Jason M. Lynn	Washington, DC
Voss Oil Inc.	Paul Rogers (Truck Stop Operator)	Cuba, MO
B-B-F Oil Co.	Bill Ferren	Pine Bluff, AR

7. Summary of Comments from SERs

Several SERs provided comments on the Panel's outreach materials. Table 7.0 provides a record of these comments. In reaching out to the SERs, the Panel asked them to provide both general information about their businesses and operating conditions and specific information about how the two approaches under consideration for implementing a diesel fuel standard would affect them. The Panel also asked the SERs for their comments on flexibility options under consideration, as well as for any recommendations as to additional flexibilities that the Panel should consider. (A copy of the Panel's outreach package to the SERs is contained in Appendix C) The remainder of this section summarizes the main issues raised by SERs in their written comments, as well as information conveyed during meetings with the Panel. The complete written comments are provided in Appendix B.

Table 7.0.

Name	Organization	Date Received	Number of Pages
Al Cabodi	U.S. Oil & Refining	12/14/99	6
Jerry L. Davis	Golden Bear Oil Specialties	12/14/99	4
Ronald Hurst*	Placid Refining	12/14/99	15
Jason M. Lynn	NATSO	12/14/99	7

John Huber	PMAA	12/14/99	16
James F. Boltz	Petro Star	12/14/99	5
Gerry Faudel	Frontier Oil	12/14/99	9
Ronald W. Williams*	Gary-Williams Energy Corp.	12/14/99	16 (+2 page cover letter)
Sally Allen	Gary-Williams Energy Corp.	12/17/99 (during site visit)	16 (Presentation slides)
Al Cabodi	U.S. Oil & Refining	01/10/00	1
Sally Allen (on behalf of small refiners)	Gary-Williams Energy Corp.	01/11/00	6
Craig Moyer	Western Independent Refiners Association	01/11/00	1

* Submitted Confidential Business Information

7.1 SER Comments: Number and Types of Entities Affected

There are approximately 22 refiners (with 26 refineries) who meet SBA's definition of a small refiner (i.e., 1500 or fewer employees).

NATSO represents truck stop operators, many of which are small businesses. PMAA provided information about their member companies. PMAA represents nearly 9,000 independent petroleum marketers, who distribute 50% of the diesel fuel sold in the U.S. Its members also sell diesel fuel at truck stops, service stations and deliver fuel to other customers.

7.2 SER Comments: Potential Reporting, Recordkeeping, and Compliance Requirements

Generally, the SERs did not identify any particular issues regarding reporting, recordkeeping or compliance requirements associated with the single fuel approach to the proposal. However, both refiner SERs and retailer/distributor SERs did raise concerns about an availability requirement in the context of a phase-in approach to the proposal.

Regarding the issue of preventing misfueling under a single fuel approach, with a flexibility option in which small refiners would be able to continue selling their existing 500 ppm fuel to the highway market, PMAA commented that retailers would be willing to label their 500 ppm pumps as higher sulfur. However, PMAA also commented that labeling would not be sufficient to prevent misfueling, and suggested that trucks would need to be tested at weigh stations to ensure they had the proper fuel. PMAA further suggested that in metropolitan areas

without weigh stations or other normal checkpoints, EPA should inspect trucks. NATSO also suggested that labeling would be insufficient, but not because truckers would deliberately misfuel. Rather, NATSO suggested that there could be an incentive for some “bad actors” among retailers to mislabel, in order to maintain market share. PMAA seems to agree with this, commenting that cheating would likely occur and be difficult to detect, if the price differential between 500 ppm and ultra-low sulfur fuel were significant. (However, PMAA and refiners noted that there were few bad actors in the reformulated gasoline program because of stiff penalties associated with violations.)

PMAA commented that marketers do not support the use of special nozzle interfaces to prevent misfueling, due to the expense and logistical problems it would create. In this SER’s view, reducing the nozzle size would be especially problematic, since it would require volume reductions, which will slow down fueling and thus increase wait times at service stations. PMAA also suggested that EPA would need to take significant enforcement action in local areas where the 500 ppm fuel is sold. PMAA has stated that it believes that if such enforcement were directed at retailers, it would probably discourage sale of the 500 ppm fuel; alternatively, if enforcement was directed at truckers, retailers would continue to sell the 500 ppm fuel.

7.3 SER Comments: Related Federal Rules

Several small refiners commented that, to stay in business, they would have to make substantial investments to comply with EPA’s proposed gasoline sulfur control program (\$100 million according to one SER, depending on flexibility provided in the final rule), at the same time they would be expected to make substantial investments in order to comply with this rule. They commented that they may be unable to do both. However, one small refiner, which also produces both gasoline and highway diesel fuel, stated that the low sulfur gasoline requirements will have no effect, since this refinery already makes low sulfur gasoline. Several small refiners also noted that they have recently made substantial investments and operational changes to meet requirements for reformulated gasoline, and that, in 1993, they made changes to comply with requirements for 500 ppm highway diesel fuel (or, in the case of California small refiners, 500 ppm diesel fuel for both highway and nonroad equipment uses).

Several small refiners also commented that potential future requirements for nonroad diesel sulfur control would involve additional substantial investments. They stated that it is important to know now what standards will be proposed for nonroad diesel fuel. Two small refiners indicated that this information would be a major factor in designing new, or modifying existing, technology to desulfurize highway diesel fuel.

Refiner SERs also commented that other federal environmental regulatory programs -- including Maximum Achievable Control Technology (MACT) standards for petroleum refiners, Clean Water Act requirements, and the new ozone and particulate matter National Ambient Air Quality Standards -- could significantly increase their overall compliance costs.

Some refiner SERs expressed concern that they might have to obtain or modify their permits to construct and operate certain equipment. One small refiner stated that environmental permitting for ultra-low sulfur projects must be timely. Another was concerned that the increase number of state permits, to address this and the gasoline sulfur rule, could slow down the process and cause delays in construction. Yet another mentioned that conventional hydrotreating is extremely energy intensive and would require a major increase in the allowable air emissions under the refinery's air permit.

The following comments would be pertinent to the approach of "phasing-in" a second grade of highway diesel fuel:

The distributor/retailer SERs commented that a phase-in approach would come on the heels of the industry's compliance with EPA's Underground Storage Tank (UST) program. NATSO commented that small truck stop operators are heavily mortgaged as a result of significant expenditures made to comply with the UST program. PMAA also commented that the industry has just completed a massive removal and replacement of tanks and pumps to comply with EPA's UST program. PMAA noted that it would not be feasible to take stations out of service to break concrete to install new tankage, piping or pumps. PMAA believes that marketers do not want to install an extra tank because of the environmental liability and insurance, and will do everything possible to avoid this scenario. PMAA also noted that the UST program contributed to the elimination of millions of tanks, and resulted in fewer retail stations.

Further, responding to the question of whether it would be feasible for retailers to install above ground tanks, NATSO commented that the use of above ground tanks requires compliance with Spill Prevention Control and Countermeasure (SPCC) rules and often is subject to local fire and related code restrictions, needing permits.

7.4 SER Comments: Costs and Financing

7.4.1 Small Refiners

Four small refiner SERs provided information on the costs of complying with various sulfur caps for highway diesel fuel. Some of these cost estimates included capital as well as increased annual operating and maintenance expenses. The cost estimates vary widely from refiner to refiner, depending largely on their current refinery configurations. For one small refiner, estimates of capital costs ranged from "unknown, may not be feasible" to \$2 million for a 40 ppm cap. This SER commented that it would cost an additional \$2 million to meet a 30 ppm cap (for a total of \$4 million) and an additional \$6 million to reach 15 ppm. For the same small refiner, estimates of increased annual operating costs ranged from a total 10 cents/gallon (c/g) for a 15 ppm cap to 2 c/g for a 40 ppm cap. Increased annual maintenance costs ranged from a total of \$850,000/year for a 15 ppm cap to \$100,000/year for a 40 ppm cap. Another SER noted that these same cost estimates are roughly applicable to Western Independent Refiners Association (WIRA) members. This SER further noted that WIRA members believe that the operating costs

of reducing sulfur from 30 to 20 ppm could be 7 c/g greater (9 to 11 c/g, total) than estimated by the above SER.

A second small refiner estimated capital costs in the range of \$10 million to achieve a 30 ppm cap, and operating and maintenance costs of only slightly higher than currently levels, but higher costs for lower cap levels. For a third small refiner, it would cost \$34 million to reach 50 ppm and an additional \$6 million to reach 5 ppm. This same refiner estimates that the annual operating and maintenance costs of achieving 50 ppm would be \$3.9 million and an additional \$1.2 million to reach 5 ppm. Included in these estimates are the costs for this small refiner to desulfurize off-highway diesel as well as on-highway diesel fuel. A fourth small refiner estimated it would cost between \$30 million and \$40 million in additional capital investments to reduce the sulfur content of its product below 50 ppm. This SER (located in Alaska) also noted that there would be additional costs associated with sulfur disposal, since there are no local markets for sulfur and it would be very expensive to transport and sell it to more distant markets. A fifth small refiner did not provide estimates and the sixth indicated this SER did not have the resources to estimate the costs of meeting a sulfur cap in the range specified (5-40ppm) nor could it begin to estimate the impact until the exact sulfur level had been specified.

Small refiners also provided information on the types of equipment they would have to purchase and install to desulfurize diesel fuel at different cap levels. Each refiner's equipment needs varies widely, depending on their current configuration. Examples of such equipment (for various refineries) included a hydrogen unit, hydrodesulfurization unit, reactor vessels, recycle gas scrubbers, make up hydrogen, recycle hydrogen compressors, newer high activity catalysts, sulfur recovery units, and tail gas cleanup units. They also commented that additional equipment would be needed to meet the lower end of the sulfur cap range. Additional equipment would be needed for the increased hydrogen demand (for more severe hydrotreating) and increased pressures under which the units would have to operate (presumably exceeding design pressures of existing equipment). Such equipment (for various refineries) could include additional reactors (which could be larger or more specialized) and catalysts, additional tankage for off-spec product, additional hydrogen generation capacity, hydrogen purification, additional pumps, heat exchangers, product separator vessels, compressors and piping.

One small refiner, which does not have a catalytic reformer for making hydrogen (needed for the hydrotreating process) and thus purchases hydrogen from a third party, expressed concern that the cost of hydrogen could increase significantly due to increased demand caused by both the gasoline and diesel sulfur control rules. If the price of hydrogen increases significantly, this SER may need to evaluate technology to make hydrogen. This refiner also commented that to reduce sulfur levels in highway diesel fuel it would have to reduce the plant charge rate, which in turn could cause it to reduce production of some specialty lube oils, which also are hydrotreated. This could have significant financial impacts (reduced revenues from the specialty oil market) that far outweigh the costs of simply operating the hydrotreating unit.

Several small refiners commented that it would be difficult to recover capital costs to produce ultra-low sulfur fuel, and they expect no return on investment. They noted that

desulfurizing highway diesel to 500 ppm in 1993 did not produce a return on investment. It was a cost of staying in business, as it would be in this case too.

7.4.2 Small Distributors/Retailers

NATSO commented that the costs to replace all current 500 ppm fuel with the new ultra-low sulfur fuel would be either extremely low or none. In certain cases, it may require the purging of tanks, which is a minimal cost. PMAA commented that there would be an incremental cost for transitioning between the 500 ppm fuel and an ultra-low sulfur grade. This SER commented that emptying out the tank and diverting it to another use would cost \$75. (This assumes no unrecovered fuel costs, to the extent the marketer cannot sell the cheaper, higher sulfur diesel that was pumped out.) This SER also seemed to suggest that if the marketer chose instead to refill the tank with ultra-low sulfur fuel until the estimated sulfur level in the tanks was below the standard, it would cost \$100 in testing to determine compliance. This would not include the unrecovered fuel costs, since the marketer would have to refill the tank(s) at least once before selling the fuel at the higher price. The choice would depend on the cost differential between two fuels, as well as the relative sulfur levels. Assuming a 5,000 gallon tank, a differential of \$0.05 per gallon between fuels, and refineries produce 10 ppm below the standard, then by the third refill, the tank should have complying fuel and the cost would be approximately \$500 (\$400 in unrecovered fuel costs and \$100 in testing).

NATSO stated that it believes it would be very difficult for many truck stops to obtain the financing necessary to carry two grades of highway diesel. As mentioned above, NATSO commented that small truck stop operators are heavily mortgaged as a result of significant expenditures made to comply with the UST program, which would make it difficult to secure additional financing. In addition, NATSO's comments included several results from its 1999 survey of its membership, to inquire about expenditures which would be required in order to carry two grades of diesel fuel. From this survey, NATSO found that the vast majority of the 228 respondents could not offer an additional grade of diesel fuel (i.e., in addition to the respondents' current offering) at no additional expense. NATSO further found that nearly half of these respondents would face financial challenges (new infrastructure, etc.) of \$100,000 or more at each location, if required to carry an additional grade of diesel fuel.⁷ NATSO's survey also included a response from one of its member truck stop operators, indicating the company has just invested \$600,000 to build new diesel islands to meet EPA's 1998 deadline under the UST program. This respondent believes that adding a new grade of fuel would require new facilities (e.g., tanks, pumps, dispensers) with little, if any, hope of recovering the costs.

If a station chose to accommodate a second grade of highway diesel fuel (under a phase-in approach), PMAA commented that the station would expect to incur costs of \$100,000 for a

⁷ The Panel notes that none of the alternatives considered by the Panel would establish a regulatory requirement on retailers to carry two grades of highway diesel fuel, although retailers could choose to do so under a phase-in approach.

new tank island, tanks and pumps. PMAA stated that it believes these investments would never be recovered.

7.5 SER Comments: Factors Unique to Small Entities

7.5.1 Small Refiners

Several small refiners pointed to a number of unique factors that make complying with new diesel fuel sulfur specifications different from a larger refiner's situation. The most prevalent comment was that small refiners have limited access to capital for financing new projects. Some small refiners commented that their only option for financing is to secure bank loans. Another commented that financing from conventional bank loans is unlikely; rather, since projects are not expected to generate a return, they will likely be paid out of existing (albeit inadequate) profits. More comments related to financing are discussed in Section 7.4. SERs also noted that costs per barrel of product would be much higher than for large refiners, due to small refiners' smaller production volumes.

Small refiners also commented that they have more limited access to engineering contractor and consulting services, as they must compete with large refiners for these services. Several small refiners commented that they operate under less flexible process scenarios than do larger refiners. One refiner mentioned that an increased number of shutdowns would be needed for catalyst change outs because they only have one diesel hydrotreater.

One small refiner commented that its business focus is making industrial lubricating oils, not fuels; thus, it does not have as many options or as much equipment as do refiners that focus on fuels production. However, the small amount of diesel fuel it makes is an important part of its overall business. This refiner also is limited and highly selective in the types of crude it selects, due to unique specifications in producing lube oils.

SERs also noted that, unlike major refiners, small refiners lack sister refineries with which to exchange products and feed stocks as a means of minimizing the overall cost on the company. Small refiners typically do not own oil and gas reserves or retail networks that could facilitate shipment and control of the market. The refining segment is the most competitive in the oil and gas industry. Thus, when market conditions are poor, small refiners cannot easily turn a profit.

7.5.2 Small Distributors/Retailers

Although the Panel's questionnaire did not request specific information about the unique circumstances of small distributors and retailers, SERs noted that many small retailers are "mom and pop" type operations with limited assets. These entities would presumably have greater difficulty undertaking any kind of capital or infrastructural expense than would a larger retailer.

7.6 SER Comments: Regulatory Alternatives

7.6.1 General

A small refiner noted that the circumstances and needs of the 22 small refiners vary significantly, so that it will be difficult to devise one approach that addresses these wide-ranging needs. This commenter characterized small refiners as falling primarily into four categories (not mutually exclusive):⁸

- 1) Those that produce only or primarily nonroad diesel, currently have no desulfurization capability, and, thus, face massive capital investments (some also face gasoline sulfur standards).
- 2) Those that produce primarily highway diesel with inadequate diesel desulfurization capacity (some also face gasoline sulfur regulations).
- 3) California refiners, which already meet strict state standards (500 ppm for both highway and nonroad equipment). These refiners previously installed desulfurization equipment and will have to revamp this equipment, but face significantly less costs than companies in the first category. These refiners do not face additional federal gasoline sulfur standards.
- 4) The Alaskan small refiner, which was previously exempted from producing 500 ppm highway diesel, and thus, has no desulfurization capacity.

7.6.2 Single Fuel Approach

Refiner SERs expressed general skepticism about their ability to implement diesel fuel sulfur standards in the range under consideration by EPA. Retailer/distributor SERs favored a single-fuel approach, because such an approach would minimize the costs of the regulation to the retail/distribution industry.

7.6.2.1 Flexibility Option: Allow Refiners to Continue Selling 500 ppm Fuel to Highway Market

As described in Section 3.3.4.1, one option for small refiner flexibility under a single-fuel approach would be to allow small refiners to continue selling their current 500 ppm highway diesel, so long as this fuel remains segregated throughout its distribution and is labeled as higher

⁸ This information was presented by the Gary Williams Energy Corporation during a site visit to its refinery in Wynnewood, OK, by several representatives of Panel members on December 16, 1999. A similar, but slightly different, characterization of small refiners was submitted in Gary Williams' written comments dated December 14, 1999.

sulfur fuel at the pump. All but one of the small refiners that commented believes this option would provide little or no benefit to small refiners. Most commenters believe there will not be any remaining markets for the 500 ppm fuel, after all the large refiners begin producing ultra-low sulfur fuel. They believe it is improbable that retailers would either continue to sell only 500 ppm diesel instead of ultra-low, or that retailers would make the investments to market both grades. Small refiners based these positions on several assumptions:

- The price differential between 500 ppm and ultra-low sulfur fuel would be minimal or non-existent;
- Large refiners would flood the market with ultra-low sulfur fuel;
- Large refiners would be able to match or undercut 500 ppm fuel prices with their ultra-low sulfur fuel;
- Retailers will prefer to sell ultra-low sulfur fuel, and will have adequate supplies;
- Retailers would sell 500 ppm fuel only if small refiners could offer it at a deep discount, which would be economically damaging for the small refiner.

However, one small refiner stated that it supports this option, and would prefer that small refiners be allowed to produce 500 ppm highway fuel as long as they could find markets. Further, nearly all refiner SERs supported an unlimited small refiner exemption, so long as it is not a stand-alone flexibility option.

One small refiner SER noted that even if it decided to sell 500 ppm fuel, it would probably need to offer both grades (ultra-low and 500 ppm) at its refinery rack in order to retain market share (e.g., by purchasing the ultra-low sulfur fuel from other refiners); and, for those refiners that purchase ultra-low sulfur fuel, there would be costs of segregating fuel (additional tankage, loading rack pumps, software).

Some small refiners said that, even with this flexibility option, they would be forced to sell their 500 ppm fuel to the nonroad market. Some believe that many refiners would choose not to desulfurize, but rather to sell to the nonroad markets, thus flooding those markets. One small refiner commented that, unless the nonroad markets were somehow “protected” for small refiners, they anticipate that the volume supplied to these markets would exceed demand and prices would drop precipitously.

One small refiner commented that, rather than marketing 500 ppm fuel directly, small refiners would be forced to sell this “unfinished” fuel to major refiners as a feedstock for further processing, at a discount.

One small refiner commented that potential markets for the 500 ppm fuel would be limited to areas where new fleet growth trails the general U.S. fleet, generally more remote areas (e.g., away from interstate traffic). This small refiner commented that potential markets for the 500 ppm fuel are limited by the turnover of the new vehicle fleet, and would probably last five to seven years. This small refiner stated that it believes small refiners should be allowed to continue selling 500 ppm diesel as long as they have a niche.

Regarding the issues of preventing contamination and misfueling, small refiners and PMAA generally agreed with maintaining segregation of the fuel, by means such as transfer documents, and with labeling the pumps at retail stations. A few refiners also suggested fuel dyeing as another means to prevent misfueling.

Regarding the issue of potential shortages for ultra-low sulfur fuel in some areas (where small refiners market solely 500 ppm fuel), most small refiners did not believe there would be supply shortages in their area, given the market share or available supply from larger refiners. However, Frontier Oil (in Cheyenne, Wyoming) did identify the potential for shortages of ultra-low sulfur diesel, especially in Eastern Wyoming. It noted that there would need to be incentives for small refiners to supply the demand for ultra-low sulfur diesel fuel to the truck stops along the I-80 corridor of Wyoming.

PMAA stated that it believes marketers would have limited interest in selling two highway diesel fuels, unless there was a guaranteed discount. However, most marketers do not anticipate a significant price differential and, thus, would opt to sell the ultra-low sulfur fuel in order to provide service to the entire market. PMAA noted that any discount of the 500 ppm fuel (to the highway market) would be limited, because if it was too substantial, refiners would opt to move the fuel to the nonroad market. PMAA believes the market for small refiners' 500 ppm fuel would last as long as there is a price differential (e.g., if the price differential were a few cents, the market might last a period of years). PMAA believes the time period of the full transition to ultra-low sulfur would be a function of the price differential. However, PMAA could not speculate on what the price differential might be, and commented that the market would decide.

NATSO stated that it believes there likely would be small potential markets for small refiners' 500 ppm fuel, although the size and nature of these markets is difficult to determine at this time. NATSO commented that smaller, local fleets (that don't travel outside a specific regional area) likely would still be a market for the 500 ppm fuel for a greater period of time. However, NATSO also noted that, if a truck stop operator chose only to carry the 500 ppm fuel, with the ultra-low sulfur fuel in the market, the operator would turn away a significant segment of customers.

7.6.2.2 Flexibility Option: Delay Diesel or Gasoline Compliance Dates

Several of the small refiners that produce both gasoline and highway diesel fuel offered proposals for more flexibility under the gasoline sulfur compliance dates, if they agree to desulfurize diesel fuel in the same timeframe as large refiners (mid-2006). These refiners claimed that being faced with desulfurizing both gasoline and diesel in the same relative timeframes will pose substantial financial hardship, and they will not be able to obtain financing for both projects simultaneously. One small refiner claimed that having to invest in both gasoline and diesel desulfurization at the same time would force it to shut down its refinery. Another suggested that desulfurizing both fuels in the same timeframe would present a challenge

to stay in business. Some refiners stated that the gasoline sulfur program will be more expensive than the diesel program, so they would prefer to comply with diesel first and have more time to produce low sulfur gasoline (and also more time to take advantage of the newer, less expensive gasoline desulfurization technologies). One suggested that small refiners might be allowed to select one of the two products to desulfurize first, based on the net reduction of sulfur in the fuels and estimated net improvement in vehicle emissions.

Small refiners presented several suggestions relating to delaying compliance with the gasoline sulfur standards for those refiners that commit to producing ultra-low sulfur diesel in mid-2006. These ideas included:

- A two year delay in the implementation of the gasoline sulfur program (including the interim standards, which take effect in 2004);
- A “guaranteed” hardship extension under the gasoline program, for two to four years, which would delay compliance with the final gasoline sulfur standards (30 ppm average; 80 ppm cap) until 2010 or 2012;
- A delay in both the interim and final gasoline sulfur standards until 2010, with refiners remaining at their baseline gasoline sulfur levels during that time; and
- “Greater than one-to-one credits” for the sale of low sulfur gasoline, which could help defray the costs of diesel desulfurization.

Nearly half of the refiner SERs supported the third idea above, combined with a 50 ppm cap (discussed below) on sulfur in diesel fuel for small refiners (in addition to other flexibility options).

7.6.2.3 Flexibility Option: 50 ppm Cap for Small Refiners

Nearly every refiner SER supported a sulfur cap of no lower than 50 ppm for small refiners (regardless of the level of the overall sulfur cap EPA eventually proposes), for an unlimited time, in addition to other options for small business flexibility. They believe that because small refiners produce only about four percent of the nation’s highway diesel fuel, the 50 ppm fuel could be blended with the rest of the fuel pool with no impact on engine technology. The SBA Panel member notes that, in its independent communications with small refiners, they implied that there would be less support for such a flexibility if associated with certain testing and labeling requirements; apparently, there would be no support for it if there were requirements to segregate 50 ppm fuel from the ultra-low sulfur fuel. They also expressed strong concerns about costs of achieving more stringent levels, as noted in Section 7.4 above.

Several refiner SERs and PMAA expressed concerns about the robustness of diesel aftertreatment technologies under consideration. From a liability standpoint, one SER could not believe that engine manufacturers would produce technologies so fragile (in terms of sulfur

sensitivity). Another refiner SER suggested that EPA take a hard look at whether engine manufacturers can create more robust technologies that would allow the fuel sulfur content to be higher, and thus allow and encourage the development of more energy efficient desulfurization technologies. This SER stated that it believes tight time schedules and unnecessarily low sulfur specifications will impede efforts to adopt energy efficient desulfurization technologies. This SER noted that new biotechnologies for desulfurization are expected to be more energy efficient and environmentally friendly than conventional technologies. This SER further noted that the Panel has not explored the tension between conventional hydrotreating and greenhouse gas concerns.

7.6.3 Phasing In a Second Grade of Highway Fuel

7.6.3.1 General

While generally unsupportive of a phase-in approach with a universal availability requirement, some refiner SERs supported other phase-in approaches, as discussed further in the sections below. Several small refiner SERs commented that a phase-in approach would provide greater flexibility than a single-fuel approach with the small refiner flexibility option discussed in Section 7.6.2.1 above, provided that some way could be found around a universal availability requirement. These SERs argued that most retailers and distributors, if required to carry ultra-low fuel, would carry only ultra-low fuel. Some refiner SERs were somewhat supportive of a phase-in with a production requirement (e.g., refineries must produce or carry some ultra-low sulfur diesel at each refinery, but small refiners are exempt from such a requirement), though at least one refiner SER opposed this approach. One small refiner commented that a better approach would be to allow retailers to decide which fuels to sell based on market forces -- i.e., phasing in the fuel on a market-wide basis without an availability or production requirement. Another small refiner stated that it believed that such a market-based approach would be beneficial to small refiners. Yet another agreed that this would be the best approach and would allow true market forces to dictate availability and price. This small refiner also acknowledged that this approach could result in potential supply problems in some areas of the country.

One SER representing several small refiners noted that under a phase-in, the ultra-low sulfur fuel would likely command a premium price, increasing the likelihood that refiners who moved quickly to produce this fuel would recover their investments. This SER noted that a phase-in, if structured properly, could actually provide market opportunities to some small refiners.

Some small refiner SERs commented on the uncertainties associated with a phase-in approach. One small refiner noted that, without provisions to ensure viability of its existing markets for 500 ppm fuel, it would not be able to take the risk of waiting too long to desulfurize and would have to make the business decision to desulfurize at the same time as all other refiners. Another small refiner SER commented that it could not decide to delay investments for the ultra low sulfur diesel unless it were confident that there would be an adequate market for 500 ppm diesel during the phase-in period. This small refiner noted that once a decision to make

the ultra low sulfur diesel is made, a two to three year period would be required before production could begin.

The distributor/retailer SERs strongly opposed phasing in an additional grade of highway diesel fuel. PMAA commented that the phase-in approach has strong potential to be adverse to small business, since 90 percent of marketers are small businesses. PMAA stated that it strongly believes that service stations do not have the ability to handle a second fuel. NATSO strongly urged the Panel to recommend to EPA to abandon the phase-in approach in favor of a single fuel approach that would maintain a single grade of highway diesel, because of the marketplace disruptions they believed would result from phasing-in ultra-low sulfur diesel fuel. NATSO commented that the vast majority of truck stops, many of which are small businesses, are designed to deliver a single grade of diesel fuel, and adding a second grade would involve tremendous costs. It should be noted that, subsequent to their written comments, NATSO and PMAA clarified that they would still oppose a phase-in even if small businesses were exempt from an availability requirement.

7.6.3.2 Availability Requirement, But No Production Requirement

The Panel asked SERs to comment on a phase-in approach that included a requirement that all retailers marketing diesel fuel carry the ultra-low sulfur grade of diesel. Under such a “universal” availability requirement, a phase-in would not include a production requirement on refiners. Small refiner SERs and distribution/retail SERs did not support this option. As noted above, the retailer/distributor SERs strongly opposed an availability requirement. They believe this option is unrealistic and unworkable. Most refiner SERs strongly believe that most retailers would not carry two grades of highway diesel fuel, but rather would switch over to the ultra-low sulfur grade to avoid the expense of installing separate tanks and pumps. Small refiners commented that large refiners would likely flood the market with ultra-low sulfur diesel, and small refiners would have to discount their 500 ppm fuel to such an extent that it would no longer be profitable.

7.6.3.3 Production Requirement, But No Availability Requirement

The Panel also asked SERs to comment on a phase-in approach that would have a refiner production requirement in lieu of a retailer availability requirement. Two small refiners indicated that some version of this approach would be preferable to the other single-fuel and phase-in flexibility options presented. One commented that a production requirement for major refiners, with an exemption for small refiners, could give small refiners the flexibility to be competitive and remain in the diesel business. This refiner believes that market supply/demand forces should make the ultra-low sulfur fuel available, but there is a question of timeliness and potential shortages. However, this refiner suggests that a combination production requirement and availability requirement for “large” retailers (e.g., those with volume of 250,000 or more gallons/month) would minimize supply problems. This refiner believes that a production requirement for all non-SBREFA refineries should ensure availability of the ultra-low sulfur fuel.

Another refiner SER noted that a production requirement, from which small refiners were exempted, augmented by a credit trading program, could create a niche market for ultra-low-sulfur fuel in the early years. Small refiners would have an opportunity to enter this market and sell credits to larger refiners.

One small refiner SER commented that it does not believe a production requirement is workable. It has only one refinery, and could not choose between desulfurizing one plant and delaying another. This refiner cannot foresee that any other refiners would agree to produce and/or sell to them their share of the production requirement at a reasonable price.

Another small refiner suggested that, if a production requirement were implemented by means of a credit system, small refiners should be awarded sufficient credits so they would not have to purchase them from large refiners. This SER suggested that EPA should not create a situation in which small refiners lacking ability to install desulfurization capacity would have to pay large refiners having such ability.

7.6.3.4 Product Standard (No Regulatory Requirements for Production or Availability)

The Panel also asked small refiners to comment on a product standard that would not be accompanied by either a production or availability requirement. One small refiner stated that it believes that this is the best approach, and would allow true market forces to dictate availability and price. This refiner believes that refiners and marketers would invest to produce ultra-low sulfur diesel and have the fuel available at “strategic” outlets to take advantage of a premium product/price scenario. This refiner acknowledged that it cannot offer suggestions to avoid potential supply problems in some parts of the country.

Another small refiner stated that it believes a better approach would be to allow retailers to decide what fuels to sell based on market forces. A third refiner SER expressed skepticism about the ability of this approach to address the needs of diesel engines.

7.6.4 Credit/Trading Programs

One small refiner suggested two forms of credit/trading programs within the context of this rule, described below:

1) Government small refiner credit/allowance program. EPA would issue a certain number of credits with a specified value that would be available only to small refiners. The pool maximum might, for example, be established at 50% of small refiners highway diesel sulfur baseline levels. Credits/allowances might be distributed on a pro rata or some other equitable basis to qualified small refiners or might be tied to the refiner’s anticipated cost of compliance. Bonus credits could be available for small refiners meeting ultra-low sulfur targets early. With this price certainty, small refiners would be better able to decide whether to desulfurize early in

order to earn credits or whether to purchase credits and delay desulfurization until financing, engineering, etc. were more feasible.

2) Mandatory refiner exchange program. Large refiners would be required to phase in ultra-low sulfur diesel by a designated percentage on an industry wide pooling basis or company by company. Small refiners would be required to meet the final sulfur target two to three years after the final large refiner deadline. During the period between the initiation of the large refiner phase-in and the small refiner deadline, small refiners would have a mandatory call on perhaps 20% of total large refiner ultra-low production for which the small refiner would exchange its low sulfur diesel on a barrel for barrel basis. As a result, small refiners would have access to ultra-low fuel to meet local market demand and large refiners would be discouraged from flooding all markets with ultra-low in order to drive the small companies out of business.

7.6.5 Delayed Compliance Date

Several small refiners requested that EPA consider a delayed compliance date, but some argued that they only desired a delayed compliance date if it was for the entire industry. These small refiners generally contend that the additional time would allow them to research the processing needed to meet the new fuel specifications and obtain engineering services, air permits, and financing. One small refiner commented that it would be difficult to compete for engineering contractors with larger refiners, which monopolize these services due to the larger scale and higher price of their projects. However, one small refiner commented that a delayed compliance date would probably not be helpful in obtaining financing.

One small refiner commented that a short compliance time frame would prevent small refiners from benefiting from new technology that might be developed and/or tested by major refiners. This refiner points out that small refiners could be faced with having to take the lead in construction and technology development, yet they have limited resources and no room for error. Another small refiner noted that a delayed compliance date also would help refiners develop desulfurization technologies in a more environmentally beneficial and cost effective manner.

As noted in Section 7.7.2.3, several small refiner SERs also endorsed the idea of a delayed compliance date for the gasoline sulfur standards in exchange for early or timely compliance with the diesel fuel standards under consideration

7.6.6 Financial Assistance

On the basis of preliminary cost information, many small refiners believe that they cannot finance diesel hydrotreating within the next ten years. Most companies have not yet analyzed their costs in detail, and were reluctant to estimate the investment required. More information on cost estimates is provided in Section 7.4. Many small refiners noted that they also are subject to gasoline sulfur standards and, thus, will face simultaneous major capital investments and increased operating costs.

Small refiners recognized that EPA does not have taxing authority, but recommended several ways that EPA might be able to assist. Such suggestions included:

- A budget request for a special appropriation that could be allocated to small refiner desulfurization research and grants, loans or loan guarantees;
- EPA support of tax incentives, such as investment tax credits, through tax legislation to be considered by Congress, as has been done in some European countries to spur a more rapid move toward lower sulfur fuels;
- EPA endorsement of state tax and other financial incentives, such as property tax relief, income tax credits, or loan guarantees for environmental equipment required by law but not enhancing profitability.
- EPA endorsement of a small assessment (managed through a trust) to be levied on manufacturers of sulfur-sensitive diesel engines, which could then be available to small refiners to offset the costs of desulfurization.

A few small refiners recommended that EPA adopt, extend, or recommend a program similar to section 410(h) of the Clean Air Act. This section of the Act relates to the 500 ppm sulfur cap for highway diesel fuel (effective in 1993) and allows small refiners (as defined in section 410(h)) to recoup some of their compliance costs under that regulation. Under section 410(h), small refiners were issued sulfur dioxide allowances under the acid rain program, based on the amount of diesel fuel they desulfurized. These allowances could then be sold or banked for sale at a later time to help defray the extra burden placed on small refiners to comply with the 500 ppm sulfur cap. Some refiners commented that, similar to the situation in complying with the 500 ppm cap in 1993, any new fuel sulfur standards will cost small refiners more on a per barrel basis for both capital and operational expenditures, as the amount of fuel produced by small refiners is significantly less than the amount produced by larger refiners.

In addition to other small business flexibilities mentioned above, refiner SERs expressed virtually unanimous support for the following options:

- 1) A \$0.03/gallon income tax credit for small diesel refiners for a limited time (e.g., from 2006-2009) to defray costs of an investment in desulfurization technology for diesel fuel.
- 2) An increase in the SBA maximum loan guarantee on pollution control loans from \$1 million to \$5 million.

Refiner SERs were concerned that small refiners have limited access to capital for financing new projects and that their only option for financing is to secure conventional bank loans, which they believe is unlikely, since projects are not expected to generate a return. Refiner SERs also commented that they need certainty as to their regulatory requirements, and any flexibilities, well in advance of compliance dates so that they can seek financing. They argued that these two options would help small refiners to secure loans with some certainty and finance desulfurization equipment for diesel fuel.

7.6.7 Nonroad Diesel Markets for Small Refiners

One small refiner suggested it could sell its current 500 ppm fuel into the nonroad markets and, thus, delay desulfurization investments if it had some certainty that the nonroad market would remain unregulated for a specified period of time. This SER suggested allowing only small refiners to continue selling nonroad fuel on a tax-exempt basis. (Nonroad fuel is now dyed red and is exempt from federal and state highway taxes.) Under this idea, larger refiners would be required to charge or pay federal highway taxes for which they or their customers could later be reimbursed from the appropriate government agency. It was suggested that this approach would encourage nonroad customers to buy fuel from small refiners, to avoid the hassle of paying taxes or applying for reimbursements.

Another SER commented that it would probably not be able to move all of its 500 ppm diesel into the nonroad market without incurring serious economic penalties. This SER expressed concern about the potential for regulating sulfur levels of nonroad diesel fuel and believes it is critical to know what the sulfur content of nonroad diesel will be, in order to be able to plan in advance.

8. Panel Findings and Discussion

During this process, the Panel has presented and sought input from the SERs on two key approaches to implementing a program for ultra-low sulfur highway diesel fuel: the single fuel approach and the phase-in approach. Both approaches are described in Section 3.3. Recommendations with respect to these approaches are presented below in Sections 8.1 and 8.2 respectively.

Some Panel members note that the recommendations below need not be considered exclusive to the approaches under which they are discussed. For example, if a temporary waiver such as that described in 8.1.4.2 could be deemed appropriate in the context of a phase-in approach, these Panel members would encourage EPA to consider that option in the context of the phase-in approach as well.

8.1 Single Fuel Approach

8.1.1 Number and Types of Small Entities

For a complete description and estimate of the small entities to which the proposed rule likely would apply, see Section 4. Under a single fuel approach to implementing the fuel program, refiners would be directly regulated. There would likely be some, fairly minimal, regulatory requirements on parties downstream of the refineries (e.g., distributors and retailers) related to segregating the fuel and preventing contamination and misfueling. However, the compliance provisions for downstream parties would be basically consistent with those in place

today for other fuel programs, including the current highway diesel fuel program, and are not expected to impose significant new burdens on small entities.

8.1.2 Potential Reporting, Recordkeeping, and Compliance Requirements

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 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 vehicle 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 500 ppm highway diesel regulation. For example, recordkeeping likely would involve the use of product transfer documents, which are already required under the 500 ppm sulfur rule (40 CFR 80.29(c)). It should be noted that this current requirement for product transfer documents applies only to dyed highway fuel, but EPA currently plans to propose the use of product transfer documents for all ultra-low sulfur fuel.

If EPA adopts a provision allowing small refiners to continue selling 500 ppm fuel to the highway market for a limited time (see Section 8.1.4.1), there would likely need to be certain safeguards to prevent contamination of the ultra-low sulfur fuel, and to prevent misfueling of new vehicles (to prevent potential damage to the emissions control equipment or even the vehicles). 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).

8.1.3 Relevance of Other Federal Rules

The regulations EPA expects to propose would be similar in many respects to the existing sulfur standard for highway diesel fuel, but with a lower sulfur standard. 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 recently promulgated gasoline sulfur control requirements in approximately the same timeframes as the standards under consideration for highway diesel fuel.⁹

The Panel also notes that more stringent diesel sulfur standards would likely require many 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.

⁹ These rules were included in the Tier 2 regulations setting light-duty vehicle and light-duty truck emission standards signed by EPA Administrator Carol Browner on December 21, 1999, and published in the *Federal Register* on February 10, 2000 (65 Fed. Reg. 6698).

8.1.4 Other Regulatory Alternatives: Burden Reduction Approaches that Would Provide Flexibility to Small Refiners

The Panel considered a range of options and regulatory alternatives for providing small refiners with flexibility in complying with new sulfur standards for highway diesel fuel. As part of the process, the Panel requested and received comment on several early ideas for flexibility 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 discusses these options in more detail below.

8.1.4.1 Continue Selling 500 ppm Fuel to Highway Market

The Panel recommends that EPA seek comment on an option for small refiner flexibility that would allow small refiners to continue selling their current 500 ppm highway diesel, provided there are adequate safeguards to prevent contamination and misfueling. Under this approach, retailers would not have an availability requirement; rather, retailers would be free to choose to sell only 500 ppm fuel (from small refiners), only ultra-low sulfur fuel, or both. The Panel recognizes that refineries owned by small businesses could experience more difficulty in complying with the standards on time because, as a group, they have less ability to raise capital necessary for desulfurization investments, face proportionately higher costs due to economies of scale, and may be less successful in competing for limited construction and engineering resources. This option effectively delays the ultra-low sulfur compliance date for small refiners, and allows them to continue selling their current fuel to the highway diesel market.

The Panel received many SER comments about this approach. At least one small refiner (Petro Star, located in Alaska¹⁰) supports this option, for an unlimited time. Other small refiners expressed the concern that they would not be able to find markets for the 500 ppm fuel once large refiners begin producing exclusively ultra-low sulfur highway diesel (i.e., as soon as the rule were implemented under the single fuel approach). However, nearly every refiner SER supported an unlimited small refiner exemption, so long as it was not a stand-alone flexibility option. Those small refiners doubtful of continued 500 ppm markets think it is unlikely that retailers would either continue to sell only 500 ppm diesel instead of ultra-low sulfur, or that retailers would make the investments to market both grades. Their key assumption is that there would be no price differential between the ultra-low sulfur fuel and the 500 ppm fuel and, thus, no incentive for marketers to want the “old” fuel. Refiner SERs have noted that, although ultra-low sulfur fuel would be more costly to produce than the current grade, vertically integrated refiners with control over the marketing of their refinery products would have incentives to price

¹⁰The Panel notes that Alaska was exempted from earlier requirements that the sulfur content of highway diesel fuel not exceed 500 ppm (63 FR 49459). Therefore, without this (or a similar) provision, Alaskan refiners such as PetroStar would be required to reduce sulfur from uncontrolled levels to ultra-low levels.

below cost in order to eliminate the potential for niche markets that would be of value to any small refiners seeking to avail themselves of this flexibility option. PMAA commented that marketers also don't anticipate a price differential, but acknowledged that a market for small refiner's 500 ppm likely would last as long as there was a price differential.

The Panel recommends that EPA request comment on an appropriate duration for this option. For example, the Panel recommends that EPA seek comment on the need for, and appropriateness of, an unlimited exemption, as well as whether such exemption should be limited (e.g., two years, ten years, etc.). EPA's Panel member notes that by limiting this flexibility to two years, during which time the new vehicle fleet would still be relatively small, the potential for misfueling would be minimized. The EPA Panel member also questions how long this flexibility option may remain viable, since many refiner SERs commented that they do not expect markets for the 500 ppm fuel to remain after larger refiners begin producing exclusively ultra-low sulfur fuel. Nevertheless, the Panel recommends that EPA request comment on the need for, and potential impacts of, a longer exemption. A longer duration for this flexibility option would give participating refiners more time to stagger their diesel desulfurization investments. The potential vehicles affected by misfueling or contamination would still be fairly limited under this approach, since small refiners produce only approximately four percent of all the highway diesel fuel produced in the U.S. Moreover, the potential for misfueling would be further limited because most small refiners distribute highway diesel in a fairly local area. (Some small refiners, however, distribute a portion of their diesel fuel outside their local area via pipeline or barge.) An unlimited exemption would allow the market to determine the duration. There would be diminishing returns to small refiners from such an option over time, as a growing portion of the vehicle miles traveled would be from vehicles with emission control devices requiring ultra-low sulfur.

To ensure that this flexibility option does not compromise the expected environmental benefits of such a rule once it is promulgated, there would have to be certain safeguards with refiners as well as downstream parties to prevent contamination of the ultra-low sulfur fuel, and to prevent misfueling of new vehicles. For example, EPA would likely need assurances that the 500 ppm fuel remains segregated throughout the distribution system and labeled as higher sulfur fuel at pump stands.

The Panel also acknowledges that many small refiners believe this option, by itself, offers little benefit, because they don't foresee markets for the 500 ppm fuel once large refiners produce only ultra-low sulfur highway diesel. However, the Panel is interested in seeking comment on this approach because at least one small refiner strongly supports it, and because this option could potentially benefit other small refiners that were not directly involved in the Panel process. The Panel believes that seeking public comment on this option will give all small refiners an opportunity to continue exploring the extent of potential markets for the 500 ppm fuel.

8.1.4.2 Temporary Waivers Based on Extreme Hardship Circumstances

Small refiners have told the Panel that there may be no “one size fits all” approach to flexibility given the wide variety of refinery circumstances and configurations. Thus, the Panel believes that it would be appropriate for EPA to consider a case-by-case approach to flexibility in addition to other flexibility options that could mitigate the burden that the diesel sulfur standards under development could pose to small refiners. The Panel further recognizes that there may be case-by-case flexibilities that are feasible, environmentally neutral, and warranted to meet the unique needs of an individual refiner, but that, if applied across the board, might jeopardize the environmental benefits of the program. Therefore, the Panel recommends that EPA seek comment on an option that would provide a process for refiners to seek case-by-case approval of applications for temporary waivers to the diesel sulfur standards, based on a demonstration of extreme hardship circumstances. The Panel envisions that this option would be modeled after a similar provision in the recently-promulgated gasoline sulfur program. This option 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.

An example of case-by-case flexibility under this approach might be to allow a refiner to continue selling 500 ppm highway diesel fuel for a time period longer than that ultimately allowed under the flexibility option described above in Section 8.1.4.1 (that is, if such a small refiner flexibility option across the board were available only for some limited time).

Some Panel members recommended that, as another example of case-by-case flexibility, EPA specifically seek comment on whether it would be appropriate, as part of a review of a refiner’s application for hardship relief under the diesel sulfur program, to consider granting a delay of diesel sulfur standards for those refiners that agree to meet the gasoline sulfur standards under a schedule more accelerated than that required under the gasoline sulfur program. Any consideration of such delays would require full consideration of the environmental implications of such a delay, as well as of other relevant factors.

Several small refiners that also produce gasoline expressed concern about the difficulty in obtaining financing for the significant capital costs of desulfurizing highway diesel and gasoline in relatively the same timeframes. One of the small refiners commenting on this issue also suggested that small refiners might be allowed to select one of the two products to desulfurize first, based on the net reduction of sulfur produced and estimated net improvement in vehicle emissions. Some of these refiner SERs stated that they could support desulfurizing highway diesel fuel in the same timeframe as large refiners, if additional flexibility were provided under the gasoline sulfur program, which would allow them to stagger their investments. Specifically, nearly half of the refiner SERs supported a delay of the gasoline sulfur standards, in exchange for desulfurizing highway diesel on time (see Section 7.6.2.2 for more detail). EPA currently plans to explore this issue further as it develops the proposed diesel rule.

Several small refiners have noted that, without such a provision, they would face the prospect of making substantial investments in order to comply with two regulations (gasoline and

diesel sulfur programs) virtually simultaneously. Two refiners have suggested that they may shut down if financing could not be obtained.

Small refiners have also commented to the Panel that they need certainty as to their regulatory requirements, and any flexibilities, well in advance of compliance dates so that they can seek financing. Therefore, the Panel recommends that EPA also seek comments on how such a hardship provision could be administered as part of the diesel sulfur control program in a manner that provides the most certainty to small refiners as to any potential hardship relief, well in advance of the compliance deadline. Specifically, the Panel recommends that as part of this flexibility provision, EPA seek comment on an appropriate timeframe within which the Agency should respond to applications, for example, one year from the date of receipt.

EPA would need to administer any hardship provision in a manner that continues to ensure the environmental benefits of the regulation that is eventually promulgated. For this reason, recognizing the constraints it places on any flexibility, EPA currently believes that it would be necessary to segregate the fuel pool for any highway diesel fuel sold under an approved hardship waiver. Consequently, any additional compliance flexibilities would carry with them the same types of safeguards for preventing contamination and misfueling as described in the previous section. Further, to guard against a hardship provision that could have undesirable environmental impacts, EPA would need to consider whether it would be necessary to limit waivers to a minimal amount of the total national pool of highway diesel fuel, or to a minimal percentage of the highway diesel supply in an area with significant air quality problems. The size of such a limitation would need to be considered in light of any additional flexibility options provided for small refiners.

8.1.4.3 Level of the Sulfur Cap

The Panel recommends that EPA seek comment on the appropriate level of the sulfur cap. In the proposed rule, EPA will fully discuss the basis for the sulfur cap proposed, based on the needs of diesel engine technology and on the criteria mandated by the Clean Air Act. The proposed rule also will discuss fully the level of sensitivity these new emission control technologies have to sulfur in the fuel, and potential consequences of the vehicles using fuel with a higher sulfur content than the level proposed. If, after public notice and comment, EPA finds that a higher sulfur cap than the one proposed is warranted, then EPA may finalize a different level for the sulfur cap.

In addition, the Panel recommends that EPA request comment on a 50 ppm cap for small refiners, and on any underlying data and analyses that would be relevant to a decision in the final rule on whether to incorporate a 50 ppm cap. Several SERs have commented that capital, operating, and maintenance costs of meeting a 50 ppm cap are significantly less than those costs of meeting more stringent standards (see Section 7.4 for specific information on costs). (These high costs are especially burdensome, considering several small refiners also will be expected to make substantial investments to comply with the gasoline sulfur standards in relatively the same time frame). Because small refiners produce relatively smaller volumes, their capital (and other

fixed) costs per barrel produced are significantly higher than those of their larger competitors. They also cannot take advantage of the significant economies of scale that exist in the refining industry. The Panel notes that the proposed sulfur cap is a product standard and so small refiners could comply with that standard by purchasing ultra-low sulfur blendstocks to mix with the fuel actually produced within the refinery itself, rather than investing in desulfurization technology.

Some Panel members further noted that, at whatever level the sulfur cap is set, refiners would have to produce fuel with a sulfur level somewhat below the cap, given the limitations of reproducibility of the test methods, and to ensure downstream compliance with the standard. Some Panel members noted, therefore, that the average sulfur level for small refiners would most likely be below 40 ppm. In addition, these Panel members recommend that EPA explore whether an averaging, banking and trading program, appropriately structured, could be used to encourage small refiners to reduce average sulfur levels even further below 40 ppm, wherever it is inexpensive to do so.

One SER commented that small refiners produce such a small percentage of total highway diesel in the country (approximately four percent) that it could be blended within the distribution system with the remaining 96 percent of ultra-low sulfur diesel with no impact on the diesel aftertreatment technologies. However, the EPA Panel member questions whether small refiners' 50 ppm fuel could simply be "blended away" with ultra-low sulfur fuel in the distribution system (i.e., after the fuel leaves the refiner's control). Information submitted by small refiners indicates that most sell highway diesel fuel directly via the refinery rack to jobbers for distribution to local truck stops, service stations, and fleet customers. Only a few small refiners distribute highway diesel via pipelines. The EPA Panel member believes that small refiners' highway diesel fuel indeed does go directly into vehicles, and commonly would not be "blended" to a significant extent with other refiners' fuel within the distribution system (i.e., downstream of the refinery). If small refiners' 50 ppm fuel were not significantly blended to ultra-low sulfur levels within the distribution system (i.e., downstream of the refinery), based on the high sulfur sensitivity of diesel aftertreatment devices, the EPA Panel member believes this approach would not accomplish the environmental objectives of the program. Nevertheless, all Panel members agree that it is appropriate to seek comment on this approach in the proposed rule.

8.2 Phase-In Approach

8.2.1 Number and Types of Small Entities

A phase-in approach to implementing the diesel sulfur rule would affect both small refiners and downstream parties. However, under a phase-in approach, it is less likely that refiners would be subject to additional regulation except that they would still be required to meet the product standard (specifying the sulfur content of the fuel) applicable to the grade of diesel fuel they chose to produce. Instead, retailers likely would be required to make ultra-low sulfur fuel available. Retailers also would likely be required to install a nozzle interface to inhibit misfueling of advanced technology diesel vehicles.

8.2.2 Potential Reporting, Recordkeeping, and Compliance Requirements

Under a phase-in approach, there could be compliance requirements in addition to those discussed for small retailers and distributors in Section 8.1.2 (under the single fuel approach). Retailers that sell diesel fuel likely would be required to make ultra-low sulfur diesel available at their stations at the beginning of the rule's phase-in period. Under the flexibility options discussed below in Section 8.2.4, these requirements would be limited to large retailers or avoided altogether. In addition, retailers likely would be required to install unique nozzle interfaces on ultra-low sulfur diesel fuel pumps to reduce the likelihood of misfueling. Depending on how a phase-in were structured, refiners and downstream parties could also face new reporting, recordkeeping, and compliance requirements, particularly if averaging, banking and trading provisions were included.

8.2.3 Relevance of Other Federal Rules

Under a phase-in approach, EPA likely would need to adopt new availability requirements for diesel retailers that would be similar to those adopted under the unleaded gasoline rules (38 FR 1254, January 10, 1973). In addition, retailer/distributor SERs have noted that a phase-in approach may require bulk terminals, bulk plants, and those service stations and truck stops wishing to supply both ultra-low and 500 ppm diesel fuel to construct additional tank capacity. Such construction at retail outlets likely would require compliance with federal rules for underground storage tanks, promulgated pursuant to Subtitle I of the Resource Conservation and Recovery Act, and Spill Prevention Control and Countermeasure Plans (40 CFR Part 112) for aboveground tanks. There also may be local fire codes and related codes that would affect the ability of bulk terminals and bulk plants to add tanks.

8.2.4 Other Regulatory Alternatives

The Panel considered a range of options and regulatory alternatives for providing small businesses with flexibility in complying with new sulfur standards for highway diesel fuel. As part of the process, the Panel requested and received comment on several early ideas for flexibility that were suggested by SERs and Panel members. This section discusses options for a phase-in approach to implementing ultra-low diesel fuel sulfur standards put forward by some Panel members, as described earlier in Section 3.3.2. The Panel believes that while this type of approach would provide greater flexibility to small refiners, as structured, it could impose significant burdens on small retailers and distributors. The regulatory alternatives presented by two Panel members in this section are therefore focused on addressing the burden of both small entities in the retail and distribution sectors of the petroleum industry and small refiners.

8.2.4.1 Recommendations²

8.2.4.1.1 Phase-in with Small Retailer Exemption from Availability Requirement

During the Panel's outreach to SERs, it became evident that a universal requirement that retailers sell ultra-low sulfur diesel fuel wherever highway diesel fuel was sold was of great concern to SERs representing the retail and distribution sectors of the petroleum industry. Refiner SERs echoed this concern, noting that a universal availability requirement would create few incentives for retailers to sell the 500 ppm sulfur diesel fuel, obviating many of the advantages of a phase-in. (Refiners could still sell the 500 ppm fuel to centrally-fueled fleets and other commercial users who did not require ultra-low sulfur fuel; however, this would limit refiners' markets and potentially cost them market share.) At the same time, several refiner SERs commented favorably on a phase-in approach that would provide flexibility with respect to an availability requirement.

In view of these comments, some Panel members recommend to EPA that the proposed rule request comment on a phase-in approach that would adopt a requirement, from which small retailers would be exempt, that ultra-low sulfur diesel fuel be made available wherever highway diesel fuel is sold. For example, this availability requirement could be limited to truck stops (defined as more than two refueling positions for diesel fuel) selling more than 200,000 gallons per month of diesel, and to retail outlets (one or two diesel dispensers) selling more than 10,000 gallons per month of diesel fuel. These Panel members believe that such a requirement would apply to half or less of retailers and truck stops.

Retailers above these (or similar) thresholds would be required to sell ultra-low sulfur diesel fuel; however they could choose also to sell 500 ppm sulfur diesel if it were economically beneficial for them to do so. Similarly, retailers below the threshold -- including most small retailers -- could choose to supply either ultra-low sulfur or 500 ppm sulfur fuel, avoiding any need to add tankage in order to carry the likely more expensive ultra-low sulfur product. Some Panel members believe that such a more market-oriented approach would reduce costs on small businesses and would still allow the market to provide sufficient availability to guarantee that new technology diesel vehicles received the fuel they need. At the same time, only those retailers for whom it was economically beneficial would need to make investments in new infrastructure.

8.2.4.1.2 Phase-in with Production Requirement

In its outreach to the SERs, the Panel asked SERs to comment on how they might be affected under a phase-in approach relying on a production requirement rather than an availability requirement to guarantee widespread availability of ultra-low sulfur fuel during the

² Some Panel members, upon evaluating the SERs' input on a phase-in approach, has concerns that such an approach could cause unintended impacts on the diesel fuel and diesel engine markets, and undercut the environmental benefits of the program.

early years of the phase-in. Under such an approach, refiners would be required to produce a certain amount of ultra-low sulfur diesel fuel (e.g., 10 percent of highway diesel produced), which would increase during each year of the phase-in. The presumption behind this approach is that refiners, retailers and distributors would have the incentive to make the ultra-low sulfur fuel available to the vehicles that would need it. Under this alternative, retailers would not face an availability requirement, though a unique nozzle interface might still be needed to inhibit misfueling and certain requirements might be necessary to ensure mislabeling does not occur. Because many individual refineries would likely not find it economical to produce two grades of diesel fuel simultaneously, this approach would most likely need to be augmented by a credit trading system to allow refiners to meet their production requirements.

Refiner SERs also expressed interest in an alternative under which small refiners would receive an exemption from a production requirement but could still generate and trade credits. Such an approach would provide incentives to small refiners to produce ultra-low sulfur diesel fuel during the early years of the market.

Nevertheless, some Panel members recognize that this approach has potential problems that would need to be addressed during the development of a proposed and final rule, if the approach were to be adopted. For example, this approach would require that the production requirement be carefully matched to the actual fuel demand, to avoid inefficient and costly oversupply or shortages of ultra-low sulfur fuel. In addition, the approach would need to deal appropriately with refiners choosing to exit the highway diesel fuel market, who would otherwise be required by this approach to continue production or to purchase credits.

While acknowledging significant concerns with this approach, on the basis of SER comments, these Panel members urge EPA to explore this approach in completing its proposal, and to request comment on this alternative within the context of a proposal that includes a phase-in approach. In particular, these Panel members recommend to EPA that any consideration of a production requirement in the proposed rule be accompanied by a request for comment on a small refiner exemption from the production requirement, and on an averaging, banking, and trading provision that would allow small refiners choosing to comply early under a phase-in to earn credits and sell them to other refiners.

8.2.4.2 Further Analysis of Phase-in Approach

The Panel requested information from the distributor/retailer SERs on whether, under a phase-in approach, they would likely carry two grades of highway diesel fuel, and on the costs of doing so. The Panel also requested SER comments on how a phase-in could be structured differently to better ensure fuel availability, provide more certainty, better match supply and demand, and prevent misfueling. However, the Panel was only able to develop an incomplete set of data due to the nature and complexity of these issues. Further analysis is reasonably required to evaluate the full effects of a phase-in approach to this rulemaking and potentially significant regulatory alternatives under it. The Panel recognizes the difficulty in developing a complete set of information but notes the importance of the information. The Panel believes that it is worthwhile to continue to explore, through the notice and comment process, various phase-in

approaches and recommends that EPA seek comment in the proposed rule on various ways of structuring such approaches.