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Part III

Environmental Protection Agency

40 CFR Parts 80, 85 and 86

Air Pollution; Tier 2 Motor Vehicle Emission Standards and Gasoline Sulphur Control Requirements; Diesel Fuel Quality Controls; Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 80, 85 and 86

[AMS–FRL–6337–3]

RIN 2060–AI23

Control of Air Pollution From New Motor Vehicles: Proposed Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of proposed rulemaking.

SUMMARY: Today's document proposes a major program designed to significantly reduce the emissions from new passenger cars and light trucks, including pickup trucks, minivans, and sport-utility vehicles. These reductions would provide for cleaner air and greater public health protection, by reducing ozone and PM pollution. The proposed program is a comprehensive regulatory initiative that treats vehicles and fuels as a system, combining requirements for much cleaner vehicles with requirements for much lower levels of sulfur in gasoline. A list of major highlights of the proposed program appears at the beginning of **SUPPLEMENTARY INFORMATION.**

For the first time, through a phase-in, we propose to apply a single average exhaust emission standard that would cover both passenger cars and all light trucks operated on any fuel. The proposed emission levels (''Tier 2 standards'') are feasible for both types of vehicles and are appropriate since the miles traveled in light trucks are increasing and the emissions from these vehicles are thus an increasing problem. This approach will build on the recent technology improvements resulting from the successful National Low-Emission Vehicles (NLEV) program and improve the performance of these vehicles through lower sulfur gasoline.

To enable the vehicle technology and generate emission reductions from current vehicles we propose to significantly reduce average gasoline sulfur levels nationwide. Refiners would generally install refining equipment to remove sulfur in their refining processes, while importers would be required to market only gasoline meeting the proposed sulfur standards. The proposal outlines an averaging, banking, and trading program to provide flexibility for refiners and ease implementation.

This program focuses on reducing the passenger car and light truck emissions most responsible for causing ozone and particulate matter problems. Without today's action, we project that emissions from these vehicles will represent 30–40 percent of nitrogen oxides and volatile organic compound emissions in some cities, and almost 20 percent nationwide, by the year 2020.

Our proposal would bring about major reductions in annual emissions of these pollutants and also reduce the emissions of sulfur compounds coming from the sulfur in gasoline. For example, we project a reduction in oxides of nitrogen emissions of nearly 800,000 tons per year by 2007 and 1,200,000 by 2010, the time frame when many states will have to demonstrate compliance with air quality standards. Emission reductions would continue increasing for many years, reaching almost 2,200,000 tons per year in 2020. In addition, the proposed program would reduce the contribution of vehicles to other serious public health and environmental problems, including regional visibility problems, toxic air pollutants, acid rain, and nitrogen loading of estuaries.

Furthermore, we project that these reductions, and their resulting environmental benefits, would come at an average cost increase of less than $100 per passenger car, less than $200 per light truck, and an increase of less than 2 cents per gallon of gasoline (or about $100 over the life of an average vehicle).

DATES: *Comments:* We must receive your comments by August 2, 1999.

Hearings: We will hold four public hearings, on June 9–10, June 11, June 15, and June 17, 1999. EPA requests that parties who want to testify notify the contact person listed in the **ADDRESSES** section of this document two weeks before the date of the hearing.

ADDRESSES: *Comments:* You may send written comments in paper form or by E-mail. We must receive them by the date indicated under ''DATES'' above (August 2, 1999). Send paper copies of written comments (in duplicate if possible) to Public Docket No. A–97–10 at the following address: U.S. Environmental Protection Agency (EPA), Air Docket (6102), Room M–1500, 401 M Street, SW, Washington, DC 20460. If possible, we also encourage you to send an electronic copy of your comments (in ASCII format) to the docket by e-mail to A-and-R-Docket@epa.gov or on a 3.5 inch diskette accompanying your paper copy. If you wish, you may send your comments by E-mail to the docket at the address listed above without the submission of a paper copy, but a paper copy will ensure the clarity of your comments.

Please also send a separate paper copy to the contact person listed below. If you send comments by E-mail alone, we ask that you send a copy of the E-mail message that contains the comments to the contact person listed below.

EPA's Air Docket makes materials related to this rulemaking available for review at the above address (on the ground floor in Waterside Mall) from 8:00 a.m. to 5:30 p.m., Monday through Friday, except on government holidays. You can reach the Air Docket by telephone at (202) 260–7548 and by facsimile at (202) 260–4400. We may charge a reasonable fee for copying docket materials, as provided in 40 CFR part 2.

Hearings: We will hold four public hearings at the following locations:

June 9–10, 1999, Top of the Tower, 1717 Arch Street, 51st Floor, Philadelphia, PA 19103, telephone: 215–567–8787, fax: 215–557–5171

June 11, 1999, Renaissance Atlanta Hotel, 590 West Peachtree Street, Atlanta, GA, 30308, telephone: 404–881–6000, fax: 404–815–5010

June 15, 1999, Doubletree Hotel, 3203 Quebec Street, Denver, CO, 80207, telephone: 303–321–3333, fax: 303–329–5233

June 17, 1999, Holiday Inn Lakeside City Center, 1111 Lakeside Avenue, Cleveland, OH 44144, telephone: 216–241–5100, fax: 216–241–7437

Additional information on the comment procedure and public hearings can be found in **SUPPLEMENTARY INFORMATION** under Section VII, ''Public Participation.''

FOR FURTHER INFORMATION CONTACT: Carol Connell, U.S. EPA, National Vehicle and Fuels Emission Laboratory, 2000 Traverwood, Ann Arbor MI 48105; Telephone (734) 214–4349, FAX (734) 214–4816, E-mail connell.carol@epa.gov.

SUPPLEMENTARY INFORMATION:

Highlights of the Tier 2/ Gasoline Sulfur Proposal

For cars and light trucks, the proposed program would:

- Through a phase-in, apply for the first time a single average exhaust emission standard that would cover both passenger cars and all light trucks. The proposed emission levels (''Tier 2 standards'') are feasible for both types of vehicles and are appropriate since the miles traveled in light trucks is increasing and the emissions from these vehicles are thus an increasing problem.
- During the phase-in, apply interim standards that match or are more

stringent than current federal and California ''LEV I'' (Low-Emission Vehicle, Phase I) standards.

- Apply the same standards to vehicles operated on any fuel.
- Allow auto manufacturers to comply with the very stringent proposed new standards in a flexible way while ensuring that the expected environmental benefits occur.
- Build on the recent technology improvements resulting from the successful National Low-Emission Vehicles (NLEV) program and improve the performance of these vehicles through lower sulfur gasoline.
- Set more stringent particulate matter standards, primarily affecting diesel powered vehicles.
- Set more stringent evaporative emission standards.

For commercial gasoline, the proposed program would:

- Significantly reduce average gasoline sulfur levels nationwide. Refiners would generally install refining equipment to remove sulfur in their refining processes. Importers of gasoline would be required to import and market only gasoline meeting the proposed sulfur limits.
- Provide for flexible implementation by refiners through an averaging, banking, and trading program.
- Apply temporary, less stringent gasoline sulfur standards to certain small refiners.
- Enable the new Tier 2 vehicles to meet the proposed emission standards, since sulfur in gasoline degrades a vehicle's emission control performance. Lower sulfur gasoline is also important in order to enable the introduction of advanced technologies that promise higher fuel economy but are very susceptible to sulfur poisoning (for example, gasoline direct injection engines).
- Reduce emissions from NLEV vehicles and other vehicles already on the road.

Regulated Entities

This proposed action would affect you if you produce new motor vehicles, alter individual imported motor vehicles to address U.S. regulation, or convert motor vehicles to use alternative fuels. It would also affect you if you produce, distribute, or sell gasoline motor fuel.

The table below gives some examples of entities that may have to follow the proposed regulations. But because these are only examples, you should carefully examine the proposed and existing regulations in 40 CFR parts 80, 85 and 86. If you have questions, call the person listed in the **FOR FURTHER INFORMATION CONTACT** section above.

Category	NAICS Codes [a]	SIC Codes [b]	Examples of potentially regulated entities
Industry	336111	3711	Motor Vehicle Manufacturers.
	336112	.....	
	336120	.....	
Industry	336311	3592	Alternative fuel vehicle converters.
	336312	3714	
	422720	5172	
	454312	5984	
	811198	7549	
	541514	8742	
	541690	8931	
Industry	811112	7533	Commercial Importers of Vehicles and Vehicle Components.
	811198	7549	
	541514	8742	
Industry	324110	2911	Petroleum Refiners.
Industry	422710	5171	Gasoline Marketers and Distributors.
	422720	5172	
Industry	484220	4212	Gasoline Carriers.
	484230	4213	

[a] North American Industry Classification System (NAICS).
[b] Standard Industrial Classification (SIC) system code.

Access to Rulemaking Documents Through the Internet

Today's document is available electronically on the day of publication from the Environmental Protection Agency Internet Web site listed below. Electronic copies of the preamble, regulatory language, Draft Regulatory Impact Analysis, and other documents associated with today's proposal are available from the EPA Office of Mobile Sources Web site listed below shortly after the rule is signed by the Administrator. This service is free of charge, except any cost that you already incur for connecting to the Internet.

Environomental Protection Agency Web Site:

http://www.epa.gov/docs/fedrgstr/epa-air/

(Either select a desired date or use the Search feature.)

Office of Mobile Sources (OMS) Web Site:

http://www.epa.gov/omswww/

(Look in ''What's New'' or under the ''Automobiles'' topic.)

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

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I. Introduction

Since the passage of the 1990 Clean Air Act Amendments significant progress has been made in reducing emissions from passenger cars and light trucks. The National Low-Emission Vehicle (NLEV) and Reformulated Gasoline (RFG) programs are important examples of control programs that will continue to help reduce car and truck emissions into the near future.

Nonetheless, due to increasing vehicle population and vehicle miles traveled, passenger cars and light trucks will be significant contributors to air pollution inventories into the indefinite future. In fact, the emission contribution of light trucks and sport utility vehicles will likely surpass that of passenger cars within the next year. (This is occurring because of the combination of growth in miles traveled by light trucks and their less stringent emission standards compared to passenger cars). The program we describe below builds on the NLEV and RFG Phase II programs to develop a strong national program to protect public health and the environment well into the next century. The program while reducing VOC emissions focuses especially on NO_X because that is where the largest air quality gains can be achieved.

We have followed several overarching principles in developing this proposal:

- Design a strong national program to assist states in every region of the country in meeting their air quality objectives.
- View vehicles and fuels as an integrated system. Define a program that continues to ensure that car and truck emission reductions are part of the solution to our nation's air quality problems.
- Establish a single set of emission standards that apply regardless of the fuel used and regardless of whether the vehicle is a car or a light truck.
- Provide compliance flexibilities that allow vehicle manufacturers and oil refiners to adjust to future market trends and honor consumer preferences.
- Encourage the development of advanced low emission, fuel efficient technologies such as lean-burn engines.
- Ensure sufficient leadtime for phase-in of the Tier 2 and gasoline sulfur program.

With these principles as background, we turn now to an overview of the vehicle and fuel aspects of the proposal. Sections I and II of this preamble will give you a brief overview of our proposal and the basics of our rationale for proposing it. Subsequent sections will expand on the air quality need, the economic impacts, and provide a more detailed description of the specifics of the proposal. The final sections deal with several subjects, including opportunities for public participation that you may wish to take advantage of. You may also want to review our Draft Regulatory Impact Analysis (RIA), found in the docket and on the Internet, where we present more detailed analyses and discussions of many topics raised in this preamble.

A. What Are the Basic Components of Today's Proposal?

The nation's air quality, while certainly better than in the past, will continue to expose tens of millions of Americans to unhealthy levels of air pollution well into the future in the absence of significant new controls on emissions from motor vehicles. EPA is therefore proposing a major, comprehensive program designed to significantly reduce emissions from passenger cars and light trucks (including sport-utility vehicles, minivans, and pickup trucks) and reduce sulfur in gasoline. Under the proposed program, automakers would produce vehicles designed to have very low emissions when operated on low-sulfur gasoline, and oil refiners would

provide that cleaner gasoline nationwide. In this preamble, we refer to the proposed comprehensive program as the ''Tier 2/Gasoline Sulfur Control Program'' or simply as the ''Tier 2 Program.''

1. Vehicle Emission Standards

Today's action proposes new federal emission standards (''Tier 2 standards'') for passenger cars and light trucks. The program is designed to focus on reducing the emissions most responsible for the ozone and particulate matter (PM) impact from these vehicles—nitrogen oxides (NO_X) and non-methane organic gases (NMOG), consisting primarily of hydrocarbons (HC) and contributing to ambient volatile organic compounds (VOC). The program would also, for the first time, apply the same federal standards to passenger cars and all light trucks (''light light-duty trucks'' (or LLDTs), rated at less than 6000 pounds gross vehicle weight and ''heavy light-duty trucks'' (HLDTs), rated at more than 6000 pounds gross vehicle weight).

The proposed Tier 2 standards would reduce new vehicle NO_X levels to an average of 0.07 grams per mile (g/mi). For new passenger cars and light LDTs, these standards would phase in beginning in 2004, with the standards to be fully phased in by 2007.[1] For heavy LDTs, the proposed Tier 2 standards would be phased in beginning in 2008, with full compliance in 2009. During the phase-in period from 2004–2007, all passenger cars and light LDTs not certified to Tier 2 standards would have to meet an interim average standard of 0.30 g/mi NO_X, equivalent to the current NLEV standards for LDVs.[2] During the period 2004–2008, heavy LDTs not certified to Tier 2 standards would phase in an average standard of 0.20 g/mi NO_X. Those not covered by the phase-in would be required to meet a traditional (non-averaging) standard of 0.60 g/mi NO_X.

Manufacturers would be allowed to comply with the very stringent proposed new standards in a flexible way, assuring that the average emissions of a company's production met the target emission levels while allowing the manufacturer to choose from several more- and less-stringent emission categories for certification. The proposed requirements also include more stringent PM standards, which primarily affect diesel vehicles, and more stringent hydrocarbon controls (exhaust NMOG and evaporative emissions standards).

We are also proposing stringent particulate matter standards that would be especially important if there were substantial future growth in diesel sales. Even under an assumed scenario where diesel sales grew to represent 50 percent of all light-duty trucks by 2010, the PM standards being proposed today would result in a steady decrease in total direct $PM_{2.5}$ from cars and light trucks. For this scenario of a 50 percent share for diesel light trucks, direct PM emissions in 2020 with today's proposal would be less than they are at present. Therefore, we believe that today's proposal accommodates environmental concerns about such vehicles in a way that insures positive environmental results.

2. Gasoline Sulfur Standards

The other major part of today's proposal would significantly reduce average gasoline sulfur levels nationwide. These reductions could begin to phase in as early as 2000, with full compliance by 2006. Refiners would generally install advanced refining equipment to remove sulfur during the production of gasoline. Importers of gasoline would be required to import and market only gasoline meeting the proposed sulfur limits. Temporary, less stringent standards would apply to a few small refiners.

EPA is proposing that gasoline produced by refiners and sold by gasoline importers generally meet an average sulfur standard of 30 ppm and a cap of 80 ppm in 2004. The proposed program builds upon the existing regulations covering gasoline content as it relates to emissions performance. It includes provisions for trading of sulfur credits, increasing the flexibility available to refiners for complying with the new requirements. We intend the proposed credit program to ease compliance uncertainties by providing refiners the flexibility to phase in early controls in 2000–2003 and use credits gained in these years to delay some control to as late as 2006. As proposed, the program would achieve expected environmental benefits while providing substantial flexibility to refiners. The effect of the credit program is that those refiners that participate would have the opportunity for more overall leadtime to reach the final sulfur levels.

B. What Is EPA's Statutory Authority for Proposing Today's Action?

1. Light-Duty Vehicles and Trucks

We are proposing the motor vehicle emission standards under the authority of section 202 of the Clean Air Act. Sections 202(a) and (b) of the Act provide EPA with general authority to prescribe vehicle standards, subject to any specific limitations otherwise included in the Act. Sections 202(g) and (h) specify the current standards for LDVs and LDTs, which became effective beginning in model year 1994 (''Tier 1 standards'').

Section 202(i) of the Act provides specific procedures that EPA must follow to determine whether standards more stringent than Tier 1 standards for LDVs and certain LDTs[3] are appropriate beginning in the 2004 model year.[4] Specifically, we are required to first issue a study regarding ''whether or not further reductions in emissions from light-duty vehicles and light-duty trucks should be required * * *'' (the ''Tier 2 study''). This study ''shall examine the need for further reductions in emissions in order to attain or maintain the national ambient air quality standards.'' It is also to consider (1) the availability of technology to meet more stringent standards, taking cost, lead time, safety, and energy impacts into consideration, and, (2) the need for, and cost effectiveness of, such standards, including consideration of alternative methods of attaining or maintaining the national ambient air quality standards. A certain set of ''default'' emission standards for these vehicle classes is among those options for new standards that EPA is to consider.

After the study is completed and the results are reported to Congress, EPA is required to determine by rulemaking whether (1) there is a need for further emission reductions; (2) the technology for more stringent emission standards from the affected classes is available; and (3) such standards are needed and cost-effective, taking into account alternatives. If EPA answers ''yes'' to these questions, then the Agency is to promulgate new, more stringent motor vehicle standards (''Tier 2 standards'').

EPA submitted its report to Congress on July 31, 1998. Today's proposal considers and proposes affirmative responses to the three questions above (see section II below) and sets forth new proposed standards that are more

[1] By comparison, the NO_X standards for the National Low Emission Vehicle (NLEV) program, which will be in place nationally in 2001, range from 0.30 g/mi for passenger cars to 0.50 g/mi for medium-sized light trucks. For further comparison, the standards met by today's Tier 1 vehicles range from 0.60 g/mi to 1.53 g/mi.

[2] There are also NMOG standards associated with both the interim and Tier 2 standards. The NMOG standards vary depending on which of various individual sets of emission standards manufacturers choose to use in complying with the average NO_X standard. This ''bin'' approach is described more fully in section IV.B.

[3] LDTs with a loaded vehicle weight less than or equal to 3750 pounds.

[4] Section 202(b)(1)(C) forbids EPA from promulgating mandatory standards more stringent than Tier 1 standards until the 2004 model year.

stringent than the default standards in the Act.

EPA is also proposing standards for larger light-duty trucks under the general authority of section 202(a)(1) and under section 202(a)(3) of the Act, which requires that standards applicable to emissions of hydrocarbons, NO_X, CO and PM from heavy-duty vehicles [5] reflect the greatest degree of emission reduction available for the model year to which such standards apply, giving appropriate consideration to cost, energy, and safety.

2. Gasoline Sulfur Controls

We are proposing gasoline sulfur controls pursuant to our authority under section 211(c)(1) of the Clean Air Act.[6] Under section 211(c)(1), EPA may adopt a fuel control if at least one of the following two criteria is met: (1) the emission products of the fuel cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or (2) the emission products of the fuel will significantly impair emissions control systems in general use or which would be in general use were the fuel control to be adopted.

We are proposing to control sulfur levels in gasoline based on both of these criteria. Under the first criterion, we believe that emissions products of sulfur in gasoline used in Tier 1 and LEV technology vehicles contribute to ozone pollution, air toxics, and PM. Under the second criterion, we believe that gasoline sulfur in fuel that will be used in Tier 2 technology vehicles will significantly impair the emissions control systems expected to be used in such vehicles. Please refer to section IV.C. below and to the Draft Regulatory Impact Analysis (RIA) for more details of our analysis and findings. The Draft RIA includes a more detailed discussion of EPA's authority to set gasoline sulfur standards, including a discussion of our proposed conclusions relating to the factors required to be considered under section 211(c).

[5] LDTs that have gross vehicle weight ratings above 6000 pounds are considered heavy-duty vehicles under the Act. See section 202(b)(3). For regulatory purposes, we refer to these LDTs as ''heavy light-duty trucks'' made up of LDT3s and LDT4s.

[6] We currently have regulatory requirements for conventional and reformulated gasoline adopted under sections 211(c) and 211(k) of the Act, in addition to the ''substantially similar'' requirements for fuel additives of section 211(f). These requirements directly or indirectly control sulfur levels in gasoline. See the Draft RIA for more details.

C. The Tier 2 Study and the Sulfur Staff Paper

On July 31, 1998, EPA submitted its report to Congress containing the results of the Tier 2 study.[7] The study indicated that in the 2004 and later time frame, there will be a need for emission reductions to aid in meeting and maintaining the National Ambient Air Quality Standards (NAAQS) for both ozone and PM. Air quality modeling showed that in the 2007–2010 time frame, when Tier 2 standards would become fully effective, a number of areas would still be in nonattainment for ozone and PM even after the implementation of existing emission controls. EPA also found ample evidence that technologies would be available to meet more stringent Tier 2 standards. In addition, the study provided evidence that such standards could be implemented at a similar cost per ton of reduced pollutants as other programs aimed at similar air quality problems. Finally, the study identified several additional issues in need of further examination, including the relative stringency of car and light truck emission standards, the appropriateness of identical versus separate standards for gasoline and diesel vehicles, and the effects of sulfur in gasoline on catalyst efficiency.

In addition, on May 1, 1998, EPA released a staff paper presenting EPA's understanding of the impact of gasoline sulfur on emissions from motor vehicles and exploring what gasoline producers and automobile manufacturers could do to reduce sulfur's impact on emissions. The staff paper noted that gasoline sulfur is a catalyst poison and that high sulfur levels in commercial gasoline could affect the ability of future automobiles to meet more stringent standards in use. It also pointed out that sulfur control would provide additional benefits by lowering emissions from the current fleet of vehicles.

II. Proposed Tier 2 Determination

Based on the statutory requirements described above and the evidence provided in the Tier 2 Study, as updated in this document, EPA proposes its determination that new, more stringent emission standards are indeed needed, technologically feasible, and cost effective.

[7] On April 28, 1998, EPA published a notice of availability announcing the release of a draft of the Tier 2 study and requesting comments on the draft. The final report to Congress included a summary and analysis of the comments EPA received.

A. There Is a Substantial Need for Further Emission Reductions in Order To Attain and Maintain National Ambient Air Quality Standards

We believe that there is a clear air quality need for new emission standards, based on the continuing air quality problems predicted to exist in future years. As the discussion in section III.B. illustrates, our modeling shows that in 2007 approximately 80 million Americans will be living in areas that are in nonattainment for the 8-hour ozone NAAQS, even with all other expected controls in place. Another 49 million people will live in attainment areas that are within 15% of being reclassified as nonattainment areas. This is a total of nearly 130 million people, which represents about 48 percent of the population of the United States.

In addition to these ozone concerns, our models indicate that by 2010, 45 areas, with 18 million people, will be in nonattainment for the original PM_{10} NAAQS and 11 areas with 10 million people will be in nonattainment for the revised PM_{10} NAAQS. While not a specific driving factor in today's findings, our models also project that 102 areas with about 55 million people will be in nonattainment with the new $PM_{2.5}$ NAAQS by 2010. We also must recognize that nonattainment areas remain for other criteria pollutants (e.g., CO) and that non-criteria pollution (e.g., air toxics and regional haze) also contributes to environmental and health concerns.

Clearly there is a critical need for reductions in the emissions being projected for future years. Furthermore, mobile sources are important contributors to the emission problem. As we will explain more fully later in this preamble, in the year 2007, the cars and light trucks that are the subject of today's proposal are projected to contribute nearly 40 percent of the total NO_X and VOC inventory in some cities, and 20 percent of nationwide NO_X and VOC emissions. This situation would have been considerably worse without the NLEV program created by vehicle manufacturers, EPA, the Northeastern states, and others. We therefore believe that reductions in these source categories are an essential part of the reductions needed to attain and maintain the NAAQS. As we explain below, we propose to find that major reductions in future emissions from light-duty vehicles and trucks are both feasible and cost effective compared to available alternatives.

B. More Stringent Standards for Light-Duty Vehicles and Trucks Are Technologically Feasible

We believe that emission standards more stringent than current Tier 1 and National Low Emission Vehicle (NLEV) levels are technologically feasible. We believe this to be true both for the LDVs and LDTs specifically covered in section 202(i) and for the heavier LDTs also included in today's proposal. Manufacturers are currently producing NLEV vehicles that meet more stringent standards than similar Tier 1 models. Our analysis shows that mainly through improvements in engine control software and catalytic converter technology, manufacturers can and are building durable vehicles and trucks, including heavy light-duty trucks, which have very low emission levels.[8]

For light duty vehicles, certified NO_X levels for 1999 reveal that NO_X levels representing full-life, deteriorated emissions in the 0.01 to 0.10 g/mi range are already being seen on some production vehicles. Similarly, light-duty trucks up to 8500 lbs. GVWR, also included in today's proposal, have some very low 1999 certification levels for NO_X, with NO_X levels of as low as 0.04 g/mi for some of the largest LDTs. These levels are well below Tier 1 and NLEV standards. Manufacturers have also certified LDVs and LDTs to NMOG and CO levels as much as 80 percent below Tier 1 standards.

As discussed in more detail below and in the Draft RIA, we believe that, by the 2004–2009 time frame proposed for the Tier 2 standards, manufacturers would be fully able to comply with the proposed new standard levels. In addition, to facilitate manufacturers' efforts to meet these new standards, the Tier 2 regulations would include a corporate fleet average, which would allow manufacturers to optimize the deployment of technology across their product lines. Our analysis of the available technology improvements and the very low emission levels already being realized on these vehicles leads us to propose a finding that today's proposed standards are fully feasible for LDVs and LDTs.

C. More Stringent Standards for Light-Duty Vehicles and Trucks Are Needed and Cost Effective Compared to Available Alternatives

In this document, we propose that Tier 2 motor vehicle standards are both necessary and cost effective. We have already described our belief that substantial further reductions in emissions are needed to help reduce the levels of unhealthy air pollution that millions of people are being exposed to. (We describe this further below and in the Draft RIA.) In its analyses supporting the new ozone and PM NAAQS, the Agency identified those methods that were reasonably cost effective, and showed that substantial progress toward attainment could be made. However, we also concluded that methods beyond those that could be identified as cost effective at the time were needed and we assumed they would be identified in the future.

We believe that the Tier 2/gasoline sulfur proposal is one of those methods. This proposal would reduce annual NO_X emissions by about 2.2 million tons per year in 2020 and 2.8 million tons per year in 2030 after the program is fully implemented. By way of comparison, if all of the controls identified for the NAAQS analysis costing less than $10,000/ton (the limit on cost effectiveness used in that analysis) were implemented nationwide, they would produce NO_X emission reductions of about 2.9 million tons per year. That is, to achieve significant further reductions using control approaches other than the proposed Tier 2/Gasoline Sulfur program could mean adopting measures costing well beyond $10,000 per ton.

Further emission reductions are needed. Without Tier 2 and gasoline sulfur controls, we project that in 2007 at least 8 metropolitan areas and 2 rural counties with a combined population of 39 million will exceed the 1-hour ozone NAAQS and 28 metropolitan areas and 4 rural counties with a combined population of 80 million will exceed the 8-hour ozone NAAQS. We project that cars and light trucks will contribute 17 percent of the nationwide NO_X inventory by 2007 and 20 to 40 percent in some cities with air quality problems. The NO_X reductions from today's proposal range from 19 to 48 percent of the reductions we estimate are needed for areas to achieve attainment. We believe that the proposed program, as well as the technologies assumed for the NAAQS analysis mentioned above, are clearly cost effective approaches for attaining and maintaining the NAAQS.

The magnitude of emission reductions that can be achieved by a comprehensive national Tier 2/gasoline sulfur program would be difficult to achieve from any other source category. Given the contribution that light-duty mobile source emissions make to the national emissions inventory and the range of control programs ozone-affected areas already have in place or would be expected to implement, we believe it will be very difficult, if not impossible, to attain and maintain the ozone NAAQS in a cost-effective manner without reducing emissions from LDVs and LDTs. In addition, we project that the Tier 2/gasoline sulfur program would reduce direct and secondary particulate matter coming from LDVs and LDTs by over 70 percent, providing reductions of almost 240,000 tons annually by 2010.

We believe, then, that today's proposal is a major and attractive source of ozone and PM precursor emission reductions when compared to other available options. It would represent a degree of emission reduction beyond those programs identified in the NAAQS analysis that we believe is currently unavailable from any other reasonable program. We also believe that it would be a cost effective program, costing approximately $2,000 per ton of NO_X plus hydrocarbon reduced according to our estimates, which is quite attractive compared to other alternatives. The discussion of cost and cost effectiveness later in this preamble explains the derivation of these numbers and compares them to other alternatives. That discussion indicates that today's proposal would be as cost effective as both the Tier 1 and NLEV standards and cost effective when compared to non-mobile source programs as well.

III. Air Quality Need for and Impact of Today's Proposal

In the absence of significant new controls on emissions, tens of millions of Americans would continue to be exposed to unhealthy levels of air pollution. Emissions from passenger cars and light trucks are a significant contributor to a number of air pollution problems. Today's proposal would significantly reduce emissions from cars and light trucks and hence would significantly reduce the health risks posed by air pollution. This section summarizes the results of the analyses we performed to arrive at our proposed determination that continuing air quality problems are likely to exist, that these air quality problems would be in part due to emissions from cars and light trucks, and that the new standards being proposed today would improve air quality and mitigate other environmental problems.

[8] The Draft RIA contains an extended analysis, Section IV.A. below has more discussion of the technological feasibility of our proposed standards including detailed discussions of the various technology options that we believe manufacturers may use to meet these standards.

A. Americans Face Serious Air Quality Problems That Require Further Emission Reductions

Air quality in the United States continues to improve. Nationally, the 1997 air quality levels were the best on record for all six criteria pollutants.[9] In fact, the 1990s have shown a steady trend of improvement, due to reductions in emissions from most sources of air pollution, from factories to motor vehicles. Despite these continued improvements in air quality, however, tens of millions of Americans are still exposed to unhealthy levels of ozone and PM. Moreover, unless there are reductions in overall emissions beyond those that are scheduled to be achieved by already committed controls, many of these Americans will continue to be so exposed.

Ambient ozone is formed in the atmosphere through a complex interaction of VOC and NO_X emissions. Cars and light trucks emit a substantial fraction of these emissions. Ambient PM is emitted directly from cars and light trucks; it also forms in the atmosphere from NO_X, sulfur oxides (SO_X) and VOC, all of which are emitted by motor vehicles. When ozone exceeds the air quality standards, otherwise healthy people often have reduced lung function and chest pain, and hospital admissions for people with respiratory ailments like asthma increase; for longer exposures, permanent lung damage can occur. Similarly, particles can penetrate deep into the lungs and are linked with premature death, increased hospital admissions, increased respiratory symptoms, and changes in lung tissue. When either ozone or PM air quality problems are present, those hardest hit tend to be children, the elderly, and people who already have health problems.

The health effects of high ozone and PM levels are not the only reason for concern about continuing air pollution. Ozone and PM also harm plants and damage materials. PM reduces visibility and contributes to significant visibility impairment in our national parks and monuments and in many urban areas. In addition, air pollution from motor vehicles contributes to cancer and other health risks, acidification of lakes and streams, eutrophication of coastal and inland waters, and elevated drinking water nitrate levels. These problems impose a substantial burden on public health, our economy, and our ecosystems.

In recognition of this burden, Congress has passed and subsequently amended the Clean Air Act. The Clean Air Act requires each state to have an approved State Implementation Plan (SIP) that shows how an area plans to meet its air quality obligations, including achieving and then maintaining attainment of all of the National Ambient Air Quality Standards (NAAQS), such as those for ozone and PM.

Under EPA's proposed policy for implementing the new 8-hour ozone, revised PM_{10}, and new $PM_{2.5}$ ambient standards (63 FR 65593, November 27, 1998), states must prepare and submit SIP revisions to demonstrate attainment of the 8-hour ozone standard between 2000 and 2003, depending on ozone classification under the 8-hour standard. The earlier submittal date applies to ''transitional'' areas, which are areas that are in attainment with the 1-hour standard and can attain the 8-hour standard through local measures adopted prior to classification (under the 8-hour standard) and the regional emission reductions to be achieved under the Regional Ozone Transport Rule (63 FR 57356, October 27, 1998). In general, EPA expects these areas to demonstrate attainment by 2007. Other 8-hour nonattainment areas will be classified as ''traditional'' under the 8-hour standard, and we believe that these areas will have attainment dates of 2007, 2009, or 2010 depending on their 1-hour classification status and 1-hour attainment date.

Because it takes three ''clean'' years to qualify an area to be redesignated as attainment for the ozone standard, the deadline for each area to achieve the VOC and NO_X emission reductions needed to meet the ozone standard generally should be two years earlier than its attainment date. For example, 8-hour ozone nonattainment areas for which we would establish an attainment date of 2009 would need to implement emission reductions by the start of the 2007 ozone season in order to have three ''clean'' years by their 8-hour attainment deadline of 2009.

The SIP revisions to demonstrate attainment with the revised PM_{10} standard must be prepared by 2002, with attainment by 2006, unless this date is not practicable. As discussed below, EPA has also finalized regulations that regions and states implement plans for protecting and improving visibility in the 156 mandatory Federal Class I areas as defined in section 162(a) of the Clean Air Act. These areas are primarily national parks and wilderness areas.

To accomplish the goal of full attainment in all areas according to the schedules for the various NAAQS and the visibility program, the federal government must assist the states by reducing emissions from sources that are not as practical to control at the state level as at the federal level. Vehicles and fuels move freely among the states, and they are produced by national or global scale industries. Most individual states are not in a position to regulate these industries effectively and efficiently. The Clean Air Act therefore gives EPA primary authority to regulate emissions from the various types of highway vehicles and their fuels. Our actions to reduce emissions from these and other national sources are a crucial and essential complement to actions by states to reduce emissions from more localized sources.

If we do not adopt new standards to reduce emissions from cars and light trucks, emissions from these vehicles would remain a large portion of the emissions burden that causes elevated ozone and continued nonattainment with the ozone NAAQS, which in turn affects tens of millions of Americans. Without new standards, steady annual increases in fleet size and miles of travel will outstrip the benefits of current emission controls, and will cause ozone-forming emissions from cars and trucks to grow each year starting about 2014. The contribution of these vehicles to PM exposure and PM nonattainment would also remain significant, and could increase considerably if diesel engines are used in more cars or light trucks. For ozone in particular, the contribution of cars and light trucks—in terms of both local emissions and transported pollution—will be so significant to those areas expected to be in nonattainment in the 2007 to 2010 time frame, and the expected emission reduction shortfall in these areas will be so large, that further reductions from cars and light trucks are an inescapable element of any attainment strategy.

The standards we are proposing would cut the contribution of ozone and PM precursors from cars and light trucks greatly. Even with this cut, many areas will likely still find it necessary to obtain additional reductions from other sources in order to fully attain the ozone and PM NAAQS. However, their task would be easier and the economic impact on their industries and citizens would be lighter as a result of the actions proposed today. This would be a critical benefit of today's proposal. Following implementation of the Regional Ozone Transport Rule, states

[9] National Air Quality and Emissions Trend Report, 1997, Air Quality Trends Analysis Group, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, N.C., December 1998 (available on the World Wide Web at http://www.epa.gov/oar/aqtrnd97/).

will have already adopted emission reduction requirements for nearly all large sources of VOC and NO_X for which cost-effective control technologies are known. Those that remain in nonattainment will therefore have to consider their other alternatives. In fact, however, many of the alternatives states will have to consider are very costly, with a small impact from each additional category subjected to new emission controls. The emission reductions from today's proposed standards for gasoline, cars, and light trucks would ease the need for states to find first-time reductions from the mostly smaller sources that have not yet been controlled, including area sources that are closely connected with individual and small business activities. They would also reduce the need for states to seek even deeper reductions from large and small sources already subject to emission controls.

In our meetings and correspondence with state and local officials, they asked us to reduce the emissions from cars and trucks, so that their charge of protecting the public against air pollution is one they can accomplish on schedule and without adverse economic impacts. We heard from the Northeast States for Coordinated Air Use Management, the Ozone Transport Commission, the State and Territorial Air Program Administrators, and the Association of Local Air Pollution Control Officers. They consistently told us that it would be very difficult and costly for the states to obtain comparable reductions from other sources as substitutes for reductions from cars and light trucks, especially on top of the additional reductions needed to reach ozone attainment even with the reductions from today's proposal.

We project that today's proposal would also have important benefits for regional visibility, acid rain, and coastal water quality.

For these and other reasons discussed in this document, we are proposing to determine that significant emission reductions will still be needed by the middle of the next decade and beyond to achieve and maintain further improvements in air quality in many, geographically dispersed areas. We also believe that a significant portion of these emission reductions can be obtained by reducing emissions from cars and light trucks. We believe that such reductions are in fact necessary (since cars and light trucks are such large contributors to current and projected ozone problems) and reasonable (since these reductions could be achieved at a reasonable cost compared to other alternative reductions).

The remainder of this section describes the health and environmental problems that today's proposal would help mitigate and the expected health and environmental benefits of this proposal. Ozone is discussed first, followed by PM, other criteria pollutants, visibility, air toxics, and other environmental impacts. The emission inventories and air quality analyses are explained more fully in the Draft Regulatory Impact Analysis for today's proposal.

B. Ozone

1. Ozone Levels Have Declined, but Unhealthy Levels of Ozone Persist

Ground-level ozone is the main harmful ingredient in smog.[10] It is produced by complex chemical reactions when its precursors, VOC and NO_X, react in the presence of sunlight. The chemical reactions that create ozone take place while the wind is carrying the pollutants, which means that ozone can be more severe many miles away from the source of ozone-forming emissions than it is at the source. The movement of ozone and its precursors is called ''ozone transport'' and suggests two complementary approaches to reduce ozone levels in areas affected by ozone transport:

(1) Reduce ozone precursor emissions in the area itself.

(2) Reduce ozone precursor emissions in upwind areas to reduce incoming ozone and ozone precursor levels.

Within a nonattainment area itself, both VOC and NO_X reductions are generally beneficial. Especially in the eastern portion of the U.S., the second approach of controlling upwind emissions can play an important part in efforts to reduce ozone levels in nonattainment areas. Because individual states cannot control upwind sources of air pollution that lie outside their borders, EPA has a special role in managing transport impacts. Vehicle and fuel standards should play a part in doing so.

Since NO_X affects downwind ozone levels in the eastern U.S. over greater distances than VOC does, reductions in upwind NO_X emissions are particularly important in reducing ozone levels downwind. Modeling conducted by the Ozone Transport Assessment Group, discussed below, indicates that VOC reductions substantially upwind from nonattainment areas have little benefit in those nonattainment areas across the eastern region of the U.S. By contrast, VOC reductions in or near nonattainment areas do provide air quality benefits. Since cars and light trucks meeting today's proposed standards would operate everywhere, today's proposal would reduce VOC and NO_X emissions in both nonattainment areas and in upwind areas.

The new standards being proposed today would have their largest effect on NO_X emissions. Sulfur in gasoline has been found to increase NO_X emissions more than VOC emissions, and reducing sulfur would therefore yield larger NO_X reductions than VOC reductions. Similarly, the vehicle standards proposed today represent a greater reduction from current NO_X standards than is the case for VOC. We have taken this approach because air quality modeling conducted for OTAG, and subsequent modeling we have conducted, indicates that NO_X reductions would have larger ozone benefits than would VOC reductions. In addition, we believe that individual nonattainment areas have a wider range of alternative control opportunities for VOC than they have for NO_X.

Ozone levels have decreased significantly over the past 20 years as VOC and NO_X emissions have been reduced. However, ozone levels in much of the country remain a major concern. Outside of California, the 1990 census showed 72 million people living in areas that were formally designated as non-attainment for the 1-hour standard as of August 10, 1998. Measured ozone design values from 1995 to 1997 in the region analyzed by the Ozone Transport Assessment Group (OTAG)[11] indicate that in this region alone, 26 metropolitan areas and 8 rural counties together containing 75 million people experienced ozone levels in excess of the 1-hour ozone standard.

The 8-hour ozone standard is more stringent and protective than the 1-hour standard, and more areas have exceeded it in the recent past. In 1995 to 1997, at least one county in each of 81 metropolitan areas and an additional 30 rural counties together containing 110 million people had ozone values in excess of the 8-hour ozone standard. Additional areas in the OTAG region had ozone levels within 15 percent of the 8-hour standard and hence faced potentially significant maintenance challenges: 52 metropolitan areas and 44 rural counties together containing 26 million people.

For several reasons, we expect to see substantial additional progress in

[10] Ozone also occurs naturally in the stratosphere and provides a protective layer high above the earth.

[11] OTAG evaluated a region that included all or part of the easternmost 37 states.

reducing ozone levels over the next ten years despite continued growth in electric power generation, industrial output, nonroad activity levels, and vehicle miles traveled. NO_X and VOC emissions from mobile sources will continue to decline as older, higher-emitting vehicles and nonroad engines are retired from service and replaced with newer vehicles and nonroad engines that must meet more stringent federal emission standards. Other federal regulations that will reduce ozone precursor emissions will take effect, such as regulations that will reduce VOC emissions from paints and other architectural coatings. Beginning in 2000, areas of the country participating in the federal reformulated gasoline program will receive lower-emitting Phase 2 reformulated gasoline. States are expected to implement additional measures to reduce NO_X and VOC emissions in 1-hour ozone nonattainment areas. In addition, the final Regional Ozone Transport Rule (ROTR) (63 FR 57356, October 27, 1998) requires the District of Columbia and 22 states in the eastern U.S. to reduce their NO_X emissions substantially by 2003 to reduce ozone levels in downwind states.

Using the most recent improvements to the OTAG emission inventories and the OTAG ozone model, we project that in the OTAG region, these combined emission reductions will bring 18 of the aforementioned 26 metropolitan areas and 6 of the 8 rural counties, with 36 million residents, into attainment with the 1-hour ozone standard by 2007. The same emission reductions are projected to bring ozone design values below the 8-hour standard in 53 out of 81 metropolitan areas and 26 out of 30 rural counties, with a combined 1990 population of 30 million people.[12]

However, we still project many areas in the OTAG region to have ozone design values in 2007 in excess of the 1-hour and 8-hour standards. Eight metropolitan areas and two counties with a combined 1990 population of 39 million are projected to experience ozone design values in excess of the 1-hour ozone standard in 2007.[13] Twenty-eight areas and 4 rural counties, with a combined 1990 population of 80 million, are projected to experience ozone design values at levels in excess of the 8-hour standard in 2007.

Additional areas outside the OTAG modeling region may also experience high ozone levels, even with the additional emission controls that will be implemented by 2007. The most recent assessment for these areas was made in the Regulatory Impact Analysis for the revised NAAQS (NAAQS RIA).[14] That assessment predicted that many areas in California will require substantial additional reductions to attain the 1-hour and 8-hour ozone standards. Although the vehicle and fuel standards being proposed today would not apply to vehicles and fuel sold in California, we project that today's proposals would lead to emission reductions within California. According to the State of California, about 7 to 10 percent of all car and light truck travel in California takes place in vehicles originally sold outside California. These vehicles operate in California during visits and after relocation of households from other states. Today's proposal would cause those vehicles to be cleaner, assisting California's nonattainment areas to meet the ozone standards. In addition, this proposal requires that gasoline in all states (except California, which has its own low-sulfur gasoline program) have a low sulfur content, in order to maintain catalyst effectiveness. This would ensure that vehicles belonging to California residents get clean gasoline when they travel outside of California, so that they return to California with fully functioning catalysts.

Outside of California and the OTAG region, the NAAQS RIA modeling indicated that all areas would attain the 1-hour standard by 2010. One area (Phoenix, AZ) was projected not to attain the 8-hour standard. Eleven other areas were projected to have ozone levels within 15 percent of the 8-hour standard and hence face potential challenges in maintaining their attainment status.

Furthermore, even an area now in attainment or that reaches attainment by 2007 can be at risk of becoming nonattainment in the face of continued growth in its population, economy, vehicle traffic, and nonroad equipment activity levels. Also, an area that we have estimated will reach attainment in 2007 may fail to do so if growth is higher than we project, if emission controls are less effective, or if the modeling is otherwise in error. Our modeling for the OTAG region has estimated that of the 1-hour nonattainment areas projected to reach attainment by 2007 with the benefits of the Regional Ozone Transport Rule (ROTR) and other already committed measures, 17 metropolitan areas and 5 rural counties, with a combined 1990 population of 35 million people, will remain within 15 percent of the 1-hour standard. These areas would benefit from additional reductions to help ensure that they will attain.

With respect to the 8-hour standard, we estimate that 80 metropolitan areas and 39 rural counties with a 1990 population of 49 million people will have design values within 15 percent of the 8-hour standard. These areas have some risk of not actually being in attainment in 2007, and will face potentially significant challenges maintaining their attainment status in future years. Today's proposed standards would help ensure these areas do attain, and help these areas accommodate continued population and economic growth while staying in attainment with the 8-hour ozone standard by further reducing levels of ozone precursors.

EPA's best ozone projections at the current time for the OTAG region are summarized in Tables III–1 and III–2, where ''ROTR'' refers to the Regional Ozone Transport Rule. It should be noted that the results for the OTAG regions discussed above and summarized in the following tables apply to only a portion of the area that would benefit from today's proposal.

TABLE III–1.—EXTENT OF POTENTIAL 1-HOUR OZONE PROBLEM AREAS IN 2007 IN THE OTAG REGION.[a]

	2007 projections with ROTR
Design values in excess of the 1-Hour NAAQS (≥125 ppb)	
Number of Metropolitan Areas	8
Number of Rural Counties	2
1990 Population of Metropolitan Areas and Rural Counties (millions)	39

[a] Additional potential problem areas in California.

[12] The design value is the calculated ozone level, based on ozone measurements in the area, that is compared to the NAAQS to determine compliance with the standard.

[13] Various states have submitted SIPs to meet a requirement that they demonstrate attainment with the 1-hour ozone standard by 2005 or 2007 (the exact date is state-specific, depending on the severity of their violation of the 1-hour standard). These plans were submitted to EPA in the first half of 1998, and we are still reviewing them for their completeness and approvability. We have not fully evaluated the impact of the measures contained in these plans on future ozone levels. As a result, they are not included in the baseline emission inventory.

[14] ''Regulatory Impact Analyses for the Particulate Matter and Ozone National Ambient Air Quality Standards and Proposed Regional Haze Rule,'' Innovative Strategies and Economics Group, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC, July 17, 1997.

TABLE III–2.—EXTENT OF POTENTIAL 8-HOUR OZONE PROBLEM AREAS IN 2007 IN THE OTAG REGION [a]

	2007 projections with ROTR
Design values in excess of the 8-Hour NAAQS (≥85 ppb)	
Number of Metropolitan Areas	28
Number of Rural Counties	4
1990 Population of Metropolitan Areas and Rural Counties (millions)	80
Design values within 15 percent of the 8-Hour NAAQS (72–84 ppb)	
Number of Metropolitan Areas	80
Number of Rural Counties	39
1990 Population of Metropolitan Areas and Rural Counties (millions)	49

[a] Phoenix, Arizona and multiple areas in California are also potential problem areas.

It should be noted that the areas included in Table III–2 have not been designated to be in nonattainment with the 8-hour ozone NAAQS. Such designations will not be made by EPA until 2000, and these designations will be based on the data that are most recently available at that time.[15] Instead, the areas included in Table III–2 have been projected to have design values that would place them in nonattainment in 2007, using an approach described in the Draft RIA.[16] This approach enabled EPA to estimate the extent of the 8-hour nonattainment problem after implementing the reductions set forth in the Regional Ozone Transport Rule and the measures states have adopted or are specifically required by the Clean Air Act to adopt for their existing 1-hour nonattainment areas. (The modeling did not consider the impact of additional measures that may appear in the SIP revisions submitted by some states in the first half of 1998.)

We believe the large reductions called for in today's action would substantially reduce ozone levels nationwide and would therefore reduce ozone levels and design values in the areas projected to otherwise exceed the 8-hour standard as well as in those areas facing potentially significant maintenance challenges.

2. Cars and Light-Duty Trucks Are a Big Part of the NO_X and VOC Inventory, and Today's Proposal Would Reduce This Contribution Substantially

Emissions of VOCs and NO_X come from a variety of sources, both natural and from human activity. Natural sources, including emissions that have been traced to vegetation, account for a substantial portion of total VOC emissions in rural areas. The remainder of this section focuses on the contribution of motor vehicles to emissions from human sources. Human-caused VOCs are released as byproducts of incomplete combustion as well as evaporation of solvents and fuels. For gasoline-fueled cars and light trucks, approximately half of the VOC emissions come from the vehicle exhaust and half come from the evaporation of gasoline from the fuel system. NO_X emissions are dominated by human sources, most notably high-temperature combustion processes such as those occurring in automobiles and power plants. Emissions from cars and light trucks are currently, and will remain, a major part of nationwide VOC and NO_X emissions. In 1996, cars and light trucks comprised 25 percent of the VOC emissions and 21 percent of the NO_X emissions from human sources in the U.S.[17] The contribution in metropolitan areas was generally larger.

Motor vehicle emission controls have led to significant improvements in emission levels in the air (the ''emission inventory'') and will continue to do so in the near term. As a result of the introduction of cleaner reformulated gasoline in 2000, the introduction of National Low Emission Vehicles (NLEVs) and vehicles complying with the Enhanced Evaporative Test Procedure and Supplemental Federal Test Procedures, and the continuing removal of older, higher-emitting vehicles from the in-use vehicle fleet, total emissions from the car and light truck fleet are projected to continue to decline through the next decade, reaching a low point for NO_X in 2013 (Figure III–1) and for VOC in 2015.[18] On a per mile basis, average VOC and NO_X emissions from cars and light trucks combined will continue to decline well beyond 2015, reflecting the continuing effect of existing emission control programs. However, projected increases in vehicle miles traveled (VMT) will cause total emissions from these vehicles to increase. With this increase in travel and without additional controls, we project that combined NO_X and VOC emissions for cars and light trucks will increase starting in 2013 and 2015, respectively, so that by 2030 they will have returned to levels nearly the same as they will be in 2000. In cities experiencing rapid growth, such as Charlotte, North Carolina, the near-term trend toward lower emissions tends to reverse sooner.

Figure III–1 illustrates this expected trend in car and light truck NO_X emissions in the absence of today's proposed standards for vehicles and gasoline. The figure also allows the contribution of cars to be distinguished from that of light trucks. The figure clearly shows the impact of steady growth in light truck sales and travel on overall light-duty NO_X emissions; the decrease in overall light-duty emission levels is due solely to reductions in LDV emissions. In 2000, we project that trucks will produce about 50 percent of combined car and light truck NO_X emissions. We project that truck emissions will actually increase after 2000, and over the next 30 years, trucks will grow to dominate light-duty NO_X emissions. By 2007, we project trucks will make up two-thirds of light-duty NO_X emissions; by 2020, nearly three-quarters of all light-duty NO_X emissions will be produced by trucks.

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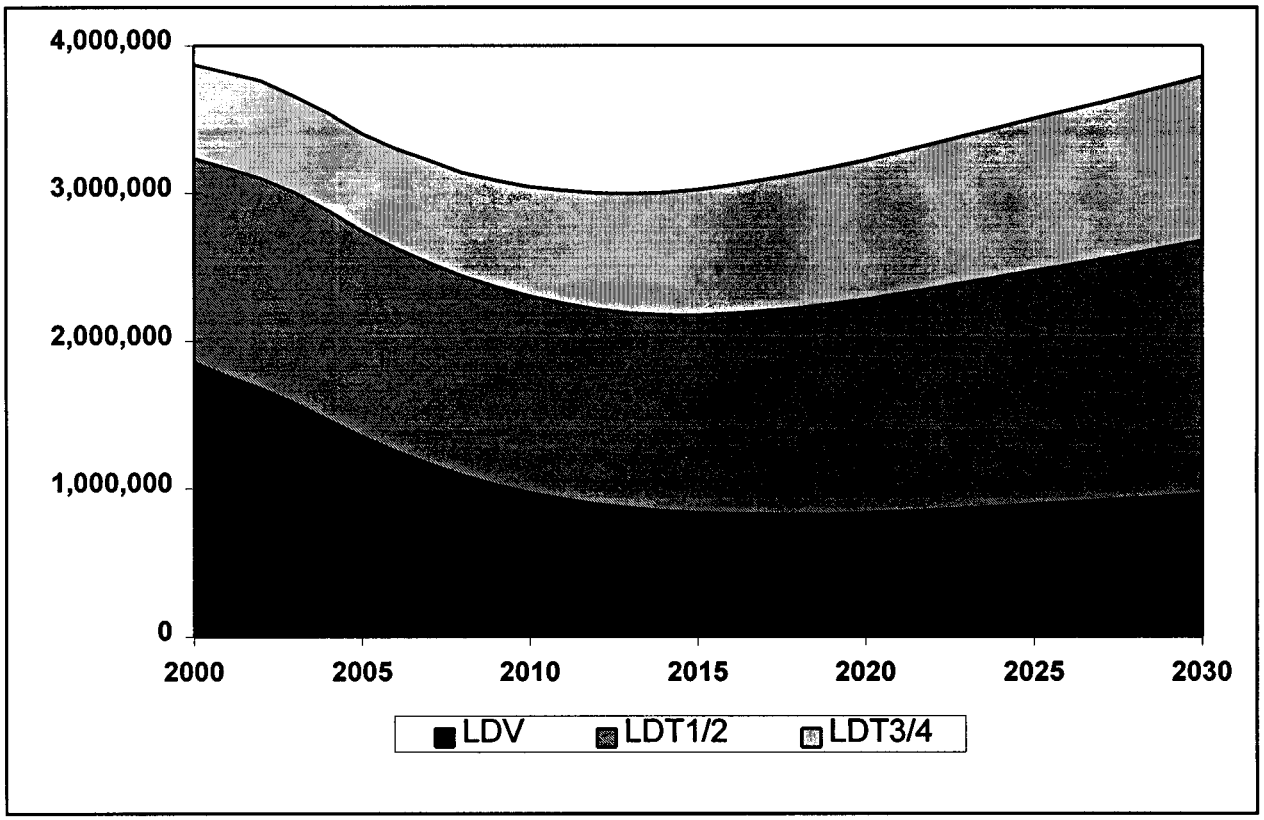
[15] It should also be noted that the number and 1990 population of metropolitan areas projected to be near or above the 8-hour ozone standard in Table III–2 are based on the boundaries of ozone nonattainment areas as currently defined under the 1-hour ozone standard. These boundaries will be reevaluated as 8-hour ozone nonattainment areas are designated and may change from those used above, affecting the count and population of the potential problem areas.

[16] The approach uses a combination of ambient monitoring data and regional ozone photochemical grid modeling for specific ozone episodes to develop statistical correlations between modeled ozone levels and projected future monitoring results. The approach does not reflect any further emission reductions that may have been included in revisions to State Implementation Plans (SIPs) for ozone that EPA received from some states in the first half of 1998. These SIP revisions are still under review by EPA for completeness and approvability.

[17] Emission Trend Report, 1997.

[18] The auto manufacturer and northeastern state commitments to the NLEV program are scheduled to end in 2004 without further EPA action on Tier 2 standards, although continued voluntary compliance by automobile manufacturers and the affected states is a possibility. Our analysis of emission trends and the emission benefits expected from today's proposal assumes for the base scenario a continuation of the NLEV program past 2004. It also includes all other control measures assumed to be implemented for the purposes of the proposed state-level NO_X budgets in the Regional Ozone Transport Rule, such as reformulated gasoline in all required and opt-in areas and enhanced I/M where required.

Figure III-1.
Light-duty NOx emissions without Tier 2 (annual tons)[a]



[a] Estimates exclude California, Alaska, and Hawaii, although reductions would occur in all three. For all cases, this figure reflects implementation of ROTR and other measures assumed in the ROTR. The estimates reflect continuation of NLEV beyond 2004.

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Today's action would significantly decrease NO_X and VOC emissions from cars and light trucks, and would delay the date by which NO_X and VOC emissions would begin to increase due to continued VMT growth. With Tier 2/Sulfur control, light-duty vehicle NO_X and VOC emissions are projected to continue their downward trend past 2020. Table III–3 shows the annual tons of NO_X that we project would be reduced if today's proposal were adopted.[19] These projections include the benefits of low sulfur fuel and the introduction of Tier 2 car and light truck standards.

TABLE III–3.—NO_X EMISSIONS FROM CARS AND LIGHT TRUCKS AS PERCENT OF TOTAL EMISSIONS, AND REDUCTIONS DUE TO TIER 2/SULFUR CONTROL [a]

Year	Light-duty tons without tier 2	Light-duty percent of total without tier 2 (percent)	Light-duty tons reduced by tier 2 [b]
2007	3,218,530	17	795,734
2010	3,041,639	17	1,182,323
2015	3,020,806	17	1,778,881
2020	3,221,151	18	2,198,113

[a] Estimates exclude California, Alaska, and Hawaii, although reductions would occur in all three. For all cases, this table reflects implementation of ROTR and other measures assumed in the ROTR. For the ''Without Tier 2'' case, the estimates reflect continuation of NLEV beyond 2004.

[b] Does not include emission reductions from heavy-duty gasoline vehicles.

The lower sulfur levels proposed today would produce large emission reductions on pre-Tier 2 vehicles as soon as low-sulfur gasoline is introduced, in addition to enabling Tier 2 vehicles to achieve lower emission levels. Among the pre-Tier 2 vehicles, the largest per vehicle emission reductions from lower sulfur in gasoline would be achieved from vehicles that automobile manufacturers will have sold under the voluntary National Low Emission Vehicle program. These vehicles are capable of substantially lower emissions when operated on low sulfur fuel. Older technology vehicles experience a smaller but significant effect.

In 2007, when all gasoline would meet the new sulfur limit and when large numbers of 2004 and newer vehicles meeting the proposed standards would be in use, the combined NO_X emission reduction from vehicles and fuels would be nearly 800,000 tons per year. After 2007, emissions would be reduced further as the fleet turned over to Tier 2 vehicles operating on low sulfur fuel. By 2020, NO_X emissions would be reduced by two-thirds from the levels that would occur if today's proposal were not adopted. This reduction equals the NO_X emissions from over 166 million pre-Tier 2/Sulfur cars and light trucks. This reduction would represent a 12 percent NO_X reduction in emissions from all manmade sources.

VOC emissions would also be reduced by today's proposal, with reductions increasing as the fleet turns over. The reductions as a percent of emissions from cars and light trucks would be 5 percent in 2007 and grow to 16 percent in 2020.

As discussed earlier, in California, smaller but still substantial reductions in both NO_X and VOC would be achieved because vehicles visiting and relocating to California would be designed to meet today's proposed standards. Also, vehicles from California visiting other states would not be exposed to high sulfur fuel.

These estimates of emission reductions reflect a mixture of urban, suburban, and rural areas. As we noted in the Tier 2 Study, however, cars and light trucks generally make up a larger fraction of the emission inventory for urban and suburban areas, where human population and personal vehicle travel is more concentrated than emissions from other sources such as heavy-duty highway vehicles, power plants, and industrial boilers. We have estimated emission inventories for three cities using the same methods as were used to project the nationwide inventories, and we present the results for 2007 below in Table III–4. Inventory shares in 2010 are about the same.

These results confirm that light-duty vehicles make up a greater share of the NO_X emission inventories in urban areas than they do in the nationwide inventory. While these vehicles' share of national NO_X emissions in 2007 is about 17 percent, it is estimated to be about 38 percent in the Atlanta area. There is also a range in VOC contributions, with Atlanta again being the area with the largest car and light truck contribution at 33 percent. In metropolitan areas with high car and light truck contributions, today's proposal would represent a larger step toward attainment since it would have a larger effect on total emissions.

TABLE III–4.—PROPORTION OF THE TOTAL URBAN AREA NO_X AND VOC INVENTORY IN 2007 ATTRIBUTABLE TO LIGHT-DUTY VEHICLES [a]

Region	NO_X (percent)	VOC (percent)
Nationwide [a]	17	18
New York urban area	29	15
Atlanta urban area	38	33
Charlotte urban area	18	15

[a] For all cases, this table reflects implementation of ROTR and other measures assumed in the ROTR. The estimates reflect continuation of NLEV beyond 2004.

Another useful perspective from which to view the magnitude of the emission reductions from today's proposal is in terms of the additional emission reductions from all human sources that areas will need to attain the 8-hour ozone standard. For this analysis, we included the implementation of the Regional Ozone Transport Rule but assumed that today's proposal was not implemented. In the previously referenced NAAQS RIA we estimated additional NO_X emission reductions that, along with specific accompanying VOC reductions, would bring each residual nonattainment area into attainment with the 8-hour ozone

[19] Today's proposed standards for both vehicles and fuels would apply in 49 states and the U.S. territories, excluding only California. If today's proposal is adopted, there would also be emissions reductions in California from vehicles that relocate or visit from other states. However, much of the emissions inventory analysis for this proposal was made for a 47-state region that excludes California, Alaska, and Hawaii, since these states were not included in the scope of ozone modeling.

standard by 2010. We have used these estimated reductions as the basis for Table III–5, which shows the NO_X reductions needed to reach attainment in 2007 for six metropolitan areas.[20] These are areas for which both the NAAQS RIA and the ozone modeling for this proposal forecasted continued 8-hour nonattainment in that year, even with the emission reductions from the Regional Ozone Transport Rule.

Table III–5 also shows the NO_X emission reductions in those same six areas that we project would result if today's proposal were implemented. Although the two analyses differ in some emission modeling estimates, the comparison is valid as a general indication of the contribution today's proposal can make to attainment. Cars and light trucks contribute about 20 to 40 percent of the NO_X inventory in these six areas. The NO_X reductions estimated for today's proposal range from 19 to 50 percent of the reductions that are estimated to be needed for attainment. These figures show that today's proposal would make a very substantial contribution to these cities' attainment programs, but that there will still be a need for additional reductions from other sources. The emission reductions from today's proposal would clearly not exceed the reductions needed from an air quality perspective for these areas; as described in the next section, we project that about 20 other areas in the eastern U.S. would also need reductions beyond those of today's proposed program to attain the NAAQS for NO_X.

TABLE III–5.—COMPARISON OF TIER 2/SULFUR NO_X REDUCTIONS TO NO_X REDUCTIONS ESTIMATED TO PRODUCE 8-HOUR OZONE ATTAINMENT IN 2007

Metro area	NO_X reductions estimated to produce attainment (tons/year)	NO_X reductions from proposed tier 2/sulfur standards (tons/year)	Tier 2/sulfur NO_X reductions as percent of reductions to produce attainment
Atlanta	69,802	17,271	25
Dallas	41,283	14,761	36
Memphis	7,343	3,683	50
NY–NJ–CT	186,880	35,906	19
Philadelphia	63,456	19,942	31
Washington, DC-Baltimore	62,519	22,673	36

3. Tier 2/Sulfur Ozone Benefits and the Post-Tier 2/Sulfur Ozone Problem

By reducing ozone precursor emissions from cars and light trucks in areas where ozone levels are near or above the ozone standard, today's proposal would reduce local ozone levels. And by reducing ozone precursor emissions in upwind areas, today's proposal would reduce ozone and ozone precursor levels in the air flowing into areas where ozone levels are high. EPA's analysis of the ozone impact of today's proposal suggests that it would yield large reductions in ozone, particularly in areas where ozone transport plays a significant role in local nonattainment problems. There are uncertainties associated with the modeling we have used to estimate these reductions, but we are certain that the emission reductions would be large.

Ozone levels in a few locations in the centers of large metropolitan areas are VOC-limited; that is, the atmospheric chemistry is such that ozone levels tend to respond to VOC reductions rather than to NO_X reductions. Some of these areas may experience essentially no change or a slight ozone increase on some days, if one considers only the isolated effect of the emission reductions due to today's proposal. However, it has long been recognized that metropolitan areas containing such locations will need to implement additional VOC reductions from local sources to reach attainment. If these reductions and the reductions from today's proposal were combined, the net effect would be a progressive drop in ozone levels until attainment is reached.

To examine the impact of today's proposal on ozone levels, we estimated the ozone effects of the emission reductions that would occur in 2007 and 2010 for the area covered by the OTAG ozone model. The 1-hour ozone reductions in 2007 are relevant to the several 1-hour nonattainment areas required to reach attainment in that year. The 8-hour reductions in 2007 and 2010 are of great relevance to the efforts of states to achieve attainment with the 8-hour ozone standard, since for many areas these dates bracket the three ''clean'' years required to show attainment by their actual deadline.

The estimated emission reductions from our proposal in 2007 and 2010 would be substantial due to the effect of low sulfur fuel on the entire in-use fleet of gasoline vehicles and trucks of all sizes, especially those designed to meet NLEV standards, and due to the fact that many cleaner 2004 and newer vehicles would be on the road. Table III–6 provides a summary of the 1-hour ozone results for the OTAG modeling area for 2007. Table III–7 provides a summary of the 2007 and 2010 results for the 8-hour standard. According to our best modeling, the reductions in 2007 would make the difference between nonattainment and attainment for four metropolitan areas with a combined 1990 population of 15 million people. In 2010, we estimate that the Tier2/Sulfur reductions would be enough by themselves to bring eight metropolitan areas with 13 million people into attainment with the 8-hour standard.

Tables III–6 and III–7 indicate that we project that some areas would not attain with only the emission reductions from the Tier 2/Sulfur proposal. However, we do project that those areas would experience reductions in ozone levels. These reductions would mean that even the areas that are not brought all the way to attainment would not need to reduce emissions from other sources as much as would be required without today's proposal, as previously explained. Of the 18 areas that we projected would not be brought to attainment with the 8-hour standard in 2010, we project that 10 areas would

[20] We calculated the estimated reductions needed for attainment in 2007 by adding the reductions due to NLEV vehicles entering the fleet between 2007 and 2010 to the estimated reductions needed for attainment in 2010.

have design values within 5 percent of the standard.

Today's proposal would also benefit ozone nonattainment areas outside of the OTAG modeling region, including the one area (Phoenix, Arizona) projected to be in nonattainment for ozone in 2010 in the absence of Tier 2/Sulfur controls. The Tier 2/Sulfur controls being proposed today would help Phoenix attain the ozone standard, particularly since cars and light trucks are a relatively large part of the Phoenix emission inventory. These controls also would help the 11 areas projected to face potential maintenance challenges stay in attainment as their economies and populations grow. And as already mentioned, because about 7 to 10 percent of travel in California is by non-California vehicles, there would be a substantial benefit in that state also.

TABLE III–6.—PROJECTED TIER 2/SULFUR IMPACT ON POTENTIAL 1-HOUR OZONE PROBLEM AREAS IN THE OTAG REGION IN 2007 [a]

	2007 without tier 2/sulfur	2007 with tier 2/sulfur	Change due to tier 2/sulfur
Design values projected to be in excess of the 1-Hour NAAQS (≥125 ppb)			
Number of Metropolitan Areas	8	4	−4
Number of Rural Counties	2	2	0
1990 Population of Metropolitan Areas and Rural Counties (millions)	39	24	−15

[a] For all cases, this table reflects implementation of ROTR and other measures assumed in the ROTR. For the "Without Tier 2/Sulfur" case, the estimates reflect continuation of NLEV beyond 2004.

TABLE III–7.—PROJECTED TIER 2/SULFUR IMPACT ON POTENTIAL 8-HOUR OZONE PROBLEM AREAS IN THE OTAG REGION IN 2007 AND 2010 [a]

	Without tier 2/sulfur	With tier 2/sulfur	Change due to tier 2/sulfur
Design values projected to be in excess of the 8-Hour NAAQS (≥85 ppb) in 2007			
Number of Metropolitan Areas	28	25	−3
Number of Rural Counties	4	3	−1
1990 Population of Metropolitan Areas and Rural Counties (millions)	80	72	−8
Design values projected to be in excess of the 8-Hour NAAQS (≥85 ppb) in 2010			
Number of Metropolitan Areas	26	[b] 18	−8
Number of Rural Counties	3	3	0
1990 Population of Metropolitan Areas and Rural Counties (millions)	78	65	−13

[a] For all cases, this table reflects implementation of ROTR and other measures assumed in the ROTR. For the "Without Tier 2/Sulfur" case, the estimates reflect continuation of NLEV beyond 2004.

[b] Of these 18 areas predicted to remain nonattainment, 10 would be within 5 percent of the 8-hour ozone standard.

Much larger VOC and NO_X emission reductions would occur in 2020, when the vehicle fleet would be almost fully turned over to Tier 2 vehicles. The 2020 scenario is designed to help evaluate the long-term impact of today's proposal on ozone levels, when the majority of the vehicle fleet would consist of vehicles that meet the standards being proposed today.

We present three indicators of the benefits of today's proposed program in 2020. First, as shown in Table III–3, that today's proposal would reduce NO_X emissions in 2020 by over 2,000,000 tons per year, not counting reductions in California, Hawaii, and Alaska. The reduction in each nonattainment area would also be very substantial. Second, we have estimated how much design values in 2020 would change due to today's proposal. For all counties projected to need emission reductions beyond the ROTR, the average reduction in 2020 design value was 6 ppb, or almost 8 percent of the 8-hour standard itself. The range of design value reductions was 3 to 12 ppb. These results included only the region covered by the OTAG ozone model. Third, when we analyzed the 2020 scenario to take into account the duration, severity, and geographic extent of high ozone levels, we found that projected excessive 8-hour ozone levels, defined as grid cell-days above 85 ppm ozone, were reduced by 43 percent.

The baseline scenario against which the ozone effects of today's proposed standards in 2020 were compared assumes that no emission control efforts beyond those assumed in the ROTR are implemented. We believe this approximation is reasonable because our inventory modeling shows that in 2020, total human-caused emissions in the absence of today's proposed program change very little from their 2007 levels. We subtracted the emission benefits of today's proposed program in 2020 from those baseline emissions to approximate the emissions that would result in 2020.

We expect the requirement to achieve attainment with the 8-hour standard will cause states with residual nonattainment areas to adopt additional controls in pursuit of their attainment obligations. The increasingly large emission reductions from today's proposal that would occur over time would be of great value to those areas since these areas would not need to implement as extensive or stringent additional controls as would otherwise be the case. Furthermore, once an area reaches attainment, it must adopt a SIP revision containing a strategy to maintain the standard thereafter. The reductions from today's proposal would help such areas overcome any loss of reductions due to less-than-expected effectiveness from other controls, provide a safety margin against the chance of new ozone violations, provide room for population and economic growth to cause increases in emissions

from other sources with less need for the maintenance plan to increase the stringency of controls on those other sources, and possibly even allow selective relaxation of other control programs.

Because the ozone modeling for 2020 did not account for the additional measures that states will adopt to attain and maintain the ozone standard, an attainment vs. nonattainment distinction does not apply in 2020. Instead, the changes that today's proposal would achieve in 2020 precursor emissions and in predicted ozone concentrations are more appropriate indicators of the benefits of the Tier2/Sulfur program than would be a count of the areas that have design values move from above to below the ozone standard.

These ozone results for 2007, 2010, and 2020 represent the best modeling currently available to us, but should be considered approximate. The Regulatory Impact Analysis documents all the methods and assumptions used. The results presented are estimates of the future that only apply to the OTAG region rather than the entire area that would be subject to today's proposal. As previously mentioned, there would also be ozone benefits outside this region, particularly for nonattainment areas in California and for Phoenix, Arizona. We expect to revise our ozone effects estimates prior to the final rule to reflect further improvements in estimates of emissions from both mobile and stationary sources.

In addition to the emission-reduction and ozone-reduction benefits discussed above that we expect will result from the proposed rule, we have done a separate analysis of economic benefits (and costs) associated with the expected ozone reductions from today's proposed program (see Section IV.D.5. below and the RIA).

C. Particulate Matter

1. Particulate Matter Presents Substantial Public Health Risks

Particulate matter (PM) is produced as a direct result of human activity and natural processes, and it is also formed through chemical and physical processes in the atmosphere. Natural sources include windblown dust, salt from dried sea spray, fires, and volcanoes, as well as so-called secondary particles formed from the transformation of natural emissions of SO_X, NO_X, and VOCs. Human sources include industrial activities, agriculture, road dust, and soot, as well as secondary particles produced from gases such as SO_X, NO_X, and VOCs that are emitted primarily from combustion processes. PM includes fine particles with a diameter smaller than 2.5 microns (also called $PM_{2.5}$) and coarse particles with larger diameters. Coarse particles are predominantly from non-combustion sources and are dominated by soil dust and sea salt. They remain in the atmosphere a relatively short period of time. Fine particulate includes carbon-based particles emitted directly from combustion processes but consists predominantly of secondary particles, such as sulfate-based particles (produced from SO_X), nitrate-based particles (produced from NO_X), and carbon-based particles created through transformation of VOC emissions. Mobile sources can reasonably be estimated to contribute to ambient secondary nitrate, sulfate and carbonaceous PM in proportion to their contribution to total NO_X, SO, and VOC emissions.

In 1997, 8 million Americans were living in 13 counties that exceeded the recently revised PM_{10} standard, and PM_{10} problems are projected to persist in the absence of further actions to control PM_{10} levels. Table III–8 presents estimates of the extent of PM_{10} and $PM_{2.5}$ nonattainment in the future. In the NAAQS RIA, we projected that in 2010, eleven counties with a combined 1990 population of about 10 million people would not be in attainment with the revised PM_{10} standards.[21] About half of the affected population lives outside of California. In the same analysis, 102 counties were projected to violate the new $PM_{2.5}$ NAAQS, with a combined 1990 population of about 55 million people. About 75 percent of the affected population lives outside of California. (More information about this analysis and its uncertainties may be found in the NAAQS RIA and the Tier 2 Report to Congress.) Ambient PM reductions from more stringent motor vehicle or fuel standards would primarily affect areas outside of California, because California has its own motor vehicle emission control program. California areas would also benefit, however, through the temporary travel and permanent migration of out-of-state vehicles into California, as discussed above.

TABLE III–8.—PROJECTED 2010 PM_{10}/$PM_{2.5}$ NONATTAINMENT COUNTIES AND POPULATIONS

	Outside California	California
Violating Original PM_{10} NAAQS		
Number of Counties	33	12
1990 Population (millions)	11	7
Violating Revised PM_{10} NAAQS		
Number of Counties	5	6
1990 Population (millions)	5	5
Violating New $PM_{2.5}$ NAAQS		
Number of Counties	92	10
1990 Population (millions)	42	13

A significant number of areas are projected to exceed the PM_{10} NAAQS in 2010 with existing emission controls, indicating that further PM and PM-precursor emission reductions will be needed. Because the bulk of PM emissions from motor vehicles are fine particles, any reduction in particulate emissions from motor vehicles aimed at reducing PM_{10} levels would also reduce ambient levels of $PM_{2.5}$. As mentioned above, the number of counties projected to violate the new $PM_{2.5}$ NAAQS is much larger than that for the revised PM_{10} standards. Tier 2/Sulfur standards that reduce particulate emissions for the purposes of facilitating attainment with the PM_{10} NAAQS could also benefit areas with elevated $PM_{2.5}$ levels.

2. Reducing Emissions From Cars and Light Trucks Would Reduce Ambient Levels

Today's proposal would reduce PM levels by reducing direct PM emissions from cars and light trucks, and by reducing emissions of sulfur and nitrogen oxides that are converted to PM in the atmosphere. Direct PM emissions would be reduced in two ways. First, reductions in gasoline sulfur levels would reduce PM emissions from gasoline vehicles. Second, the more stringent PM standard included in today's proposal would reduce PM emissions from cars and light trucks equipped with diesel engines. Diesel engines are used in a small fraction of current cars and light trucks, but this

[21] The methods used to project PM concentrations in 2010 from 1990 emissions and ambient concentration data introduce several sources of uncertainty. Also, the $PM_{2.5}$ values are predicted from a regression model and hence are subject to the uncertainty associated with this model. Other uncertainties exist regarding emission inventory estimates from human and natural sources, monitoring data, and the models used to account for physical and chemical processes in the atmosphere. Even with the anticipated delivery of more comprehensive modeling techniques, the scarcity of speciated ambient PM data in both urban and rural areas to evaluate model behavior will continue to compromise the certainty of the best model-derived conclusions.

fraction could grow as discussed in III.C.3. below.

With no growth in diesel sales, we project today's action would reduce direct PM emissions from cars and light trucks mainly due to the introduction of low-sulfur gasoline. Sulfur-based particles account for a substantial portion of the particulate matter emitted by gasoline-powered vehicles. More stringent PM emission standards are not anticipated to alter PM emissions from gasoline vehicles but would result in reductions in diesel PM emissions. The overall effect of today's proposal under this assumption would be to reduce direct exhaust PM emissions from cars and light trucks by 60 percent in 2007 and by 62–63 percent in 2015 and beyond. Tables III–9 and III–10 show the contribution of cars and light trucks to total PM_{10} and $PM_{2.5}$ emissions, and the reductions that would be obtained from today's proposal. The contribution of cars and light trucks to either PM inventory will generally be higher in urban areas than on a nationwide basis, and will vary from area to area. In 2007, for example, cars and light trucks contribute 1.3 percent to the nationwide PM_{10} inventory (excluding natural sources and fugitive dust). For comparison, this percentage is estimated to be 4.4 percent in Atlanta and 1.9 percent in the New York City metropolitan area.

Later in this section we discuss the possibility that sales of diesel-powered vehicles might increase from current levels, making the effect of the more stringent PM standard in this proposal larger.

TABLE III–9.—DIRECT EXHAUST PM_{10} EMISSIONS FROM CARS AND LIGHT TRUCKS AS PERCENT OF TOTAL EMISSIONS, AND REDUCTIONS DUE TO TIER 2/SULFUR CONTROL[a,b]

Year	Light-duty tons without tier 2	Light-duty percent of total without tier 2	Light-duty tons reduced by tier 2
2007	39,209	1.3	23,379
2010	41,412	1.4	25,239
2015	46,064	1.4	28,674
2020	51,102	1.5	32,031

[a] For all cases, this table reflects continuation of current diesel engine usage in the light truck fleet and implementation of ROTR and other measures assumed in the ROTR.

[b] The emission estimates shown exclude natural sources of PM and fugitive dust. They also do not include California (which has its own vehicle and fuel standards), Alaska, or Hawaii. Today's proposal would have additional emission benefits in these states.

TABLE III–10.—DIRECT EXHAUST $PM_{2.5}$ EMISSIONS FROM CARS AND LIGHT TRUCKS AS PERCENT OF TOTAL EMISSIONS, AND REDUCTIONS DUE TO TIER 2/SULFUR CONTROL [a,b]

Year	Light-duty tons without tier 2	Light-duty percent of total without tier 2	Light-duty tons reduced by tier 2
2007	36,365	1.7	21,687
2010	38,409	1.8	23,410
2015	42,724	1.9	26,595
2020	47,397	2.0	29,707

[a] For all cases, this table reflects continuation of current diesel engine usage in the light truck fleet and implementation of ROTR and other measures assumed in the ROTR.

[b] The emission estimates shown exclude natural sources of PM and fugitive dust. They also do not include California (which has its own vehicle and fuel standards), Alaska, or Hawaii. Today's proposal would have additional emission benefits in these states.

Even larger PM reductions would result from the reductions in the sulfur oxides (SO_X), NO_X, and VOC emissions that give rise to secondary PM that would result from today's proposal. The reduction in ambient PM levels that would come from the proposed reductions in these precursor emissions is about 6 to 7 times as large as the reduction from lower emissions of direct PM. Essentially all secondary PM is fine PM and hence is included in estimates of both PM_{10} and $PM_{2.5}$.

We described the effect of today's proposal on VOC and NO_X emissions above in Section III.B. Today's proposal also would reduce SO_X emissions from cars and light trucks by dramatically lowering the level of sulfur in gasoline, since gaseous SO_X emissions are dependent entirely on fuel sulfur level. In the absence of today's proposal, we project that SO_X emissions from cars and light trucks will increase steadily in conjunction with VMT growth, from approximately 216,000 tons in 2005 to 300,000 tons in 2020—an increase of almost 40 percent (total nationwide SO_X emissions from all sources was 20,000,000 tons in 1997). Today's proposal would reduce SO_X emissions from all gasoline-powered engines, including cars, light trucks, heavy-duty gasoline vehicles, and gasoline-powered nonroad engines, in any year by 90 percent, once all gasoline meets the proposed sulfur limit. The same percentage reductions in SO_X emissions would occur in subsequent years. The absolute emission reduction increases with time, however, due to growth in VMT and nonroad engine use. Table III–11 shows the impact of today's proposal on SO_X emissions.

TABLE III–11.—SO_x EMISSIONS FROM CARS AND LIGHT TRUCKS AS PERCENT OF TOTAL EMISSIONS, AND REDUCTIONS DUE TO TIER 2/SULFUR CONTROL [a]

Year	Light-duty tons without tier 2	Light-duty percent of total without tier 2	Light-duty tons reduced by tier 2
2007	225,673	1.2	202,748
2010	240,694	1.3	216,437
2015	270,174	1.4	242,964
2020	299,959	1.6	269,756

[a] The emission estimates shown do not include California (which has its own vehicle and fuel standards), Alaska, or Hawaii. Today's proposal would have additional emission benefits in these states.

3. Today's Proposal Would Limit the Potential Health Risks From Increased Diesel Engine Use in Cars and Light Trucks

Of particular concern from a PM perspective is the possibility that diesels will become more prevalent in the light-duty truck fleet. This development is a reasonable possibility since vehicle and engine manufacturers have indicated their intent to sell more diesel-powered light-duty trucks and in some cases have made capital investments to implement these plans. The Partnership for a New Generation of Vehicles (PNGV), a public-private research and development effort that has been pursuing several promising technologies for greatly improved vehicle fuel economy combined with low emissions, has identified improved diesel engines as a technology likely to be able to deliver large fuel economy improvements in the near future, by about 2004. In order to assess the potential impact of increased diesel sales penetration on $PM_{2.5}$ emissions, we analyzed benefits from our proposed Tier 2 PM standards under a scenario in which the use of diesel engines in light trucks increases rapidly, by five percentage points per year from 2001 through 2010, when diesels would account for 50 percent of light-duty truck sales; beyond 2010, diesel sales were assumed to be stable at 50 percent of the light-truck market. Table III–12 presents the results of our analysis of this scenario.

This scenario of increased diesels would result in dramatic increases in direct $PM_{2.5}$ emissions from cars and light trucks, if there is no change in the PM standards for light trucks. The increase in diesel exhaust $PM_{2.5}$ emissions would more than overcome the reduction in direct $PM_{2.5}$ attributable to the sulfur reduction in gasoline. Assuming no change in the existing PM standards for light trucks, our analysis of this scenario shows that direct $PM_{2.5}$ emissions in 2020 would be approximately 140,000 tons, nearly three times the 47,000 tons projected in the base diesel sales case from Table III–10. The portion of the $PM_{2.5}$ inventory attributable to cars and light trucks would climb steadily, reaching almost 6 percent in 2020 instead of the 2 percent shown in Table III–10 for a scenario where diesel engines do not increase their presence in the light truck fleet. In some cities with relatively high vehicle use and lower industrial emissions, the car and truck contribution would be even higher.

This increase would be accompanied by increases in the mortality and morbidity associated with $PM_{2.5}$ exposure. Fortunately, the standards being proposed today would result in a steady decrease in total direct $PM_{2.5}$ from cars and light trucks despite a possible increase in diesel engines in light trucks. Direct PM emissions in 2020 with today's proposal would be about 25,000 tons per year, less than at present.

If this scenario for increased diesel engines in light trucks were to occur, today's proposal would reduce diesel $PM_{2.5}$ by over 90 percent in 2020. Stated differently, by 2020 today's proposal would reduce over 113,000 tons of the potential increase in PM emissions from passenger cars and light trucks. The result would be less direct $PM_{2.5}$ than is emitted today, because the increase in diesel PM would be more than offset by the reduction in gasoline PM.

TABLE III–12.—DIRECT EXHAUST $PM_{2.5}$ EMISSIONS FROM LIGHT DUTY VEHICLES AND REDUCTIONS DUE TO TIER 2/SULFUR CONTROL, WITH GREATER DIESEL ENGINE SALES [a,b]

Year	Light-duty exhaust tons without tier 2	Light-duty exhaust tons with tier 2	Light-duty tons reduced
2007	52,907	22,478	30,429
2010	72,626	22,542	50,084
2015	109,622	23,275	86,347
2020	138,177	24,754	113,424

[a] For all cases, this table reflects implementation of ROTR and other measures assumed in the ROTR and an increase in diesel-powered light truck market share from 5 percent of light truck sales in 2001 to 50 percent in 2010 and beyond.

[b] The emission estimates shown exclude natural sources of PM and fugitive dust. They also do not include California (which has its own vehicle and fuel standards), Alaska, or Hawaii. Today's proposal would have additional emission benefits in these states.

4. Today's Proposal Would Have Substantial PM Benefits

In general, we project that today's proposal would reduce both direct and secondary PM from cars and light trucks substantially, regardless of the future market share for diesel engines in the light-duty fleet. The larger part of the reduction is due to large reductions in VOC, NO_X, and SO_X emissions, with corresponding reductions in secondary PM formation.

Low sulfur fuel would greatly reduce direct PM emissions and sulfate-based secondary PM formation from SO_X emissions from gasoline vehicles, while tailpipe PM standards are projected to mitigate excess PM emissions from diesel vehicles, even at very aggressive rates of diesel vehicle sales growth. Substantial reductions in NO_X

emissions would carry over to reductions in indirect PM. These reductions would help reduce the number of areas with PM_{10} and $PM_{2.5}$ levels in excess of national standards, reduce the severity of PM nonattainment in other areas, and help areas facing PM maintenance challenges stay in attainment.

The magnitude of the PM reductions from today's proposal in a given area depends on conditions such as the contribution of light-duty vehicles to the local PM, SO_X, NO_X, and VOC inventory; the contribution of light-duty vehicles to the PM, SO_X, NO_X, and VOC inventories in upwind areas; local and upwind ammonia inventories (involved in secondary PM formation); control measures being implemented on both local and upwind sources of PM and its precursors, and local meteorology. We have incorporated these factors into the air quality modeling used to develop the benefit/cost analysis presented in Section IV.D.5., which includes the economic benefits of the direct and secondary PM reductions expected to result from today's proposal.

The PM modeling results from that analysis suggest that if all cars and trucks used in 2010 met the emission standards being proposed today, significant PM reductions would result in urban and substantial PM reductions would result in much of the continental U.S. The annual average level of both PM_{10} and $PM_{2.5}$ was projected to decline by 0.25 to 0.64 micrograms per cubic meter (μ/m^3) in many cities; average levels were projected to decline by 0.1 to 0.25 μ/m^3 throughout most of the country east of the Great Plains, Nebraska, and parts of Colorado, Arizona, and other western states. Similarly, daily maximum PM levels [22] were projected to decline substantially, with many cities projected to see declines of 0.75 to 4.5 μ/m^3 and over half the continental U.S. projected to experience declines of 0.25 to 0.75 μ/m^3. Note that this analysis assumed no growth in sales of diesel-powered light trucks. It also did not account for the direct PM reductions that would be achieved when the small number of diesel-powered trucks already being sold now will reduce their PM emissions to meet the lower proposed PM standard.

[22] Daily maximum PM levels are the PM levels (averaged over 24 hours) for days that are projected to be in the 98th or 99th percentile when ranked by their $PM_{2.5}$ and PM_{10} levels, respectively.

D. Other Criteria Pollutants: Carbon Monoxide, Nitrogen Dioxide, Sulfur Dioxide

This proposal would help reduce levels of three other pollutants for which NAAQS have been established: carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). The extent of nonattainment for these three pollutants is small, so the primary effect of today's proposal would be to provide areas concerned with maintaining their attainment status a greater margin of safety. As of 1998, every area in the United States has been designated to be in attainment with the NO_2 NAAQS. As of 1997, only one area (Buchanan County, Missouri) did not meet the primary SO_2 short-term standard, due to emissions from the local power plant. In 1997, only 6 of 537 monitoring sites reported ambient CO levels in excess of the CO NAAQS; all six sites were located in California, which has established its own vehicle and fuel emission standards.

The reductions in SO_2 precursor emissions from today's proposal are essentially equal to the SO_X reductions described in Section III.B. and III.C., respectively. The impact of today's proposal on NO_2 emissions depends on the specific emission control technologies used to meet the standards being proposed today. However, essentially all of the NO_X emitted by cars and light trucks converts to NO_2 in the atmosphere; therefore, it is reasonable to assume that today's proposal would substantially reduce ambient NO_2 levels by the same proportion. Today's proposal also would require light trucks to meet more stringent CO standards; we will evaluate the impact of these standards more fully before publishing our final rule. The analysis of economic benefits and costs found in Section IV.D.–5. does not account for the economic benefits of the CO reductions expected to result from today's proposal.

E. Visibility

Visibility impairment occurs as a result of the scattering and absorption of light by particles and gases in the atmosphere. It is most simply described as the haze that obscures the clarity, color, texture, and form of what we see. The principal cause of visibility reduction is fine particles between 0.1 and 1 μm in size. Of the pollutant gases, only NO_2 absorbs significant amounts of light; it is partly responsible for the brownish cast of polluted skies. While the contribution of NO_2 to visibility impairment varies from area to area, it is generally responsible for less than ten percent of visibility reduction.

The CAA requires EPA to protect visibility, or visual air quality, through a number of programs. These programs include the national visibility program under Sections 169a and 169b of the Act, the Prevention of Significant Deterioration program for the review of potential impacts from new and modified sources, and the secondary NAAQS for PM_{10} and $PM_{2.5}$. The national visibility program established in 1980 requires the protection of visibility in 156 mandatory federal Class I areas across the country (primarily national parks and wilderness areas). More than 65 million visitors travel each year to these parks and wilderness areas. The CAA established as a national visibility goal, ''the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory federal Class I areas in which impairment results from manmade air pollution.'' The Act also calls for state programs to make ''reasonable progress'' toward the national goal. In addition, a recent national opinion poll on the state of the national parks found that more than 80 percent of Americans believe air pollution affecting these parks should be cleaned up for the benefit of future generations.[23]

There has been improvement in visibility in the western part of the country over the last ten years. However, visibility impairment remains a serious problem in Class I areas. Visibility in the East does not seem to have improved. As one part of addressing this national problem, EPA has proposed that states be required to adopt and implement effective plans for protecting and improving visibility in Class I federal areas (including 156 major national parks and wilderness areas), integrated with plans to achieve the revised ozone and PM standards.

Today's proposal should result in visibility improvements due to the reduction in local and upwind PM and PM precursor emissions. Since mobile source emissions contribute to the formation of visibility-reducing PM, control programs that reduce the mobile source emissions of direct and secondary PM would have the effect of improving visibility. The Grand Canyon Visibility Transport Commission's final recommendations report [24] found that

[23] ''National Parks and the American Public: A National Pubic Opinion Survey on the National Park System,'' Summary Report, National Parks and Conservation Association, June 1998.

[24] ''Recommendations for Improving Western Vistas,'' Report of the Grand Canyon Visibility Transport Commission to the United States Environmental Protection Agency, June 10, 1996.

reducing total mobile source emissions is an essential part of any program to protect visibility in the Western U.S. The Commission found that motor vehicle exhaust is responsible for about 14 percent of human-caused visibility reduction (excluding road dust). A substantial portion of motor vehicle exhaust comes from cars and light trucks. In light of that impact, the Commission's recommendations in 1996 supported federal Tier 2/Sulfur standards, as EPA is proposing today. More recently, a number of Western Governors noted the importance of controlling mobile sources as part of efforts to improve visibility in their comments on the Regional Haze Rule and on the need to protect the 16 Class I areas on the Colorado Plateau. In their joint letter dated June 29, 1998, they stated that, ''* * * the federal government must do its part in regulating emissions from mobile sources that contribute to regional haze in these areas. * * *'' and called on EPA to make a ''binding commitment * * * to fully consider the Commission's recommendations related to the * * * federal national mobile source emission control strategies.'' These recommendations included Tier 2 vehicle standards and reductions in gasoline sulfur levels.

As an indication of how important car and light truck emissions can be to fine PM and visibility, the recent Northern Front Range Air Quality Study has reported findings that indicate that cars and light trucks are responsible for 39 percent of fine PM at a site within the metropolitan Denver area, and for 40 percent at a downwind rural site. This contribution includes both direct PM and indirect PM formed from sulfur dioxide and NO_X from these vehicles.

The analysis of economic benefits and costs found in Section IV.D.5. accounts for the economic benefits of the visibility improvements expected to result from today's proposal.

F. Air Toxics

Emissions from cars and light trucks include a number of air pollutants that are known or suspected human or animal carcinogens such as benzene, formaldehyde, acetaldehyde, 1,3-butadiene, and diesel particulate matter, or that are known or suspected to have other, non-cancer health impacts. For several of these pollutants, motor vehicle emissions are believed to account for a significant proportion of total nation-wide emissions. All of these compounds are present in exhaust emissions; benzene is also found in evaporative emissions from gasoline-fueled vehicles.

The health effects of diesel particulate are of particular relevance to this rulemaking, because of the possibility for increased diesel-powered truck sales and our proposal for a more stringent PM standard that would apply to these trucks. While we have not finalized our decision about the carcinogenicity of diesel exhaust particulate, we are in the process of addressing this question. Several other agencies and international organizations have already made such a determination, including the California Air Resources Board (ARB). Our own quantitative risk assessment for diesel particulate is still in draft form,[25] and is presently being revised to address the comments of a peer review panel of the Clean Air Science Advisory Committee.

Because our assessment for diesel particulate is not complete, we are not presenting absolute estimates of how potential cancer risks from diesel particular could be affected by today's proposal. However, we can give a qualitative or relative discussion. Diesel engines are used in a very small portion of the cars and light-duty trucks in service today. By far, heavy duty highway and nonroad diesel engines are the larger source of diesel PM. Engine and vehicle manufacturers have projected that diesel engines are likely to be used in an increasing share of light trucks, and some manufacturers have announced capital investments to build such engines.

If these projections are valid and the proportion of light-duty trucks powered by diesel engines increases, the potential health risks from diesel PM could increase substantially. Light trucks could become a larger source of diesel PM than heavy-duty diesel trucks. We estimate that if the percentage of light duty diesel truck sales were to increase to 50 percent of light-duty truck sales by 2010, the increased presence of light duty diesel trucks on the nation's roads could increase the potential cancer risks associated with PM emissions from all diesel-powered highway vehicles (including heavy-duty diesel trucks, diesel buses, and light-duty diesel vehicles) by approximately 130 percent as of 2020, under the current light-duty diesel PM standards. Though the actual levels of diesel engine use may be considerably different than the projections used in both analyses, the analyses are useful in illustrating the potential impact of increased diesel engine use in light trucks.

Today's proposal would limit the increase in the potential cancer risks from cars and light trucks associated with any potential increase in light-duty diesel sales. We have estimated that in 2020, today's proposal would limit the increase in total highway diesel PM emissions due to growth in light truck diesels to 24 percent, in contrast to the more than doubling that would occur without our proposal for a tighter PM standard for light trucks. The comparison in terms of potential cancer risk from car and light truck diesel PM likely would closely follow this emissions comparison.

The VOC emission reductions resulting from today's proposal would further reduce the potential cancer risk posed by air pollutants other than diesel PM emitted by cars and light trucks, since many of these pollutants are themselves VOCs. The analysis of economic benefits and costs found in Section IV.D.5. does not account for the economic benefits of the reduction in cancer risk from air toxics that could result from today's proposal, because we have not yet completed our study of this issue or engaged in a peer-reviewed assessment of the baseline air toxics risks (including a final quantitative risk assessment of the diesel particulate risks) or of the reductions that would be achieved by today's proposal. Therefore, the estimates included in the Draft RIA should be considered preliminary. A peer-reviewed assessment is planned and may be completed in time to be available for incorporation into the impact analysis for the final rule. EPA will place this document in the docket as soon as it is available for public review.

Section 202(l)(2) of the Clean Air Act requires EPA to establish regulations for the control of hazardous air pollutants, or air toxics, from motor vehicles. The regulations may address vehicle emissions or fuel properties that influence emissions, or both. We will issue a proposal to address this requirement in September of this year, and a final rule in July 2000.

G. Acid Deposition[26]

Acid deposition, or acid rain as it is commonly known, occurs when SO_2

[25] EPA's diesel health assessment (Health Assessment Document for Diesel Emissions, SAB Review Draft, U.S. Environmental Protection Agency, Washington, DC. EPA/600/8–90/057C, February 1998.) can be found at the following EPA website: *http://www.epa.gov/ncea/diesel.htm*. The Clean Air Science Advisory Committee's review of that assessment (CASAC Review of the Draft Diesel Health Assessment Document, U.S. Environmental Protection Agency Science Advisory Board, Washington, DC EPA–SAB–CASC–99–001.) can be found at the following SAB website: http://www.epa.gov/sab/.

[26] Much of the information in this section was excerpted from the EPA document, Human Health Benefits from Sulfate Reduction, written under Title IV of the 1990 Clean Air Act. Amendments, U.S. EPA, Office of Air and Radiation, Acid Rain Division, Washington, DC 20460, November 1995.

and NO_X react in the atmosphere with water, oxygen, and oxidants to form various acidic compounds that later fall to earth in the form of precipitation or dry deposition of acidic particles. It contributes to damage of trees at high elevations and in extreme cases may cause lakes and streams to become so acidic that they cannot support aquatic life. In addition, acid deposition accelerates the decay of building materials and paints, including irreplaceable buildings, statues, and sculptures that are part of our nation's cultural heritage. To reduce damage to automotive paint caused by acid rain and acidic dry deposition, some manufacturers use acid-resistant paints, at an average cost of $5 per vehicle—a total of $61 million per year if applied to all new cars and trucks sold in the U.S. The general economic and environmental effects of acid rain are discussed at length in the Draft RIA.

Acid deposition primarily affects bodies of water that rest atop soil with a limited ability to neutralize acidic compounds. The National Surface Water Survey (NSWS) investigated the effects of acidic deposition in over 1,000 lakes larger than 10 acres and in thousands of miles of streams. It found that acid deposition was the primary cause of acidity in 75 percent of the acidic lakes and about 50 percent of the acidic streams, and that the areas most sensitive to acid rain were the Adirondacks, the mid-Appalachian highlands, the upper Midwest and the high elevation West. The NSWS found that approximately 580 streams in the Mid-Atlantic Coastal Plain are acidic primarily due to acidic deposition. Hundreds of the lakes in the Adirondacks surveyed in the NSWS have acidity levels incompatible with the survival of sensitive fish species. Many of the over 1,350 acidic streams in the Mid-Atlantic Highlands (mid-Appalachia) region have already experienced trout losses due to increased stream acidity. Emissions from U.S. sources contribute to acidic deposition in eastern Canada, where the Canadian government has estimated that 14,000 lakes are acidic. Acid deposition also has been implicated in contributing to degradation of high-elevation spruce forests that populate the ridges of the Appalachian Mountains from Maine to Georgia. This area includes national parks such as the Shenandoah and Great Smoky Mountain National Parks.

The SO_X and NO_X reductions from today's proposal would help reduce acid rain and acid deposition, thereby helping to reduce acidity levels in lakes and streams throughout the U.S. These reductions would help accelerate the recovery of acidified lakes and streams and the revival of ecosystems adversely affected by acid deposition. Reduced acid deposition levels would also help reduce stress on forests, thereby accelerating reforestation efforts and improving timber production. Deterioration of our historic buildings and monuments, and of buildings, vehicles, and other structures exposed to acid rain and dry acid deposition, also would be reduced, and the costs borne to prevent acid-related damage may also decline.

While the reduction in sulfur and nitrogen acid deposition would be roughly proportional to the reduction in SO_X and NO_X emissions, respectively, the precise impact of today's proposal would differ across different areas. Each area is affected by emissions from different source regions, and the mobile source contribution to the total SO_X and NO_X emission inventory will differ across different source regions. Nonetheless, the projected impact of today's proposal on SO_X and NO_X emission inventories provides a rough indicator of the likely effect of today's proposal on acid deposition. As discussed in Section III.D. above, today's proposal would reduce SOx emissions by 1.6 percent and NO_X emissions by 12.5 percent in 2020.

The analysis of economic benefits and costs found in Section IV.D.5. was not able to account for the economic benefits of the reduction in acid deposition expected to result from today's proposal.

H. Eutrophication/Nitrification

Nitrogen deposition into bodies of water can cause problems beyond those associated with acid rain. Elevated levels of nitrate in drinking water pose significant health risks, especially to infants. The Ecological Society of America has included discussion of the contribution of air emissions to increasing nitrogen levels in surface waters in a recent major review of causes and consequences of human alteration of the global nitrogen cycle in its *Issues in Ecology* series.[27] Long-term monitoring in the United States, Europe, and other developed regions of the world shows a substantial rise of nitrogen levels in surface waters, which are highly correlated with human-generated inputs of nitrogen to their watersheds. These nitrogen inputs are dominated by fertilizers and atmospheric deposition.

Human activity can increase the flow of nutrients into those waters and result in excess algae and plant growth. This increased growth can cause numerous adverse ecological effects and economic impacts, including nuisance algal blooms, dieback of underwater plants due to reduced light penetration, and toxic plankton blooms. Algal and plankton blooms can also reduce the level of dissolved oxygen, which can also adversely affect fish and shellfish populations. This problem is of particular concern in coastal areas with poor or stratified circulation patterns, such as the Chesapeake Bay, Long Island Sound, or the Gulf of Mexico. In such areas, the ''overproduced'' algae tends to sink to the bottom and decay, using all or most of the available oxygen and thereby reducing or eliminating populations of bottom-feeder fish and shellfish, distorting the normal population balance between different aquatic organisms, and in extreme cases causing dramatic fish kills.

Collectively, these effects are referred to as eutrophication, which the National Research Council recently identified as the most serious pollution problem facing the estuarine waters of the United States (NRC, 1993). Nitrogen is the primary cause of eutrophication in most coastal waters and estuaries.[28] On the New England coast, for example, the number of red and brown tides and shellfish problems from nuisance and toxic plankton blooms have increased over the past two decades, a development thought to be linked to increased nitrogen loadings in coastal waters. Airborne NO_X contributes from 12 to 44 percent of the total nitrogen loadings to United States coastal water bodies. For example, approximately one-quarter of the nitrogen in the Chesapeake Bay comes from atmospheric deposition.

Excessive fertilization with nitrogen-containing compounds can also affect terrestrial ecosystems.[29] Research suggests that nitrogen fertilization can alter growth patterns and change the balance of species in an ecosystem. In

[27] Vitousek, Peter M., John Aber, Robert W. Howarth, Gene E. Likens, et al. 1997. Human Alteration of Global Nitrogen Cycle: Causes and Consequences. *Issues in Ecology*. Published by Ecological Society of America, Number 1, Spring 1997.

[28] Much of this information was taken from the following EPA document: *Deposition of Air Pollutants to the Great Waters-Second Report to Congress*, Office of Air Quality Planning and Standards, June 1997, EPA–453/R–97–011.

[29] Terrestrial nitrogen deposition can act as a fertilizer. In some agricultural area, this effect can be beneficial.

extreme cases, this process can result in nitrogen saturation when additions of nitrogen to soil over time exceed the capacity of the plants and microorganisms to utilize and retain the nitrogen. This phenomenon has already occurred in some areas of the U.S.

Deposition of nitrogen from cars and light trucks contributes to these problems. As discussed in Section III.B. above, today's proposal would reduce total NO_X emissions by 12.5 percent in 2020. These reductions should reduce drinking water nitrate levels by reducing the amount of nitrate deposited from the atmosphere onto drinking water sources or onto the watersheds of drinking water sources by similar amounts. The NO_X reductions would also reduce the eutrophication problems associated with atmospheric deposition of nitrogen into watersheds and onto bodies of water, particularly in aquatic systems where atmospheric deposition of nitrogen represents a significant portion of total nitrogen loadings. Since air deposition accounts for 12–44 percent of total nitrogen loadings in coastal waters, the 12.5 percent reduction in NO_X from today's proposal are projected to reduce nitrogen loadings by 1.5–5.5 percent. To put these reductions in perspective, the reductions expected in the Chesapeake Bay area would amount to about 6 percent of the total reduction in nitrogen loading needed to maintain the reduction in nutrient loads agreed to by the signatory states in the Chesapeake Bay Agreement (40 percent of ''controllable by the year 2000).

The analysis of economic benefits and costs found in Section IV.D.5. does not account for the economic benefits of reduced drinking water nitrate levels and reduced terrestrial nitrogen deposition expected to result from today's proposal, if implemented. The analysis does, however, account for the economic benefits of reduced eutrophication.

I. Conclusion: Cleaner Cars and Light Trucks Are Critically Important to Improving Air Quality

Despite continued progress in reducing emissions from cars and light trucks, these vehicles will continue to contribute a substantial share of the ozone and PM precursors in current and projected nonattainment areas, and in upwind areas whose emissions contribute to downwind nonattainment, unless additional measures are taken to reduce their emissions. These vehicles will also continue to contribute to the ambient PM that affects visibility in Class I federal areas and some urban areas. Emissions from cars and light trucks also play a significant role in a wide range of health and environmental problems, including known and potential cancer risks from inhalation of air pollutants (a problem that could become more significant if sales of diesel-powered cars and light trucks were to increase), health risks from elevated drinking water nitrate levels, acidification of lakes and streams, and eutrophication of inland and coastal waters.

Today's proposal would reduce NO_X, VOC, CO, PM, and SO_X emissions from these vehicles substantially. These reductions would help reduce ozone levels nationwide and reduce the extent and severity of violations of both the 1-hour and 8-hour ozone standards. These reductions would also help reduce PM levels, both by reducing direct PM emissions and by reducing emissions that give rise to secondary PM. The NO_X and SO_X reductions would help reduce acidification problems, and the NO_X reductions would help reduce eutrophication problems and drinking water nitrate levels. The PM standards proposed today would help improve visibility and would help mitigate the adverse health effects due to possible increases in light-duty diesel engine sales.

Section IV.D.5. of this preamble describes the comprehensive analysis EPA has made of the net economic benefit of the requirements we are proposing today. In that analysis, we have quantified many of the public health and environmental benefits of the actions on an annual, national scale. Estimates of the economic value of these effects have been made for as many of the effects as possible, and compared to the cost of compliance. This rulemaking is the first instance in which EPA has conducted such a cost-benefit analysis for a set of proposed vehicle emission standards.

IV. What Are We Proposing and Why?

In the previous section, we showed why many states need as much emission reduction as is reasonably possible from LDVs and LDTs—plus reductions from other sources—if they are to reach and maintain compliance with the 1-hour and 8-hour ozone NAAQS. We also pointed out that these reductions would also be important in addressing PM and other air quality and environmental problems in every major region of the country.

In this section, we describe the comprehensive vehicle/fuel program we are proposing to respond to these serious air quality needs. Specifically, we discuss:

- Our reasons for proposing a comprehensive vehicle and fuel program, including why stringent LDV and LDT standards are feasible in conjunction with low sulfur gasoline.
- Our proposed vehicle-related requirements and our rationales for proposing them.
- Our proposed fuel-related requirements and our rationales.
- Our projections of the economic impacts, cost effectiveness, and monetized environmental and health benefits of the proposed program.
- Other program design options we have considered.

A. Why Are We Proposing Vehicle and Fuel Standards Together?

1. Feasibility of Stringent Standards for Light-Duty Vehicles and Light-Duty Trucks.

a. *Gasoline Fueled Vehicles.* We believe that the standards being proposed today for gasoline-fueled vehicles are well within the reach of existing control technology. Our proposed determination of feasibility is based on the use of catalyst-based strategies that are already in use and are well proven on the existing fleet of vehicles. In fact, as you will see below, many current engine families are already certified to levels at or below the proposed new Tier 2 requirements. All of the certification and research testing discussed below was performed on low-sulfur test fuel (nominally 30 ppm).

Certainly, larger vehicles and trucks, which are heavier and have larger frontal areas, will face the biggest challenges. However, conventional technology will be sufficient for even these vehicles, especially in light of the extra leadtime we have provided before LDT3s and LDT4s have to meet Tier 2 levels. We are also proposing to change the test conditions for these trucks from ''adjusted loaded vehicle weight'' to ''loaded vehicle weight.'' Adjusted loaded vehicle weight, suitable for commercial truck operation, loads the truck to half of its full payload. Loaded vehicle weight, on the other hand, represents curb weight plus 300 pounds. The proposed change more accurately reflects how these vehicles are used and makes heavy LDT testing consistent with passenger car and light LDT testing. This change will make it substantially easier for the heavier trucks to meet our proposed standards.

Emission control technology has evolved rapidly in recent years. Emission standards applicable to 1990 model year vehicles required roughly 90% reductions in exhaust HC and CO

emissions and a 75% reduction in NO_X emissions compared to uncontrolled emissions. Today, some vehicles currently in production are well below these levels, showing overall emissions reductions of all three of these pollutants. These vehicles' emissions are well below those necessary to meet the current federal Tier 1 and even California Low-Emission Vehicle (LEV) standards. The reductions have been brought about by ongoing improvements in engine air-fuel management hardware and software plus improvements in catalyst designs, all of which are described fully in the Draft RIA.

The types of changes being seen on current vehicles have not yet reached their technological limits and continuing improvement will allow both LDVs and LDTs to meet the proposed standards. The Draft RIA describes a range of specific techniques that we believe could be used. These range from improved computer software and engine air-fuel controls to increases in precious metal loading and other exhaust system/catalyst system improvements. All of these technologies are currently used on one or more production vehicle models. There is no need to invent new approaches or technologies. The focus of the effort is primarily development, application, and optimization of these existing technologies.

We can gain significant insight into the difficulty of meeting the proposed new standards by looking at current full-life certification data. There are at least 48 engine family-control systems combinations certified in 1999 at levels below the Tier 2 NO_X standard of 0.07 g/mi. Of these, 35 also have hydrocarbon levels of 0.09 g/mi or below. Looking at a somewhat higher threshold to identify vehicles certified near the proposed standard, there are an additional 113 car and light truck families certified at levels between 0.07 g/mi and 0.10 g/mi NO_X.

All of the above vehicles are already able, or close to being able, to certify to our proposed standards. The further reductions needed are those to provide an ample safety margin, or cushion, between the certified level and the emission standard. The degree of compliance margin required is a function of a variety of factors designed to provide the manufacturer a high confidence that production vehicles will meet the standards in-use over their useful life. Historically, these determinations are manufacturer specific, with cushions generally growing smaller as standards decline (reflecting more precision and repeatability in vehicle performance as more sophisticated controls are developed). The 1999 certification data reflects compliance cushions from as little as 20 percent below the standard to as high as 80 percent below the standard.

The cushion to be expected for Tier 2 vehicles is difficult to establish, although some manufacturers claim a cushion of 50 percent below the standard would be needed. We believe that manufacturers would strive to use the smallest cushions possible in order to minimize the impacts of the standards on their vehicles. Looking at 1999 certification data from this perspective and using a threshold of 0.04 g/mi NO_X, there are fully 22 engine family-control system configurations at or below the 0.04 g/mi level (one of which is a LDT4). Thus, even at such low levels, current technology is already demonstrating the performance that would be necessary to meet the proposed standards.

Since the most difficult compliance effort would be faced by the larger LDTs, we have undertaken a technology demonstration program aimed at lowering the emissions of a large 1999 LDT3 vehicle. This vehicle has a high horsepower engine, four wheel drive, and a curb weight of 4,500 pounds (GVWR[30] of 6,100 lbs). The exhaust system of the vehicle was modified to incorporate two close-coupled and two underfloor catalytic converters. The catalytic converters were aged to full useful life conditions using the accelerated aging methods described by Theiss.[31] For further details of the modifications to this vehicle, please refer to the draft RIA.

In our initial work we made no attempts to alter the calibration of the electronic engine controls. In this configuration, the vehicle achieved emissions levels of 0.060 ± 0.002 g/mi NO_X and 0.09 ± 0.01 g/mi NMHC. Thus, by these straightforward modifications to the catalyst system based upon existing catalyst hardware, this vehicle was able to reach the proposed Tier 2 levels. In order to achieve additional reductions in the test vehicle's emissions, we are planning further work consisting largely of elimination of fuel cut-offs during decelerations, slight increases in EGR, and a minor degree of air injection during cold-start. However, given the amount of leadtime before any of the proposed Tier 2 standards would begin, we believe that the work already done clearly shows the feasibility of our proposal, even for large light-duty trucks.

Figure IV.A.–1 shows the results of our testing in comparison to the California LEV–1 standards applicable to this vehicle, and the proposed Tier 2 standards.

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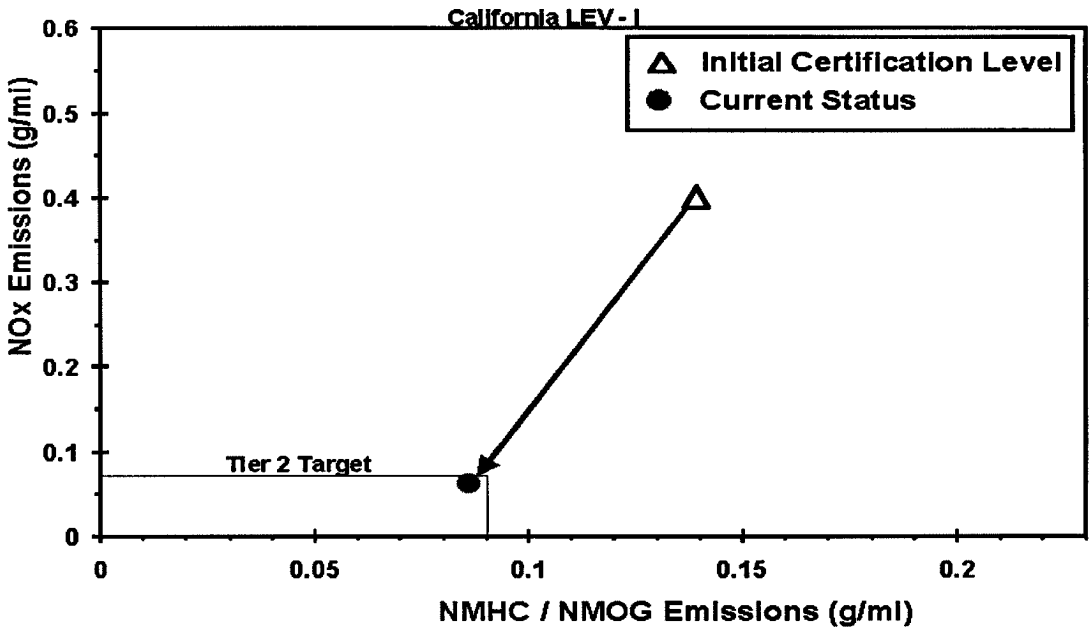
[30] Gross Vehicle Weight Rating. The curb weight of the vehicle plus its maximum recommended load of passengers and cargo.

[31] Theiss, J.R., ''Catalytic Converter Diagnosis Using the Catalyst Exotherm,'' SAE Technical Paper Series, Paper No. 942058, SAE Fuels and Lubricants Meeting and Exposition, Baltimore, MD, October 17–20, 1994.

Figure IV.A.-1

Emission Results - 1999 Light-Duty Truck as Modified by EPA



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One of the challenges facing larger truck catalyst systems is overtemperature protection. Because of this, our work on this vehicle included temperature evaluation of the catalyst under maximum load conditions. We found that the original fuel calibration for the truck provided sufficient enrichment under wide-open-throttle conditions to prevent exceeding the catalyst bed temperature limits (~950 to 1000°C) specified by the manufacturer of the catalytic converters. We conducted chassis dynamometer testing over the aggressive US06 cycle with the dynamometer inertia greatly increased to simulate full GVWR load conditions (6,100 lbs) for the pickup. Catalyst bed temperatures did not exceed 850°C at any point during the testing.

In addition to the EPA work, others have conducted several test programs recently that help demonstrate the feasibility of our proposed levels. The Coordinating Research Council (CRC), automobile manufacturers, and the American Petroleum Institute (API) all tested a number of light-duty vehicles capable of complying with the California LEV or ULEV standards as part of an evaluation of the effects of sulfur levels on emissions. Of the vehicles tested, seven met or nearly met the Tier 2 design targets, and all were below the proposed 0.07 g/mi NO_X and 0.09 g/mi NMOG standards.

Another program sponsored by MECA took two LDVs (a Crown Victoria and a Buick LeSabre) and one LDT2 (a Toyota T100) certified to the federal Tier 1 standards and replaced the original catalytic converters with more advanced catalytic converters, thermally aged to roughly 50,000 miles. With these systems and some related emission control modifications, all three vehicles' emissions were well below our proposed 50,000 mile standards (0.05 g/mi NO_X, 0.075 g/mi NMOG), and the Buick and the Toyota LDT2 met our estimated design targets for those standards.

Finally, the California Air Resources Board (ARB) tested six different production LEV light-duty vehicle models. Two of the six models met the proposed Tier 2 design targets for NMOG and NO_X. After installing low mileage advanced catalytic converters and making some minor adjustments, all of the vehicles had emission levels well below the proposed Tier 2 NMOG and NO_X design targets. ARB also tested several Ford Expeditions (LDT4) equipped with advanced catalytic converters. By adjusting several parameters, they were able to reduce NO_X emissions to 0.06 g/mi and NMOG to 0.07 g/mi with a catalyst aged to 50,000 miles of use.

Neither the MECA nor the ARB test programs modified the basic engine calibrations of the vehicles tested. It is very likely that such recalibration could reduce emissions even further. Therefore, we consider these actual test results to be a conservative estimate of the capability of these advanced catalytic converters. This is especially true for the Ford Expedition testing by ARB, where the engine software appeared to modify its own calibration with the new catalyst, counteracting some of the advantages of the new catalyst.

A more expanded analysis of the feasibility of the proposed standards for gasoline fueled vehicles can be found in the Draft RIA, considering the types of changes that will allow manufacturers to extend effective new controls to the entire fleet of affected vehicles. That analysis includes discussion of gasoline direct-injection engines, as well as the feasibility of the proposed CO, formaldehyde and evaporative emission standards. The conclusion of all of our analyses is that the proposed standards would be feasible for gasoline-fueled vehicles operated on low-sulfur gasoline. As gasoline-fueled vehicles represent the overwhelming majority of the light-duty vehicle and truck population, EPA proposes to find that the proposed standards would be feasible overall for LDVs and LDTs.

b. *Diesel Vehicles.* As outlined above, we have decided to propose standards that are intended to be ''fuel neutral.'' In today's document, we propose to find that the Tier 2 standards are technologically feasible and cost-effective for light-duty vehicles and light-duty trucks overall, based on the discussion in Section IV.A.1.a. above. Under the principal of fuel neutrality, all cars and light trucks, including those using diesel engines, would be required to meet the proposed Tier 2 standards. EPA believes that the proposed program, including the phase-in periods, would facilitate the advancement of clean diesel engine technologies. EPA further believes that in the long term the standards would be within reach for diesel-fueled vehicles in combination with appropriate changes to diesel fuel to facilitate aftertreatment technologies.

As with gasoline engines, manufacturers of diesels have made abundant progress over the past 10 years in reducing engine-out emissions from diesel engines. In heavy trucks and buses, PM emission standards, which were projected to require the use of exhaust aftertreatment devices, were actually met with only engine modifications. NO_X emissions from heavy trucks and buses sold starting in 2002 will also reflect deep reductions from emission levels typical of engines produced in the mid-1980's. Indeed, emissions and performance of lighter diesel engines are rapidly approaching the characteristics of gasoline engines, while retaining the durability and fuel economy advantages that diesels enjoy. Against this background of continuing progress, we believe that the technological improvements that would be needed could be made in the time that would be available before diesels would have to meet the new Tier 2 standards.[32]

While reductions in ''engine-out'' emissions, including incorporation of EGR strategies, will continue to be made, increasing emphasis is being placed on various aftertreatment devices for diesels. This is because further reductions in engine-out emissions will be unlikely, by themselves, to allow diesels to comply with the proposed Tier 2 standards for NO_X and PM. Rather, diesels would require the use of highly effective aftertreatment devices.

For NO_X emissions, potential aftertreatment technologies include lean NO_X catalysts, NO_X adsorbers and selective catalytic reduction (SCR). Lean NO_X catalysts are still under development, but generally appear capable of reducing NO_X emissions by about 15–30%. This efficiency is not likely to be sufficient to enable compliance with the proposed Tier 2 standards, but it could be used to meet the interim standards that would begin in 2004.

NO_X adsorbers appear to be up to 90% efficient at removing NO_X from the exhaust. Efficiency in this range is likely to be sufficient to enable compliance with the proposed Tier 2 standards. NO_X adsorbers temporarily store the NO_X and thus the engine must be run periodically for a brief time with excess fuel, so that the stored NO_X can be released and converted to nitrogen and oxygen using a conventional three-way

[32] We generally expect that manufacturers would take advantage of the flexibilities in today's proposal to delay the need for diesel vehicles to meet the final Tier 2 levels until late in the phase-in period. Because diesel vehicles represent a very small percentage of the LDV/LDT market, diesels would not fall under the final Tier 2 standards until 2009, giving manufacturers a relatively large amount of leadtime. As discussed below, we are issuing an Advance Notice of Proposed Rulemaking intended to solicit comment on the need for reduced sulfur in diesel fuel in order to meet these standards. We also believe that the proposed interim standards would be feasible for diesels by 2004, with or without the fuel change, given the flexibilities associated with those standards.

catalyst, like that used on current gasoline vehicles.

There is currently a substantial amount of development work being directed at NO_X adsorber technology. While there are technical hurdles to be overcome, progress is continuing and it is our judgement that the technology should still be available by the time it would be needed for the proposed Tier 2 standards.

One serious concern with current NO_X adsorbers is that they are quickly poisoned by sulfur in the fuel. Some manufacturers have strongly emphasized their belief that, in order to meet the Tier 2 levels, low sulfur diesel fuel would also be required to mitigate or prevent this poisoning problem. One solution would be to reduce sulfur to very low levels. Another solution would be to reduce sulfur somewhere below current levels and develop a way to periodically remove the sulfur from the adsorber. In any event, this technique, if used, would also require low sulfur diesel fuel.

SCR has been demonstrated commercially on stationary diesel engines and can reduce NO_X emissions by 80–90%. This efficiency would be sufficient to enable compliance with the proposed Tier 2 standards. However, SCR requires that the chemical urea be injected into the exhaust before the catalyst to assist in the destruction of NO_X. The urea must be injected at very precise rates, which is difficult to achieve with an on-highway engine, because of widely varying engine operating conditions. Otherwise, emissions of ammonia, which have a very objectionable odor, can occur. Substantial amounts of urea are required, meaning that vehicle owners would have to replenish their vehicles' supply of urea frequently. As the engine and vehicle will operate satisfactorily without the urea (only NO_X emissions would be affected), some mechanism would be needed to ensure that vehicle owners maintained their supply of urea. Otherwise, little NO_X emission reduction would be expected in-use.

Regarding PM, applicable aftertreatment devices tend to fall into two categories: oxidation catalysts and traps. Diesel oxidation catalysts can reduce total PM emissions by roughly 15–30%. They would need to be used in conjunction with further reductions in PM engine-out emissions in order to meet the proposed Tier 2 standards. Diesel particulate traps, on the other hand, can eliminate up to 90% of diesel PM emissions. However, some of the means of accomplishing the regeneration of particulate traps involve catalytic processes that also convert sulfur dioxide in the exhaust to sulfate. These techniques, if used, would also require a low sulfur fuel.

Since we have noted that some of the options for diesel aftertreatment may require lower sulfur diesel fuel than is currently available, the question of diesel fuel quality improvement arises. Manufacturers have argued that low sulfur diesel fuel will be required to permit diesels to meet the proposed new standards. While we believe that low sulfur diesel fuel would likely be required to enable diesel engines to meet the proposed Tier 2 standards, this proposal does not include provisions for such fuel. We need additional information about the specific aftertreatment solutions that could be used to meet the standards, the effectiveness of these approaches in reducing PM and NO_X emissions and their sensitivity to diesel sulfur, and improvements or alternatives that might reduce the impacts of fuel sulfur.

To deal more thoroughly with this matter, we are issuing an Advanced Notice of Proposed Rulemaking on a parallel path with today's Tier 2 proposal. As a part of that process, EPA will assess the effect of low-sulfur fuel on the ability of diesels to meet Tier 2 standards for LDVs and LDTs. It will also consider the issue of the relation of diesel fuel quality to future standards for heavy-duty on-highway diesel engines and nonroad diesel engines. Our plans for this Advanced Notice are discussed further in section IV.C. below. In any case, we believe that the standards proposed today are appropriate and feasible overall for LDVs and LDTs.

2. Gasoline Sulfur Control Is Needed To Support the Proposed Vehicle Standards

As we discussed in the previous section, we believe that the stringent standards we propose are needed to meet air quality goals are feasible for LDVs and LDTs. At the same time, we believe that for these standards to be feasible for gasoline LDVs and LDTs, low sulfur gasoline must be made available. The following paragraphs explain why we think gasoline sulfur control must accompany Tier 2 vehicle standards.

Catalyst manufacturers generally use low sulfur gasoline in the development of their catalyst designs. Vehicle manufacturers then equip their vehicles with these catalysts and EPA certifies them to the exhaust emission standards, usually based on testing the manufacturer does using low sulfur gasoline. However, fundamental chemical and physical characteristics of exhaust catalytic converter technology generally result in a significant degradation of emission performance when these vehicles use gasoline with sulfur levels common in most of the country today. This sensitivity of catalytic converters to gasoline sulfur varies somewhat depending on a number of factors, some better understood than others. Clearly, however, as we discuss in the following paragraphs, gasoline sulfur's impact is large, especially in vehicles designed to meet very low emission standards like those proposed today.

This is the reason EPA has decided to propose a comprehensive approach to addressing emissions from cars and light trucks, including provisions to get low sulfur gasoline into the field in the same time frame needed for Tier 2 vehicles. (We discuss the related fact that the sulfur impact on catalyst performance is not fully reversible in Section IV.C. below, in the context of EPA's preference for a nationwide versus a regional gasoline sulfur control program, and in the Draft RIA.)

a. *How Does Gasoline Sulfur Affect Vehicle Emission Performance?* We know that gasoline sulfur has a negative impact on vehicle emission controls. Vehicles depend on the catalytic converter to reduce emissions of HC, CO, and NO_X. Sulfur and sulfur compounds attach or ''adsorb'' to the precious metal catalysts that are required to convert these emissions. Sulfur also blocks sites on the catalyst designed to store oxygen that are necessary to optimize NO_X emissions conversions. While the amount of sulfur contamination can vary depending on the metals used in the catalyst and other aspects of the design and operation of the vehicle, some level of sulfur contamination will occur in any catalyst.

Sulfur sensitivity is impacted not only by the catalyst formulation (the types and amounts of precious metals used in the catalyst) but also by factors including the following:

- the materials used to provide oxygen storage capacity in the catalyst, as well as the general design of the catalyst,
- the location of the catalyst relative to the engine, which impacts the temperatures inside the catalyst,
- the mix of air and fuel entering the engine over the course of operation, which is varied by the engine's computer in response to the driving situation and affects the mix of gases entering the catalyst from the engine, and
- the speeds the car is driven at and the load the vehicle is carrying, which

also impact the temperatures experienced by the catalyst.

Since these factors vary for every vehicle, the sulfur impact varies for every vehicle to some degree. There is no single factor that guarantees that a vehicle will be very sensitive or very insensitive to sulfur. We now believe that there are not (and will not be in the foreseeable future) emission control devices available for gasoline-powered vehicles that can meet the proposed Tier 2 emission standards that would not be significantly impaired by gasoline with sulfur levels common today.

b. How Large Is Gasoline Sulfur's Effect on Emissions? High sulfur levels have been shown to significantly impair the emission control systems of cleaner, later technology vehicles. The California LEV standards and Federal NLEV standards, as well as California's new LEV–II standards and our proposed Tier 2 standards, require catalysts to be extremely efficient to adequately reduce emissions over the full useful life of the vehicle. Recent test programs conducted by the automotive and oil industries show that LEV and ULEV vehicles can experience, on average, a 40% increase in NMHC and 134% increase in NO_X emissions when operated on 330 ppm sulfur fuel (approximately the current national average sulfur level) compared to 30 ppm sulfur fuel.

This level of emissions increase is significant enough on its own to potentially cause a vehicle to exceed the proposed full useful life emission standards when operated on sulfur levels that are substantially higher than the levels proposed today, even with the margin of safety that auto manufacturers generally include. Average sulfur levels in the U.S. are currently high enough to significantly impair the emissions control systems in new technology vehicles, and to potentially cause these vehicles to fail emission standards required for vehicles up through 100,000 miles (or more) of operation.

For older vehicles designed to meet Tier 0 and Tier 1 emission standards, the effect of sulfur contamination is somewhat less. Still, testing shows that gasoline sulfur increases emissions of NMHC and NO_X by almost 17% when one of these vehicles is operated on gasoline containing 330 ppm sulfur compared to operation on gasoline with 30 ppm sulfur. Thus, Tier 0 and Tier 1 vehicles can also have higher emissions when they are exposed to sulfur levels substantially higher than the proposed sulfur standard. This increase is generally not enough to cause a vehicle to exceed the full useful life emission standards in practice, but it can result in in-use emissions increases since the vehicle could emit at levels higher than it would if it operated consistently on 30 ppm sulfur gasoline.

Gasoline sulfur control to 30 ppm would achieve about 700,000 tons of NO_X reductions per year from LDVs and LDTs by 2020. This represents about a third of the national NO_X emission reductions otherwise available from these vehicles. Without these potential emission reductions, many states would face the potentially unmeetable challenge of finding enough other cost-effective sources of NO_X emission reductions to address their ozone nonattainment and maintenance problems.

Other implications of continued use of high-sulfur gasoline include the following:

- Other important potential air quality benefits would not be realized throughout the country, including reduction in direct emissions of sulfur dioxide, secondary formation of nitrate PM from NO_X emissions, reductions in regional haze, reductions in air toxics emissions and other pollution problems described in Section III above.
- The immediate and very significant improvements that lower sulfur gasoline would bring in the emissions performance of vehicles already on the road would not occur.
- Advanced emission control technologies now being developed, all of which appear equally or even more sensitive to gasoline sulfur levels than current technologies, would not be available to the U.S. vehicle market (for example, very fuel efficient technologies like gasoline direct injection technology and fuel cells).
- Finally, any interference with onboard emission control system diagnostic (OBD) systems that high-sulfur gasoline causes would remain in the absence of a low-sulfur gasoline program.

3. A Comprehensive Vehicle/Fuel Approach Is Therefore Necessary

Based on this information, we have concluded that sulfur levels in gasoline must be reduced to enable these catalysts to operate properly and for the needed air quality benefits of this program to be achieved. In today's action, therefore, we are proposing a comprehensive, integrated program of stringent vehicle emission standards in combination with stringent gasoline sulfur standards. The proposal is carefully designed to address the need for refiners to make low-sulfur gasoline available at very nearly the same time as auto makers begin selling large numbers of Tier 2 vehicles. We have tried to take into account all potential areas of interaction between the vehicle and gasoline sulfur parts of the proposal, and as a result we believe that the overall proposed program would achieve the expected environmental goals while minimizing the economic and administrative burdens on the affected industries. We encourage all commenters to consider and discuss the interrelationships among the elements of the program when they comment on individual provisions.

B. Our Proposed Program for Vehicles

We have held a series of meetings with the various stakeholders impacted by this action. We have seriously considered their input in developing our proposal and believe the program laid out below and the areas upon which we are seeking comment are responsive to their concerns. One part of this input was provided by a broad representation of the LDV/LDT manufacturing industry, represented by the Alliance of Automobile Manufacturers, and offered constructive recommendations on a number of elements of a vehicle emission control program. We have considered many of their ideas and issues in the design of the proposed program and we are seeking comment on a number of others. The ''Alliance'' proposal is documented in the docket in a letter to EPA dated March 26, 1999.

The next sections of the preamble describe our proposal in detail.

1. Overview of the Proposed Vehicle Program

The vehicle-related part of today's proposal covers a wide range of standards, concepts, and provisions that affect how vehicle manufacturers would develop, certify, produce, and market Tier 2 vehicles. This Overview subsection provides readers with a broad summary of the major vehicle-related aspects of the proposal. Readers for whom this Overview is sufficient may want to move on to the discussion of the key gasoline sulfur control provisions (Section IV.C.). Readers wishing a more detailed understanding of the proposed vehicle provisions can continue beyond the Overview to deeper discussions of key issues and provisions (Sections IV.B.–2, 3, and 4) as well as discussions of additional provisions (Section V.A.). Readers should refer to the regulatory language found at the end of this preamble for a complete compilation of the proposed requirements.

a. *Introduction.* Today's proposal for Tier 2 vehicle standards incorporates concepts from the federal NLEV program. The program takes the

corporate averaging concept and other provisions from NLEV but changes the focus from NMOG to NO_X. The emission standard ''bins'' used for this average calculation are different in several respects from those of the California LEV II program, yet we have designed them to allow harmonization of federal and California vehicle technology. As discussed below, the Tier 2 corporate average NO_X level to be met through these requirements ultimately applies to all of a manufacturer's LDVs and LDTs (subject to two different phase-in schedules) regardless of what fuel is used.

In the discussions below, we propose different Tier 2 phase-in schedules for two different groups of vehicles as well as two different sets of interim standards for 2004 and later model year vehicles not yet phased-in to the Tier 2 standards. To understand how the program would work, it is necessary first to understand EPA's classification system for light-duty vehicles and trucks.

The light duty category of motor vehicles includes all vehicles and trucks under 8500 pounds gross vehicle weight rating, or GVWR (i.e., vehicle weight plus rated cargo capacity). Table IV.B.–1 shows the various light duty categories. In the discussion below, we make frequent reference to two separate groups of light vehicles: (1) LDV/LLDTs, which include all LDVs and all LDT1s and LDT2s; and (2) HLDTs, which include LDT3s and LDT4s.

TABLE IV.B.–1.—Light Duty Vehicles and Trucks; Category Characteristics

	Characteristics
LDV	A passenger car or passenger car derivative seating 12 passengers or less.
Light LDT (LLDT).	Any LDT rated at up through 6,000 lbs GVWR. Includes LDT1 and LDT2.
Heavy LDT (HLDT).	Any LDT rated at greater than 6,000 lbs GVWR, but not more than 8,500 lbs GVWR. Includes LDT3 and LDT4.

As discussed below, the Tier 2 program would take effect in 2004, with full phase in occurring by 2007 for LDV/LLDTs and 2009 for HLDTs. During the phase-in years of 2004–2008, vehicles not certified to Tier 2 requirements would meet interim requirements that would also employ a bins system, but with less stringent corporate average NO_X standards.

References to California LEV II Program

Throughout this preamble, we make reference to California's LEV II program and its requirements. The LEV II program was approved by the California ARB at a hearing of November 5, 1998. Numerous draft documents were prepared by ARB staff in advance of that hearing and made available to the public. Some of those documents have now been modified as a result of changes to the proposed program made at the hearing and due to comments received after the hearing.

However, when this NPRM was assembled for signature, the documents related to the LEV II program had still not been finalized. In fact, a 15 day public review of the program was scheduled for April 15–30, 1999. After that review, ARB expected to be able to formally adopt the program and issue final documents without significant change.

We have placed copies of the latest available documents, some of which we used in the preparation of this NPRM, in the docket. You may also obtain these documents and other information about California's LEV II program from ARB's web site: (www.arb.ca.gov/regact/levii/levii.htm).

In the regulatory text that follows this preamble, we propose to incorporate by reference a number of documents related to LEVII and California test procedures under LEVII. ARB expects to finalize the LEV II program without significant changes before we issue a final rule. We will review any changes to the final version of the LEV II program and its supporting documents and consider them for inclusion in the federal program when we prepare our final rule.

b. *Corporate Average NO_X* Standard. The program we are proposing today would ultimately require each manufacturer's average NO_X emissions over all of its Tier 2 vehicles each model year to meet a NO_X standard of 0.07 g/mi. Manufacturers would have the flexibility to certify Tier 2 vehicles to different sets of exhaust standards that we refer to as ''bins,'' but would have to choose the bins so that their corporate sales weighted average NO_X level for their Tier 2 vehicles was no more than the 0.07 g/mi. (We discuss the bins in the next subsection.)

The value of a corporate average standard is that the program's air quality goals would be met while allowing manufacturers the flexibility to certify some models above and some models below the standard. Each manufacturer would determine its year-end corporate average NO_X level by computing a sales-weighted average of the NO_X standards from the various bins to which it certified any Tier 2 vehicles. The manufacturer would be in compliance with the standard if its corporate average NO_X emissions for its Tier 2 vehicles met the 0.07 g/mi level.

c. *Tier 2 Emission Standard ''Bins''.* We are proposing seven emission standard bins, each one a set of standards to which manufacturers could certify their vehicles. (Table IV.B.–2. in Section IV.B.–4.a. below shows all the standards associated with each bin.) Several bins have the same values as the California LEV II program. Further, we added three bins that are not a part of the California program to increase the flexibility of the program for manufacturers. As further discussed in Section IV.B.4. below, we believe these extra bins would help provide incentives for manufacturers to produce vehicles with emissions below 0.07 g/mi NO_X.

The corporate average concept using the seven bins would provide a program that gets the same emission reductions we would expect from a straight 0.07 g/mi standard for all vehicles because all NO_X emissions from Tier 2 vehicles in bins above 0.07 g/mi would need to be offset by NO_X emissions from Tier 2 vehicles in bins below 0.07 g/mile. This focus on NO_X allows NMOG emissions to ''float'' in that the fleet NMOG emission rate depends on the mix of bins used to meet the NO_X standard. However, you can see by examining the bins we are proposing, that any combination of vehicles meeting the 0.07 g/mi average NO_X standard would have average NMOG levels at or below 0.09 g/mi. In addition, there will be overall improvements in NMOG since Tier 2 incorporates HLDTs, which are not covered by the NLEV program.

d. *Schedules for Implementation.* We recognize that the Tier 2 standards pose greater technological challenges for larger light duty trucks than for LDVs and smaller trucks. We believe that additional leadtime is appropriate for HLDTs. HLDTs have historically been subject to the least stringent vehicle-based standards. Also, HLDTs were not subject to the voluntary emission reductions implemented for LDVs, LDT1s and LDT2s in the NLEV program. Consequently we have designed separate phase-in programs for the two groups. Our phase-in approach would provide HLDTs with extra time before they would need to begin phase-in to the Tier 2 standards and also provide two additional years for them to fully comply. Figure IV.B–1 provides a graphical representation of how the phase-in of the Tier 2 program would work for all vehicles. This figure shows several aspects of the proposed program:

- Phase-in/phase-out requirements of the interim programs;

- Phase-in requirements of new evaporative standards;
- Years that could be included in alternative phase-in schedules;
- Years in which manufacturers could bank NO_X credits through ''early banking''; and
- ''Boundaries'' on averaging sets in the Tier 2 and interim programs.

We discuss each of these topics in detail below and make numerous references to Figure IV.B–1.

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Figure IV.B-1

TIER 2 AND INTERIM NON-TIER 2 PHASE-IN AND EXHAUST AVERAGING SETS

(Bold lines around shaded areas indicate averaging sets)

	2001	2002	2003	2004 %	2005 %	2006 %	2007 %	2008 %	2009 + later %	NOx STD. (g/mi)
LDV/LLDT (INTERIM)	NLEV	NLEV	NLEV	75 max	50 max	25 max				0.30 avg
LDV/LLDT (TIER 2 +evap)	*early banking* [b]	[b]	[b]	25	50	75	100	100	100	0.07 avg
HLDT (TIER 2 +evap)	[b]	[b]	[b]	*early banking* [b]	[b]	[b]	[b]	50	100	0.07 avg
HLDT (INTERIM)	TIER 1 [b]	TIER 1 [b]	TIER 1 [b]	25	50	75	100	50 max		0.20[a] avg

[a] 0.60 NOx cap applies to balance of vehicles during the 2004-2006 phase-in years

[b] Alternative phase-in provisions permit manufacturers to deviate from the 25/50/75% 2004-2006 and 50% 2008 phase-in requirements and provide credit for phasing in some vehicles during one or more of these model years.

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i. Implementation Schedule for LDVs and LLDTs

We are proposing that the Tier 2 standards take effect beginning with the 2004 model year for light duty vehicles and trucks at or below 6000 pounds GVWR (LDV/LLDTs). We are proposing that manufacturers would phase their vehicles into the Tier 2 program beginning with 25 percent of LDV/LLDT sales that year, 50 percent in 2005, 75 percent in 2006, and 100 percent in 2007. Manufacturers would be free to choose which vehicles were phased-in each year. However, in each year during (and after) the phase-in, the manufacturer's average NO_X for its Tier 2 vehicles would have to meet the 0.07 g/mi corporate average standard. This phase-in schedule would provide between five and eight years of leadtime for the manufacturers to bring all of their LDV/LLDT production into compliance. These vehicles constitute nearly 90 percent of the light duty fleet.

To increase manufacturer flexibility and provide incentives for early introduction of Tier 2 vehicles, we are proposing that manufacturers could use alternative phase-in schedules that would require 100 percent phase-in by 2007, but would recognize the benefits of early introduction of Tier 2 vehicles, and allow manufacturers to adjust their phase-in to better fit their own production plans.

ii. Implementation Schedule for HLDTs

To provide greater leadtime for HLDTs we are proposing that the Tier 2 phase-in schedule would start later and end later than that for LDVs and LLDTs. In our proposal 50 percent of each manufacturer's HLDTs would be required to meet Tier 2 standards in 2008, and 100 percent would have to meet Tier 2 standards in 2009. As with the LDV/LLDTs, the Tier 2 HLDTs would have to meet a corporate average NO_X standard of 0.07 g/mi. This delayed phase-in schedule would provide manufacturers with nine years of lead time before they would need to bring any HLDTs into compliance with Tier 2 standards. As for the LDV/LLDTs above, to encourage early introduction of Tier 2 HLDTs and to provide manufacturers with greater flexibility, we are proposing that manufacturers could use alternative phase-in schedules that would still result in 100% phase-in by 2009.

We request comment on the appropriateness of this separate schedule for HLDTs.

e. *LDVs and LDTs Not Covered by Tier 2.* The two groups of vehicles (LDV/LLDTs and HLDTs) will be approaching the Tier 2 standards from quite different emission ''backgrounds.'' LDV/LLDTs will be at NLEV levels, which require NO_X emissions of either 0.3 or 0.5g/mi on average[33], while HLDTs will be at Tier 1 levels facing NO_X standards of either 0.98 or 1.53 g/mi, depending on truck size. These Tier 1 NO_X levels for HLDTs are very high relative to our 0.07 g/mi Tier 2 NO_X average. To address the disparity in emission ''backgrounds'' while gaining air quality benefits from vehicles during the phase-in period, we are proposing separate sets of interim standards for the two vehicle groups during the phase-in period. The provisions described below would apply in 2004 for all LDVs and LDTs not certified to Tier 2 standards. The relationship of the interim programs to the final Tier 2 standards is shown in Figure IV.B–1.

i. Interim Standards for LDV/LLDTs

Beginning with the 2004 model year, all new LDVs and LLDTs not incorporated under the Tier 2 phase-in would be subject to an interim corporate average NO_X standard of 0.30 g/mi. This is the nominal LEV NO_X emission standard for LDVs and LDT1s under the NLEV program. This interim program would hold LDVs and LLDTs not covered by the Tier 2 standards during the phase-in to NLEV levels and bring about NO_X emission reductions from LDT2s . By implementing these interim standards for LDVs and LLDTs we will ensure that the accomplishments of the NLEV programs are continued. Because the Tier 2 standards are phased-in beginning in the 2004 model year, the interim standards for LDVs and LLDTs apply to fewer vehicles each year, i.e., they are ''phase-out'' standards. Figure IV.B–1 shows the maximum percentage of LDVs and LLDTs that would normally be subject to the interim standards each year.

As the interim program for LDV/LLDTs is designed to hold these vehicles to NLEV levels, it employs bins derived from the NLEV program. These bins are shown in Tables IV.B.–6 and –7.

ii. Interim Standards for HLDTs.

Our interim standards for HLDTs would begin in 2004. The Interim Program for HLDTs would set a corporate average NO_X standard of 0.20 g/mi that would be phased in between 2004 and 2007. The interim HLDT standards, like those for LDV/LLDTs would be built around a set of bins (See Tables IV.B.–8 and –9).

As shown in Figure IV.B.–1, the phase-in would be 25 percent in the 2004 model year, 50 percent in 2005, 75 percent in 2006, and 100 percent in 2007. The program would remain in effect through 2008 to cover those HLDTs not yet phased into the Tier 2 standards (a maximum of 50%). Vehicles not subject to the interim corporate average NO_X standard during the 2004–2006 phase-in years would be subject to the least stringent bin (Bin 5) so their NO_X emissions would be effectively capped at 0.60 g/mi. These vehicles would be excluded from the calculation to determine compliance with the interim 0.20 g/mi average NO_X standard.

This proposed approach would implement standards significantly lower than the Tier 1 NO_X standards currently applicable to these vehicles. While manufacturers already certify many HLDTs at or below these levels, we believe these interim standards represent a reasonable step toward the Tier 2 standards and would provide meaningful control in the near term relative to current levels and Tier 1. This approach would allow more time for manufacturers to bring the more difficult HLDTs to Tier 2 levels while achieving real reductions from those HLDTs that may present less of a challenge.

iii. Interim Programs Would Provide Reductions over Previous Standards

As was the case with the primary Tier 2 bin structure, the bin structure for the interim programs would focus on NO_X and yet should provide further reductions in NMOG beyond the NLEV program (See Tables IV.B.–6,7,8 and 9). This is because the interim programs would reduce emissions from LDT2s and HLDTs compared to their previous standards. Without the interim standards, HLDTs could be certified as high as 0.46 g/mi or 0.56 g/mi, the Tier 1 NMHC levels. With the interim standards, however, exhaust NMOG should average approximately 0.09 g/mi for all non-Tier 2 LDV/LLDTs. and 0.25 g/mi or less for HLDTs.

iv. Alternative Approach for Interim Standards

An alternative flexible approach for reducing the emissions from vehicles and trucks prior to their phase-in to Tier 2 standards would be to employ a declining NO_X average, or perhaps separate declining NO_X averages for LDV/LLDTs and HLDTs. In this approach, manufacturers would certify vehicles to their choice of bins, but

[33] The NLEV program imposes NMOG average standards that would lead to full useful life NO_X levels of about 0.3 g/mi for LDV/LDT1s and 0.5 g/mi for LDT2s.

would have to meet an average NO_X standard (or standards) that became lower each year. Manufacturers could bank NO_X credits in early years of such a program for use in later years when the standard tightened. We request comment on the benefits, implications and drawbacks of such an approach. Commenters should address the issues of (1) what added flexibility does this approach provide beyond that provided by the bins and phase-in approach proposed above, (2) how to handle potential windfall credits that could arise in the early years under such an approach, (3) how a standard that changes each year would impact technology phase-in and phase-out, and (4) whether such an approach would require the implementation of declining average standards for the other exhaust pollutants.

f. *Generating, Banking, and Trading NO_X* Credits. As described above, we are proposing that manufacturers average the NO_X emissions of their Tier 2 vehicles and comply with a corporate average NO_X standard. In addition, we are proposing that when a manufacturer's average NO_X emissions fall below the corporate average NO_X standard, it could generate NO_X credits that it could save for later use (banking) or sell to another manufacturer (trading). NO_X credits would be available under the Tier 2 standards, the interim standards for LDVs and LLDTs, and the interim standards for HLDTs. These NO_X credit provisions would facilitate compliance with the fleet average NO_X standards and would be very similar to those currently in place for NMOG emissions under California and federal NLEV regulations.

A manufacturer with an average NO_X level for its Tier 2 vehicles in a given model year below the 0.07 gram per mile corporate average standard would generate Tier 2 NO_X credits that it could use in a future model year when its average NO_X might exceed the 0.07 standard. Manufacturers would calculate their corporate average NO_X emissions and then compute credits based on how far below 0.07 g/mi the corporate average fell.

Manufacturers would be free to retain any credits they generate for future use or to trade (sell) those credits to other manufacturers. Credits retained or purchased could be used by manufacturers with corporate average Tier 2 NO_X levels above 0.07 g/mi. Manufacturers could certify LDVs and LLDTs to Tier 2 standards as early as the 2001 model year and receive NO_X credits for their efforts. They could use credits generated under these ''early banking'' provisions after the Tier 2 phase-in begins in 2004 (2008 for HLDTs).

Banking and trading of NO_X credits under the interim non-Tier 2 standards would be similar, except that a manufacturer would determine its credits based upon the 0.30 or 0.20 gram per mile corporate average NO_X standard applicable to vehicles in the interim programs. There would be no provisions for early banking under the interim standards and manufacturers would not be allowed to use interim credits to address the Tier 2 NO_X average standard. Interim credits from LDVs/LLDTs and interim credits from HLDTs could not be used interchangeably due to the differences in the interim corporate average NO_X standards. We seek comment on allowing exchanges of credits between the LDV/LLDT interim program and the HLDT interim program.

Banking and trading of NO_X credits and related issues are discussed in greater detail in Section IV.B.–4.d. below.

2. Why Are We Proposing the Same Set of Standards for Tier 2 LDVs and LDTs?

Before we provide a more detailed description of the proposed vehicle program, two overarching principles of today's proposal are worth explaining in some detail. The first of these is our proposal to bring all LDVs and LDTs under the same set of emission standards. Historically, LDTs—and especially the heavier trucks in the LDT3 and LDT4 categories—have been subject to less stringent emission standards than LDVs (passenger cars). In recent years the proportion of light truck sales has grown to approximately 50 percent. Many of these LDTs are minivans, passenger vans, sport utility vehicles and pick-up trucks that are used primarily or solely for personal transportation; i.e., they are used like passenger cars and there are more annual vehicle miles of travel as a result.

As vehicle preferences have increasingly shifted from passenger cars to light trucks there has been an accompanying increase in emissions over what otherwise would have occurred, because of the increase in miles traveled and the less stringent standards for LDTs as compared to LDVs. As Section III. above makes clear, reductions in these excess emissions (and in other mobile and stationary source emissions) are seriously needed. Since both LDVs and LDTs are within technological reach of the standards in the proposed Tier 2 bin structure, we are proposing to equalize the regulatory useful life periods for LDVs and LDTs and to apply the same Tier 2 exhaust emission standard bins to all of them.

Once the phase in periods end for all vehicles in 2009, manufacturers would include all LDVs and LDTs together in calculating their corporate average NO_X levels.[34] As mentioned above and described in more detail in Section IV.B.–4. below, manufacturers could choose the emission bin for any test group of vehicles provided that on a sales weighted average basis, the manufacturer met the average NO_X standard of 0.07 g/mi for its Tier 2 vehicles that year.

Some have suggested that a program with different requirements would be needed for heavy LDTs. Recognizing that compliance will be most challenging for HLDTs, the delay in the start of the phase-in and the additional phase-in years for those vehicles would allow manufacturers to delay the initial impact of the Tier 2 standards until the 2008 model year. This represents four additional model years of leadtime beyond the time when passenger cars and LDT1s and LDT2s would have achieved Tier 2 standards in substantial numbers. We believe this phase-in and other provisions of this proposal respond to these concerns. However, we request comments on the need for different standards for these vehicles. Specifically, we request comment on different levels for NMOG standards for these vehicles, including how NMOG standards less stringent than our proposed standards might affect the technological challenges presented by the proposed NO_X standards.

Considerations for a 2004 Technology Review

EPA is seeking comment on whether it should conduct a technology review of the Tier 2 standards in the future. As part of the input received from stakeholders while developing this proposal, the Alliance of Automobile Manufacturers suggested that the proposal include consideration of a technology review, principally designed to assess the status of Tier 2 technology development. As discussed above, we recognize that HLDTs will face the greatest technological challenge in complying with our proposed standards. Some manufacturers have suggested that the approach of applying the same standard to cars and light-duty trucks presents sufficient challenge as to raise serious uncertainty about compliance for the larger vehicles, even in the 2008

[34] Because of the different phase-in percentages and phase in schedules for the two groups, we are proposing that during the duration of the phase-in (through 2008) manufacturers would average Tier 2 LDV/LLDTs separately from HLDTs.

time frame. In addition to the concerns expressed regarding the time frame for implementation of the more stringent standards for HLDTs in 2008, manufacturers have indicated that there are questions of feasibility for introduction of advanced technologies for improved fuel economy, such as lean burn, fuel cell, and hybrid electric technology.

The review could assess the feasibility of the standards relative to the state of technology development for HLDTs. Further, the review could consider gasoline and diesel fuel quality and its impact on the effectiveness of aftertreatment, and whether lower sulfur levels are necessary for HLDTs to meet the Tier 2 standards. We may also examine the feasibility of the standards for vehicles using technologies to advance fuel economy. In addition, the review could consider whether additional air quality improvements are necessary and the feasibility of additional reductions of vehicle emissions to achieve such air quality improvements. EPA believes that serious consideration of this concept is warranted and if it determines such a review to be appropriate, the best time to conduct such a review may be in the 2004 time frame, before the final Tier 2 standards go into effect for HLDTs.

EPA could conduct such a review to assess the feasibility, timing and stringency of the standards relative to the state of technology development. In doing so, EPA would determine whether or not there was a need to formally consider a change in the final Tier 2 standards. If such a change were determined to be necessary, EPA would conduct a formal rulemaking, including conducting public hearings.

As part of the technology review, EPA would seek advice from all appropriate stakeholders and could engage a peer review process. In addition, such a process, if undertaken, could include public notice and opportunity for comment on the review, including the holding of public hearings by EPA. One way to structure the process would include the establishment of an advisory panel under the Clean Air Act Advisory Committee to provide assessment of the state of technology and the feasibility of the standards. The Committee could recommend appropriate action for the Administrator based on their findings. The Administrator would then determine if any changes were needed to adjust the Tier 2 standards for HLDTs, advanced technologies, or the fuel parameters. We request comment on the need for a technology review, scope of the review and on the design of the process and its timing.

3. Why Are We Proposing the Same Standards for Both Gasoline and Diesel Vehicles?

The second overarching principle of our vehicle proposal is to apply the same Tier 2 standards to all light vehicles, regardless of the fuel they are designed to use. The same exhaust emission standards and useful life periods we are proposing today would apply whether the vehicle is built to operate on gasoline or diesel fuel or on an alternative fuel such as methanol or natural gas. Diesel engines used in LDVs and LDTs tend to be used in the same applications as their gasoline counterparts, and thus we believe they should meet the same or very similar standards.

Manufacturers have expressed concerns that diesel-fueled vehicles would have difficulty meeting NO_X and particulate matter levels like those contained in today's proposal. Clearly, these standards would be challenging. As discussed in Section IV.A.–1. above, we expect that the proposed Tier 2 NO_X and NMOG standards would be challenging for gasoline vehicles, but that major technological innovations would not be required. For diesels, however, the proposed NO_X and PM standards would likely require applications of new types of aftertreatment with, perhaps, changes in diesel fuel. We anticipate that manufacturers that chose to build diesel vehicles would adopt aftertreatment technologies such as NO_X storage catalysts and continuously regenerating particulate traps to meet Tier 2 requirements.

Today, diesels comprise less than one-half of one percent of all LDV/LDT sales. While this is a small fraction, the potential exists for diesels to gain a considerable market share in the future. All one need do is review the dramatic increase in recent years of diesel engine use in the lightest category of heavy duty vehicles (8500–10,000 pounds GVWR) to see the potential for significant diesel engine use in LDTs, and perhaps LDVs, in the future. Just ten ago years diesels made up less than 10 percent of this class of vehicles. In 1998, this fraction approached 50 percent.

The potential impact of large-scale diesel use in the light-duty fleet underscores the need for the same standards to apply to diesels as for other vehicles. Given the health concerns associated with diesel PM emissions (see Section III. above), we believe that it is prudent to address PM emissions from diesel LDVs and LDTs while their numbers are relatively small. In this way the program can minimize the PM impact that would accompany significant growth in this market segment while allowing manufacturers to incorporate low-emission technology into new light-duty diesel engine designs.

4. Key Elements of the Proposed Vehicle Program

The previous subsections IV.B.–1., 2., and 3. provided an overview of today's proposed vehicle program and the two overarching principles that it is built on. This subsection elaborates on the major vehicle-related elements of today's proposal. Later in this preamble, Section V.A. discusses the rest of the proposed vehicle provisions.

a. *Basic Exhaust Emission Standards and ''Bin'' Structure.* The program we are proposing today contains a basic requirement that each manufacturer meet, on average, a full useful life NO_X standard of 0.07 g/mi for all its Tier 2 LDVs and LDTs. Manufacturers would have the flexibility to choose the set of standards that a particular test group [35] of vehicles must meet. For a given test group of LDVs or LDTs, manufacturers would select a set of full useful life [36] standards from the same row (''emission bin'' or simply ''bin'') in Table IV.B.–1. below. Each bin contains a set of individual NMOG, CO, HCHO, NO_X, and PM standards. The vehicles would have to comply with each of those standards and would also be subject to the corresponding bin of intermediate useful life standards, if applicable, found in Table IV.B–2. For technology harmonization purposes, our proposed

[35] A ''test group'' is the basic classification unit proposed for certification of light-duty vehicles and trucks under EPA certification procedures for the CAP2000 program. This preamble assumes that manufacturers will be certifying under the provisions of the CAP2000 program. ''Test group'' is a broader classification unit than ''engine family'' used prior to the implementation of the CAP2000 program. We discuss the CAP2000 program in more detail in section V.A.9. of this preamble.

[36] The regulatory ''useful life'' value for Tier 2 vehicles is specifically addressed in Section V.A.2. of this preamble. Full useful life is proposed to be 10 years or 120,000 miles for all vehicles except LDT3s and LDT4s, for which it is 11 years or 120,000 miles. Intermediate useful life, where standards are applicable, is 5 years or 50,000 miles.

[37] EPA's current standards for Clean Fuel Vehicles are less stringent than the proposed Tier 2 standards. See 40 CFR 88.104–94. The Tier 2 standards would supercede the current CFV standards, and, if EPA adopts the standards proposed today, the Agency intends to undertake a rulemaking to revise the CFV standards accordingly.

emission bins include all of those adopted in California's LEV II program.[37]

TABLE IV.B.–2.—TIER 2 LIGHT-DUTY FULL USEFUL LIFE (120,000 MILE) EXHAUST EMISSION STANDARDS
[Grams per mile]

Bin No.	NO_X	NMOG	CO	HCHO	PM
7	0.20	0.125	4.2	0.018	0.02
6	0.15	0.090	4.2	0.018	0.02
5	0.07	0.090	4.2	0.018	0.01
4	0.07	0.055	2.1	0.011	0.01
3	0.04	0.070	2.1	0.011	0.01
2	0.02	0.010	2.1	0.004	0.01
1	0.00	0.000	0.0	0.000	0.00

TABLE IV.B.–3.—LIGHT-DUTY INTERMEDIATE USEFUL LIFE (50,000 MILE) EXHAUST EMISSION STANDARDS
[Grams per mile]

Bin No.	NO_X	NMOG	CO	HCHO	PM
7	0.14	0.100	3.4	0.015	.....
6	0.11	0.075	3.4	0.015	.....
5	0.05	0.075	3.4	0.015	.....
4	0.05	0.040	1.7	0.008	

Under a ''bins'' approach, a manufacturer may select a set of emission standards (a bin) to comply with, and a test group must meet all standards within that bin. Ultimately, the manufacturer must also ensure that the emissions of a targeted pollutant—NO_X in this case—from all of its vehicles taken together meet a ''corporate average'' emission standard. This corporate average emission standard ensures that a manufacturer's production yields the required overall emission reductions. (See Section IV.B.–4.c. below for more discussion of the corporate average NO_X standard.)

In addition to the Tier 2 standards described above, we are also proposing interim standards derived from the LDV/LDT1 NLEV standards to cover all non-Tier 2 LDVs and LLDTs during the Tier 2 phase-in. We are proposing separate interim standards for HLDTs. (We describe the interim standards in detail in Section IV.B.4.e. below.)

i. Why Are We Proposing Extra Bins?

Compared to the CalLEV II program, our Tier 2 proposal includes additional bins. The California program contains no bins that would allow NO_X levels above the 0.07 g/mi level of LEVs. Therefore, under the California program, no engine family can be certified above LEV levels, even with the application of offsetting credits. We propose to add two bins above the LEV bin (Bins 6 and 7) and another below the LEV bin (Bin 3) to provide manufacturers with additional flexibility to reduce costs and to account for greater technological challenges faced in getting certain vehicles to levels of 0.07 g/mi NO_X or less.

During the Tier 2 phase-in years (through 2006 for LDV/LLDTs and 2008 for HLDTs), we are also proposing that the bins from the applicable interim program would be available. Vehicles certified to these levels could, at the manufacturer's option, be included in calculating the Tier 2 corporate average NO_X level. This would enhance the flexibility of the program by providing manufacturers with three additional bins having NO_X standards above 0.07 g/mi. Since a manufacturer could elect these bins under the interim program anyway, there would be no impact on air quality. The interim program and the interim bins for non-Tier 2 vehicles are described in detail in section IV.B.4.e.

The additional bins would also provide an incentive for manufacturers to produce vehicles below 0.07 g/mi of NO_X. We believe this incentive would exist because manufacturers would have some vehicles (especially larger LDTs) that they might find more cost effective to certify to levels above the 0.07 g/mi average standard. However, to do this they would have to offset those vehicles in our NO_X averaging system with vehicles certified below 0.07 g/mi, and the 0.04 g/mi bin would provide greater opportunity to do this. Thus, the extra bins would serve two purposes; they would provide additional flexibility to manufacturers to address technological differences and costs, and they would provide those manufacturers with incentives to produce cleaner vehicles and thus advance emission control technology.

We are proposing a bins approach and the proposed bins because we believe they would provide adequate and appropriate emission reductions and manufacturer flexibility. In addition, this structure will help to accelerate technological innovation. We request comment on the appropriateness of the proposed bin structure and whether the levels proposed are appropriate. Also, we request comment on whether we should include up to two additional bins between bin 5 (NO_X = 0.07) and bin 6 (NO_X = 0.15). Our proposed bin structure is intended to assure that nearly all vehicles comply with a NO_X standard of 0.07 g/mi. These additional bins would provide greater flexibility for manufacturers who may find it more cost-effective to produce some vehicles slightly above 0.07 but would have difficulties meeting a 0.07 g/mi average NO_X standard if they had to certify them to a NO_X level of 0.15 g/mi. We request specific comment on whether we should

[35] A ''test group'' is the basic classification unit proposed for certification of light-duty vehicles and trucks under EPA certification procedures for the CAP2000 program. This preamble assumes that manufacturers will be certifying under the provisions of the CAP2000 program. ''Test group'' is a broader classification unit than ''engine family'' used prior to the implementation of the CAP2000 program. We discuss the CAP2000 program in more detail in section V.A.9. of this preamble.

establish these bins and if so what standards for each pollutant we should include. As we indicated above, we believe that the existence of bins above 0.07 g/mi NO_X provide an incentive for technological advancement. We request comment as to whether these additional bins would limit this incentive in any way.

On the other hand, Bin 7 is intended primarily to aid manufacturers during the transition to Tier 2 standards. We request comment on whether this bin should be eliminated when the Tier 2 phase-in is completed (after 2007 for LDV/LLDTs and after 2009 for HLDTs).

b. *The Proposed Program Would Phase in the Tier 2 Vehicle Standards over Several Years*

i. Primary Phase-In Schedule

We are proposing to phase in the Tier 2 standards for LDVs/LLDTs over a four year period beginning in 2004 and we are proposing a delayed two year phase-in beginning in 2008 for HLDTs. These phase-in schedules are shown in Tables IV.B.–2 and are also shown separately in Tables IV.B.–4 and 5. We believe the flexibility of this dual phase-in approach is appropriate because the proposed Tier 2 program would encompass all light-duty vehicles and trucks and would result in widespread applications of upgraded and improved technology across the fleet. The program would require research, development, proveout, and certification of all light-duty models, and manufacturers would need longer lead time for some vehicles, especially HLDTs. Also, manufacturers might wish to time compliance with the Tier 2 standards to coincide with other changes such as the roll out of new engines or new models. In order to begin the introduction of very clean vehicles as soon as possible while avoiding imposing unnecessary inefficiencies on vehicle manufacturers, we believe a practical but aggressive phase-in schedule like the one we are proposing effectively balances air quality, technology, and cost considerations.

In each year, manufacturers would have to ensure that the specified fraction of their U.S. sales [38] met Tier 2 standards for evaporative emissions (discussed in Section IV.B.–4.f. below) and exhaust emissions, including Supplemental Federal Test Procedure (SFTP) standards (discussed in Section V.A.–3. below), as well as the corporate average Tier 2 NO_X standard. Manufacturers would have to meet the Tier 2 exhaust requirements (i.e., all the standards of a particular bin plus the SFTP standards) using the same vehicles. Vehicles not covered by the Tier 2 standards during the phase-in years (2004–2008) would have to meet interim standards described in Section IV.B.–.4.e. below and the existing evaporative emission as well as the applicable SFTP standards.

Manufacturers could elect to meet the percentage phase-in requirements for evaporative and exhaust emissions using two different sets of vehicles. We believe that because of interactions between evaporative and exhaust control strategies, manufacturers would generally address the Tier 2 evaporative phase-in with the same vehicles that they used to meet the exhaust phase-in. However, the primary focus of today's proposal is on exhaust emissions, and the flexibility for manufacturers to use different sets of vehicles in complying with the phase-in schedule for evaporative standards and for the exhaust standards would have no environmental down side that we are aware of. It is possible that some exhaust emission improvements might even occur sooner than they otherwise would if a manufacturer were able to move ahead with the roll-out of a model with cleaner exhaust emissions without having to wait for the development of suitable evaporative controls to be completed for that model.

TABLE IV.B.–4.—PRIMARY PHASE-IN SCHEDULE FOR SALES OF TIER 2 LDVS AND LLDTS

Model year	Required percentage of light-duty vehicles and light light-duty trucks
2004	25
2005	50
2006	75
2007	100

TABLE IV.B.–5.—PRIMARY PHASE-IN SCHEDULE FOR SALES OF TIER 2 HLDTS

Model year	Required percentage of heavy light-duty trucks
2008	50
2009	100

According to the proposed phase-in approach, vehicle sales would be determined according to the ''point of first sale'' method outlined in the NLEV rule. Vehicles with points of first sale in California or a state that had adopted the California LEV II program would be excluded from the calculation. The ''point of first sale'' method recognizes that most vehicle sales will be to dealers and that the dealers' sales will generally be to customers in the same geographic area. While some sales to California residents (or residents of states that adopt California standards) may occur from other states and vice-versa, we believe these sales will be far too small to have any significant impact on the air quality benefits of the Tier 2 program.

ii. Alternative Phase-In Schedule

While our primary proposal is based upon a phase-in of 25%, 50%, 75% and 100% of sales over the 2004, 2005, 2006 and 2007 model years, respectively (or 50% and 100% in 2008 and 2009 for HLDTs), we are proposing to permit alternative phase-in schedules as an option to provide additional flexibility to manufacturers. The alternative phase-in schedule provisions are structured to provide incentive to manufacturers to introduce Tier 2 vehicles before 2004 (or 2008 for HLDTs).

Under this alternative, manufacturers that introduced vehicles earlier than required could earn the flexibility to make offsetting adjustments, on a one-for-one basis, to the phase-in percentages in later years. However, they would still need to reach 100% of sales in the 2007 model year (2009 for HLDTs). Manufacturers would have the option to use this alternative to meet phase-in requirements for LDV/LLDTs and/or HLDTs. They could use separate alternative phase-in schedules for exhaust and evaporative emissions, or an alternative phase-in schedule for one set of standards and the primary (25/50/75/100%) schedule for the other.

An alternative phase-in schedule would be acceptable if it passed a specific mathematical test. We have designed the test to provide manufacturers benefit from certifying to the Tier 2 standards early while ensuring that significant numbers of Tier 2 vehicles would be introduced during each year of the alternative phase-in schedule. To test an alternative schedule, a manufacturer would sum its yearly percentages of Tier 2 vehicles beginning with model year 2001 and compare the resulting sum to the sum that results from the primary phase-in schedule. If an alternative schedule scored as high or higher than the base

[36] The regulatory ''useful life'' value for Tier 2 vehicles is specifically addressed in Section V.A.2. of this preamble. Full useful life is proposed to be 10 years or 120,000 miles for all vehicles except LDT3s and LDT4s, for which it is 11 years or 120,000 miles. Intermediate useful life, where standards are applicable, is 5 years or 50,000 miles.

option, then the alternative schedule would be acceptable.

For LDV/LLDTs, the final sum of percentages would have to equal or exceed 250—the sum that results from a 25/50/75/100 percent phase-in. For example, a 10/25/50/65/100 percent phase-in that began in 2003 would have a sum of 250 percent and would be acceptable. In this example, each Tier 2 vehicle sold early (i.e. in 2003) would permit the manufacturer to sell one less Tier 2 vehicle in the last phase-in year (2006). A 10/20/40/70/100 percent phase-in that began the same year would have a sum of 240 percent and would not be acceptable. For HLDTs, the sum would have to equal or exceed 150 percent.

To ensure that significant numbers of Tier 2 vehicles are introduced in the 2004 time frame, manufacturers would not be permitted to use alternative phase-in schedules that delayed the implementation of the Tier 2 LDV/LLDT requirements, even if the sum of the phase-in percentages met or exceeded 250. Such a situation could occur if a manufacturer delayed implementation of its Tier 2 production until 2005 and began a 75/85/100 percent phase-in that year. To protect against this possibility, we are proposing that in any alternate phase-in schedule, a manufacturer's phase-in percentages from the 2004 and earlier model years sum to at least 25%.

The mathematical technique to evaluate alternative phase-in schemes is somewhat similar to that used in our NLEV rule and in California rules. We request comment on its appropriateness for this application. We also request comment on other approaches that might serve to provide incentive to manufacturers to introduce Tier 2 vehicles early, and to provide additional flexibility, while at the same time assuring that environmental gains equivalent to or greater than those of the primary phase-in option are produced. We have considered whether it would be appropriate to provide a ''multiplier'' that would serve to increase the value of the percentage of vehicles introduced before 2004 (2008 for HLDTs) in the mathematical test described above. Such a multiplier might start at 1 for 2004–2007 vehicles and increase for each year prior to 2004 (2008 for HLDTs). We request comment as to whether such a multiplier would be appropriate and whether it would produce real environmental gains by speeding the introduction of Tier 2 vehicles into the fleet.

All of the discussion on alternative phase-in schedules to this point has been premised on 100% compliance in 2007 (2009 for HLDTs). We request comment as to whether alternative phase-in schedules should be structured in such a way that, if a manufacturer introduced Tier 2 vehicles in excess of the minimum required during the phase-in years, that manufacturer could extend its phase-in beyond 2007 or 2009. Commenters should address the time period beyond 2007 or 2009 that would be appropriate as well as how EPA would determine the fraction of vehicles that could be delayed until that time.

Phase-in schedules, in general, add little flexibility for manufacturers with limited product offerings. A manufacturer with only one or two test groups can not take full advantage of a 25/50/75/100 percent or similar phase-in. However for manufacturers that meet EPA's definition of ''small volume manufacturer,'' we are proposing elsewhere in this preamble that those manufacturers be exempt from the phase-in schedules and would simply have to comply with the final 100% compliance requirement. Still, we request comment on how alternative phase-in schedules might be structured to provide flexibility and incentive for early introduction to smaller manufacturers.

Later in this preamble (in Section V) we request specific comment on whether we should include a scheme to provide extra NO_X credits for manufacturers that introduce Tier 2 vehicles early. Commenters to the above discussion on alternate phase-in schedules should address whether a provision for extra NO_X credits might be a more appropriate way to provide inducements to smaller manufacturers to introduce Tier 2 vehicles early. Commenters should consider the interactions such extra credits might have with alternate phase-in schedules, particularly in situations where a ''multiplier,'' as described above, might be applied.

c. *Manufacturers Would Meet a ''Corporate Average'' NO_X* Standard. While the manufacturer would be free to certify a test group to any bin of standards in Table IV.B.–2, it would have to ensure that the sales-weighted average of NO_X standards from all of its test groups of Tier 2 vehicles met a full useful life standard of 0.07 g/mi. Using a calculation similar to that for the NMOG corporate average standard in the California and NLEV programs, manufacturers would determine their compliance with the corporate average NO_X standard at the end of the model year by computing a sales weighted average of the full useful life NO_X standards from each bin. Manufacturers would use the following formula:

Corporate Average NO_X = Σ(Tier 2 NO_X std for each bin) ×(sales for each bin) total Tier 2 sales

Manufacturers would exclude vehicles sold in California or states adopting California LEV II standards from the calculation. As indicated above, manufacturers would compute separate NO_X averages for LDV/LLDTs and HLDTs through the year 2008.

The corporate average NO_X standards of the primary Tier 2 program and the interim programs for LDVs/LLDTs and HLDTs would ensure that expected fleet-wide emission reductions are achieved. At the same time, the corporate average standards allow us to permit the sale of some vehicles above the levels of the average standards to address the greater technological challenges some vehicles face and to reduce the overall costs of the program. We discuss how manufacturers could generate, use, and buy or sell NO_X credits under the proposed program in the next subsection.

Given the corporate average NO_X standards, we do not believe a corporate average NMOG standard as used by California is essential because meeting the corporate average NO_X standard would automatically bring the NMOG fleet average to approximately LEV levels. However, we request comment on the need for such a corporate average NMOG standard, as well as suggestions and rationales for what that standard, if any, should be. Commenters are encouraged to address any interactions with the bin structure, if appropriate.

d. *Manufacturers Could Generate, Bank, and Trade NO_X Credits.*

i. General Provisions

As mentioned in the Overview above, we are proposing that manufacturers with year-end corporate average NO_X emissions for their Tier 2 vehicles below 0.07 g/mi could generate Tier 2 NO_X credits. Credits could be saved (banked) for use in a future model year or for trading (sale) to another manufacturer. Manufacturers would consume credits if their corporate average NO_X emissions were above 0.07 g/mi.

We are proposing the Tier 2 standards to apply regardless of the fuel the vehicle is designed for, and there would be no restrictions on averaging, banking or trading of credits across vehicles of different fuel types. Consequently, a gasoline fueled LDV might help a manufacturer generate NO_X credits in one year that could be banked for the next year when they could be used to average against NO_X emissions of a diesel fueled LDT.

Because of the split phase-in and the different interim programs we are

proposing for the two different groups of vehicles (LDV/LLDTs and HLDTs), we are also proposing to require that manufacturers compute their corporate Tier 2 NO_X averages separately for LDV/LLDTs and HLDTs through 2008. Credit exchanges between LDVs/LLDTs and HLDTs would not be allowed nor would credit exchanges across the interim program and Tier 2 program be allowed. These restrictions would end with the 2009 model year at which time both phase-ins and all interim standards will have ended and the program would permit free averaging across all Tier 2 vehicles. In the context of the whole program we are proposing, we are concerned that allowing cross-trading between interim and Tier 2 vehicles would reduce the expected benefits of the program and delay fleet turnover to Tier 2 emission levels. For this reason we are not proposing to allow such exchanges. We seek comment on this issue.

ii. Averaging, Banking, and Trading of NO_X Credits Would Fulfill Several Goals

There are several reasons why we believe the proposed provisions for averaging, banking, and trading of NO_X credits (ABT) would be valuable.

- ABT allows us to consider a more stringent emission standard than might otherwise be appropriate under the CAA, since ABT reduces the cost and improves the technological feasibility of achieving the standard.
- ABT enhances the technological feasibility and cost effectiveness of the proposed standard, helping to ensure that the standard would be attainable earlier than would otherwise be possible.
- ABT would provide manufacturers with additional product planning flexibility and the opportunity for a more cost effective introduction of product lines meeting the new standard.
- ABT would create an incentive for early introduction of new technology, allowing certain engine families to act as trail blazers for new technology. This could help provide valuable information to manufacturers on the technology prior to manufacturers needing to apply the technology throughout their product line. The early introduction of new technology would also further improve the feasibility of achieving the standard and could also provide valuable information for use in other regulatory programs that may benefit from similar technologies (e.g., heavy-duty vehicle standards).

EPA views the proposed ABT provisions as environmentally neutral because the use of credits by some vehicles would be offset by the generation of an equal number of credits generated by other vehicles. However, when coupled with the new standards, ABT could have environmental benefits because it could allow the new standards to be implemented earlier than would otherwise be appropriate under the Act.

iii. How Manufacturers Would Generate and Use NO_X Credits

As described in the previous subsection, and subject to the phase-in restrictions described in that subsection, manufacturers would determine their year-end corporate average NO_X emission level by computing a sales-weighted average of the NO_X standard from each bin to which the manufacturer certified any LDVs or LDTs. The manufacturer would round this average to one more decimal place than in the corporate average NO_X standard. Tier 2 NO_X credits would be generated when a manufacturer's average was below the 0.07 gram per mile corporate average NO_X standard, according to this formula:

NO_X Credits = (0.07 g/mi—Corporate Average NO_X) × Sales

The manufacturer could then use these NO_X credits in future years when its corporate NO_X average was above 0.07, or it could trade (sell) the credits to other manufacturers. The use of NO_X credits would not be permitted to address Selective Enforcement Auditing or in-use testing failures.

The enforcement of the NO_X averaging standard would occur through the vehicle's certificate of conformity. A manufacturer's certificate of conformity would be conditioned upon compliance with the averaging provisions. The certificate would be void *ab initio* if a manufacturer failed to meet the corporate average NO_X standard and did not obtain appropriate credits to cover their shortfalls in that model year or in the subsequent model year (see proposed deficit carryforward provision below). Manufacturers would need to track their certification levels and sales unless they produced only vehicles certified to bins containing NO_X levels of 0.07 g/mi or below and did not plan to bank NO_X credits.

iv. Manufacturers Could Earn and Bank Credits for Early NO_X Reductions

To provide manufacturers with greater flexibility and with incentives to certify, produce and sell Tier 2 vehicles as early as possible, we are proposing that manufacturers could utilize alternative phase in schedules. (See IV.B.4.b.ii above.) Under such schedules, a manufacturer could certify vehicles to bins having NO_X standards of 0.07 g/mi or below in years prior to the first required phase-in year and then phase its remaining vehicles in over a more gradual phase-in schedule that would still lead to 100% compliance by 2007 (2009 for HLDTs). To the extent that a manufacturer's corporate average NO_X level of its ''early Tier 2'' vehicles was below 0.07 g/mi, the manufacturer could bank NO_X credits for later use. Manufacturers would compute these early credits by calculating a sales-weighted corporate average NO_X emission level of their Tier 2 vehicles, as in the basic Tier 2 program described above.

These credits would have all the same properties as credits generated by vehicles subject to the primary phase-in schedule. These credits could not be used in the NLEV, Tier 1 or interim program for non-Tier 2 vehicles in any way. However, the NMOG emissions of these vehicles (LDVs and LLDTs only) could be used in the calculation of the manufacturer's corporate average NMOG emissions under NLEV through 2003.

To provide manufacturers with maximum flexibility in the period prior to 2004, when LDV/LLDT useful lives will still be at 100,000 miles, we are proposing that manufacturers could choose between the Tier 2 120,000 mile useful life or the current 100,000 mile useful life requirement for early Tier 2 LDV/LLDTs. (HLDTs already have a 120,000 mile useful life.) Early LDV/LLDT NO_X credits for 100,000 mile useful life vehicles would have to be prorated by 100,000/120,000 (5/6) so that they could be properly applied to 120,000 mile Tier 2 vehicles in 2004 or later.

We are proposing that early banking of HLDT NO_X credits could not begin until the 2004 model year. This provides a four year period during which early credits could be generated for use in the 2008/2009 HLDT Tier 2 phase-in. We are concerned that allowing generation of early HLDT credits in years prior to 2004 could result in credits that are largely windfall credits. Still, we recognize that vehicles that meet the Tier 2 standards early represent an environmental benefit and we request comment on the need for and appropriateness of allowing early banking of HLDT credits before the 2004 model year.

We recognize that vehicles generating early NO_X credits may be doing so without the emissions benefit of low sulfur fuel, and thus these vehicles may not achieve the full in-use emission reduction for which they received credit. When these credits are used to

permit the sale of higher-emitting vehicles, there may be a net increase in emissions. We believe that the benefits of early introduction of Tier 2 technology described above are significant enough that they are worth the risk of some emission losses that might occur if and when the early credits are used. Also, we believe that some fuel sulfur reductions will occur prior to 2004 as refiners upgrade their refineries or bring new refining capacity on stream in anticipation of the 2004 requirements and take advantage of the phase-in proposed in the gasoline sulfur ABT program (described in Section IV.C. below). We request comment on all aspects of early introduction of Tier 2 vehicles and the proposed provisions for early NO_X credits.

v. NO_X Credits Would Have Unlimited Life

We are not proposing to apply the California schedule of discounting unused credits that was adopted for NMOG credits in the NLEV program. This schedule serves to limit credit life throughout the program by reducing unused credits to 50, 25 and 0 percent of their original number at the end of the second, third and fourth year, respectively, following the year in which they were generated. Because of the declining corporate average NMOG standards in that program, California has decided, and we agree, that it is prudent to limit the lives of credits to prevent manufacturers from being able to accumulate credits and then apply them in such a way as to delay the impact of declining standards. But in this proposed federal program, once the proposed phase-in period ends in model year 2009, all light duty vehicles and trucks would comply on average with a fixed Tier 2 NO_X standard.

Credits would allow manufacturers a way to address unexpected shifts in their sales mix and yet would prevent the program from being abused to allow emission increases by design, since emissions would be capped by the levels in the least stringent bin. The NO_X emission standards in the Tier 2 and interim programs are quite stringent and do not present easy opportunities to generate credits. The degree to which manufacturers invest the resources to achieve extra NO_X reductions provides true value to the manufacturer and the environment. We do not want to take measures to reduce the incentive for manufacturers to bank credits nor do we want to take measures to encourage unnecessary credit use. Consequently we are proposing that Tier 2 NO_X credits would have unlimited lives. We request comment on the need for discounting of credits or limits on credit life and what those discount rates or limits, if any, should be.

vi. NO_X Deficits Could Be Carried Forward

When a manufacturer has a NO_X deficit at the end of a model year—that is, its corporate average NO_X level is above the required corporate average NO_X standard—we are proposing that the manufacturer be allowed to carry that deficit forward into the next model year. Such a carry-forward could only occur after the manufacturer used any banked credits. If the deficit still existed and the manufacturer chose not to or was unable to purchase credits, the deficit could be carried over. At the end of that next model year, the deficit would need to be covered with an appropriate number of NO_X credits that the manufacturer generated or purchased. Any remaining deficit would be subject to an enforcement action.

To prevent deficits from being carried forward indefinitely, the manufacturer would not be permitted to run a deficit for two years in a row.[39] We believe that it is reasonable to provide this flexibility to carry a deficit for one year given the uncertainties that light duty vehicle and truck manufacturers face with changing market forces and consumer preferences, especially during the introduction of new technologies. These uncertainties can make it hard for manufacturers to accurately predict sales trends of different vehicle models. We request comment on this provision.

e. *Interim Standards.*

i. Interim Standards for LDV/LLDTs

The NLEV program referenced throughout this discussion is a voluntary program in which all major manufacturers have opted to produce LDVs and LLDTs to tighter standards than those required by EPA's Tier 1 regulations. Under the NLEV program, manufacturers must meet an NMOG average outside of California that is equivalent to California's current intermediate-life LEV requirement—0.075 g/mi for LDVs and LDT1s (0.10 g/mi for LDT2s). Currently, NLEV requirements apply only to LDVs and LLDTs, not to HLDTs.

The NLEV program is effective beginning in the northeastern states in 1999 and in the remaining states in 2001, except that the program does not apply to vehicles sold in California or in states that adopted California's LEV program. The program runs at least through 2003 and can run through model year 2005.

Given the Tier 2 phase-in we are proposing, not all LDV/LLDTs covered under NLEV will be subject to Tier 2 standards in the 2004 to 2006 period. Unless EPA adopts a program for full Tier 2 compliance in 2004 (i.e., without a phase-in), these vehicles could revert to Tier 1 standards. The NLEV program, moreover, is a voluntary program that contains several provisions that restrict EPA's flexibility and that could lead to a manufacturer or a covered Northeastern state leaving the program in or prior to 2004. To resolve these concerns we are proposing interim standards for all non-Tier 2 LDV/LLDTs for the 2004–2006 model years. Our interim standards would replace the NLEV program, which would then terminate at the end of 2003. The transition from NLEV to Tier 2 should be smooth because the interim standards are derived from the NLEV standards for LDVs and LDT1s and would ensure that all LDVs, LDT1s and LDT2s that are not certified to Tier 2 levels during the 2004–2006 phase-in period remain at levels at least as stringent as NLEV levels. The standards would also arguments prebring the emission standards for LDT2s into line with those for the LDVs and LDT1s. We propose to align the useful life periods for interim standards with those of the Tier 2 standards (full useful life of 120,000 miles, intermediate useful life of 50,000 miles, as discussed in Section V.A.-2 below)

Tables IV.B.-6 and IV.B.-7 below present interim standards we are proposing for LDVs and LLDTs not covered by Tier 2 standards during the phase in period.

[39] Because of the limited duration of the interim programs, we are proposing that a manufacturer could carry a credit deficit in the interim program forward until the 2006 model year (2008 for HLDTs). The interim program, in its entirety, lasts only five years and therefore we see little risk of prolonged deficits.

TABLE IV.B.–6.—FULL USEFUL LIFE (120,000 MILE) INTERIM EXHAUST EMISSION STANDARDS FOR LDV/LLDTS

[Grams per mile]

Bin No.	NO_X	NMOG	CO	HCHO	PM
5	0.60	0.156	4.2	0.018	0.06
4	0.30	0.090	4.2	0.018	0.06
3	0.30	0.055	2.1	0.011	0.04
2	0.07	0.090	4.2	0.018	0.01
1	0.00	0.00	0.0	0.000	0.0

TABLE IV.B.–7.—INTERMEDIATE USEFUL LIFE (50,000 MILE) INTERIM EXHAUST EMISSION STANDARDS FOR LDV/LLDTS

[Grams per mile]

Bin No.	NO_X	NMOG	CO	HCHO	PM
5	0.40	0.125	3.4	0.015	.....
4	0.20	0.075	3.4	0.015	.....
3	0.20	0.040	1.7	0.008	.....
2	0.05	0.075	3.4	0.015	.....

We are proposing a corporate average full useful life NO_X standard of 0.30 g/mi for this interim program. LDV/LLDTs, which will already be at NLEV levels, should readily be able to meet this average NO_X standard. Although we have not shown it in the tables of interim standards above, we are also proposing that all of the bins shown for the Tier 2 program (see Tables IV.B.–2 and –3) could be used in the interim program. Thus if a manufacturer had vehicles certified to Tier 2 bins that it did not need to comply with the Tier 2 NO_X average standard and phase in percentage, it would have the additional option to use them in the interim program. We request comment as to whether the number of bins provided in the interim program and their emission levels are appropriate.

The 0.30 g/mi corporate average NO_X standard (and the bins of standards in the above two tables) would apply only to non-Tier 2 LDV/LLDTs and only for the 2004–2006 model years. Manufacturers would compute, bank, average, trade, account for, and report NO_X credits via the same processes and equations described in this preamble for Tier 2 vehicles, substituting the 0.30 g/mi corporate average standard for the 0.07 g/mi corporate average standard in the basic program. Also, EPA would condition the certificates of conformity on compliance with the corporate average standard, as described for Tier 2 vehicles. These NO_X credits would be good only for the 2004–2006 model years and would only apply to the interim non-Tier 2 LDV/LLDTs. Credits would not be subject to any discounts, and credit deficits from the 2004 and 2005 model year could be carried forward, provided they were covered with appropriate credits by the end of the 2006 model year. NMOG credits from the NLEV program could not be used in this interim program in any way. Credits generated under this interim program would not be applicable to the Tier 2 NO_X average standard of 0.07 g/mi because of our concern that a windfall credit situation could occur. This could happen because credits are relatively easy to generate under a 0.30 g/mi standard compared to generating credits under a 0.07 g/mi standard. The application of credits earned under the interim standard to the Tier 2 standards could significantly delay the fleet turnover to Tier 2 vehicles. The requirements of the interim program would be monitored and enforced in the same fashion as for Tier 2 vehicles.

For the reasons cited above, we believe it is appropriate to extend interim, NLEV-like standards beyond 2003 as a mandatory program and to bring all LDVs and LLDTs within its scope. Manufacturers have already demonstrated their ability to make LDVs and LLDTs that comply at levels well below these standards, and, as the interim standards for LDV/LLDTs are essentially ''phase-out'' standards, we are not proposing any alternative phase-in schedules or early banking provisions for NO_X credits from the interim LDV/LLDTs.

We request comment on all aspects of the interim standards for LDVs and LLDTs.

ii. *Interim Standards for HLDTs.*

We are also proposing interim standards to begin in 2004 for HLDTs. These vehicles are not included in the NLEV program and will be subject only to the Tier 1 standards prior to model year 2004. Tier 1 standards permit NO_X emissions of 0.98 g/mi for LDT3s and 1.53 g/mi for LDT4s.

The interim standards for HLDTs would apply beginning in the 2004 model year and would phase-in through the 2007 model year, as shown in Figure IV.B.–1. The proposed interim program is based on a corporate average full-life NO_X standard of 0.20 g/mi. Manufacturers would comply with the corporate average HLDT NO_X standard by certifying their interim HLDTs to any of the full useful life bins shown in Table IV.B.–8. Where applicable, manufacturers would also comply with the intermediate useful life standards shown in Table IV.B.–9. Interim HLDTs not needed to meet the phase-in percentages during model years 2004–2006 would have to be certified to the standards of one of the bins in Table IV.B.–8 (and –9), but would not be included in the calculation to demonstrate compliance with the 0.20 g/mi average. Thus, the emissions of all interim HLDTs would be capped at a NO_X value of 0.60 g/mi.

As with LDV/LLDTs, manufacturers would also have the flexibility to use any of the Tier 2 bins shown in Tables IV.B.–2 and IV.B.–3 as additional bins for interim HLDTs. At the end of each model year, manufacturers would determine their compliance with the 0.20 NO_X standard by calculating a sales weighted average of all the bins to which they certified any interim HLDTs, excluding those not needed to meet the phase-in requirements during 2004–2006.

We believe these interim standards are necessary and reasonable for HLDTs. While these trucks make up a fairly small portion of the light-duty fleet (about 11%), their current standards under Tier 1 are far less stringent than the NLEV standards that apply to current model year LDVs and LLDTs.

Given the delayed phase-in we are proposing for HLDTs, we believe it is appropriate to bring about some interim reductions from these vehicles. Further, manufacturers have already demonstrated their ability to meet these interim standards with HLDTs. These standards are a reasonable first step toward the Tier 2 program and would provide meaningful reductions in the near term relative to current certification levels under the Tier 1 emission standards.

TABLE IV.B.–8.—FULL USEFUL LIFE (120,000 MILE) INTERIM EXHAUST EMISSION STANDARDS FOR HLDTS

[Grams per mile]

Bin No.	NO_X	NMOG	CO	HCHO	PM
5	0.60	0.230	4.2	0.018	0.06
4	0.30	0.180	4.2	0.018	0.06
3	0.20	0.156	4.2	0.018	0.02
2	0.07	0.090	4.2	0.018	0.01
1	0.0	0.0	00.0	0.000	0.0

TABLE IV.B.–9.—INTERMEDIATE USEFUL LIFE (50,000 MILE) INTERIM EXHAUST EMISSION STANDARDS FOR HLDTS

[Grams per mile]

Bin No.	NO_X	NMOG	CO	HCHO	PM
5	0.40	0.160	3.4	0.015	
4	0.20	0.140	3.4	0.015	
3	0.14	0.125	3.4	0.015	
2	0.05	0.075	3.4	0.015	

Given that the interim HLDT standards are ''phase-in'' standards through 2007 (as opposed to the interim LDV/LLDT standards, which are ''phase-out'' standards), we are proposing that manufacturers could employ alternative phase-in schedules as proposed for the Tier 2 standards and described in detail in section IV.B.4.b.ii. of this preamble. These schedules provide manufacturers with greater flexibility and we believe they also provide incentive for manufacturers to introduce advanced emission control technology at an earlier date. Alternative phase-in schedules would have to provide 100% phase-in by the same year as the primary phase-in schedule (2007). Because we are concerned about the possibility of windfall credits from some vehicles that might easily meet the 0.20 corporate average NO_X standard, we are not proposing to permit the generation of credits from interim HLDTs prior to the 2004 model year, although we request comment on this issue.

f. *More Stringent Proposed Light-Duty Evaporative Emission Standards.* We are proposing to adopt a set of more stringent evaporative emission standards for all Tier 2 light-duty vehicles and light-duty trucks. The standards we are proposing in Table IV.B.–10 represent, for most vehicles, more than a 50% reduction in diurnal plus hot soak standards from those that will be in effect in the years immediately preceding Tier 2 implementation. The higher standards for HLDTs provide allowance for greater non-fuel emissions related to larger vehicle size.

TABLE IV.B.–10.—PROPOSED EVAPORATIVE EMISSION STANDARDS [GRAMS PER TEST]

Vehicle class	3 day diurnal + hot soak	Supplemental 2 day diurnal + hot soak
LDVs and LLDTs	0.95	1.2
HLDTs	1.2	1.5

Evaporative emissions from light-duty vehicles and trucks represent nearly half of the light duty VOC inventory projected for the 2007–2010 time frame, according to MOBILE5 projections. We are proposing today to reduce the light-duty evaporative emission standards applicable to diurnal and hot soak emissions by more than 50 percent for most vehicles. Manufacturers are currently certifying to levels that are, on average, about half of the current standards, and in many cases, much less than half the standards. Thus, meeting these proposed standards appears readily feasible. Even though manufacturers are already certifying at levels much below the current standard, we believe that reducing the standards will result in emission reductions as all manufacturers seek to certify with adequate margins to allow for in-use deterioration. Further, we believe that tighter standards will prevent ''backsliding'' toward the current standards as manufacturers pursue cost reductions.

As mentioned in section IV.B.–4.b above, we are proposing to phase in the Tier 2 evaporative standards by the same mechanism as the Tier 2 exhaust standards; e.g., 25/50/75/100 percent beginning in 2004 for LDV/LLDTs and 50/100 percent beginning in 2008 for HLDTs. (as shown in Figure IV.B.–1) As for the proposed exhaust standards, alternative phase-in plans would also be available.

The evaporative emissions standards we are proposing are the same as those that manufacturers' associations proposed during the development of California's LEV II proposal; California ultimately did not adopt these standards. We request comment on all aspects of these proposed evaporative standards and their likely impact on in-use evaporative emission levels. We also request comment on adopting the evaporative emissions standards and phase-in schedule that California adopted (representing about a 75 percent reduction from the standards that will otherwise be in place).

C. Our Proposed Program for Controlling Gasoline Sulfur

When we discussed gasoline sulfur control with the American Petroleum Institute, the National Petrochemical and Refiners Association, and other representatives of the oil industry, they laid out several major points for us to consider in development of our proposal:

• A regional approach to gasoline sulfur control would be more appropriate than a nationwide program. Gasoline sulfur control should be targeted primarily at the areas of greatest environmental need.

• Within the regions, gasoline sulfur standards should be uniform. State fuel initiatives different from any federal regional standards could result in supply disruption and price volatility and should be avoided.

• Adequate lead time would be critical to a successful implementation. Implementing gasoline sulfur control over the next few years involves a number of demands and uncertainties. For example, the technology that is the lowest cost and more cost effective requires sufficient time to develop.

• Permitting and construction of all of these refineries in just four years would be a major challenge. Therefore, streamlining of the permitting process could help address lead time concerns.

• If sulfur levels in diesel fuel were also going to be reduced (or any other changes to gasoline or diesel fuel required) industry would need to know soon so investment discussions could be coordinated.

We have seriously considered the oil industry's input in developing our proposal. While we are not proposing a regionally-based program, as discussed below, we believe the nationwide program we are proposing would provide flexibility in response to many of these concerns about uncertainty and would provide uniformity on a national basis.

The next section of the preamble describes in more detail the industry proposal and our response to their approach, including the concepts of national versus regional scope and the level of the standard. We recognize that refineries face many uncertainties and constraints, including potential future regulation of diesel sulfur that would affect the timing of their ability to meet the proposed gasoline sulfur levels. Consequently, also in this section we propose and request comment on two provisions, a sulfur averaging, banking and trading program and permit streamlining, designed to provide flexibility, to increase lead time, and to ease concern about how other uncertainties would affect decision making concerning gasoline sulfur control.

1. Oil Industry Proposal

During the development of this proposal, a large part of the oil refining industry, represented by the American Petroleum Institute (API) and the National Petrochemical and Refiners Association (NPRA), offered a series of constructive recommendations for the design of a gasoline sulfur control program. These proposals, which have progressively addressed more and more of the concerns we had raised about such a program, have a key element in common—the suggestion that different levels of gasoline sulfur control be applied to different regions of the country. These industry representatives observe that some areas of the country need the emission reductions to be achieved from Tier 2 LDVs and LDTs more than others, and that the gasoline distribution system can supply different gasolines to different geographical regions.

The most recent proposal from these members of the oil industry would provide gasoline meeting an average sulfur level of 150 ppm (capped at 300 ppm) to a large region of the U.S. This proposal would cover all states east of the Mississippi river, plus Missouri, Louisiana, and the eastern half of Texas (and any RFG areas in the West), and would begin in 2004.[40], [41] The remainder of the country (excluding California) would receive gasoline meeting a 300 ppm average (450 ppm cap). Further reductions in sulfur levels in eastern states, to a 30 ppm average/80 ppm cap, would be required starting in 2010, unless a study performed in 2004–06 demonstrated no air quality need for further sulfur reductions. If this study found an air quality need for additional reductions, EPA would make recommendations about the appropriate sulfur levels (if different from the proposed 30/80 ppm levels) and the area to receive this lower sulfur gasoline (if different from the region receiving the 150 ppm average in 2004). The industry representatives thus characterized the 2010 standards as ''rebuttable,'' standards because EPA could have to initiate additional regulatory actions to implement the final 2010 standards.

The arguments presented by the members of the oil industry for why this regional program would be reasonable include a consideration of the technical needs of the vehicles and the ability of refining industry to meet the requirements. Based on testing and analyses performed by oil companies and their trade associations, they concluded:

• Automakers can select from a range of design factors to reduce sulfur sensitivity, including engine design, catalyst size, catalyst location, control of air/fuel mixtures, the types and amounts of precious metals used in the catalyst;

• Vehicles can be designed to fully reverse the sulfur effect while meeting both Tier 2 and SFTP emission standards, even if operated for a long time (1,000 miles) on high sulfur fuel;

• This division of the country into two sulfur regions ''matches cost to consumers with benefits,'' since the areas with the greatest air quality need would get the lower sulfur gasoline, while consumers and refiners located in areas without substantial air quality need would not have to pay the higher costs resulting from the lower levels; and

• The regions, as defined, would optimize gasoline distribution based on the existing distribution system, thus reducing the potential for supply shortfalls or other difficulties.

Following the same methodology we used to estimate the future emissions and emissions reductions that would result from our combined Tier 2/gasoline sulfur proposal (presented above in Section III), we estimated the emissions that would occur from a program that combined our proposed Tier 2 vehicle standards with the gasoline sulfur program proposed by the oil industry.[42] As explained below, we believe vehicles meeting the proposed Tier 2 standards that consistently use the higher sulfur gasoline would emit at higher levels than those that consistently use 30 ppm sulfur gasoline, and that vehicles that travel between the East and West (as defined by the oil industry proposal) would experience an irreversible (permanent) loss in as much as 50 percent of the emissions performance after being exposed to high sulfur levels. As a result, our analysis shows somewhat higher total emissions for the program incorporating the oil industry's proposal than would occur if this sulfur effect did not occur. Since the ''rebuttable standard'' leaves open the possibility that the eastern region will not receive 30 ppm sulfur levels in 2010 and beyond (upon a finding of no air quality need for further reductions), we analyzed that scenario as well. Table IV.C.–1 shows the NO_X emissions we

[40] The industry representatives offered to meet these standards earlier if Tier 2 vehicles were introduced before 2004.

[41] While a majority of oil companies have approved this proposal, not every U.S. refiner supports all of the provisions summarized here.

[42] As explained in this section, because of sulfur's effect on emissions, we do not believe we could finalize the proposed Tier 2 vehicle standards with sulfur levels averaging significantly above 30 ppm. However, for the purposes of this analysis we did not change the modeled Tier 2 vehicle standards.

calculated for select years for these two scenarios, compared to our proposal.

TABLE IV.C.–1.—NATIONWIDE NO_X Emissions from Tier 2 Standards and Oil Industry Proposed Gasoline Sulfur Program

Year	Total NO_X tons		
	EPA proposal	Oil industry proposal 2004: 150/300 [a] 2010: 30/300	Oil industry proposal, 2010 standard re-butted 2004: 150/300 [a] 2010: 150/300
2007	2,423,000	2,821,000	2,821,000
2010	1,859,000	2,021,000	2,292,000
2015	1,242,000	1,424,000	1,701,000
2020	1,023,000	1,221,000	1,508,000

[a] Sulfur average in East/sulfur average in West.

The industry's proposals have been valuable in helping EPA and all the major stakeholders focus on key issues of the design of gasoline sulfur control options. We have seriously considered these proposals as well as the responses of others to the proposals. We have paid particularly close attention to the issue of the reversibility of gasoline sulfur's emissions impacts, since the environmental benefits to be gained from a regional sulfur program in combination with national Tier 2 vehicle standards hinge on the degree to which the negative impact of high sulfur levels can be reversed when a vehicle is operated later on low sulfur gasoline. We encourage comments on the appropriateness and feasibility of a regional gasoline sulfur program such as the one recommended by the oil industry (in combination with national Tier 2 vehicle standards as proposed today). We are particularly interested in analyses of the environmental and economic consequences of such a proposal.

In addition, others have raised the idea of an alternative temporary regional gasoline sulfur control program. Under this program, which would last from 2004 through 2008, gasoline refined in PADD IV (generally covering the Rocky Mountain states and representing about 5 percent of U.S. gasoline production) would meet an average sulfur standard of 150 ppm with a 300 ppm cap while the remainder of the country would meet a 30 ppm average beginning in 2004. Gasoline refined in PADD IV would have to comply with the 30 ppm average/80 ppm cap beginning in 2009.

This approach would provide the smaller refineries in this region with additional time to make the significant capital investments to desulfurize gasoline. In part because of the smaller scale of the PADD IV refineries, we estimate that the cost of desulfurization would be larger for these refineries than the estimated average cost of meeting a 30 ppm standard.

While the Rocky Mountain region's air quality problems are generally less severe than those in many other parts of the country, we believe that the emission reductions provided by today's proposed program would still be important, for several reasons.

- The Denver and Salt Lake City areas will have ozone levels in the 2007 time frame within 15 percent of the national ambient standards and would benefit from the lowest possible gasoline sulfur levels to assist their efforts to maintain their ozone attainment status.
- Other benefits of the proposed program would also be forgone during the interim period, as discussed above, including the lower secondary PM emissions, improved visibility, and reduced toxic emissions.
- Irreversible damage to vehicle emission control systems in those vehicles that have been fueled in this region at any time during their life would occur.
- PADD IV gasoline is marketed outside the borders of PADD IV.
- The vehicle emission standards would be more difficult to enforce if there were an extended period when vehicles were exposed to gasolines of more than one sulfur level.

We seek comment on the appropriateness of this approach, including consideration of the cost, air quality, and public health impacts as compared to our proposal.

As discussed below, however, we are not proposing a gasoline sulfur control program that incorporates a regional element. We have not been able to satisfy our concerns with the irreversibility of the sulfur effect, since it is not clear that vehicle or catalyst design changes will solve the problem and since we do not believe that the effect is negligible. Without a national low sulfur gasoline program, the air quality benefits of our program would be reduced, particularly in the initial years when the emissions reductions will be most required to help many states achieve attainment with the National Ambient Air Quality Standards. A national program providing low sulfur gasoline everywhere could ensure that the vehicles designed to meet the proposed Tier 2 standards achieved the desired emissions performance, that the investments made by car buyers in cleaner technology would be justified, and that the needed emissions reductions occurred beginning as early as 2004.

2. Why EPA Believes Gasoline Sulfur Program Must be Nationwide

As explained in Section IV.C.3. below, we are proposing that our gasoline sulfur control program apply throughout the country, rather than in a more limited geographic area along the lines of what the oil industry has proposed. In determining the appropriate geographic scope for our proposed program, we considered the implications for the emission control hardware of Tier 2 vehicles, based on the degree to which the sulfur impact on catalysts may be reversible. We considered the degree to which sulfur will impact advanced technology engines and aftertreatment systems. We weighed the impact that sulfur has on onboard diagnostic systems, and what that may mean for state inspection and maintenance programs. We evaluated the environmental implications beyond the ozone benefits to be realized. We also considered the ability of the entire refining industry to control gasoline

sulfur at essentially the same time. After review of all of these issues, it is our judgement that a national program is appropriate and reasonable. The following sections explore these issues in more detail.

a. *Sulfur's Negative Impact on Tier 2 Catalysts Is Irreversible.* We have reviewed data from several test programs designed to characterize both the effect of high sulfur levels on vehicle emissions and the ease and completeness with which this effect was eliminated or ''reversed'' once the vehicle was operated on low sulfur gasoline. These test programs were performed by auto manufacturers, oil companies, emission control equipment manufacturers and their various associations. All of the vehicles included in these test programs met either EPA Tier 1 or California LEV emission standards and were not designed to comply with either EPA or California supplemental federal test procedure (SFTP) standards. The SFTP standards are intended to better address and control emissions under driving conditions not captured when compliance with our FTP-based exhaust emissions standards is demonstrated, such as operation with the air conditioning turned on or driving at very high rates of acceleration and vehicle speeds (hereafter referred to simply as aggressive driving). This is an important factor in assessing sulfur reversibility, because in contrast to the vehicles that have been tested to date, Tier 2 vehicles would have to meet more stringent exhaust emission standards and would have to meet these standards over the wider variety of operating conditions included in the SFTP provisions. Hence, they would have to be designed to meet the emission standards under all such operating conditions; these design changes may influence the ease with which the sulfur effect is reversed, as explained below.

The vehicles tested exhibited a wide range of reversibility, for reasons that are not fully understood. The LEVs tested in these programs showed, on average, that the effect of operation on high sulfur fuel was reversed after operation on low sulfur fuel if aggressive driving conditions occurred once the vehicle was switched to low sulfur fuel. Roughly 85% of the increase in NMOG and NO_X emissions resulting from high sulfur levels was reversible after operation on low sulfur fuel coupled with more moderate urban driving. (CO emissions were somewhat less reversible under these conditions.) Individual vehicles showed a wide range of responses, however. For example, many vehicles showed substantial irreversibility for one pollutant (NO_X or NMOG) while very high reversibility for the other. In some cases, only half of the initial emission increase due to high sulfur could be removed by driving on low sulfur fuel. Catalyst temperature, the mixture of air and fuel in the engine and the design of the catalyst are all believed to be important factors that affect the reversibility of the sulfur impact. However, to date, no one has been able to demonstrate the specific contributions of these various factors. Also, no one has been able to design a catalyst with both high conversion efficiencies and no or very low sensitivity to sulfur.

These data indicate that the effect of high sulfur levels on emissions from current LEV models driven over a wide variety of operating conditions appears to be partially reversible, particularly if the vehicle is periodically driven aggressively. However, were these vehicles required to meet the SFTP standards, we believe that the degree of reversibility would have been substantially worse.

Studies of the adsorption and removal of sulfur on catalysts have demonstrated that wide variations in the mixture of air and fuel entering the engine (alternating between having a shortage to having an excess of oxygen) directionally help to remove sulfur from the catalytic surface. When driven aggressively, the mixture of air and fuel in the engines of most current vehicles (those not certified to SFTP standards) is quite variable, because precise control of the mixture of air and fuel is primarily done to control emissions. Meeting the SFTP standards will ensure that manufacturers carefully control the mixture of air and fuel over essentially all in-use driving conditions. This absence of widely varying mixtures of air and fuel could therefore inhibit the removal of sulfur from the catalyst once operation on high sulfur fuel ceased. Thus, we project that the sulfur effect on vehicles meeting both the LEV and SFTP standards (vehicles sold after 2000) and vehicles meeting the Tier 2 standards (which will include low exhaust emissions and low SFTP emission standards, too) will be less reversible than the effect shown on the vehicles included in the test programs discussed here.

Another factor that may substantially influence sulfur reversibility is the amount of time the catalyst is exposed to high sulfur fuel. With only a few exceptions, the vehicles in the test programs mentioned above were only driven on high sulfur fuel for a few miles (well under 100) before low sulfur fuel was reintroduced. This appears to limit the extent to which sulfur could permanently disable the effectiveness of the catalyst. However, one vehicle was tested with an aged catalyst system (to simulate a vehicle near the end of the useful life of 100,000+ miles) and driven for extended mileage (more than 1,000 miles) on high sulfur fuel before being retested on low sulfur fuel. (As with the other vehicles, this test vehicle was not designed to be SFTP-compliant; SFTP compliance could further complicate the ability of a vehicle to reverse the sulfur effect.) For this vehicle, only 50% of the NO_X emission effect of high sulfur fuel was reversed upon operation on low sulfur fuel. This is much less than the 85–100% reversibility found with short term exposure to sulfur. Thus, we project that in-use emissions performance of Tier 2 vehicles operated for some time on high sulfur fuel (as would occur if a regional sulfur control program permitted high sulfur levels in a large geographic area) might be substantially compromised. For example, in-use emissions of passenger cars designed to meet the 0.07 g/mi NO_X standard and operate on 30 ppm gasoline would actually be increased by about 50 percent if they were operated on 300 ppm gasoline at any point in their life. Such vehicles might only recover half of the emissions performance otherwise expected, perhaps even less once SFTP compliant designs are incorporated. Furthermore, we believe this effect would be essentially permanent; continued operation with low sulfur gasoline would be unlikely to improve the emissions performance.

The Draft RIA presents our complete evaluation of sulfur irreversibility, based on the data we have obtained to date. We encourage comments on this analysis. Furthermore, we are seeking comment on and will be considering the studies described in Appendix B of the Draft RIA, plus any new information developed or received before a final decision. We welcome any additional data characterizing the irreversibility of the sulfur effect, including what vehicle or catalyst design factors may make exposure to sulfur more or less reversible.

The preceding discussion focused on the irreversibility of the sulfur impact on emissions from current gasoline engine technologies. There are new technologies under development, which could be sold in the U.S. in the middle of the next decade (the same time that Tier 2 vehicles are being introduced), which also appear to be very sensitive to sulfur and largely unable to reverse this sulfur impact. One of these

technologies is the direct injection gasoline (GDI) engine. These engines utilize much more air than is needed to burn the fuel, unlike conventional gasoline engines that operate under conditions where only just enough air to completely burn the fuel is introduced into the engine. This GDI technology allows these engines to be up to 25% more fuel efficient than current gasoline engines and to emit up to 20% less carbon dioxide. GDI engines are currently being introduced in both Japan and Europe (which have or will soon require low sulfur gasolines). Because of the significant operating differences with GDI engines, these vehicles will likely require emission control technology substantially different from that used on conventional gasoline engines. For example, a GDI engine may require a NO_X adsorber to meet the proposed Tier 2 NO_X standard. High fuel sulfur levels quickly and permanently degrade the performance of these NO_X adsorbers. Thus, to enable the sale of advanced, high efficiency GDI engines in the U.S. under the Tier 2 standards, it appears that low sulfur gasoline would have to be available nationwide by the time this technology becomes available.

The fuel cell is another promising propulsion system that is being developed for possible introduction to consumers early in the next century. Fuel cells are being designed to operate on a variety of fuels, including gasoline and diesel fuel. The basic fuel cell technology is highly sensitive to sulfur. Almost any level of sulfur in the fuel will disable the fuel cell. One possible solution is to install a technology that essentially filters out the sulfur before it enters the fuel cell. However, such sulfur ''guards'' are costly and could not practically be used like a disposable filter (requiring the vehicle owner to change the sulfur guard frequently, much like changing an oil filter) in situations where constant exposure to high sulfur levels occurs. (Even exposure to relatively low sulfur levels will likely require periodic replacement of the sulfur guard to ensure adequate protection for the fuel cell.) Therefore, the amount of sulfur in the fuel must be limited to that which can be removed by one or at most two sulfur guards over the life of the vehicle. Thus, in order for fuel cells operating on gasoline to be feasible in the U.S., low sulfur fuels would have to be available nationwide by the time this technology becomes available.

b. *Sulfur Has Negative Impacts on OBD Systems and I/M Programs.* As discussed in more detail in the RIA, EPA believes that sulfur in gasoline can adversely impact the onboard diagnostic (OBD) systems of current vehicles as well as vehicles meeting the proposed Tier 2 standards. This is an important factor supporting the need for a national sulfur control program. EPA's onboard diagnostics (OBD) regulations require that all vehicles be equipped with a system that monitors, among other things, the performance of the catalyst and warns the owner if the catalyst is not functioning properly. The OBD catalyst monitor is designed to identify those catalysts with pollutant conversion efficiencies that have been reduced to the extent that tailpipe emissions would exceed a specified multiple of the applicable hydrocarbon emissions standard. For California LEV and federal NLEV vehicles, that multiple is 1.75 times the applicable hydrocarbon emissions standard; for federal Tier 1 vehicles, that multiple is 1.5 times the applicable hydrocarbon standard added to the 4,000 mile emission level.

We want to ensure that OBD systems operate correctly, and thus the possibility that gasoline sulfur may interfere with these systems was another consideration when evaluating the need for a national sulfur program. Our evaluation of sulfur's effect on OBD systems was summarized in a staff paper in 1997.[43] We concluded that sulfur can affect the decisions made by the OBD systems. Sulfur appears to affect the oxygen sensor downstream of the catalyst, which is used in the OBD systems, and it is not clear that the conditions that seem to reverse sulfur's effect on the catalyst will also reverse any sulfur impact on the downstream oxygen sensors. Indirectly, sulfur impacts OBD systems because it can impair a catalyst that would otherwise be operating satisfactorily, thereby triggering the OBD warning lights. While this would be indicate a properly operating OBD system, auto manufacturers have expressed the concern that consumers using high sulfur fuel may experience OBD warnings much more frequently than they would if operating on low sulfur gasoline, and that this could lead to a loss of consumer confidence in or support for OBD systems. Consumers may then ignore the OBD warning system and drive a potentially high emitting vehicle (which may have nothing to do with exposure to sulfur), contributing even more to air quality problems. Another possible scenario is that the OBD system may be impaired by sulfur in such a way that it does not register an improperly functioning catalyst, even if the catalyst is impaired for reasons unrelated to exposure to sulfur. This would defeat the purpose of OBD systems.

The NLEV program provides manufacturers the opportunity to request extra preconditioning of vehicles that they believe may be negatively impacted by high sulfur levels, when such vehicles may be included in in-use testing by EPA. We consider such requests on a case-by-case basis. One manufacturer has already requested, and received approval for, a special preconditioning cycle to remove any sulfur from the catalyst of a specific vehicle model, should that vehicle model be included in any in-use testing. We are concerned that a regional gasoline sulfur program would increase the likelihood that manufacturers would be compelled to request special preconditioning cycles for test programs, and believe that the one request we have granted already is indicative of the potential problems that would arise under a regional gasoline sulfur program. While the use of a special preconditioning cycle can protect the manufacturer from liability for high in-use emissions resulting purely from exposure to high sulfur, the in-use emissions from these vehicles would still be higher than expected based on the certified design.

To the extent that future catalysts are more sensitive to sulfur as emission standards become more stringent, the impact of sulfur on catalysts and catalyst monitors becomes proportionately more critical. The more stringent the Tier 2 vehicle emission standards are, the more stringent the OBD malfunction thresholds will be, because those thresholds are expressed as multiples of the applicable hydrocarbon emission standard. Therefore, even if the sulfur effect on future technology vehicles were equivalent in absolute terms to the effect on current technology vehicles, would become more significant in relative terms on those future technology vehicles. Because of this (and our concern about how reversible the effect of sulfur may be), we are concerned that a regional sulfur program could create widespread problems with OBD catalyst monitors for vehicles traveling outside of the low sulfur region. A regional sulfur program would likely result in higher emissions from Tier 2 vehicles in high sulfur regions, and may also result in more OBD-identified catalyst failures in those areas. We are not aware of a technical solution to this problem.

[43] U.S. EPA, ''OBD & Sulfur Status Report: Sulfur's Effect on the OBD Catalyst Monitor on Low Emission Vehicles,'' March 1997, updated September 1997.

The geographic scope of a sulfur control program also has implications for inspection and maintenance (I/M) programs. A regional sulfur control program could affect I/M programs located outside of the sulfur control region. The emissions measured in these I/M programs would likely be higher than those measured in the low sulfur region, possibly necessitating the use of unique emission cut points for Tier 2 vehicles registered in the higher sulfur region. I/M programs located outside of the sulfur control area would need to consider the possibility that the presence of OBD failure codes may be caused primarily by the use of high sulfur fuels, and may have to provide for a catalyst regeneration procedure to try to reverse the sulfur buildup to get a reading of how the catalyst is operating. This could lead to unequal treatment of vehicles located in different regions of the country based solely on their exposure to sulfur, unnecessarily complicating I/M programs. Furthermore, many I/M areas intend to rely heavily on OBD checks rather than emission checks in the future, making the correlation of OBD checks to the emissions from the vehicles very important. Therefore, the potential scenario of increased emissions without OBD detections (due to sulfur-fouled catalyst monitors) would make OBD a less attractive I/M tool in areas with high sulfur fuel. A national program, even one providing limited, temporary exemptions for small refiners, would avoid many of these concerns.

c. *Sulfur Reductions Would Ensure Lower Emissions of Many Pollutants.* One of the major arguments supporting a regional program is that such a program could be targeted at the majority of areas needing ozone controls by getting the NO_X and VOC reductions in the areas with the greatest ozone pollution problems. However, as our estimates of the total emission reductions to be achieved through the combined Tier 2/gasoline sulfur program show (presented above in Section III), there are substantial NO_X and VOC reductions to be attained nationwide with our proposal. In Table IV.C.–1 above, we estimated that our national sulfur control proposal would result in 9–22% fewer NO_X emissions compared to the regional sulfur program proposed by the oil industry, presuming that we implemented Tier 2 vehicle standards consistent with today's proposal and depending on the year in which the emissions reduction is evaluated. The higher emissions from a regional program would be due to the reduced emissions performance of vehicles (Tier 2 and others) located in the West where higher sulfur levels would be permitted and the loss of emissions performance for vehicles located in the East that travel to the West (or are relocated from the West) and are expected to suffer irreversible catalyst damage due to the higher sulfur levels in the West. Even in 2010 and beyond, when the oil industry's proposed program would result in sulfur levels consistent with our proposal in the East, Tier 2 vehicles located in the West or traveling from West to East would see substantial reductions in emissions performance. Furthermore, if the oil industry's proposed 2010 standard were not implemented (on the basis of the findings of the study they propose for 2004–06), the difference in emissions reductions between our proposal and the oil industry proposal climbs to 16–47% fewer NO_X emissions. Hence, the ozone benefits of this proposal would be somewhat smaller if a regional gasoline sulfur program were adopted.[44]

While the benefits of reducing ozone precursors through gasoline sulfur reductions are generally limited to a nonattainment area (as well as areas trying to maintain their attainment status, including those within 15% of the NAAQS standard and upwind locations that contribute transported ozone precursors into those areas), reductions in emissions of other pollutants have broader geographic benefits, as discussed in Section III. For example, sulfur reductions would help reduce emissions of particulate matter, providing some benefit to PM nonattainment areas (which may or may not coincide with ozone nonattainment areas) as well as areas with visibility problems. Sulfur reductions will also have benefits for areas across the country with acid deposition problems. Furthermore, sulfur reduction, by enabling tighter Tier 2 standards and by improving the emissions performance of the vehicles already on the road, will lead to fewer NMOG emissions, since, as explained in the Draft RIA, NMOG emissions are also impacted by gasoline sulfur (although to a lesser extent than NO_X emissions). Some of the NMOG emissions reduced are air toxics. As described in Section III above, air toxics, also known as hazardous air pollutants, or HAPs, contribute to a variety of human health problems. Thus, a national sulfur reduction program would achieve larger benefits than a regional program, and people living in the region with higher-sulfur gasoline would not get the full benefits of reduced air toxics emissions and could suffer adverse health consequences.

d. *The Refining Industry Can Control Gasoline Sulfur.* While evaluating the merits of a national gasoline sulfur program, in addition to considering the technical requirements for vehicles to meet the proposed Tier 2 standards and the potential air quality benefits that could be realized, we also considered the ability of refiners to reduce gasoline sulfur in essentially every gallon of gasoline by 2004. Based on this evaluation, we believe it is technically feasible for refiners to meet the proposed standards and that it is possible for them to do so in the proposed time frame. A summary of our analysis is presented here; we refer the reader to the Draft RIA for more details.

Technologies that enable refiners to significantly reduce the level of sulfur in gasoline have been available for many years. California began requiring low sulfur gasoline (30 ppm average/80 ppm cap) in 1996.[45] Refiners in California are currently producing gasoline that averages around 20 ppm sulfur. In addition, low sulfur gasoline standards similar to our proposal are, or soon will be, implemented by countries in Asia and Europe, and by Canada. These programs provide additional evidence that desulfurization technologies are available to meet a low sulfur gasoline standard, and that the majority of refiners in the industry can reasonably be expected to install and operate these technologies if given a reasonable amount of lead time.

When considering the implications of a sulfur standard, U.S. refiners can be grouped into two major groups: those already producing gasoline that meets, or nearly meets, the proposed requirements, and those that would have to make processing changes to comply. The majority of refiners currently producing relatively low sulfur gasoline today (roughly 15 percent of domestic production) could meet the proposed gasoline sulfur standard with no or very little additional capital investment, and at most a small increase in operating cost. These refiners have achieved their current sulfur levels using traditional sulfur removal technologies, or, in some cases, with refinery configurations that can accommodate very low sulfur crude oils.

Two examples of these traditional technologies are hydrotreating or hydrocracking the feed to the fluidized catalytic cracker unit (FCC), the unit in

[44] See the Draft RIA for information on the evaluation of this and other alternatives.

[45] Prior to that date, gasoline in California was capped at 300 ppm sulfur.

the refinery that produces the largest fraction of gasoline blendstock. These processes are capital intensive and demand large amounts of hydrogen and other utilities, resulting in high operating expenses. Another example is desulfurization of the gasoline stream coming from the FCC unit. Treating the FCC gasoline stream has the advantage of lower capital and operating costs than treating the FCC feed. The major concern with this approach is that the octane value of this gasoline blendstock is reduced at the same time that sulfur is reduced, particularly when the sulfur is being reduced to low levels. This lost octane must be made up by increasing the production of high-octane blendstocks from other units of the refinery, or by the addition of oxygenates. Making up this octane loss adds significantly to the cost of desulfurizing FCC gasoline. We seek comment on any implications of this proposal of recent activities in California relating to the oxygenate MTBE, and of refiners' possible use of oxygenates other than MTBE to make up any octane loss.

Based on current sulfur levels, we believe the majority of U.S. refiners would have to install at least one desulfurization processing unit to lower gasoline sulfur to the proposed levels. Since installation of traditional desulfurization technologies could be quite costly for most refiners, we have been very encouraged to see the recent development of several improved desulfurization processes that are now available at reduced capital investment and operating costs (and which avoid the octane loss that increases the costs of traditional technologies). Examples of these technologies are CDHydro and CDHDS (licensed by the company CDTECH) and OCTGAIN 220 (licensed by Mobil Oil).[46] These technologies use conventional refining processes combined in new ways, with improved catalysts and other design changes that minimize the undesirable impacts (such as the substantial loss in octane) and maximize the effectiveness of the desulfurization approach. Since these processes provide less costly ways to reduce gasoline sulfur, we presume that they would be used by most refiners to meet the proposed gasoline sulfur standard, and have based our economic assessment (summarized in Section IV.D. below) on that presumption.

Some in the refining industry have told us that since there have not been long-term commercial demonstrations of these newer technologies, they would not consider these technologies to be viable and, if faced with our proposed requirements in 2004, they might select the more traditional sulfur reduction processes, resulting in a higher cost to produce low sulfur gasoline. While we understand the hesitation on the part of some in the oil industry to invest in these improved sulfur reduction technologies, we believe many, if not all, of their concerns would be addressed in the next few years. The industry would have four years to prepare to meet our proposed gasoline sulfur requirements. Refiners have been provided a similar amount of time to comply with fuel programs in the past (highway diesel fuel sulfur control, reformulated gasoline under the complex model) and some have told us that three to four years is adequate to allow them to meet gasoline sulfur standards similar to those proposed today. Refiners would have time to grow more comfortable with the improved processes after they have obtained additional data and information from the vendors that license these technologies. Refiners would be able to have their FCC gasolines tested in vendors' pilot plant facilities, which would provide each refiner with more specific information on how the process would function in their particular refineries. Furthermore, we have been informed that there will soon be demonstrations of at least two of the improved desulfurization technologies in existing refineries; the entire industry will benefit from these efforts.

We have heard concerns that small refiners, particularly those in the Rocky Mountain region, would bear proportionately higher economic burdens if they were required to produce gasoline meeting the same sulfur levels as larger refineries located in the Gulf Coast and East. The severity of these economic impacts could result in unreasonably high gasoline prices, potential refinery closures, and supply shortages, according to those raising the concerns. Our analysis, presented here and in the Draft RIA, leads us to conclude that these severe events would not occur. Furthermore, we have recently received a study that suggests that, in fact, small refiners in the Rocky Mountain region will incur costs only slightly higher than the national average.[47] This study concludes that the potential for refinery closures in this region in response to a gasoline sulfur regulation is small, and that even if ten percent of gasoline were negatively impacted there would not be a significant supply shortfall in the region. We have not yet reviewed this study in detail, and we encourage comments on the analysis presented in it. However, having considered the concerns raised about small refiners in general, including those in the Rocky Mountain region, we are proposing special provisions for small refiners to address their unique challenges.

The advent of the improved desulfurization technologies creates an opportunity for a stringent, nationwide, and yet relatively low-cost, sulfur control program. Such a program would still likely be challenging for many if not most refiners. In the program proposed today, we have built in a number of flexibilities that would ease the task of compliance for refiners while maintaining the level of air quality improvements of a less flexible program. In particular, Section IV.C.–3 below presents a sulfur averaging, banking, and trading program that effectively extends the final compliance date by two years. In consideration of all these factors, we believe that under the proposed program, all refiners nationwide should be able to produce very low sulfur gasoline without suffering severe financial consequences.

e. *Other Stakeholders Support National Gasoline Sulfur Control.* In addition to our technical arguments for concluding that gasoline sulfur should be controlled nationwide, we have considered the positions of other parties. Many stakeholders to our decision have expressed to us their support for a national sulfur control program. Automakers, represented by the American Automobile Manufacturers Association (AAMA) and the Association of International Automotive Manufacturers (AIAM), have petitioned the Agency to implement a national, low sulfur gasoline program ''as soon as possible.'' State organizations such as STAPPA/ALAPCO and the Ozone Transport Commission (OTC) have made similar resolutions, and many individual states have also voiced support for a national program. Environmental organizations, such as the American Lung Association

[46] In addition to these technologies, other companies have told us that they are working on developing their own desulfurization technologies. Furthermore, there have been recent advances in an approach called biodesulfurization, which employs bacteria that selectively desulfurizes petroleum. We believe refiners will have an increasing number of technology options to meet our proposed standards.

[47] MathPro, Inc., ''Likely Effects on Gasoline Supply in PADD 4 of a National Standard for Gasoline Sulfur Content,'' Prepared for Association of International Automobile Manufacturers, DaimlerChrysler Corporation, Ford Motor Company, and General Motors Corporation, March 19, 1999.

and the American Council for an Energy Efficient Economy, favor a national sulfur control program, as well. The arguments for a national program presented by these parties include:

- High sulfur levels significantly impair the performance of today's emission control technologies, reducing the emissions benefits of current and advanced vehicles,
- Gasoline sulfur contributes to air quality problems not directly benefitted by vehicle emission standards (PM, SO_X, hazardous air pollutants),
- The sulfur impact on emission controls is largely irreversible, and
- If sulfur levels are not controlled, new, more fuel-efficient vehicle technologies that are as or more sulfur-sensitive than today's vehicles will not be introduced in the U.S.

3. Proposed Gasoline Sulfur Standards

We are proposing to require substantial reductions in gasoline sulfur levels nationwide. Not only would these standards enable the stringent tailpipe emission standards we're proposing for Tier 2 vehicles and ensure that these low emission levels would be realized throughout the life of the vehicle, but they would also help to reduce emissions of pollutants that endanger public health and welfare from vehicles already on the road, including NLEV vehicles. The following sections summarize the proposed requirements for gasoline refiners and importers, special provisions for small refiners, and possible changes to construction permitting requirements that would enable refiners to install gasoline desulfurization technology in a timely manner. We also raise the potential need for changes to diesel fuel to enable diesel technologies to meet the proposed Tier 2 standards. Section VI. provides additional information about the compliance and enforcement provisions that would accompany these proposed requirements. More detailed information in support of the conclusions presented in this section of the proposal is found in the draft Regulatory Impact Analysis.

a. *Standards for Refiners and Importers.* Our proposed gasoline sulfur program balances the goal of enabling Tier 2 emission control technologies with the goal of lowering sulfur as early as the refining industry can practically achieve the required levels. To accomplish both of these goals, we are proposing a set of standards combined with a sulfur averaging, banking, and trading (ABT) program. This proposed overall program would achieve the desired sulfur levels, on average, beginning in 2004—the first year Tier 2 vehicles will be sold—while proposing to allow the use of credits towards compliance with refinery average standards indefinitely (within the limits of per-gallon caps). These requirements would apply to all gasoline sold in the U.S.,[48] based on our belief that emissions must be reduced nationwide to adequately protect public health and the environment and that Tier 2 vehicles operated everywhere in the U.S. require protection from the harmful impacts of gasoline sulfur.

Table IV.C.–2. presents the proposed standards for gasoline refiners and importers. The proposal would require all gasoline refiners and importers to produce gasoline that meets an average standard of 30 ppm sulfur at the refinery gate on an annual basis, beginning in 2004. These requirements would apply to all gasoline, reformulated as well as conventional. In 2004 and beyond this standard could be met through the use of credits generated as early as 2000 by refiners who substantially reduce sulfur levels from current (1997–1998) levels, under the provisions of the proposed sulfur ABT program discussed below in Section IV.C.3.c. Hence, the actual average sulfur levels for gasoline in use could be somewhat higher than 30 ppm. However, to ensure that sulfur levels are being reduced significantly (for the benefit of Tier 2 vehicles and to achieve the other emissions benefits of reducing gasoline sulfur), these in-use sulfur levels would be constrained by maximum corporate pool average standards of 120 ppm in 2004 and 90 ppm in 2005. These standards would represent the maximum allowable average sulfur levels for each refiner, measured across all refineries owned and operated by that refiner, rather than at each refinery. In 2006 and beyond, there would be no corporate pool average standard. Every refinery would have to meet the 30 ppm average refinery gate standard, although refiners could use any banked/purchased credits to meet this standard (as explained in the ABT discussion below). Thus, in 2006 and beyond, the majority of gasoline would average 30 ppm, although some individual refineries could average slightly more or less.

TABLE IV.C.–2.—PROPOSED GASOLINE SULFUR STANDARDS FOR REFINERS AND IMPORTERS [EXCLUDING SMALL REFINERS]

Compliance as of:	January 1, 2004	January 1, 2005	January 1, 2006+
Refinery Average, ppm	[a]30	[a]30	[a]30
Corporate Pool Average, ppm	120	90	not applicable
Per-Gallon Cap, ppm	[b]300	180	80

a This standard can be met through the use of credits as long as the applicable corporate pool average and per-gallon caps are not exceeded, as explained in the text.
b This initial per-gallon cap standard begins October 1, 2003.

To ensure that, even as average sulfur levels are reduced in 2004–2006, gasoline sulfur levels do not exceed a maximum level that we believe is particularly harmful to Tier 2 vehicles, we are also proposing ''caps'' on the sulfur content of every batch of gasoline produced or imported into the country. As shown in Table IV.C.–2, these caps decline over time, ultimately resulting in a per-gallon limit of 80 ppm in 2006 and beyond. Since Tier 2 vehicles would be sold prior to the start of calendar year 2004, the actual date when the initial sulfur cap standard would take effect at the refinery is October 1, 2003. We are also proposing caps on the sulfur content of gasoline sold at the retail level or otherwise distributed downstream of the refinery, as explained in Section VI.B.

For purposes of compliance, we propose that a joint venture, in which two or more refiners own and operate one or more refineries, be treated as separate refining corporations under the proposed gasoline sulfur requirements.

[48] Gasoline sold in California that meets California's standards would be exempt from meeting the proposed standards, due to our belief tht California gasoline already meets or exceeds these requirements. See Section VI.B.

Hence, a refinery owned by a joint venture would be included in the corporate pool calculations of the joint venture, and would not be allowed to be included with other refineries owned by one of the parties to the joint venture in the corporate pool calculations for that party. Given the large number of joint ventures that have been announced recently in the oil industry, we believe this would be an equitable way to handle compliance for joint venture refineries. Furthermore, this approach would increase the number of companies that can generate and trade sulfur credits; a more limited number of multi-refinery companies would tend to bank and trade credits within rather than across corporations. We welcome comments on alternatives to this approach, such as requiring the majority owner in a joint venture to include the jointly owned refinery in his compliance calculations. If you recommend such an approach, please discuss how joint ventures that have (nearly) equal ownership among the parties should be treated for compliance and aggregation purposes.

i. *Why Begin the Program In 2004?*

The primary reason for our proposal to begin the gasoline sulfur standards in 2004 is that this is the first year that Tier 2 vehicles would be required to be sold, and these lower sulfur levels would be needed to avoid significant impairment of the Tier 2 emissions control technology. Furthermore, vehicles already in the fleet would benefit and we would like to maximize that benefit by starting the program as soon as is reasonable. States need the emission reductions that sulfur control would bring as soon as possible due to their SIP requirements in 2007 and 2010. This is reinforced by the fact that several states have already taken the initiative to develop state gasoline sulfur standards. In fact, since model year 2004 vehicles will likely be on the market in the fall of 2003, we are proposing to implement the caps on sulfur levels beginning October 1, 2003. This would help to ensure that sulfur levels are reduced coincidentally with the sale of Tier 2 vehicles, and would also ensure that sulfur levels throughout the gasoline distribution system have been reduced by the start of 2004.

We request comment on the feasibility of the compliance dates summarized in Table IV.C.–2. If these dates are not feasible, what date(s) would be more appropriate, given that Tier 2 vehicles will be introduced no later than model year 2004 and our conclusion that gasoline sulfur reductions must coincide with the introduction of these vehicles? For example, we request comment on the implications of implementing the 30 ppm average standard beginning later than 2004, including potential implication on cost, air quality, and implementation of the proposed Tier 2 vehicle standards. What other factors should we consider if you believe that the proposed implementation dates are not feasible and should be postponed?

We also seek comment on the implications of implementing an average sulfur standard different than the proposed 30 ppm average standard, including levels higher and lower than 30 ppm. Specifically, commenters should address the feasibility of different standards they support, the time frame in which different average standards could be implemented (i.e., in 2003, 2004, or 2005), the potential air quality impacts of such standards, and how such standards would affect the implementation of the proposed Tier 2 vehicle standards.

ii. *How Did We Arrive At the 80 ppm Cap and 30 ppm Average Standards?*

We believe a 30 ppm averaging standard is important and necessary to enable the emission reductions needed from Tier 2 vehicles. The test data we have reviewed, referenced in previous sections of this notice and in the Draft RIA, show that even very low levels of sulfur have some negative impact on catalyst performance. Most of the data available to us were generated through testing with minimum sulfur levels near 30 ppm. We have used this data to conclude that sulfur levels need to be reduced, and to assess, as part of our analysis, the technical feasibility of the proposed Tier 2 vehicle standards. The non-linear relationship between sulfur level and emissions impact (the lower the sulfur level, the greater the incremental increase in emissions) suggests that emission reductions would be ensured by sulfur levels at or near 30 ppm. We believe that requiring the 30 ppm average standard would be necessary to ensure that vehicles regularly use gasoline containing very low amounts of sulfur, regardless of where the vehicles were driven, what time of year it was, or how gasoline production varied from batch-to-batch in a given refinery.

We also believe that an 80 ppm cap standard would be required to provide appropriate insurance for maintaining Tier 2 standards in use and to give automakers an indication of the maximum sulfur levels for which they would need to design their vehicles. The test data we have reviewed show that the greatest increase in emissions comes as the sulfur level is increased from the lowest levels (i.e., 30 ppm). At higher sulfur levels (i.e., above 100 ppm), the catalyst performance is impaired to the extent that an additional increase in sulfur content has a smaller additional impact on emissions. Since the factors that influence sulfur sensitivity vary from vehicle to vehicle, different vehicles will experience different impacts from exposure to specific sulfur levels. None of the data that we have reviewed indicates that a vehicle can be designed to be completely insensitive to sulfur for all types of emissions. Furthermore, as discussed in Section IV.C.2., our concern that roughly half of the sulfur impact on the catalyst would be irreversible for Tier 2 vehicles (with other vehicles being negatively affected as well) provides additional arguments for trying to keep the sulfur cap as close to the average as possible. Hence, to ensure that Tier 2 vehicles maintain the designed emission performance over the life of the vehicle, we believe a cap on gasoline sulfur levels would be necessary, and that 80 ppm would be the appropriate level for this cap.

Setting a cap also would enhance enforcement of sulfur standards by setting a maximum level of sulfur that could be checked at all points in the gasoline distribution process. A sulfur cap significantly lower than 80 ppm could have the unintended consequence of forcing a sulfur average lower than the 30 ppm standard, increasing the overall costs of the program. The proposed level of 80 ppm sulfur for the cap reflects our balancing of several factors, including the potential air quality benefits, economic impacts, compliance flexibility, and the irreversibility of the effects of gasoline sulfur on vehicle emission controls.

As explained in Section IV.D. below, we believe that the combination of our proposed gasoline sulfur standards and the proposed Tier 2 standards would be cost-effective. This judgement about cost-effectiveness reflects what we believe would be an appropriate balance between the costs to be borne by the affected industries and the emissions reductions to be gained. Even though few refiners currently produce gasoline at or near these levels, as explained in Section IV.C.2 above there appear to be no significant obstacles to refiners achieving this level of sulfur control by 2004 (or 2006 if they were to take advantage of the sulfur ABT program). Unless a substantially higher average sulfur standard were set or a substantially smaller fraction of gasoline were affected by our regulations, refiners would have to make a significant investment in technology to desulfurize gasoline. Hence the cost to

refiners would not be substantially reduced if we selected a less stringent average standard. Furthermore, we believe that a lesser reduction in gasoline sulfur levels could require us to reduce the stringency of the proposed Tier 2 standards. A higher average sulfur level would require less stringent standards or more vehicle hardware costs; either would reduce the effectiveness of our proposed combined program.

At the same time, we recognize the need to provide some flexibilities to refiners in meeting our proposed standards, to ensure that the program is implemented in an orderly manner, without severe consequences in the initial months (for example, supply shortages or substantial spikes). Hence, we have proposed to allow less stringent caps in 2004 and 2005 (through 2007 under the small refiner provisions discussed below) to balance the needs of the technology with the regulatory burden, economic impact, and ability of the refining industry to reduce sulfur levels in this time frame. Given that Tier 2 vehicles would be phased in over several years and that the vast majority of gasoline would be capped at 80 ppm by 2006 (when 75% of new LDV, LDT1, and LDT2 sales would be required to meet the proposed Tier 2 standards), we believe that the potential damage to Tier 2 catalysts would be minimized. Furthermore, since the gasoline distribution system is fungible (i.e., gasoline from multiple refiners may be mixed together, and gasoline produced at one company's refinery may be sold at another company's retail station), any gasoline that approached the higher caps in 2004 and 2005 would be highly likely to be diluted by lower sulfur gasoline, further limiting the potential negative impact on Tier 2 vehicles.

We have also proposed to permit compliance with the 30 ppm refinery average with the use of credits indefinitely, not just in the years during which the corporate average is reduced, as long as the applicable per-gallon caps are not exceeded. We would like comments on whether this provision should end, and if so, what date would be appropriate to require every refinery to meet the 30 ppm standard with actual production. We also encourage comments on whether corporate averaging (aggregation of refineries owned by a single entity) should be allowed for compliance with the 30 ppm standard, in 2004 and 2005 (in addition to corporate averaging to the pool standard) and/or beginning in 2006.

In light of our technical conclusions about the need for these standards, and our concerns about the irreversibility of the sulfur effect, we believe the 30 ppm average/80 ppm cap is the appropriate sulfur level to enable vehicles to meet the proposed Tier 2 standards and to maximize the emissions reductions to be achieved from this program in a cost-effective way. We welcome comments on these conclusions. We are also interested in any information on the reversibility of the sulfur impact on NLEV and Tier 2 catalysts that may supplement our understanding of how reversibility may differ with exposure to different sulfur levels and how this difference would impact our selection of the 30/80 standards. We also solicit information about what, if any engine or catalyst design modifications could minimize the irreversibility of the sulfur impact and about how compliance with the SFTP standards could impact irreversibility (for either NLEV or Tier 2 vehicles).

iii. *Should a Near-Zero Gasoline Sulfur Standard Be Considered?*

The auto industry, represented by the Alliance of Automobile Manufacturers, have supported a gasoline sulfur control program that would require 30 ppm gasoline in 2004 with a further reduction to ''near-zero'' levels (less than 5 ppm) by 2007. They believe that near-zero sulfur levels would enable the emission control technology that would ultimately be necessary to meet standards similar to those we are proposing today. They also believe that very low sulfur gasoline would significantly increase the emission reductions of the program as compared to a 30 ppm sulfur program.

We are also aware of concerns that advanced emission control and fuel efficient technologies, such as gasoline direct injection engines and automotive fuel cells, may require zero or near-zero sulfur levels to achieve Tier 2 emission levels over their full useful life (or in some cases, even to operate for a significant length of time). At the same time, we're aware that there may be technological solutions to these problems that may allow these technologies to operate on gasoline averaging 30 ppm sulfur. For example, it may be possible to regenerate (remove the sulfur from) the emission control technologies used by gasoline direct injection engines on an ongoing basis. Similarly, it may be possible to prevent sulfur from entering a fuel cell through the use of a sulfur ''guard'' made, for example, of zinc oxide, that might need to be replaced periodically.

We believe at this time that our proposed Tier 2 standards could be met with conventional technology if gasoline averaging 30 ppm is available. Nonetheless, for the reasons put forward by the auto industry and others, we also believe that it may be desirable in the long term for all gasoline in the U.S. to average substantially below 30 ppm sulfur. We encourage you to comment on the question of requiring gasoline sulfur levels under 5 ppm in the 2007 and later time frame. If you are commenting on this issue, we encourage you to take a broad view and to discuss all of the following questions in your comments:

- What technological options would be opened to manufacturers of vehicles and emission control hardware if near-zero sulfur fuel were available?
- What additional air quality benefits would be achieved?
- What changes in vehicle engines and emission control technology would be needed to achieve these emission benefits, absent reductions in gasoline sulfur levels beyond our proposed 30 ppm standard? What would these changes cost?
- What is the maximum sulfur level that advanced technologies, including gasoline direct injection and automotive fuel cells, could be designed to withstand if they are to be commercialized under the proposed Tier 2 standards? In what time frame might substantial commercialization of these technologies occur?
- How feasible is production of near-zero sulfur gasoline for the refining industry? What technologies would be required? How would this vary from refinery to refinery? What additional costs, beyond those expected for a 30 ppm sulfur program, would be incurred? How would the timing of a near-zero sulfur requirement affect refining costs?
- Would equipment used to make 30 ppm have to be modified or replaced to make near-zero sulfur gasoline? If so, how would this affect the time frame in which a near-zero sulfur level in gasoline could be achieved? Would the time frame for achieving these levels be different if refiners were not required to meet a 30 ppm standard? Is there another sulfur concentration that could be easily achieved as an intermediate level before achieving near-zero levels?
- What other issues should we consider in evaluation of further reductions in gasoline sulfur levels?

iv. *Why Are We Proposing Less Stringent Standards for 2004 and 2005?*

We are proposing to permit corporate average sulfur levels to be somewhat higher than 30 ppm, and maximum sulfur levels to be higher than 80 ppm, under the ABT program in 2004 and 2005. This proposal is meant to provide greater flexibility for refiners to meet

our ultimate goal of the 30 ppm standard in an orderly fashion, while limiting the negative environmental consequences. The temporary nature of the ABT program would ensure that any negative consequences for Tier 2 vehicles of these higher sulfur levels (120 ppm average in 2004, 90 ppm in 2005) would be minimal. By the time that the majority of new vehicles sales would be required to meet the Tier 2 standards (2006 and beyond), average sulfur levels in gasoline would meet the 30 ppm annual average standard.

We are interested in comment on the corporate pool average values, and their associated caps. A higher pool average would obviously ease implementation (e.g., 150 ppm average with an appropriate cap in 2004, for example), but we have not proposed a higher average because of our concerns that higher in-use sulfur levels after 2004 are undesirable for emissions from Tier 2 vehicles. We request that commenters supporting higher corporate pool average values discuss how such higher values would affect in-use emission levels of Tier 2 vehicles, as well as NLEV and Tier 1 vehicles.

We also ask for comment on an alternative approach that would implement the corporate average requirement for 2004 (120 ppm) but not require compliance with the 30 ppm standard (with or without credit use) until 2005. The 120 ppm corporate pool average would continue in 2005 and the 90 ppm corporate pool average would be implemented in 2006, with the requirement to meet the 30 ppm standard (with or without credits) beginning in 2005 and extending indefinitely, consistent with the proposed program.

Finally, we request comment on whether refiners should be allowed to comply with the corporate average standards through the use of sulfur credits generated under the ABT program (within the limits of the proposed caps). This would likely render the refinery-specific standards in 2004 and 2005 unnecessary, and thus refiners would only have to comply with the per-gallon caps and corporate averages in 2004 and 2005. However, in 2006 and beyond refiners would have to meet the 30 ppm average at every refinery (with limited use of sulfur credits, to the extent that the 80 ppm cap permits).

We have proposed per-gallon caps of 300 ppm in 2004 and 180 ppm in 2005 at the refinery gate, with slightly higher caps imposed downstream (as explained in Section VI.B below). We believe that downstream caps would be necessary to ensure compliance and protect Tier 2 vehicles. At the same time, we believe caps at the refinery gate would be necessary to guarantee that the environmental goals of this program were met; the corporate and refinery averages alone wouldn't provide the full emissions reductions and environmental benefits we have estimated because, by themselves, they could allow gasoline with high sulfur levels in the system as long as the refiner offset any such high sulfur batches with very low sulfur gasoline. However, there are some arguments for eliminating the per-gallon standard at the refinery gate and simply enforcing a per-gallon cap at the retail level (or some intermediate point downstream). This approach would give refiners and blenders greater flexibility in blending occasional batches of gasoline that exceed the proposed cap standards. These refiners/blenders could sell and transport these high sulfur batches to another party who would blend down the sulfur level to make gasoline meeting the downstream caps. One shortcoming of such an approach (removing the per-gallon cap at the refinery) is that not all gasoline passes through multiple parties before ending up at the retail level; some refiners ship part or all of their production directly from refinery to retail outlet. We welcome comment on whether caps at both the refinery gate and downstream are appropriate. We also encourage your input on whether the caps we have proposed to coincide with the corporate average standards are appropriate. Keep in mind that we need some limitation on sulfur levels to protect the first Tier 2 vehicles that would begin entering the marketplace as early as the fall of 2003.

b. *Proposed Standards for Small Refiners.* As explained in the regulatory flexibility analysis discussion in Section VIII.B. of this document, we have considered the impacts of these proposed regulations on small businesses. As part of this process, we convened a Small Business Advocacy Review Panel for this proposed rulemaking, as required under the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA). The Panel was charged with reporting on the comments of small business representatives regarding the likely implications of possible control programs, and to make findings on a number of issues, including:

- A description and estimate of the number of small entities to which the proposed rule would apply;
- A description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule;
- An identification of other relevant federal rules that may duplicate, overlap, or conflict with the proposed rule; and
- A description of any significant alternatives to the proposed rule that accomplish the objectives of the proposal and that may minimize any significant economic impact of the proposed rule on small entities.

The final report of the Panel is available in the docket. The Panel concluded that small refiners were the group most likely to be negatively impacted by the proposed program. (The Panel noted that small gasoline marketers would also have to comply with some portions of a gasoline sulfur program, but did not recommend any regulatory relief for this group of small businesses.) Many of the small refiners the Panel met with indicated their belief that their businesses may close if relief were not considered due to the substantial capital and other costs required to reduce sulfur levels to the 30/80 standard. The Panel recommended that EPA solicit comments on a number of options to provide relief to small refiners, which include some or all of these provisions:

- Providing small refiners a four-to six-year period during which less stringent gasoline sulfur requirements would apply; comment was also recommended on extending this period for up to a total of 10 years.
- Basing each small refinery's gasoline sulfur limit on its individual average sulfur level based on the most recent report(s) to EPA; and
- Granting temporary hardship relief on a case-by-case basis, following the four-to six-year period of relief common to all small refiners, based on a showing of economic need.

The Panel stated its belief that additional time would allow sulfur-reduction technologies to be proven out by larger refiners, thereby reducing the risks to be incurred by small refiners who choose to incorporate these technologies. The added time would likely allow for costs of these desulfurization units to drop, thereby limiting the economic consequences for small refiners. Nationally, giving small refiners more time to comply would help ensure that cross-industry engineering and construction resources would be available. Finally, extending the compliance deadlines would provide small refiners with additional time to raise capital for infrastructure changes.

i. *What Standards Would Small Refiners Have to Meet Under Today's Proposal?*

Upon evaluating the impacts of our proposed gasoline sulfur requirements on small refiners and careful review of the Panel's recommendations, we have determined that regulatory relief in the form of delayed compliance dates is appropriate to allow small refiners to comply without disproportionate burdens. We propose that, for a period of four years after other refiners must start meeting the standards proposed in Table IV.C–2, refiners meeting clearly defined company size criteria be allowed to comply with somewhat less stringent requirements than those just described for refiners and gasoline importers. We propose to define a small refiner as any company employing no more than 1,500 employees throughout the corporation, including any subsidiaries, regardless of the number of individual gasoline-producing refineries owned by the company or the number of employees at any one refinery. This number is based on the Small Business Administration definition of a small refiner for the purposes of regulation.[49] The proposed annual average small refiner standards beginning with 2004 are shown in Table IV.C–3 below, although the cap standards begin October 1, 2003.

TABLE IV.C–3.—PROPOSED TEMPORARY GASOLINE SULFUR REQUIREMENTS FOR SMALL REFINERS IN 2004–2007

Refinery baseline sulfur level (ppm)	Temporary sulfur standards (ppm)
0 to 30 ..	Average: 30. Cap: 80.[a]
31 to 80	Average: no requirement. Cap: 80.[a]
81 to 200.	Average: baseline level. Cap: Factor of 2 above the baseline.[a]
201 and above.	Average: 200 ppm minimum, or 50% of baseline, whichever is higher, but in no event greater than 300 ppm. Cap: Factor of 1.5 above baseline level.[a]

[a] The cap standard takes effect at the refinery gate October 1, 2003.

We also propose to apply these provisions to any foreign refiner that can establish that they meet this same definition of small. Since few if any foreign refiners send all of their gasoline production to the U.S., allowing eligible small foreign refiners to meet these less restrictive standards, even on a temporary basis, would be a less restrictive requirement than it will be for small domestic gasoline producers since they may be able to send lower sulfur gasoline to the U.S. without having to incur capital expenses. Furthermore, in many cases foreign refiners are not subject to the same stringent permitting and other regulatory requirements that domestic refiners face. At the same time, we believe many foreign refiners will be installing gasoline desulfurization equipment because of the various international requirements that have been proposed and/or finalized (for example, in Europe, Canada, Japan) that require gasoline sulfur levels to be reduced to levels similar to our proposed standards and thus these companies will not avoid all of these costs. In addition, in most cases we expect importers to be the party responsible for the sulfur level of imported gasoline, and importers are not eligible for the less stringent standards applied to small refiners. Hence, the number of foreign refiners who could benefit (financially and otherwise) from gaining small refiner status is likely to be very small. However, we welcome comments on the competitive and other marketplace implications of this proposal.

We believe that these proposed small refiner standards are reasonable and that they would not conflict with our overall goals of reducing gasoline sulfur levels nationwide as soon as possible and of reducing gasoline sulfur levels sufficiently to enable and protect the emissions performance of Tier 2 vehicles. Our conclusions are based in part on the fact that only a very small volume of gasoline will be eligible for these lesser standards. We have estimated that small refiners produce approximately 2.5 percent of all gasoline in the U.S. Furthermore, of the 17 refineries that we have identified as meeting SBA's definition of small business, nine already have gasoline sulfur levels less than 90 ppm. Hence, only a very small fraction of the gasoline sold in the U.S. would take advantage of the higher small refiner standards through 2007. By the time that a large number of Tier 2 vehicles could have been impacted by residing in or traveling to areas where higher sulfur fuel is sold, the temporary exemptions for small refiners would have expired. Furthermore, in most cases, gasoline produced by small refiners is mixed with substantial amounts of other gasoline prior to retail distribution (due to the functioning of the gasoline distribution system), likely resulting in only marginal increases in overall sulfur levels. Thus, the sulfur level of gasoline actually used by Tier 2 vehicles should generally be much lower than that produced by individual small refineries who receive unique compliance standards through 2007.

As explained above, we are proposing that compliance under the proposed standards be based on a refiner's being able to show that it meets specific criteria. If a refiner were able to qualify as a small refiner under our definition, it would need to then establish a sulfur baseline for each participating refinery. For small refiners, compliance with the proposed sulfur regulations would be determined on the basis of the sulfur baseline for each refinery owned by that company. The following sections explain these proposed requirements in more detail, to supplement the information be presented above. We also explain how small refiners could obtain an additional two-year exemption upon establishing a hardship case, as well as how small foreign refiners could establish eligibility for compliance under the small refiner provisions.

ii. *Application for Small Refiner Status.*

We are proposing that refiners seeking small refiner status under our gasoline sulfur program would have to apply to us in writing no later than June 1, 2002, requesting this status. In this application, the refiner must demonstrate that as of January 1, 1999, the business and any subsidiaries, including all refining, distribution, and marketing activities, as well as any other activities worldwide, employed 1,500 or fewer employees. We are proposing that in the case of refineries owned by joint ventures, the total employment of both (all) companies would be considered in determining whether the 1,500 employee limit is reached. If a refiner that is not small as of January 1, 1999 subsequently sells part of its business and as a result has fewer than 1500 employees, it would not be eligible for a small refiner status. These provisions would provide stability to the regulated and regulatory parties and ensure that no ''gaming'' of the program occurs. However, we are also proposing that any new refinery built between January 1, 1999 and January 1, 2001, or a refinery that was not operational as of January 1, 1999, owned by a refiner that meets our proposed definition, could apply for small refiner status no later than June 1, 2002. In this case, we would consider carefully the history of the refinery and

[49] SBA uses a different definition of small refiner for the purposes of federal procurements of petroleum products, and EPA in the past has used criteria based on the processing capacity of the individual refinery and of all refineries owned by one company.

the company in determining whether it is appropriate to grant this refiner small refiner status.

We are also proposing that if a refiner with approved small refiner status later exceeds the 1,500 employee threshold without merger or acquisition, its refineries could keep their individual refinery standards. This is to avoid stifling normal company growth and is subject to our finding that the refiner did not apply for and receive the small refiner status in bad faith. An example of an inappropriate application for small refiner status would be a refiner that temporarily reduced its workforce from 1,600 employees to 1,495 employees prior to January 1, 1999, and then rehired employees after the cutoff date. This would be a bad faith attempt to avoid the intent of the rule. We are requesting comment on this provision.

At any time after June 1, 2002, a refiner with approved small refiner status could elect to cease complying with the small refiner standards and, in the next calendar year, begin complying with the standards specified in Table IV.C–2 and related provisions. However, this decision would apply to all refineries owned by that refiner and once a refiner dropped its small refiner status, it would not be eligible to be reinstated as a small refiner at some later date.

iii. *Application for a Small Refiner Sulfur Baseline.*

A qualifying small refiner could apply for an individual sulfur baseline by June 1, 2002 for any refinery owned by the company by providing a calculation of its sulfur baseline using its average gasoline sulfur level based on 1997 and 1998 production data, and the average volume of gasoline produced in these two years. The proposed regulations specify the information to be submitted to support the baseline application. The baseline calculations should include any oxygen added to the gasoline at the refinery. This application would be submitted at the same time that the refiner applied for small business status; confirmation of small business status would not be required to apply to EPA for an individual sulfur baseline. If the baseline were approved, we would assign standards to each of the company's refineries in accordance with Table IV.C.–2.

Blenders would not be eligible for the small refiner individual baselines and standards because they would not have the burden of capital costs to install desulfurization equipment, which is the primary reason for allowing small refiners to have a relaxed compliance schedule.

iv. *Volume Limitation on Use of a Small Refinery Standard.*

We are proposing that the volume of gasoline subject to the small refinery's individual standards would be limited to the volume of gasoline the refinery produced from crude oil, excluding the volume of gasoline produced using blendstocks produced at another refinery.[50]

Under this approach, the baseline volume for a small refinery would reflect only the volume of gasoline produced from crude oil during the baseline years. In addition, use of the refinery's individual baseline sulfur level during each calendar year averaging period (beginning with 2004) would be limited to the volume of gasoline that is the lesser of: (1) 105% of the baseline volume, or (2) the volume of gasoline produced during the year from crude oil. Any volume of gasoline produced during an averaging period in excess of this limitation would be subject to the standards applicable to refiners not subject to a small refiner standard. In this case, the small refiner's annual average standard would be adjusted based on the excess volume in a manner similar to the compliance baseline equation for conventional gasoline under Section 80.101(f) of Part 40 of the Code of Federal Regulations. However, the small refiner's per-gallon cap standard would not be adjusted.

This limitation would assure that small refiners receive relief only for gasoline produced from crude oil, the portion of the refinery operation requiring capital investment to meet lower sulfur standards. We are requesting comment on this provision and whether an alternative approach may be more appropriate for the stated purpose.

v. *Hardship Extensions Beyond 2007 for Small Refiners.*

Beginning January 1, 2008, all small companies' refineries would have to meet the permanent national sulfur standard of 30 ppm on average and the 80 ppm cap, except small refineries that apply for and receive a hardship extension. A hardship extension would provide the small refiner an additional two years to comply with these national standards. A hardship extension would need to be requested in writing and would specify the factors that qualify the refiner for such an extension. Factors considered for a hardship extension could include, but would not be limited to, the refiner's financial position; its efforts to procure necessary equipment and to obtain design and engineering services and construction contractors; the availability of desulfurization equipment, and any other relevant factors.

By January 1, 2010 all refiners would be required to meet the permanent national average standard and cap. We are requesting comment on the proposed hardship extension, including the factors to be considered in petitions for extension, and the proposed time periods.

vi. *What Alternative Provisions for Small Refiners Are Possible?*

We have proposed one type of program to address the needs of small refiners. We solicit comment on other options so that we can consider these options as we finalize this rule. We encourage comments. We request comment on a range of alternatives, including those listed below, which could be considered when developing unique regulatory requirements for small refiners. We specifically request that the comments address not only the economic but also the environmental implications of the alternative, relative to the program we've proposed.

- Are there alternative or additional criteria that could/should be used to define a small refiner, such as the volume of crude oil processed or the volume of gasoline produced (since the gasoline sulfur standard applies specifically to gasoline)? Other criteria may also be acceptable, such as a different employee number for qualification as a small entity, or basing the count on employees employed in gasoline production only. We welcome your recommendations. Our desire is to limit the number of companies meeting the small refiner definition in order to provide regulatory relief only to those companies that have the economic concerns unique to small businesses. If you recommend criteria other than number of employees, please comment on how those criteria can be shown to limit the number of refineries that will be eligible for the proposed relief.
- Are the caps and averages of the proposed interim standards for small refiners (see Table IV.C.–3) appropriate for the corresponding individual sulfur baseline levels?
- What is an appropriate and sufficient time period for the proposed small refiner interim standards? Would most qualifying small refiners be able to meet the 30/80 standards within four years (six if a hardship extension is granted, which is dependent on the case made by the individual refiner), as proposed? The Panel report suggested that a period of six to ten years could

[50] In addition to gasoline produced from crude oil, a small refinery's baseline volume would include gasoline produced from purchased blendstocks where the blendstocks are substantially transformed using a refinery processing unit.

be desirable to provide sufficient time for small refiners to comply with the proposed standards. What are the arguments for granting more than four years of additional time and what are the environmental implications (and implications for Tier 2 vehicles) of such an extension?

- Should small refineries of multi-refinery companies (companies too large to meet the proposed small refiner criteria) be eligible for small refiner interim standards? Should refineries not producing gasoline as a major product (for example, refineries engaged primarily in the production of lubricants where gasoline is a small volume by-product) be eligible for small refiner interim standards regardless of corporate size/employment?
- If a small refiner operates more than one refinery (while still meeting our proposed small refiner criteria), should that refiner be permitted to aggregate the sulfur baselines and comply with the small refiner standards applicable to that aggregate baseline? Under the sulfur ABT program described below, we are proposing to require refiners to aggregate data from all of their refineries when determining compliance with the 2004 and 2005 corporate average standards (Table IV.C.–2) (but not the refinery gate standards, although we seek comment on that alternative).
- Rather than providing unique standards for qualifying small refiners, would the need for separate small refiner provisions be addressed if we were to adopt a regional sulfur program? In Section IV.C.1. above, we explained our concerns that a regional sulfur program would not achieve the same emission reductions we project for our Tier 2/gasoline sulfur program. However, some have suggested to us that a regional program would address the need for small refiner provisions since the majority of small refiners are thought to sell gasoline in the West. We know of several refiners that appear to meet our proposed criteria for being small that sell at least some of their gasoline production in the eastern U.S. (as defined by the oil industry's proposed program) and thus a regional program would not cover all small refiners. We encourage comments on this alternative, particularly from refiners who could be impacted by such a decision.
- Would a more general hardship provision that would be based on a showing of substantial economic hardship, such a discussed in Section IV.C.4.c., provide sufficient compliance flexibility to address the needs of small refiners?

4. Compliance Flexibilities

In addition to the basic standards applicable to refiners that were explained above, we are proposing two additional programs that will provide flexibility for refiners when complying with the proposed standards. The first is the sulfur ABT program mentioned previously. The second is a program to streamline the construction permitting process so that refiners can make the required process modifications by 2004.

a. *Sulfur Averaging, Banking, and Trading (ABT) Program*. We are proposing that any refiner or importer be allowed to generate, bank, and trade sulfur credits. A sulfur ABT program would accelerate the reduction of sulfur in gasoline and provide refiners with additional flexibility in achieving compliance with the 30 ppm standard in 2004 and beyond. The following paragraphs provide additional information about our proposed sulfur ABT program, to supplement that presented in Section IV.C.–3.a above. We encourage comments on the design elements we have proposed for the sulfur ABT program. If you believe alternative approaches would make the program more useful to the refining industry, please share your specific recommendations with us.

i. *Why Are We Proposing a Sulfur Averaging, Banking, and Trading Program?*

A sulfur ABT program, if properly implemented, would provide the opportunity for a win for both the refining industry and the environment. The flexibility provided by an ABT program could provide refiners more lead time to bring all of their refineries into compliance with the 30 ppm standard, by allowing them to use credits generated at one refinery to delay having to desulfurize gasoline from another refinery. ABT would provide the opportunity for reduced costs by allowing the industry the flexibility to average sulfur levels among different refineries, between companies, and across time. Since, under banking, early reductions have a value during program implementation, ABT provides an incentive for technological innovation and the early implementation of refining technology.

The ABT program could provide meaningful early benefits for the environment because it would allow the Tier 2 standards to be implemented earlier than might otherwise have been possible, and because it would provide direct environmental benefits. The first direct benefit relates to atmospheric sulfur loads. This benefit is largely independent of when credits are generated and used. However, atmospheric deposition and transformation rates of sulfur compounds tend to vary geographically and seasonally and thus we must consider whether a broad averaging program would have different pollutant effects when compared to a more constrained averaging program or a program without averaging. Any potential negative effects of a broad ABT program should be mitigated by the geographic distribution of refineries, the widespread distribution pipelines, and the fungible nature of gasoline. All of these factors, taken together, lead us to believe that any negative effect on atmospheric sulfur levels from ABT (relative to a single 30 ppm average/80 ppm cap in 2004) would be negligible. It should be noted that this situation is further moderated by the pool averages and caps proposed for 2004 and 2005, since these averages and caps would reduce actual gasoline sulfur levels as the ABT program phases in.

Another environmental benefit is related to the effect of gasoline sulfur on catalyst performance, as discussed in the draft RIA. Since catalyst performance depends in part on gasoline sulfur levels, we must consider whether the emissions benefits (measured in g/mi-per-ppm) of early sulfur reductions when credits are generated are essentially the same as the g/mi-per-ppm benefits when the credits are used. The effect of sulfur on emissions from Tier 0 and Tier 1 vehicles, which will dominate the fleet in 2000–2005, is approximately the same when sulfur levels increase from 30 to 150 ppm as it is when sulfur levels increase from 150 ppm to 330 ppm. In other words, for each ppm increase in sulfur levels, approximately the same effect on emissions results regardless of whether the increase is from low levels (e.g., from 30 ppm up to 150 ppm) or from higher levels (e.g., from 150 ppm up to current average levels). Therefore, the emissions benefits from credits generated before 2004 would essentially offset the emissions effects of those credits being used in 2004 and beyond, especially since corporate pool average sulfur levels could not exceed 120 ppm in 2004 and 90 ppm in 2005, and sulfur levels will be capped at 80 ppm in 2006 and beyond.

Nonetheless, there remains concern about the sensitivity of later models (NLEV and Tier 2) to sulfur and about the reversibility of the effect of higher sulfur levels on catalyst efficiency. More explicitly, the relatively few Tier 2 vehicles that would see somewhat higher sulfur levels than 30 ppm in 2004 and 2005 (about three-quarters of

a model year of production) would not be able to fully recover the loss in emissions performance due to the higher sulfur levels. Hence, the corporate averages and caps would be necessary in these interim years. In 2006 and beyond, the 80 ppm cap and the 30 ppm average refinery standard, even with the ongoing use of credits to comply with the 30 ppm standard, would keep in-use sulfur levels very close to 30 ppm. Thus, Tier 2 vehicles sold in 2006 and beyond would receive appropriate protection from gasoline sulfur.

ABT programs must be designed and implemented carefully to be certain that they are sensitive to equity and competitive issues in the industry and do not create the potential for inadvertent emission increases. In the context of gasoline sulfur control, concerns about different baseline sulfur levels and different technological capabilities among refiners must be considered. Even with the proposed lead time, some refiners would find it easier to achieve reductions than would others. This is due to a number of factors, including refinery configuration, product mix (gasoline versus distillates), crude oil sulfur levels, and the ability to generate capital to fund the investment. At the same time the program must be designed to eliminate the possibility of windfall credits and to be sure that the environmental benefits associated with early sulfur reductions offset the potential forgone benefits when the credits are used.

The program we are proposing today attempts to strike a balance among all of these factors. Some of the elements and design features (such as the eligibility trigger and the baseline requirement) were included to address concerns such as timing, disparate capabilities among refineries, and the potential for excessive (''windfall'') credits. We are seeking comment on options for dealing with all of the issues we have identified.

The ABT program is voluntary. No refiner or importer qualifying for credits is required to generate them, use them, or make them available to others (except as discussed in Section IV.C.4.a.vi. below). The process for establishing a sulfur baseline and generating and using credits is outlined below.

ii. *How Would Refiners Establish a Sulfur Baseline?*

To establish a sulfur baseline against which credits would be calculated, we propose that by July 1, 2000, each refiner or importer that wants to generate credits submit two pieces of information to the Agency. One would be the volume-weighted average sulfur content for conventional gasoline (CG) for each refinery (or imported by that importer) for 1997 and 1998. The second would be the annual average volume of CG produced by that refinery (or imported by the importer) in those years. [51] [52]

Since we expect summer RFG sulfur levels to decrease in 2000 to approximately 150 ppm (due to the actions refiners will take to meet the Phase II NO_X standards for RFG), we are proposing to set the individual refinery sulfur baseline for summer RFG at 150 ppm, regardless of volume produced in 1997 and 1998. Winter RFG production would be assigned the same sulfur baseline as the refinery's conventional gasoline, without regard to the volume of winter RFG produced in 1997–98. Hence, no reporting of RFG sulfur levels or volumes would be required in setting a sulfur baseline. We encourage comments on the use of different sulfur baselines for summer and winter RFG, particularly regarding whether this could create a disincentive to produce RFG in the summer months. We do not want to jeopardize our RFG program, but at the same time, we want sulfur credits to reflect actions taken by refiners above and beyond their current operations and/or regulatory obligations.

Conventional gasoline produced in 2000 and beyond that exceeded 105% of the CG baseline volume produced at that refinery would be assigned a sulfur baseline (from which credits would be generated) of 150 ppm. This provision is intended to prevent increases in average sulfur levels resulting from increases in CG production. A refiner/importer of conventional gasoline to which oxygenate is added downstream during 1997–1998 could include the downstream oxygenate volume in that refinery's CG baseline, if the refiner can substantiate that oxygenate was added to that gasoline.

A refinery/importer that did not produce/import gasoline during 1997–1998 would be assigned a baseline of 150 ppm each for CG and RFG for the purposes of sulfur credit generation in 2000 and beyond. This provision would also apply to blenders of natural gasoline, butane, or similar non-oxygenated blending components. Such parties would be considered refiners and would need to meet all requirements, such as analyzing each batch of the blending component for sulfur prior to its addition to gasoline. Credits would be based only on the volume of the blending components. We encourage comments on alternative provisions for establishing baselines for refiners/importers that could not establish a 1997–98 sulfur baseline as described above. In particular would 150 ppm be appropriate, or would a greater or lesser sulfur content be most equitable and most environmentally neutral? Should this baseline be tied in some way to the trigger for credit generation in (as discussed below) 2000–2003?

We request comment on several aspects of this baseline provision. The 1997–1998 years for the baseline represent the latest available data and thus best reflects the present state of each refinery's gasoline sulfur levels. However, we already have established baseline sulfur levels for 1990 for most refineries. Except for changes related to RFG, average gasoline sulfur levels have changed little since 1990. Hence, we request comment on whether that 1990 baseline would be a suitable substitute. Alternately, we request comment on whether 1997 and 1998 are the appropriate years to average when establishing a sulfur baseline, given that mandatory use of the Complex Model starting in 1998 could have led to changes in sulfur levels between 1997 and 1998. Since our purpose in proposing to establish sulfur baselines is to try to capture current sulfur levels (within a reasonable date of the 2000 start date for credits to be generated), the sulfur baseline could be based on a single year's data (for example, 1998) rather than a two-year average. We proposed a two-year average to try to capture and accommodate operational fluctuations and changes. However, a single year's data may adequately capture current sulfur levels.

We are not proposing a formal baseline review and/or approval process since the proposal envisions a self-certifying process. Refiners would submit their 1997 and 1998 sulfur baseline data for each refinery to us, and then would generate credits from that baseline in 2000–2003. If we determined, through a refinery audit or other action, that the sulfur baseline was calculated with incorrect data, we would establish a new sulfur baseline and the refinery would subject to that baseline, even if it meant recalculating

[51] Since participation in the sulfur ABT program is voluntary, refines opting not to generate or use sulfur credits do not have to establish a sulfur baseline for this program.

[52] We believe that variations in specific gravity, which could affect the sulfur content of gasoline as determined on a mass basis, will average out over the year and need not be included in the calculations. However, we request comment on whether specific gravity should be considered in the calculation of sulfur baselines (including whether such data exists for 1997–98) and subsequently, in calculating credits generated relative to this baseline.

the number of credits generated in subsequent years. We have used this baseline review process in other mobile source programs and believe it works well, but we request comment this approach.

We considered the possibility that, since refiners report annual production information to EPA, we could issue baselines for each refinery rather than refiners having to submit them to us. However, we do not think this is a possible solution because many refiners comply with our RFG and CG requirements by aggregating the data from all of their refineries. Thus, the data we currently receive from refiners would not allow us to establish an individual baseline for every refinery in the U.S. (unless we went back to 1990 data). However, we would like comment on whether a more formal sulfur baseline approval process (say, a letter from the Agency or a date by which approval can be assumed unless the refiner hears otherwise) would be desirable. Keep in mind that even with a more formal baseline approval process, the baseline could be changed at a later date if we found, during an audit of refinery records, errors in compliance with the proposed baseline requirements. Hence, any up-front approval would only provide certainty that, based on the data reported to us, we believe the refiner had correctly applied the mathematical equations proposed today for establishing a sulfur baseline.

Some have raised the concern that if imported gasoline were allowed to be used for credit generation, as we propose today, foreign refiners might be able to gain an unfair advantage. For example, it is possible that foreign refiners could simply re-blend their gasoline (without installing new capital equipment) and send their lowest-sulfur refinery streams to the U.S. at a lower cost than gasoline produced by domestic refiners that had to reduce overall sulfur levels through desulfurization. Since importers, not foreign refiners, would be the parties assigned a sulfur baseline and eligible for generating credits, we do not believe foreign refiners would have a strong incentive to send lower sulfur gasolines to the U.S. We believe that the benefits of allowing importers to participate in the sulfur ABT program (more players in the credit trading field, more chance for early reductions in gasoline sulfur levels) outweigh the potential detriments. However, we encourage comment on the implications of the decision to allow imported gasoline to be used for credit generation.

Oxygenate blenders would not be able to participate in this proposed credit program because they would not be subject to the sulfur standard. Special provisions would exempt them from having to measure the sulfur content of the oxygenate they blend and from the recordkeeping and reporting requirements of the sulfur program, other than the requirements that apply to all parties that handle gasoline and gasoline blendstocks downstream of the refinery.

iii. *How Would Refiners Generate Credits?*

During the period 2000–2003, credits could be generated annually by any refinery that produced conventional gasoline averaging 150 ppm sulfur or less on an annual, volume-weighted basis. Credits would be calculated based on the amount of reduction from the refinery's CG sulfur baseline.[53] Credits could also be generated from winter RFG based on reductions from the sulfur baseline, if the winter RFG sulfur level averaged 150 ppm or less (on a seasonal volume-weighted basis). Similarly, summer RFG would need to have a seasonal volume-weighted average sulfur level below 150 ppm to be eligible for credit generation, although credits would only be created based on the difference between 150 ppm and the summer RFG sulfur average. Thus, credits would need to be generated separately for conventional gasoline and RFG. Conventional gasoline produced in excess of 105% of the baseline volume could only generate credits for sulfur reductions below 150 ppm, not for the cumulative reduction from the baseline sulfur level. Winter RFG would not be subject to any volume limitations, and thus refineries could generate credits for any volume of winter RFG that contains 150 ppm sulfur or less.

For example, if in 2002 a refinery reduced its annual average sulfur level for conventional gasoline from a baseline of 450 ppm to 150 ppm, its sulfur credits would be determined based on the difference in annual sulfur level (450–150=300 ppm) multiplied by the volume of conventional gasoline produced (up to 105% of the baseline CG volume). If this refinery produced more CG than 105% of the baseline volume, it would only generate credits from that incremental volume if the incremental gasoline were below 150 ppm. (For example, if the refinery's 2002 average CG sulfur level were 100 ppm, it would get 150–100=50 ppm sulfur credits on any volume in excess of 105% of its baseline CG volume, as well as 450–100=350 ppm for the baseline volume up to 105%.)

If this same refinery also produced RFG with an annual average sulfur content of 90 ppm in 2002, it could also receive sulfur credits calculated based on the difference between 150 ppm and 90 ppm (60 ppm) times the volume of summer RFG produced plus 360 ppm (450–90) times the volume of winter RFG produced. A refinery with a sulfur baseline lower than 150 ppm sulfur would only generate credits relative to reductions from its baseline, for either CG or winter RFG. Credits from summer RFG would be based on reductions from 150 ppm.

Several states have implemented or are considering gasoline sulfur control programs. To avoid double-counting of emission benefits, lower sulfur gasoline produced to comply with these state programs would not be eligible for early banking credits under this program.

In 2004 and beyond we propose that credits could only be generated for actual annual sulfur averages below the 30 ppm standard (combining conventional and reformulated gasolines), and only for the difference between the standard and the actual annual sulfur average. (For example, a refinery producing gasoline in 2004 that averaged 25 ppm could generate 30 − 25=5 ppm, while a refinery producing gasoline that averaged 40 ppm would not be eligible for any credits.)

We encourage comments on this credit generation concept. In particular, would these formulas permit sufficient credits to be generated industry-wide to provide adequate credits for use in compliance in 2004 and beyond? If not, what are the limitations on credits and what changes could be made to improve the likelihood that sufficient credits would be generated?

Our proposal to cap volumes on which credits could be generated at 105 percent of baseline levels is intended to preclude the possibility of closely-located refineries generating credits by moving blendstocks. This could occur if a refinery with a relatively low baseline level moved blendstocks to a refinery with relatively higher levels, thus allowing the somewhat artificial generation of credits. We request comment on whether such a provision is necessary and whether the 5 percent cap should be increased to as high as 10 percent to reasonably accommodate normal growth in volume. We raise some potential alternatives to these provisions in Section IC.C.4.a.vi. below, and encourage your consideration of all of these issues in your comments.

[53] If a refinery's baseline average were 150 ppm or less, credits could only be generated for annual average reduction's below the baseline level.

iv. *How Would Refiners Use Credits?*

Credits generated prior to 2004 would have to be used or transferred by 2007. Credits generated in 2004 and beyond would have to be used or transferred within five years of the year in which they were generated. If these credits were traded to another party, they would have to be used by the new owner within five years of the year of transfer. Since the transfer could occur any time within five years of generation, some credits could have a life of up to ten years.

Our proposed ABT program is designed to ease implementation of the new standards and credits would be of their greatest value during phase-in periods. ABT is not necessarily intended to permit a refinery to operate above the standard for a protracted time period. While limiting credit life might reduce the incentive to generate credits and could create a ''use or lose'' mentality, the credit program would seem to be of relatively small value to any refiner/importer that held credits for five years and did not need to use them. We believe that limiting credit life is appropriate since we must also consider the basic reason for ABT and address concerns about our ability and the ability of the refiners to maintain the integrity of the credit system over many years. EPA requests comment on credit life including options such as limiting life by depreciating their value over a period of years as well as longer or shorter periods of fixed credit value.

We propose that credits could be withdrawn from a refinery's/importer's credit bank or purchased from another refinery/importer to bring the annual sulfur average for each refinery down to the 30 ppm standard beginning in 2004. There would be no geographic constraints on credit trades. However, as explained in Section IV.C.3.a above, in 2004 no batch of domestically produced or imported gasoline could exceed 300 ppm, and a refinery's/importer's actual annual corporate pool average sulfur level could not exceed 120 ppm. (A refiner owning more than one refinery would have to aggregate the respective sulfur levels of gasoline produced at those refineries for determining compliance with the 120 ppm standard.) In 2005, gasoline sulfur would be capped at 180 ppm and the corporate pool average could not exceed 90 ppm. The aggregation requirement would also apply in 2005. As described above, credits would apply only to compliance with the 30 ppm refinery standard, not to the corporate pool average or the cap.

A refiner or importer choosing to participate in the ABT program would be required to file annual reports with the Agency indicating the applicable baselines or standard(s) in ppm sulfur, the annual average(s) in ppm sulfur, and the annual volume(s) in gallons (for each refinery). These calculations would be reported, along with an accounting of credits banked, transferred (sold), or acquired (bought). (For 2000–2003, the reports would only cover credits banked and traded.) The credits would be in units of ppm-gallons.

Thus, for each purchase of credits, as reported on the buyer's annual report, there should be a corresponding entry on the seller's annual report. Through the report, refiners would have to demonstrate that their average sulfur levels (with the use of credits, if necessary) comply with the 30 ppm standard at each refinery. Refiners would also have to demonstrate that the combined production from all refineries meets the corporate average standard. As mentioned above, the actual corporate averages could not exceed 120 ppm in 2004 and 90 ppm in 2005. The identity of refiners/refineries and importers involved in these transactions would be reported, along with the registration numbers assigned to them by the Agency under the RFG/CG program (40 CFR part 80, Subparts D, E, and F).

In addition, we are concerned that the potential exists for credits to be generated by one party and subsequently purchased or used in good faith by another, and later found to have been calculated or created improperly or otherwise determined to be invalid. In this case, both the seller and purchaser would have to adjust their sulfur calculations to reflect the proper credits and either party (or both) could be deemed in violation of the standards and other requirements if the adjusted calculations demonstrate noncompliance with an applicable standard. We have taken this approach in our other fuels enforcement programs. We welcome comments on this provision. In particular, we request comment on whether our program should be designed such that only the seller should be deemed in violation if that party sold invalid credits and, upon correction for this error, was found to have violated one or more standards. In general, mobile source ABT programs hold both parties liable.

For the duration of the credit program, each participating refinery and importer could make deposits to and withdrawals from its ''bank account''. All transactions would have to be concluded by the last day of February after the close of the annual compliance period (2004, 2005, etc.). It would be up to the industry to establish any mechanisms for linking buyers and sellers. The Agency does not intend to become involved in this marketplace activity.

We are also proposing to allow refiners to miss the 30 ppm standard for an individual refinery and to carry forward the credit debt that would have brought that refinery into compliance in the year the deficit occurred. This is very similar to provisions proposed today for auto manufacturers in complying with the averaging provisions Tier 2 standards. Under this provision, the refiner would have to make up the credit deficit and bring that refinery into compliance with the 30 ppm standard the next calendar year, or face penalties. This program would in no way absolve the refiner from having to meet the applicable per-gallon cap standard. This provision would provide some relief for refiners faced with an unexpected shutdown or that otherwise were unable to obtain sufficient credits to meet the 30 ppm standard. We welcome comment on this provision.

The following Table IV.C.–4 summarizes the compliance dates and program requirements of this proposed sulfur ABT program. See Section VI for more specific information, particularly about the dates that the sulfur caps would apply and the standards that would apply downstream of the refinery.

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Table IV.C.-4
Gasoline Sulfur Program Duration and Effective Dates

<table>
<tr><th>2000</th><th>2000 - 2003</th><th>2004</th><th>2005</th><th>2006</th><th>2007+</th></tr>
<tr><td rowspan="6">Application for Credit Program Baseline due by July 1</td><td colspan="2">Early Credit Generation for Gasoline with ≤150 ppm Sulfur</td><td colspan="3"></td></tr>
<tr><td></td><td colspan="4">Credit Generation for ≤30 ppm Sulfur</td></tr>
<tr><td>Banking & Trading of Credits</td><td colspan="4">Banking & Trading of Credits</td></tr>
<tr><td></td><td colspan="2">Corporate Average Standards Apply</td><td colspan="2"></td></tr>
<tr><td colspan="2" rowspan="2"></td><td colspan="4">Compliance with 30 ppm Average Standard at the Refinery and Importer Level</td></tr>
<tr><td colspan="4">Phase-in of Downstream Cap Standards</td></tr>
</table>

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v. *Could Small Refiners Participate in the ABT Program?*

We believe that refiners complying under the small refiner provisions outlined in the previous section should not be permitted to use sulfur credits to meet the average standard applicable to their refineries. We are proposing to exclude small refiners from using credits to meet the small refiner standards because the small refiner standards are generally more lenient than the 30 ppm standard and thus these refiners should have less need for a credit trading program than the rest of the industry. Furthermore, small refiners, even those currently producing gasoline near the 30 ppm average, are given an additional two years (until 2008) to meet the 30 ppm standard compared to refiners complying under the sulfur ABT program. We want to ensure that the sulfur levels of the majority of gasoline are reduced on average, and overall, in 2004 and 2005; permitting small refiners to meet the more lenient standards through the purchase of credits could jeopardize that goal by resulting in in-use sulfur levels that are even greater than the maximum small refiner standard (300 ppm average). If a small refiner believed it could generate sufficient sulfur credits in 2000–2003, or obtain such credits through purchases from other refiners, to be able to meet the 30 ppm average and the corporate averages of 120 ppm in 2004 and 90 ppm in 2005, it should choose not to participate in the small refiner program and take full advantage of the sulfur ABT program.

However, small refiners would be permitted to generate and trade sulfur credits if they reduced sulfur levels early in 2000–2003, per the requirements outlined above. Furthermore, a small refiner could sell credits that were generated in 2000–2003 in 2004 and 2005 while at the same time meeting the small refinery standards. A small refiner wishing to generate and sell credits would have to establish the individual refinery sulfur baseline by the deadline specified above for the ABT program (July 1, 2000) but could wait until June 1, 2002 to apply for small refiner status. However, the standards assigned to that refinery (as presented in Table IV.C–3) would be based on the sulfur level from which credits were generated, not the 1997–98 baseline sulfur level, since the refiner would have already demonstrated the ability to meet the lower sulfur level (in this case, 150 ppm or lower on an annual average basis).

At any time, a small refiner could ''opt out'' of the small refiner program and, beginning the next calendar year, comply with the standards in Table IV.C–2. The refiner would have to notify us of this change in compliance program. Once a small refiner left the small refiner program, however, we propose that it would not be eligible to re-enter the small refiner program. We encourage comments on this provision.

The sulfur ABT program could provide an alternative to offering any small refiner standards, if small refiners were capable of complying with the proposed pool average standards and caps in 2004 and 2005 just as larger refiners could. In this case, all refiners, large or small, could obtain credits necessary to meet the 30 ppm average standard for the two intervening years. However, EPA recognizes that this may not be the best response to the needs of small refiners, and has proposed, as a result of the SBREFA Panel process, alternate standards in section IV.C.3.b of this document. Indeed many small refiners expressed concern during the Panel process that an ABT program would not address their needs. However, we welcome comments on the pros and cons of using the sulfur ABT program to provide regulatory relief for small refiners in lieu of additional regulatory standards unique to small refiners.

vi. *What Alternative Implementation Approaches Are Possible?*

As we were developing this proposal, members of the oil industry and others expressed concern that the ABT program as described above may not be of great value in providing flexibility in complying with the 30 ppm standard in 2004. Several different concerns have been expressed.

Industry representatives have asserted that the opportunity to generate early credits is limited because the proposed lead time would be too short to implement enough of the refinery operational changes and capital investments needed to achieve sulfur reductions before 2004. Additionally, the industry is concerned that relying on early credits generated with what is perhaps the best long-term technology(ies) is problematic because the preferred technology(ies) is new and

does not yet have a proven performance record. Their concern is further exacerbated by the uncertainty in the diesel fuel sulfur picture, the MTBE /oxygenates situation developing in California, and the DI petition discussed below, as well as ongoing state initiatives to reduce sulfur in gasoline before this action is decided upon.

When credits are generated, there is a fear that those that generate them will hoard them, particularly refiners that operate several refineries. And when credits are made available for trade, they may not become publicly available in enough time for them to be considered by others in their capital investment planning, so essentially all refineries would have to take steps to implement 30 ppm technology by 2004. These issues may be of special concern to those moderate sized refiners that are too large to qualify as small entities but do not have enough refineries or refineries of the right gasoline production volume to internally optimize their operations under the ABT program.

Given these uncertainties about credit availability, the refiners may need additional flexibility as a means to provide relief to those that make a good faith effort to comply but are precluded by circumstances beyond their control. These may include unanticipated technological and commercial concerns, credit availability problems, or *force majeure* type events.

We have examined this issue of credit availability and our analysis, which is presented in the Draft RIA, indicates that credits should be available by 2004 for the 2004/5 phase-in. This is based on the fact that the 300 ppm cap in 2004 would require that all refineries with a baseline above 300 ppm reduce sulfur by 2004. And, while they could choose to just achieve 300 ppm, some would need greater reductions to comply with the 120 ppm corporate pool average standard and all would be facing increasingly more stringent requirements in 2005 and beyond. Quite simply, we believe that good business sense would dictate that once a hardware investment is made the refinery would shoot for 30 ppm or less. As the analysis shows, this approach implemented over just three years would yield compliance with the 120 ppm corporate pool average and would generate ample credits. We requested comment on our analysis in the Draft RIA and the underlying analytical approach.

EPA is proposing the ABT program described above in order to increase the refiners'/importers' confidence that they could comply in 2004. And, while our analysis indicates that credits would be available for 2004/2005 compliance, we realize that the ABT program might not meet its objective if the industry did not have confidence that credits would be available in enough time and in sufficient quantities to enable them to make economically efficient investment decisions. It is our desire to provide the industry as much flexibility as possible to ease implementation and phase-in while still meeting the objectives of the program as described above. Toward that end we are asking for comment on several variations on the above proposal that might increase its overall value as a means to provide flexibility in meeting the proposed standards. These can be divided into four categories: (1) Modifications to the design elements of the proposed ABT program, (2) a compliance supplement pool, (3) an allowance-based system, and (4) reserved credits. As constructed below, the compliance supplement pool, an allowance-based system, and reserved credits could be implemented in varying ways to complement the early ABT program. EPA asks comments on the cost and air quality impact implications of these concepts, which are described in more detail below.

Potential Modifications to Proposed ABT Program

Modifications to the base program to increase the potential availability of credits and the time over which these credits could be used might increase the effectiveness of the proposed ABT program. These changes could potentially affect both the near-term when the program was phasing-in and the long term when the 30 ppm standard was fully implemented.

The 150 ppm trigger value is designed to ''level the playing field'' between companies with relatively low baselines and those with relatively high baselines. Those with high baselines could potentially generate more credits than those with lower baselines, but at a somewhat greater cost since achieving 150 ppm or less becomes increasing more difficult with higher sulfur gasoline. Those with baselines closer to 150 ppm may be able to generate fewer credits, but generate them more easily.

However, requiring that gasoline be below 150 ppm before credits could be generated might preclude credit generation from higher sulfur gasolines that could achieve large, real reductions in sulfur. The size of the potential credit pool could be increased, perhaps dramatically, if the trigger were relaxed or eliminated. We would like comment on trigger values higher than 150 ppm for CG and winter RFG. We would also request comment on expressing the trigger as a percent reduction from baseline levels (e.g., 10–25%) rather than as an absolute value. In addition, we request comment on a hybrid concept under which credits would be generated for CG and winter RFG depending on initial 1997/1998 baseline sulfur levels (gasoline less than 150 ppm sulfur would qualify, gasoline between 150 ppm and 350 ppm sulfur would need a 10–15 percent reduction, and gasoline greater than 350 ppm sulfur would need a 15–20 percent reduction to qualify.) It would be helpful for those suggesting the ''no-trigger'' approach to also address the issue of equity among refiners with different baselines.

In combination with comments on the trigger, we also ask for comment on the proposed phase-in approach. The 300 ppm cap effective October 1, 2003 and the timing for the 30 ppm average standard would both be important factors affecting the transition to low-sulfur gasoline. Our analysis of the potential availability of credits (discussed above and presented in the Draft RIA) indicates that most of the credits needed to smooth out the transition would be generated by low-sulfur winter RFG. Our analysis also assumes that a substantial number of credits would be generated by refiners investing in technology capable of producing 30 ppm gasoline prior to 2004 to ensure compliance with the 300 ppm cap. If refiners take another approach to meeting the 300 ppm cap (i.e., one that does not result in significant credit generation), fewer excess credits would be available. However, as long as some refiners invest in 30 ppm technology before 2004, we believe sufficient credits would be available. We encourage comment on our proposed phase-in approach.

Specifically, should the interim phase-in program be extended by an additional year to provide an even smoother transition to the 30 ppm standard (e.g., 120/300, 105/210, 90/180 for 2004, 2005, and 2006)? Should the time frame for the 30 ppm average standard be shifted to 2005, for example, while retaining the 120/300 ppm caps for 2004, to provide more time for transition to the 30 ppm standard? Should credits expire after 2007 (as proposed) or would a shorter (or longer) credit life be appropriate?

We are also seeking comment on a concept that would provide an incentive to introduce clean technology early. Under this concept, any sulfur credits generated before 2004 would be banked at a rate of 1.5 to 2.0 times the amount generated, if the annual average for that

refinery were equal to or less than 30 ppm and if the credits resulted from the implementation of gasoline sulfur reduction technology (hardware) not previously used at that refinery. This multiplier would not be available for credits generated from modest operational changes or product separation at the refinery or downstream. Calculation of the un-multiplied credits would be at the refinery level. Neither domestic refiners nor importers could qualify by segregating product or product streams either from their refinery(ies) or in the case of importers from one or more offshore refineries. Also, while refiners/importers could get sulfur credits under ABT through the use of allowable oxygenates, these could not be used as part of the basis for achieving the 30 ppm average. EPA seeks comment on the need for and utility of such an approach and on whether it is appropriate to encourage implementation of sulfur control technology in this manner.

Compliance Supplement Pool

To address concerns about credit supply and the timeliness of the availability of credits, and as a way of providing additional flexibility, particularly to refiners that encounter unexpected problems in complying, we are considering the concept of a government-created and -operated compliance supplement pool for the sulfur ABT program. Under this concept, the government would create a pool of additional credits that could be provided to refiners/importers. This pool would build refiner confidence that a supply of credits would be available in the market and that credits could in fact be considered as part of the business plan for 2004–2005 compliance. Credits from this pool could first be made available in the 2000–2001 time frame and perhaps in subsequent years and could only be used in 2004–2005. This program would supplement the 2000–2003 early credit approach under ABT.

There are a number of issues related to implementing such a program. The size of the pool potentially available for use in 2004 and 2005 would be a critical issue. A larger pool would lower the chance that a refiner/importer could not get credits, but would reduce the environmental benefits of the overall program. Clear rules on the availability of credits would need to be established at the outset so that refiners/importers could make correct investment decisions. In addition, EPA would not want a compliance supplement pool to supplant the need for each refiner to make aggressive efforts to comply in the appropriate time or for a pool to create a disincentive for refiners to generate early credits. If credits from early reductions were available at a reasonable price, EPA would prefer that refiners/importers purchase such credits rather than looking to a compliance supplement pool. EPA seeks comment on the appropriate size of a compliance supplement pool in light of these factors.

The conditions under which a refiner/importer would be eligible for credits are important. For example, the pool could be made available only to refiners that had demonstrated that they had made a good faith effort to comply with the 2004 requirements, but, due to circumstances beyond their control could not do so. Providing credits to a refiner that failed to make good faith efforts to procure and install the technology would create the wrong incentives and could be unfair to competitors that had invested resources to comply.

Options for distributing credits in the pool might include granting credits as rewards to those that generated some early reductions, distribution based primarily or solely on need, equal distribution to all, pro-rata distribution based on volume, making credits available at a fixed price, or a credit auction. These approaches could be considered singly or in combination. For example, the majority of the compliance supplement pool could be distributed based on need, with due consideration of the effect of lack of credits on gasoline supply in a given area. In this case, the remaining portion might be set aside and auctioned off to provide a price signal and a certain source of credits.

It would seem that any such compliance pool should be administered by the government or its agent, but decisions on credit applications would include a public process. As part of our deliberations on this concept we need to decide whether credits could be used to meet the interim corporate pool averages (120/90 ppm) or just the 30 ppm standard or both. Unlike credits generated by refiners/importers reducing actual sulfur levels, any credits under this program would expire after 2005.

Credits from the compliance supplement pool would be government-created and not derived from actual reductions in gasoline sulfur. If credits from the compliance supplement pool were distributed at little or no cost to the receiver, such an approach might create an inequity between those using credits and those who invested in technology to reduce sulfur. As a means to address the potential environmental effects of these government credits and to correct financial inequities among refiners/importers, we seek comment on a provision that would require those awarded these credits from the compliance supplement pool to repay them. The credits to be used for repayment could be generated internally in 2004–2006, purchased surplus credits from other refiners/importers, or simply unused credits originally distributed from the compliance supplement pool. These credits would have to be repaid by the expiration of the period to close credit balances under the interim program (2006, taking into account the one-year credit debt carry-forward provision).

If, as mentioned above, credits were sold at a fixed price or auction, several issues would arise. Should payment be through monetary means? If so, what is EPA's authority to engage in such monetary transactions, and what would be done with any proceeds? There is also an issue with regard to a requirement to both buy credits for cash and then also repay with credits. Alternatively, credits could be allocated based on a determination that a refiner/importer needs the credits, in conjunction with a determination regarding the refiner's/importer's ability and willingness to repay the credits to the pool in the future at a rate greater than 1:1. A credit auction could be held in a similar way, that being the willingness of the bidder to repay the credits in the future at a rate greater than 1:1. In these approaches, a refiner/importer seeking credits might be willing to repay them at a rate of say 1.2:1, thus essentially offering or bidding a 20 percent premium. This could be done as a one-time premium or perhaps as a discount at the time the credits are issued from the pools. Under this system no money exchange would be required. This would simplify set-up of the compliance supplement pool, allow refiners to conserve capital for purposes of capital investment, and create an environmental return for the compliance supplement pool. In addition, it would result in credits being provided to refiners/importers that need them, and that are expected to achieve additional environmental benefits in the future by generating or purchasing excess credits.

The ''reasonableness'' of the price of credits is critical to any approach requiring repayment from those entities using these credits. We request comment and suggestions on ways to establish reasonable credit prices. For example, as an upper bound, EPA might

set a credit price based on information received during the rulemaking on the cost of sulfur removal for different technologies.

EPA also seeks comment on whether refiners/importers that used credits from the compliance supplement pool should be excused from the repayment of some or all of the credits if they could demonstrate that it was not feasible for them to generate credits themselves and insufficient credits were available at a reasonable price. Finally, EPA seeks comment on how to ensure that refiners/importers that used credits from the compliance supplement pool would in fact repay those credits. One option would be to hold such refiners/importers liable for failure to meet the sulfur standards over the averaging period during which they relied on credits from the compliance supplement pool, if such credits were not repaid in time. EPA seeks comment on this option, as well as other alternatives that would ensure that compliance supplement pool credits were repaid.

EPA has some experience with the compliance supplement pool approach as part of the NO_X SIP Call (ROTR) discussed in Section III above. In this process, a compliance supplement pool was created to address concerns raised by industry about how the requirements might affect the reliability of the supply of electric power. The size of the NO_X compliance supplement pool was created based on an EPA projection of what compliance shortfalls might result if problems developed in implementing the control technology. The NO_X SIP Call pool may be allocated through direct distribution based on need or as a reward for early reductions.

Allowance-Based System

In the context of gasoline sulfur, a traditional allowance program would provide more confidence in the availability of ''credits'' (surplus allowances) by creating sulfur budgets that the industry (refiners and importers) would be required to meet during the 2004–5 phase-in and perhaps beyond. This budget would be created on a mass basis using gasoline volume and the applicable regulatory standard. This budget would then have to be allocated to individual refiners and importers. If an individual refinery or importer had sulfur levels below its allocation this would create surplus allowances that could be traded. Allowances for 2004 and later would be made available in 2001. This would facilitate the development of a market in allowances, since those planning to beat the requirements for 2004/5 could market their allowances early. This could significantly contribute to the certainty that surplus allowances would be available in time for consideration by others in their 2004 business planning.

While there are other possibilities, it would seem reasonable to allocate the budgets to individual refiners/importers in the 2004 and later time period based upon their individual percentages of the gasoline market. To be consistent with other aspects of this proposal this could be done at the corporate level in 2004/5 and at the individual refinery/importer level in 2006 and later.

One major benefit of such an approach is that refiners/importers could trade part or all of their 2004 and later allowances for future use without EPA involvement and those purchasing these allowances could do so early enough to allow a more orderly and reasoned set of capital investment decisions. Also, since it would be allowances, not credits, that would be traded, the seller could be held solely responsible for failure to meet its budget without involving the buyer. The trading of allowances would be relatively unencumbered. Allowances could be used to meet the budgets allocated under the regulatory standard.

This approach would provide increased flexibility and certainty, it is not clear that a large number of surplus allowances would be created, since surplus allowances would only exist relative to a budget based on the 30 ppm standard. Obviously the number of allowances created in 2004 and 2005 could be increased if the budget were based on a value higher than the 30 ppm regulatory standard, but this would require a fundamental change in overall program design. Alternatively, the number of surplus allowances might be increased if the allowances program were started earlier. For example, refiners/importers could be allocated budgets beginning in 2001 based on the product of their 1997/1998 sulfur baselines in ppm (with appropriate adjustments for RFG Phase II) and their gasoline volume. Any reductions in the average sulfur levels or volume from the baseline level during that 2001–2003 time period would result in surplus allowances.

While the idea of pre-2004 allowances has merit, it requires the *de facto* implementation of a standard before 2004 (since each refiner's/importer's budget would in effect be a standard), in order to establish allowances. And, in contrast to the ABT program where participation is voluntary and no requirements exist before 2004, an allowance system would require refiners subject to the allowance program to hold sufficient allowances to cover their calculated mass emissions starting in 2001.

In principle, an allowance system could be designed to incorporate all of the features of an ABT credit system as described above. We are interested in comment on the viability of such an allowance program as an alternative to the traditional ABT program and whether such a program would have to be mandatory for all refiners/importers in order to be effective. For example, could we structure an allowance program such that the refiner opts into if it intends to generate or use allowances or opts out of if it does not? We are also interested in comment on the parameters of such a program, including the appropriate budget levels, methods for distributing the budgets to refiners/importers, and whether allowances could be used to meet the corporate pool averages, the regulatory standard, or both. As with the ABT program, we would like to hear your views on the years over which such a program should apply (e.g., should it start in 2001?, should it extend beyond 2005?), as well as the other regulatory requirements that should apply in each year.

We also request comment on whether the allowance program could be established as a supplement to the credit program. If an allowance program is implemented along with a compliance supplement pool and/or early ABT we are interested in comments on how to make credits fully exchangeable among the programs. We are also interested in comments on how the programs could/should be integrated. For example, could we let a refiner/importer generate early ABT credits and at the same time sell 2004–2005 allowances?

Reserved Credits

EPA is also aware of concerns regarding whether refiners that earned or received credits would make them available in a timely manner to those that needed them, particularly to small- to mid-sized refiners/importers. If an adequate number of credits were not available in a timely manner and for a reasonable price, small- to mid-size refiners would have no choice but to pursue near term capital investment to comply in 2004. This might be the appropriate course for many of these refineries, but we do not think it is appropriate for them to be precluded from the same flexibility as larger refineries.

We are seeking comment on whether we should require that a set percentage (e.g., 1015%) of all credits generated in early ABT (2000–2003), awarded

through the compliance supplement pool, or earned through the allowance-based approach either must be retired or offered for trade outside of the refining company that originally generated or was granted them. Under such a provision, refiners/importers would be required to set aside a percentage of credits/allowances they generate, but could choose whether to retire them or offer them for sale at a fair market price to another refiner/importer. Regardless of which option the refiner/importer chose, the results would be beneficial—the environment would benefit if credits are retired, and credit availability would improve if the refiner chose to sell credits. We are also interested in your views as to how this objective might be accomplished.

EPA also asks comment on the disposition of credits that were put up for trade one or more times during the period 2004–2006 but did not sell during that period. This could be the case if a credit owner offered credits for sale at a price in excess of fair market value and thus they were not purchased by another party or if credit supply significantly exceed demand. In this kind of situation, should the credits be retired or revert to the generator at a full or reduced rate (e.g., 50%) for future use in compliance determinations? We request comment on whether such a provision for reserved credits would be needed by small- to mid-sized refiners and whether the reservation of 10–15 percent of credits would be sufficient to address the concerns. We also seek comment on whether such a pool should be supplemented by the government through an auction to ensure that the pool size is adequate and whether such a pool could be useful in helping to establish a market price for company owned credits.

b. *Refinery Air Pollution Permitting Requirements.* As discussed previously in this document, this proposed program would result in significant emission reductions from reducing sulfur in gasoline nationally, through the emission reductions from the current fleet of vehicles and ensuring the efficacy of new technologies in future vehicles. In order to achieve this environmental benefit as soon as possible, we want to be sure the public is aware of the full range of available methods for expediting permits required for refinery process changes to reduce gasoline sulfur. Expedited permitting also will facilitate refiners' ability to generate sulfur credits, under today's proposed sulfur Averaging, Banking and Trading program, described in the previous section.

There are two key Clean Air Act permitting programs that refiners must comply with when making changes at their existing facilities to implement gasoline sulfur control—the New Source Review (NSR) program and the Title V operating permit program. Typically, both of these programs are administered by state/local permitting agencies, with EPA oversight. While the basic requirements of these programs are dictated by the Clean Air Act and EPA regulations, the specific requirements of each state/local permitting program may vary.

We recognize that compliance with these air permitting requirements is an integral component in any plan to implement the gasoline sulfur control program under the schedule proposed today. To help refiners meet the permit requirements, below we discuss the possible mechanisms to address the substantive requirements of the major NSR and Title V programs, including possible opportunities to streamline and expedite the processing of permit applications. Finally, we conclude this section by discussing possible tools that we are currently testing in the experimental Pollution Prevention in Permitting Program (P4), which promotes permit streamlining and flexibility for Title V operating permits, along with increased pollution prevention activities. We encourage commenters to provide suggestions for additional opportunities to streamline the permitting process to accommodate the implementation of the proposed gasoline desulfurization requirements for the refining industry sector.

The American Petroleum Institute (API) has sent a letter to EPA outlining its concerns about the potential impact of various permitting requirements on the industry's ability to meet future gasoline sulfur standards, as well as their suggested options for permit streamlining.[54] This letter is included in the docket for this rulemaking. We are aware that individual refineries are in different situations regarding the modification to current operation that would be needed to meet the proposed sulfur standard and the regulatory requirements applicable to those modifications. Based on the limited information available at present, some refineries may not increase emissions significantly, and others may find it most economical to make on-site emission reductions at the plant to avoid emission increases. Accordingly, we request comment on the extent to which the various mechanisms to streamline the permitting process discussed in this section are in fact needed or useful. We request that commenters supporting such streamlining describe the specific refiner situations in which they believe streamlining is needed, and encourage them to provide any suggestions for additional opportunities to streamline the permit process to expedite refineries' preparation to meet the proposed sulfur standards.

i. *New Source Review Program.*

The New Source Review (NSR) program,[55] as it applies to existing major sources of air pollution, requires that a preconstruction permit be issued before a source begins construction of any project that would result in a significant net emissions increase. With respect to NSR, we anticipate that refineries will fall into one of two categories if the proposed sulfur standards are implemented. The first category consists of those refineries that would be able to avoid major NSR by demonstrating that the physical and operational changes needed to reduce gasoline sulfur do not result in a net emission increase of the quantity that would require a major NSR permit. Major NSR would not apply where: (1) The proposed changes would not result in an emissions increase at the refinery; (2) the increase is, in and of itself, less than ''significant'' [56]; or (3) the refinery ''nets'' the project out of review. In most cases, even where a refinery change to accommodate the production of lower sulfur gasoline does not trigger the major source NSR program, the project still will be subject to a state's general, or ''minor,'' NSR program.[57] The second category consists of those refineries that would experience a significant net emissions increase as a result of process changes necessary to accommodate gasoline sulfur control and, therefore, will trigger major NSR applicability and the attendant permit process (e.g., nonattainment NSR or Prevention of Significant Deterioration). Accordingly, such facilities must obtain a major source preconstruction permit prior to making these process changes.

As described previously in today's document, there are several types of process changes refineries could make to meet the proposed gasoline sulfur

[54] Letter from William F. O'Keefe, Executive Vice President, American Petroleum Institute, to Bruce Jordan, U.S. EPA, Office of Air Quality Planning and Standards, dated February 12, 1999 (Docket item IIG–304).

[55] See 40 CFR 51.165, 40 CFR 51.166, 40 CFR 52.21, 42 U.S.C. 7475, and 42 U.S.C. 7503.

[56] EPA's and state/local regulations for major NSR define ''significance'' levels for various pollutants.

[57] This permitting program applies to the construction or modification of any stationary source. See 40 CFR 51.160 and 42 U.S.C. 7410(a)(2)(C).

levels. Traditional sulfur removal technologies include installing a hydrocracker upstream, or a hydrotreater upstream or downstream, of the fluidized catalytic cracker (FCC) unit, the unit that produces the largest fraction of gasoline. There also are improved desulfurization technologies, CDHydro and CDHDS (licensed by the company CDTECH) and OCTGAIN 220 (licensed by Mobil Oil). These technologies use conventional refining processes combined in new ways, with either improved catalysts or other design changes to maximize gasoline desulfurization effectiveness with minimal negative effects, such as octane loss. To different degrees, all these technologies involve the use of a furnace and, thus, have the potential to increase pollutants associated with combustion, such as NO_X, VOCs, PM, CO, and SO_2. The addition of these technologies also could result in equipment leaks of petroleum compounds, which could increase emissions of VOCs and other pollutants. It also is possible that the increased removal of sulfur from the gasoline stream might require increased capacity of a number of refinery processes, such as the sulfur recovery unit (SRU), which converts hydrogen sulfide into elemental sulfur and is associated with SO_2 emissions. The emission increase associated with a desulfurization project will vary from refinery to refinery, depending on a number of source-specific factors, such as the specific refinery configuration, choice of desulfurization technology, amount of gasoline production, and type of fuel used to fire the furnace.

While we do not have sufficient information at this time to estimate the number of refineries nationwide that will trigger major NSR, we believe it could be substantial, given that over 100 refineries in the country would be required to make desulfurization process changes under today's proposal. Estimates from one vendor indicate that its desulfurization process could result in emission increases that are considered ''significant'' in severe ozone nonattainment areas (i.e., greater than 25 tons/year of NO_X and VOC), which would trigger major source nonattainment NSR review. Since the significance threshold generally is lower in certain nonattainment areas (i.e., those nonattainment areas classified as serious and above for ozone), refineries located in those nonattainment areas may be the most likely to trigger major NSR review. There are many refineries located in ozone nonattainment areas (e.g., parts of the Gulf Coast).

NSR Applicability Principles

A refiner's ability to avoid triggering major NSR by keeping emission increases below the major NSR applicability cutoffs will depend primarily on the case-by-case circumstances of each refinery. Nevertheless, numerous means by which a source can otherwise legally avoid major NSR permitting are available to all refineries for consideration and possible use. In addition, as discussed below, the Agency is prepared to work with refineries to explore the use of certain NSR applicability mechanisms (i.e., plant wide applicability limits or ''PALs''), where appropriate.

To the extent needed, we intend to work with state/local permitting authorities to provide assistance with the proper application of the NSR rules on an expedited basis for permits involving refinery desulfurization projects. We want to ensure that applicability decisions are made at the earliest possible opportunity and consider the full spectrum of options available so that a refiner can adjust, or possibly reconfigure, planned desulfurization projects so as to prevent significant emission increases and thereby avoid major NSR within the framework of the current regulations. In addition, timely applicability decisions will provide added certainty as to the applicable NSR requirements and, where a major NSR permit is needed, how to best to expedite the issuance of a permit.

Depending on the nature of the physical or operational changes necessary to accommodate desulfurization projects, the NSR applicability process for major modifications can be a complex and time consuming exercise. The NSR regulatory provisions require that a proposed physical change result in a significant net emissions increase in order for the change to be considered a modification and therefore subject to NSR. We expect that there likely will be questions regarding which, and how, existing emission units are affected by the change, including how to calculate the magnitude of the emissions change for major NSR applicability purposes. We are committed to working with refiners and state/local air pollution control agencies to clarify and ensure that, in applicability analyses for gasoline desulfurization projects, only those emissions increases resulting from the physical or operational changes necessary to comply with gasoline desulfurization requirements are included in the applicability analysis.

In doing an applicability analysis for major NSR, refineries should analyze their past, current, and future operations and emissions to determine whether it is possible to avoid major NSR based upon their facility-specific circumstances, including the use of previous emission reductions at the facility to ''net'' out of NSR. Similarly, sources might avoid NSR by using Plantwide Applicability Limits (PALs) to cap emissions. Emissions netting is a term that refers to the process of considering certain previous and prospective emission changes at an existing major source to determine if a net emissions increase will result from the proposed new project. Where the sum total of creditable increases and decreases across the refinery is less than significant, major NSR would not apply. In addition, if the proposed emissions increase from a proposed project (in this case, a project undertaken to reduce gasoline sulfur levels) is by itself, without considering any decreases, less than significant, major NSR would also not apply.

PALs may provide another opportunity for refineries to avoid triggering major NSR applicability. The voluntary, source-specific PAL is a straightforward, flexible approach to determine whether changes at an existing major source of air pollution result in a significant net emissions increase. By restricting (or ''capping'') a facility's emissions to a level representative of current actual emissions, a PAL allows a source to change operations and equipment without having to undergo major NSR permitting. For example, as long as refinery activities do not result in emissions above the PAL cap level, the refinery would not be subject to major NSR, regardless of the nature of the activity. Under a PAL, instead of a case-by-case assessment of whether a proposed change is subject to or excluded from major NSR, the refinery manager knows that as long as the refinery stays within its emissions cap, major NSR will not be triggered. Production units may be started and stopped, production lines reconfigured, and products changed and revamped without delay from major NSR permitting.

Because of these advantages, the Agency previously has proposed to incorporate PALs in all of its NSR regulations (see 61 FR 38250, 38264, July 23, 1996), and has worked with state permitting authorities to develop PALs for individual sources. Likewise, the Agency is committed to exploring the propriety of authorizing PALs for refineries subject to the final gasoline

sulfur control rules. We are examining our authorities to assure they support these approaches. Should it be necessary, EPA stands prepared to issue final regulations to make PALs available to sources making changes to comply with these gasoline sulfur control requirements.

We are further committed to investigating with affected refineries whether a PAL might be a valuable tool for managing a number of other Clean Air Act requirements. For instance, depending on the relevant state rules, a PAL also could include terms that allow facility changes to be made without triggering minor NSR. It is our experience that, in the cases where PALs have been applied, both industry and air pollution regulators have benefitted from the regulatory certainty and simplicity a PAL provides. The use of a PAL can enhance a refinery's ability to make appropriately designated changes quickly, without having to evaluate a baseline for each modification, determine the contemporaneous increases and decreases, and engage in other time-consuming netting procedures required under the major NSR program on a case-by-case basis. A PAL also can encourage a source to reduce emissions voluntarily (e.g., from pollution prevention or other emission reduction efforts), so that it has sufficient room for growth (under the PAL) to accommodate increased emissions from future process changes.

Approaches to Expedite the Processing of NSR Permit Applications

Notwithstanding the availability of the major NSR applicability principles and mechanisms discussed above, we anticipate that it will not be possible for all refineries subject to the gasoline desulfurization requirements to prevent significant emission increases and avoid major NSR. Additionally, even those facilities that are able to avoid major NSR likely will be required to obtain a state minor NSR permit. For facilities subject to major NSR, the timing of permit issuance could vary depending on many factors, including the complexity of process changes, the type of permit required, air quality impact, control technology reviews, and the state's overall permit workload. It is not uncommon for issuance of a major source preconstruction permit to take six to 12 months from the receipt of a source's complete permit application. In addition, determining the applicable permitting requirements for refineries is often complex, due to the wide array of emission points and processes.

To help expedite the NSR permitting process, we suggest the following streamlining approaches. Since state/local governments typically are the lead permitting agencies, we will work closely with them on any of these efforts. We solicit comments on the efficacy of these approaches and opportunities for additional streamlining. We are particularly interested in understanding whether these permit streamlining approaches could enable refineries to begin voluntarily producing lower-sulfur gasoline earlier than the compliance dates proposed today, so that the environmental benefits may be realized sooner than 2004 and ABT credits (see previous Section) could be generated.

- *Federal guidance on streamlining certain major NSR permitting requirements, such as control technology and compliance parameters.* Although the major NSR permit is a case- and source-specific evaluation, we could provide guidance on certain aspects of refinery projects designed to reduce fuel sulfur that share a common requirement or circumstance. For example, for refinery projects permitted in the same time frame, the Lowest Achievable Emission Rate (LAER) requirement should be the same for identical emissions units regardless of the location of the individual refinery. In this case, we could define for the industry what emissions levels would be expected to meet LAER and provide model permit conditions, including appropriate monitoring, record keeping, and reporting. Although Best Available Control Technology (BACT) determinations require case-by-case considerations, we also could issue guidance setting out a level of emissions that, in our view, satisfies BACT for the class or category of emission units associated with refinery desulfurization. We expect that providing BACT and LAER guidance would help to expedite major source permitting and add more certainty to the permit process. Consequently, for any applications processed within a discrete time frame, a presumptive federal LAER and/or BACT could be established.
- *Availability of offsets.* The major NSR permitting provisions require that a significant emissions increase of nonattainment pollutants must be offset by emission reductions from other sources. We solicit comment on the need for offsets by refineries making modifications to meet the proposed sulfur standards, and the expected size or volume of any offsets that may be necessary. In addition, to the extent offsets may be useful or necessary, EPA requests comment on whether on-site emissions reductions at the refinery could be used to avoid the expected emissions increases that would otherwise occur. We will work with refiners and state/local air pollution control agencies to explore options and possible new approaches that would help ensure the availability of offsets. For example, it may be possible to establish pre-funded offset pools, designed specifically for offsetting emissions increases resulting from gasoline desulfurization projects. We believe that the establishment of preapproved offset banks or pools could greatly expedite permitting in nonattainment areas.

To help give certainty that offsets will be available, we seek comment on how and whether emission reductions resulting from vehicles operated on low sulfur gasoline could be used as offsets by refineries implementing gasoline sulfur controls. For example, it may be possible for a state, within a given nonattainment area, to set aside a portion of the emission reductions expected from vehicles operating on low sulfur gasoline and dedicate those reductions for use as offsets by refineries. These offsets would have to meet all the criteria currently established for being creditable, and could not be ''double-counted'' by the state for other SIP planning purposes. We request comment on the ability of emission reductions from the use of low sulfur gasoline to meet the Clean Air Act's criteria for creditable offsets for NSR purposes. Since securing offsets can be a significant challenge to sources undergoing major NSR permitting in nonattainment areas, we believe this approach could substantially speed up, and add certainty to, the permitting process. We believe this approach is worth evaluating, given the enormous emission reductions resulting from the use of low sulfur gasoline, and given that some refineries will trigger major NSR solely as a result of the process changes needed to produce this new gasoline. Finally, EPA seeks comment on whether providing the ability to use the emissions reductions resulting from the use of low sulfur gasoline in vehicles as offsets for refineries producing low sulfur gasoline can be limited to this specific situation. Specifically, EPA requests comment on the concern that providing this option to refineries would allow the use of such emissions reductions as offsets for other stationary sources.

As discussed above, we believe that refineries in ozone nonattainment areas could be the most likely to trigger major NSR review, based on net emission increases of NO_X and/or VOCs. The proposed Tier 2/gasoline sulfur control program is expected to result in over

500,000 tons of NO_X reductions and over 100,000 tons of VOC reductions nationwide in 2004 (the first year of implementation), as well as substantial reductions in particulate matter and sulfur dioxide, as described elsewhere in this document and the draft Regulatory Impact Analysis.[58] In a given nonattainment area, the program could result in hundreds to thousands of tons of NO_X and VOC reductions, depending on the inventory of cars and light-trucks in the area. For example, for the New York metropolitan area, EPA projects NO_X emission reductions of 7,344 tons and VOC emission reductions of 1,285 tons in 2004 resulting from the proposed Tier 2/gasoline sulfur control program.[59] We anticipate that only a small fraction of these total emission reductions in a given area would be needed for use as offsets for refineries implementing gasoline sulfur control projects.

• *Model permits and permit applications.* It may be possible to develop an individual, or series of, model permits or permit applications for gasoline desulfurization projects. Rather than each individual refinery having to develop its own permit application from scratch, a generic permit application form could be developed to address common issues. To file a major source application, a refinery would only need to fill in the blanks as they may relate to case-specific assessments, such as air quality impacts. Similarly, a model permit could contain all necessary compliance measures avoiding the time spent in developing individual permit conditions. Model permits or permit applications would serve as templates, thereby eliminating much of the time and uncertainty associated with processing each application.

• *EPA refinery permitting teams.* We could establish a team of experts to be available as a resource, as needed, to refineries and state/local agencies to troubleshoot permitting issues that may develop with individual applications. The team could be made up of EPA permitting experts empowered to make decisions and resolve issues quickly.

In addition to the above opportunities to streamline the permitting process, we encourage states to process a refinery's request to implement changes at a facility to meet gasoline desulfurization requirements as a priority and on an expedited basis. Priority treatment, in combination with the above opportunities to streamline the process, would ensure that permit applications associated with gasoline desulfurization changes are processed as expeditiously as possible. Given the enormous environmental benefits that we estimate would be achieved as a result of the proposed gasoline sulfur control requirements, we believe such expedited and special processing is appropriate.

ii. *Title V Operating Permit Program.*

We recognize that the changes to be made by refiners to implement gasoline sulfur controls typically would involve not only NSR preconstruction permitting requirements but also those of the title V operating permit program. Title V requires owners or operators of ''major'' and certain other sources to obtain an operating permit—a document that identifies all emissions units, their applicable requirements as developed in accordance with the Clean Air Act, and monitoring and other permit conditions to provide a reasonable assurance of compliance with each of the applicable requirements on an ongoing basis. Most of the refiners likely are ''major'' sources subject to title V, due to their plant-wide level of emissions. As with other process changes, prior to implementing gasoline sulfur controls, refiners would need to work with their state, local, or tribal permitting agency to determine what requirements apply and what changes might be required to the source's title V permit application or permit (if one has been issued).

A critical element of any successful title V permitting strategy to accomplish the necessary desulfurization is how best to integrate the procedural and substantive requirements of the title V and NSR permit programs. We believe the title V permitting process provides an excellent opportunity to accomplish this integration and to impart greater certainty into the ultimate approvability of a gasoline desulfurization project under both permit programs. Depending on a specific permitting authority's program and when the desulfurization activity would occur relative to the issuance of the refinery's initial title V permit, the NSR preconstruction permit and the title V permit processes might be done in parallel or in sequence.

Where the title V permit is issued before the desulfurization activity commences, this permit must be updated before operation of the changes that would also be subject to NSR. In this case, we suggest that the preconstruction permit review process, managed by the permitting authority, be merged with the title V permit revision process so as to satisfy the procedural safeguards and the same substantive requirements of the NSR and title V programs at the same time.[60] If this is done, the title V permit may be administratively amended to incorporate the contents of the NSR permit prior to operation of the desulfurization process changes. Where the appropriate NSR action (major or minor) approving the desulfurization changes precedes the issuance of a source's initial title V permit, the applicable NSR process can still be ''enhanced'' to address title V obligations. Here, in order to determine approvability under both title V and NSR, the permitting authority can issue a separate title V permit specifically for the desulfurization project in advance of the title V permit that will be issued subsequently for the rest of the site. Finally, if issuance of the title V permit issuance for the entire source would precede the NSR construction, depending on several factors, the permitting authority could conduct simultaneous permit processes to accomplish preconstruction approval of the desulfurization project and title V approval for the operation of the project in conjunction with the entire refinery source.

Beyond synchronizing when the two permit programs would be implemented, we recommend that permitting authorities take approaches in the substantive permitting of the desulfurization projects that will both assure compliance with all applicable air requirements and result in a more flexible and efficient permit design. We encourage that the approaches in the

[58] Although these emission reduction estimates are for the combined Tier 2 emission standards/gasoline sulfur control program, in 2004, nearly all these emission reductions would be attributed solely to vehicles fueled by low sulfur gasoline, since vehicles meeting the Tier 2 emission standards would comprise only a small fraction of the vehicle fleet.

[59] See draft Regulatory Impact Analysis, Chapter III.

[60] The concept of a merged NSR/title V process refers to the combination of the title V review process with any otherwise applicable state preconstruction review process, where such process satisfies the procedural requirements of the title V's permit revision, permit review, and public participation provisions. Example state review processes that may be eligible for merger include, but are not limited to, preconstruction review of major or minor NSR, source-specialized State Implementation Plan revisions, and procedures implementing section 112(g) of the Clean Air Act. Under a merged process, activities are only presented in a public forum once, rather than in sequence, to avoid duplication of process. Upon completion of the merged process, a successful project would have met all federal permitting requirements, including review by the public, EPA and affected States, and opportunities for EPA objection and public petition, and can implement both processes without delay. Qualifying activities that have received preconstruction review permits meeting the requirements of 40 CFR 70.7(d)(1)(v) may be incorporated into title V permits as administrative permit amendments.

title V ''White Papers'' [61] be considered to focus both the content of title V applications and permits. In particular, we recommend that permitting authorities and owners or operators of refineries consider the ''streamlining'' of multiple applicable requirements applying to the same project. Under the streamlining concept, where multiple applicable requirements apply to the same emission unit(s), the permitting authority may develop one emission limit (with associated monitoring, recordkeeping, and reporting) that assures compliance with all applicable requirements. For example, several aspects of the control requirements necessary to implement our maximum available control technology (MACT) and new source performance standards (NSPS) requirements, State Implementation Plan (SIP), and NSR programs (including both major and minor NSR, as applicable) could be considered for streamlining per White Paper Number 2. Where successful, this streamlining will result in a single control requirement (or emission limit), coupled with appropriate monitoring, recordkeeping, reporting, and testing requirements that yield a reasonable assurance of compliance for all subsumed requirements.[62]

We also are willing to explore applying to the varying situations of sulfur removal at refineries certain permit design approaches that have previously been limited to some permitting pilot projects. In particular, in partnership with permitting authorities, we have been working with selected industries at specific sites to conduct Pollution Prevention in Permitting Project (P4) pilots. These projects respond to the Administration's goals for reinvention in order to implement environmental permit programs in a more streamlined fashion, while assuring required levels of environmental protection. Based on our prior experience with these regulatory reinvention projects, permit design options for refiners implementing gasoline desulfurization projects might include, but are not limited to, any of the following approaches:

- Advance approvals of certain types of changes in title V, including those subject to minor NSR. [63]
- Provisions that where met would prevent another requirement from applying (e.g., plant wide applicability limits (as noted above) to address potential major NSR applicability).
- Model permit conditions, such as a presumptive, streamlined approach to meet all applicable control technology requirements to expedite permitting decisions, where applicable.
- Adding terms to a title V permit so as to preauthorize a faster permit revision process where one is necessary to add further details within an approved approach (e.g., the minor instead of significant permit modification process).
- Permitting the worst-case emissions scenario to address all applicable requirements applying in a range of possible operating scenarios or to prevent certain requirements from applying.
- Permitting alternative compliance options where an owner or operator of a source needs the flexibility to vary the compliance approach with changing refinery conditions.
- Using pollution prevention approaches to facilitate compliance with applicable requirements and/or required permit terms.

We recognize that the situations for refineries affected by the proposed gasoline sulfur control program can vary widely (e.g., sulfur level in the gasoline, size of the stream, air quality status of the area, etc.), and that the actual permit approach for an individual refinery may be a combination of certain options outlined above and previously for streamlining NSR. Any title V approach must, however, assure compliance with all applicable requirements linked to the necessary construction and provide a meaningful opportunity for all affected parties to review the appropriateness of a proposed approach as it would apply to a particular site. For example, where new desulfurization units would be required and would be well controlled so as to result in emissions below the threshold for triggering major NSR, then an advance approval of minor NSR requirements in combination with certain operationally limiting conditions might be an appropriate strategy. Where the addition of such a unit would trigger major NSR, then the strategies that combine the reviews and streamline the requirements of both title V and major NSR offer promise. In a few cases, reblending of high sulfur gasoline blend stocks, blending in low sulfur oxygenates, or using sweeter crude oil might be sufficient to achieve the necessary sulfur reductions and require few, if any, additional title V permit terms to implement.

iii. *EPA Assistance to Explore Permit Streamlining Options and Solicitation of Comment.*

We are committed to exploring the possible approaches described above. Accordingly, if there is sufficient interest and need, as expressed in comments on this proposed rule, within the refining industry and among state permitting authorities, we will hold a P4/flexible permit workshop focused on the permitting of the refining industry arising from the gasoline desulfurization program. Additionally, should a permitting authority and owners or operators of affected facilities within a common jurisdiction express a desire for a specific flexible permit project aimed at the development of permit language to facilitate refinery activities to reduce gasoline sulfur, then in accordance with already established principles for initiating similar permit projects, we would be willing to work with a designated refinery. We intend that the approaches derived from such efforts could then serve as a template as needed for use by other refineries and state permitting authorities, provided the approaches are modified to conform with all applicable state title V and NSR requirements.

We believe that application of one or more of the approaches described in today's document would reduce any burden of meeting NSR permit requirements and revisions to title V permit applications or permits to incorporate the gasoline desulfurization requirements adopted in the final rule. However, the use of one or more of these approaches would have accompanying resource requirements. For example, it is possible that the initial resources required to establish a PAL, and the attendant monitoring, recordkeeping and reporting requirements, could involve as much time and resources as associated with a typical NSR permit. However, once established, a PAL could provide more flexibility and minimize future resource demands than more traditional permit approaches. Accordingly, we request that permitting authorities, owners or operators of affected facilities, and the public comment on whether use of the

[61] *White Paper for Streamlined Development of Part 70 Permit Applications,* Lydia N. Wegman, Deputy Director, Office of Air Quality Planning and Standards, U.S. EPA, July 10, 1995 and *White Paper Number 2 for Improved Implementation of the Part 70 Operating Permits Program,* Lydia N. Wegman, Deputy Director, Office of Air Quality Planning and Standards, U.S. EPA, March 5, 1996.

[62] See Section II.A. of White Paper Number 2.

[63] Advance approval means that a particular project (or class of projects) like one to accomplish gasoline desulfurization and its support activities would be preapproved for title V purposes before its actual construction, provided that the terms of the title V permit governing the advance approval are met. The Agency has a possible non-binding interpretation of the Title V regulations that would provide for the advance approval of certain new emission units and control devices. See 63 FR 50279, 50315–20 (Sept. 21, 1998) (Section IV.L., Permitting and Compliance Options/Change Management Strategy, in National Emission Standards for Hazardous Air Pollutants for Source Categories: Pharmaceuticals Production).

approaches described in today's document will achieve appropriate streamlining of controls and requirements arising out of this rule and meet the objectives of the NSR and title V permitting programs.

c. *Should Hardship Relief Be Available?* Elsewhere in this document (Section IV.C.3.b.), we propose a hardship provision that would apply to small refiners. EPA seeks additional comment on whether it should adopt a hardship provision allowing for compliance with standards less stringent than those proposed today during the early years of the program. While EPA believes that it is feasible for most refiners to meet the proposed standard by 2004, the Agency is seeking comment on whether it may be appropriate to allow refiners with substantial economic hardship circumstances to apply for relief from compliance with the sulfur standard for a limited time period.

Such a hardship provision would need to contain appropriate criteria to limit the provision to a narrowly drawn set of circumstances. This might include criteria such as ability to raise capital to make necessary refinery investments in time for 2004, given the current size and ownership of the refinery, the physical characteristics of the refinery, the volume of gasoline at issue, ability to purchase credits to comply, and any efforts by the refiner to limit sulfur that are already underway or have been attempted. The provision would also need to contain criteria to ensure that it would not undermine the emissions reduction goals of the Tier 2/sulfur program and would not allow large amounts of gasoline with sulfur levels significantly above 30 ppm into the market. For example, this might include a volume limit on the use of less stringent standards in hardship circumstances. It would also need to include an endpoint, so that the relief is short-term and the refinery would then have to meet the same standard as all other refineries. For example, EPA would not expect that hardship relief will be needed beyond 2009.

Under such a provision, we expect that refiners would be subject to a reasonable level of control, albeit less stringent than the proposed standards. At a minimum, sulfur levels at a particular refinery should not be permitted to be higher than 1997–1998 baseline levels and in no event should the average sulfur level be greater than 300 ppm. EPA also seeks comment on the appropriate time frame for allowing relief in hardship circumstances. EPA solicits comments on whether any refiners would encounter significant hardship in meeting the proposed standard. EPA solicits comment on the implications of any such hardship provision on small refiners and its relationship to the small refiner provisions proposed in this document. Finally, EPA seeks comment on the implications of a hardship provision on the proposed ABT program.

5. Consideration of Diesel Fuel Control

As explained in Section IV.B. above, the proposed Tier 2 standards would apply to both gasoline- and diesel fuel-fueled vehicles. Currently very few light-duty vehicles operate on diesel fuel. Given what we know about gasoline vehicles, we believe it is reasonable to anticipate that the use of exhaust aftertreatment devices may be required, and that these technologies may have similar sensitivities to sulfur that the catalysts used on gasoline engines have. However, we do not yet have enough information to be able to conclude that diesel sulfur levels need to be reduced in the same time frame that Tier 2 vehicles are introduced. A decision to require reductions in diesel sulfur levels could have significant implications for the refining industry, both because it would likely require capital expenditures over and above the significant costs that would be incurred in controlling gasoline sulfur, and because for some refiners concurrent control of gasoline and diesel sulfur may be the most economical solution. Hence, due to the implications for automotive manufacturers and for diesel fuel producers, a decision on whether to require diesel fuel sulfur reductions needs to be made as soon as possible.

Automobile and diesel engine manufacturers and state air quality agencies have recently asked us to set new fuel quality requirements for diesel fuel used in highway vehicles.[64] The manufacturers believe that such requirements, especially controlling diesel fuel sulfur content to very low levels, could produce large environmental benefits by enabling dramatically lower-emitting diesel engines equipped with exhaust aftertreatment devices. The viability of such technologies would, of course, affect the feasibility of the proposed Tier 2 emission standards for diesel vehicles. Currently, highway diesel fuel is regulated under standards we set in 1990. These standards, which became effective in 1993, limit the concentration of sulfur in diesel fuel to a maximum of 500 ppm; they also control the amount of aromatic compounds in the fuel (55 FR 34120, August 21, 1990).

Diesel engine manufacturers have argued that implementing Tier 2 standards without concurrent diesel fuel changes would be unfair to diesels because diesel fuel quality is worse than gasoline fuel quality, especially considering that the Tier 2 rulemaking includes proposed improvements in gasoline quality to enable advanced three-way catalytic converters. Some argue that, beyond fuel-neutrality considerations, diesel fuel quality improvement is needed to combat global warming because it will facilitate the marketing of more diesel vehicles and, in their opinion, thereby reduce emissions of global warming gases. Others counter that such benefits are illusory and that diesel vehicles should be discouraged because diesel exhaust is a serious health hazard, a hazard that improvements in fuel quality would do little to mitigate.

To address the issue of diesel fuel changes, we will issue an Advance Notice of Proposed Rulemaking (ANPRM) in the near future. We encourage interested parties to review and comment on the issues raised in the ANPRM. On the basis of this information, if appropriate, we plan to publish a proposal on standards for diesel fuel in the next several months. This would provide some degree of clarity regarding our plans in this area in time to help affected industries to then make their own plans without undue disruption. This is especially important for the petroleum refining industry in planning capital outlays to accomplish sulfur reduction in gasoline, and potentially diesel fuel, at the most economical point in the refining process.

Several diesel vehicle manufacturers have raised the concern that unless or until lower sulfur diesel fuel is available, the sulfate component of diesel PM may be particularly difficult to control to very low emission levels. They have encouraged us to express the proposed PM standards in terms of non-sulfate PM to provide manufacturers flexibility in how they balance the control of sulfate and non-sulfate PM components.

[64] See the following contained in the docket for this rulemaking: Letter from Robert J. Eaton, Chrysler Corporation, Alex Trotman, Ford Motor Company and John F. Smith, Jr., General Motors Corporation, to Vice President Al Gore, July 16, 1998; ''STAPPA/ALAPCO Resolution on Sulfur in Diesel Fuel,'' October 13, 1998; Letter from S. William Becker, Executive Director of STAPPA/ALAPCO, to Carol Browner, Administrator of U.S. EPA, October 16, 1998; Letter from Jed R. Mandel, Engine Manufacturers Association, to Margo T. Oge, Director, Office of Mobile Sources, EPA, November 6, 1998.

We request comment on such an approach, including specific comments on the following:

- Whether or not such an approach could be justified on an air quality basis, given the potential for very high sulfate PM emissions due to unrestrained sulfate production in diesel catalytic converters;
- Whether such an approach should be limited to the interim PM standards and be discontinued when the Tier 2 standards are fully phased in;
- How this approach should be phased out if low-sulfur diesel fuel were to be phased in; and
- Whether a cap on sulfate PM should accompany such an approach and what value (in grams per mile) would be appropriate for a cap.

D. What Are the Economic Impacts, Cost Effectiveness and Monetized Benefits of the Proposal?

Consideration of the economic impacts of new standards for vehicles and fuels has been an important part of our decision making process for this proposal. The following sections describe first the costs associated with meeting the new vehicle standards and the new fuel standards. This will be followed with a discussion of the cost effectiveness of the proposal. Lastly, we will discuss the results of a preliminary benefit-cost assessment that we have prepared.

Full details of our cost analyses, including information not presented here, can be found in the Draft RIA associated with this rule. We invite comments on all aspects of these analyses.

1. What Are the Estimated Costs of the Proposed Vehicle Standards?

To perform a cost analysis for the proposed standards, we first determined a package of likely technologies that manufacturers could use to meet the proposed standards and then determined the costs of those technologies. In making our estimates we have relied both on publicly available information, such as that developed by California, and confidential information supplied by individual manufacturers.

In general, we expect that the Tier 2 standards will be met through refinements of current emissions control components and systems rather than through the widespread use of new technology. Furthermore, lighter vehicles will generally require less extensive improvements than larger vehicles and trucks. More specifically, we anticipate a combination of technology upgrades such as the following:

- Improvements to the catalyst system design, structure, and formulation plus some increase in average catalyst size and loading.
- Air and fuel system modifications including changes such as improved microprocessors, improved oxygen sensors, leak free exhaust systems, air assisted fuel injection, and calibration changes including improved precision fuel control and individual cylinder fuel control.
- Engine modifications, possibly including an additional spark plug per cylinder, an additional swirl control valve, or other hardware changes needed to achieve cold combustion stability.
- Increased use of fully electronic exhaust gas recirculation (EGR).
- Increased use of secondary air injection for 6 cylinder and larger engines.
- Heat optimized exhaust pipes and low thermal capacity manifolds.

Using a typical mix of changes for each group, we projected costs separately for LDVs, the different LDT classes, and for different engine sizes (4, 6, 8-cylinder) within each class. For each group we developed estimates of both variable costs (for hardware and assembly time) and fixed costs (for R&D, retooling, and certification).

Cost estimates based on the current projected costs for our estimated technology packages represent an expected incremental cost of vehicles in the near-term. For the longer term, we have identified factors that would cause cost impacts to decrease over time. First, since fixed costs are assumed to be recovered over a five-year period, these costs disappear from the analysis after the fifth model year of production. Second, the analysis incorporates the expectation that manufacturers and suppliers will apply ongoing research and manufacturing innovation to making emission controls more effective and less costly over time. Research in the costs of manufacturing has consistently shown that as manufacturers gain experience in production, they are able to apply innovations to simplify machining and assembly operations, use lower cost materials, and reduce the number or complexity of component parts.[65] These reductions in production costs are typically associated with every doubling of production volume. Our analysis incorporates the effects of this ''learning curve'' by projecting that the variable costs of producing the Tier 2 vehicles decreases by 20 percent starting with the third year of production. We applied the learning curve reduction only once since, with existing technologies, there would be less opportunity for lowering production costs than would be the case with the adoption of new technology.

We have prepared our cost estimates for meeting the Tier 2 standards using a baseline of NLEV technologies for LDVs, LDT1s, and LDT2s, and Tier 1 technologies for LDT3s and LDT4s. These are the standards that vehicles would be meeting in 2003.[66] We have not specifically analyzed smaller incremental changes to technologies that might occur due to the interim standards between the baseline and Tier 2. In many cases, we believe these changes will not be significant based on current certification levels. For others, manufacturers can use averaging and other program flexibilities to avoid redesigning vehicles twice within a relatively short period of time. We believe this is likely to be an attractive approach for manufacturers due to the savings in R&D and other resources.

For the total annual cost estimates, we projected that manufacturers will start the phase-in of Tier 2 vehicles with LDVs in 2004 and progress to heavier vehicles until all LDT2s meet Tier 2 standards in 2007. For LDT3s and LDT4s, we projected some sales of Tier 2 LDT3s prior to 2008 for purposes of averaging in the interim program and that the phase-in of Tier 2 vehicles would end with LDT4s in 2009.

Finally, we have incorporated what we believe to be a high level of R&D spending at $5,000,000 per vehicle line (with annual sales of 100,000 units per line). We have included this large R&D effort because calibration and system optimization is likely to be a critical part of the effort to meet Tier 2 standards. However, we believe that the R&D costs may be overstated because the projection ignores the carryover of knowledge from the first vehicle lines designed to meet the standard to others phased-in later.

The evaporative emissions standards we are proposing today for LDVs and LDTs are feasible with relatively small cost impacts. We estimate the cost of system improvements to be about $4 per vehicle, for all vehicle classes. This incremental cost reflects the cost of moving to low permeability materials, improved designs or low-loss

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

[66] Even though the NLEV program ends in the Tier 2 time frame, we have not included the NLEV program costs or benefits in our analysis, since EPA analyzed and adopted NLEV previously.

connectors. R&D for the evaporative emissions standard is included in the R&D estimates given above for the tailpipe standards. We have made no projections of learning curve reductions for the evaporative standard.

Table IV.D.–1 provides our estimates of the per vehicle increase in purchase price for LDVs and LDTs. The near-term cost estimates in Table IV.D.–1 are for the first years that vehicles meeting the standards are sold, prior to cost reductions due to lower productions costs and the retirement of fixed costs. The long-term projections take these cost reductions into account. We have sales weighted the cost differences for the various engine sizes (4-, 6-, 8-cylinder) within each category.

TABLE IV.D.–1.—ESTIMATED PURCHASE PRICE INCREASES DUE TO PROPOSED TIER 2 STANDARDS

	LDV	LDT1	LDT2	LDT3	LDT4
Tailpipe standards:					
Near-term (year 1)	$76	$69	$132	$270	$266
Long-term (year 6 and beyond)	46	43	99	214	209
Evaporative Standard	4	4	4	4	4

2. What Are the Estimated Costs of the Proposed Gasoline Sulfur Standards?

As explained in Section IV.C., most refiners will have to install capital equipment to meet the proposed gasoline sulfur standard. Presuming that refiners will want to minimize the cost involved, refiners are expected to desulfurize the gasoline blendstock produced by the fluidized catalytic cracker (FCC) unit. Recent advances have led to significant improvements in hydrotreating technology by CDTECH and Mobil Oil (OCTGAIN) that lower the cost of desulfurizing FCC gasoline; we understand that similar technologies are being developed by other parties. Since these improved desulfurization technologies represent the lowest cost options and are expected to be used by most refiners needing to install desulfurization equipment, we estimated the cost of desulfurization based on their use.

For our analysis, we estimated the cost of lowering gasoline sulfur levels in five different regions of the country (Petroleum Administration Districts for Defense, or PADD), starting from the current regional average in each PADD down to 30 ppm. We then converted the regional cost to a national average per-refinery cost, and calculated a national aggregate cost and cents-per-gallon cost.

Based on this analysis we estimate that, on average, refiners in the year 2004 would be expected to invest about $45 million for capital equipment and spend about $16 million per year for each refinery to cover the operating costs associated with these desulfurization units. Since this average represents many refineries diverse in size and gasoline sulfur level, some refineries would pay more and others less than the average costs. When the average per-refinery cost is aggregated for all the gasoline expected to be produced in this country in 2004, the total investment for desulfurization processing units is estimated to be about $4.7 billion dollars, and operating costs for these units is expected to be about $1.5 billion per year. We believe that the $4.7 billion in capital costs would be spread over several years by the refiners' participation in the proposed averaging, banking, and trading program.

These capital and operating costs represent our estimates for domestic costs. While we think that many foreign refiners might incur capital costs to meet the requirements of our gasoline sulfur program, particularly in light of similar programs being enacted internationally, others will argue that most foreign refiners would not incur new costs as a result of our program because they can simply send the lowest-sulfur fraction of their current production to the U.S. Furthermore, some will argue that most foreign refiners do not face the same permitting limitation and environmental and other regulatory costs that domestic refiners face, and thus that their costs of producing low sulfur gasoline will be minimal even if some investment is required. While we have developed cost estimates with and without consideration of possible costs attributed to imported gasoline, our estimates of national and average costs do not include any costs attributed to foreign refiners.

Using our estimated capital and operating costs we calculated the average per-gallon cost of reducing gasoline sulfur down to 30 ppm. Using a capital cost amortization factor based on a seven percent rate of return on investment, and including no taxes, we estimated the average national cost for desulfurizing gasoline to initially be about 1.7 cents per gallon. This cost is the cost to society of reducing gasoline sulfur down to 30 ppm that we used for estimating cost effectiveness. If we amortize the costs based on a rate of return on investment of six to ten percent and a tax rate of 39 percent, which may more closely represent the actual economic situation facing refiners today, the average national cost for desulfurizing gasoline down to 30 ppm would be 1.7–1.9 cents per gallon.

We anticipate that these costs will decrease in future years due to improvements in technology, similar to the learning curve improvements discussed above for vehicle cost. This improvement is estimated to result in a 20 percent reduction in operating costs after the second complete year of use. This estimated rate of improvement is similar to previous cost reductions observed with desulfurization technologies as they were being developed.

Additional cost reduction is expected as refiners increase the throughput (debottleneck) of their refineries to lower their per-gallon fixed costs. This increase in throughput for the industry as a whole is termed capacity creep and it is has allowed a shrinking number of U.S. refineries to handle the increasing demand for refined products. Our analysis presumes that as an industry, refiners will debottleneck their refineries at a rate consistent with the forecasted increase in gasoline demand, which is about 2 percent per year. Thus, the fixed operating cost, and a portion of the capital costs for these desulfurization technologies, would decrease over time on a per gallon basis as the volume of gasoline processed at each refinery increased.

Table IV.D.–2 below summarizes our estimates of per-gallon gasoline cost increases for the years 2004, 2010 and 2015.

TABLE IV.D.–2.—ESTIMATED PER-GALLON COST FOR DESULFURIZING GASOLINE IN FUTURE YEARS

Year	Cost (cents/gallon)
2004	1.7
2010	1.5
2015	1.4

3. What Are the Aggregate Costs of the Tier 2/Gasoline Sulfur Proposal?

Using current data for the size and characteristics of the vehicle fleet and making projections for the future, the per-vehicle and per-gallon fuel costs described above can be used to estimate the total cost to the nation for the proposed emission standards in any year. Figure IV.D.–1 portrays the results of these projections.[67]

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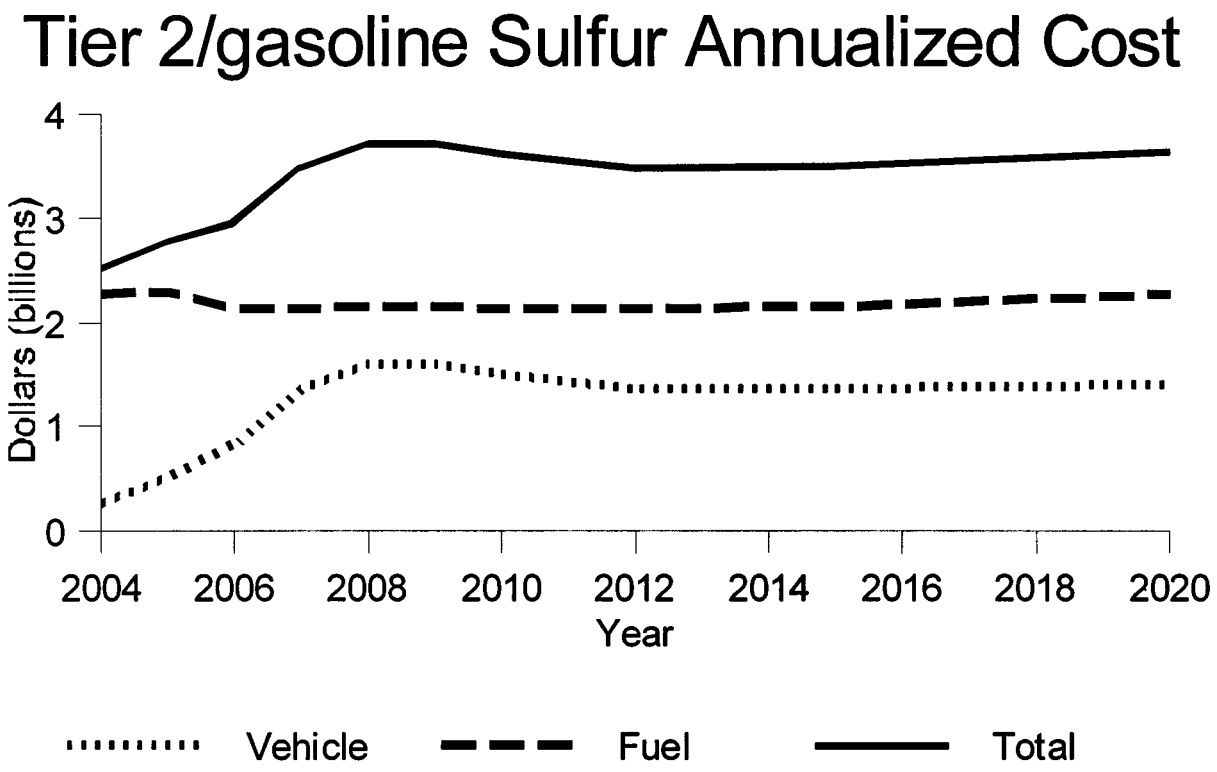
Figure IV.D. -1



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As can be seen from the figure, the annual cost starts out at just over $2.5 billion per year and increases over the phase-in period to a maximum of $3.7 billion in 2008. Thereafter, the annual cost declines to a level of about $3.5 billion. The effect of projected growth in vehicle sales and fuel consumption causes a slow, gradual rise in annual cost to set in after about 2012.

4. How Does the Cost Effectiveness of This Program Compare to Other Programs?

This section summarizes the cost effectiveness analysis done by EPA and its results. The purpose of this assessment is to determine whether reductions from the vehicle and fuel controls are cost effective, taking into consideration alternative means of attaining or maintaining the national primary ambient air quality standards. This involves a comparison of our proposed program not only with past measures, but with other new measures that might be employed to attain and maintain the NAAQS. Both EPA and states have already adopted numerous control measures, and remaining measures tend to be more expensive than those previously employed. Therefore, there is no single cost effectiveness level that defines what is acceptable. Rather, as we employ the most cost effective available measures first, more expensive ones tend to become necessary over time.

a. *What Is the Cost Effectiveness of This Program?* We have calculated the per-vehicle cost effectiveness of the exhaust/gasoline sulfur standards and the evaporative emission standards, based on the net present value of all costs and emission reductions over the life of an average Tier 2 vehicle subject to today's proposal. As described earlier in the discussion of the cost of this proposal, the cost of complying with the new standards will decline over time as manufacturing costs are reduced and amortized capital investments are recovered. To show the effect of declining cost on the cost effectiveness, we have developed both near term and long term cost effectiveness values. More specifically, these correspond to

[67] Figure IV.D.–1 is based on the amortized costs from Tables IV.D.–1 and IV.D.–2. Actual capital investments, particularly important for fuels, would occur prior to and during the initial years of the program, as described above in section IV.D.2.

vehicles sold in years one and six of the vehicle and fuel programs. Vehicle cost is constant from year six onward. Fuel costs per gallon continue to decline slowly in the years past year six; however, the overall impact of this decline is small and we have decided to use year six results for our long term cost effectiveness. Chapter V of the draft RIA contains a full description of this analysis, and you should look in that document for more details on the results summarized here.

Table IV.D.–3 summarizes the net present value lifetime cost, NMHC + NO_X emission reduction and cost effectiveness results for the Tier 2/gasoline sulfur proposal using sales weighted averages of the costs (both near term and long term) and emission reductions of the various vehicle classes affected.

Table IV.D.–3 also displays cost effectiveness values based on two approaches to account for the small reductions in SO_2 and tailpipe emitted sulfate particulate matter (PM) associated with the reduction in gasoline sulfur. While these reductions are not central to the proposal and are therefore not displayed with their own cost effectiveness, they do represent real emission reductions due to the proposed rule. The first set of cost effectiveness numbers in Table IV.D.–3 simply ignores these reductions and bases the cost effectiveness on only the NMHC + NO_X reductions from Tier 2/gasoline sulfur. The second set accounts for these reductions by crediting some of the cost of the program to SO_2 and PM reduction. The amount of cost allocated to SO_2 and PM is based on the cost effectiveness of SO_2 and PM emission reductions from other EPA actions. You may refer to the RIA for details about these actions and how the specific allocations were developed.

TABLE IV.D.–3.—COST EFFECTIVENESS OF THE PROPOSED STANDARDS (1997 DOLLARS)

Cost basis	Discounted lifetime vehicle and fuel costs	Discounted lifetime NMHC + NO_X reduction (tons)	Discounted lifetime cost effectiveness per ton	Discounted lifetime cost effectiveness per ton with SO_2 and direct PM credit[a]
Near term cost (production year 1)	$230	0.108	$2,134	$1,599
Long term cost (production year 6)	188	0.109	1,748	1,213

[a] $54 credited to SO_2 ($4800/ton), $4 to direct PM ($10,000/ton).

b. *How Does the Cost Effectiveness of this Program Compare with Other Means of Obtaining Mobile Source NO_X + NMHC Reductions?* In comparison with other mobile source control programs, we believe that today's proposal represents the most cost effective new mobile source control strategy currently available that is capable of generating substantial NO_X + NMHC reductions. This can be seen by comparing the cost effectiveness of today's program with a number of new mobile source standards that EPA has adopted in recent years. Table IV.D.-4 summarizes the cost effectiveness of several recent EPA actions.

TABLE IV.D.-4.—C/E OF PREVIOUSLY IMPLEMENTED MOBILE SOURCE PROGRAMS

Program	$/ton NO_X+NMHC
2004 Highway HD Diesel stds	300
Nonroad Diesel engine stds	410–650
Tier 1 vehicle controls	1,980–2,690
NLEV	1,859
Marine SI engines	1,128–1,778
On-board diagnostics	2,228

(Costs adjusted to 1997 dollars.)

We can see from the table that the cost effectiveness of the Tier 2/gasoline sulfur standards falls within the range of these other programs. Engine-based standards (the 2004 highway heavy-duty diesel standards, the nonroad diesel engine standards and the marine spark-ignited engine standards) have generally been less costly than Tier 2/gasoline sulfur. Vehicle standards, most similar to today's proposal, have values comparable to or higher than Tier 2/gasoline sulfur.

It is tempting to look at the engine standards and conclude that more reductions at a similar low cost effectiveness should still be available. This is especially true for the two largest categories (highway and nonroad diesel engines) where new standards have been adopted that were highly cost effective. However, cost effectiveness was not a limiting consideration in either case. Rather, the level of the standards selected was based primarily on technical feasibility in the time available. That is, the maximum level of control that we found to be feasible in these actions was driven more by what technology we believed would be available than by cost. It will be important to consider the potential for further control in these categories as we move forward.

We do not believe that significant further control is available from highway or nonroad diesel engines through more stringent standards at the same cost effectiveness that these standards realized, in the time frame proposed. Based on current knowledge, the next generation of controls for these diesel engines would require advanced after-treatment devices, still in the research and development phase. Such controls have not yet been employed and when they become available will be more costly and will have difficulty functioning without changes to diesel fuel. We fully expect that, as the development of new technology progresses and cost declines, future new standards for both of these source categories will be developed. But we also expect that the cost effectiveness of future standards will be higher and is not likely to be significantly less than the cost effectiveness of today's proposal.

On the light duty vehicle side, the last two sets of standards were Tier 1 and NLEV, which had cost effectiveness comparable to or higher than Tier 2/gasoline sulfur. Compared to engines, these levels reflect the advanced (and more expensive) state of vehicle control technology, where standards have been in effect for a much longer period than for engines. In fact, considering the increased stringency of the Tier 2 standards,[68] it is remarkable that the cost effectiveness of Tier 2/gasoline sulfur is in the same range as these actions. Based on these results, Tier 2/gasoline sulfur appears to be a logical and consistent next step in vehicle control.

In conclusion, we believe that the Tier 2/gasoline sulfur proposal is a cost effective program for mobile source NO_X + NMHC control. We are unable to

[68] Tier 2/gasoline sulfur will yield about a 75% reduction in NO_X emissions compared to NLEV vehicles.

identify another mobile source control program that would be more cost effective than Tier 2/gasoline sulfur for making substantial further progress in reducing NO_X + NMHC emissions.

c. *How Does the Cost Effectiveness of this Proposed Program Compare with Other Known Non-Mobile Source Technologies for Reducing NO_X +* NMHC? In evaluating the cost effectiveness of the Tier 2/gasoline sulfur proposal, we also considered whether our proposal is cost effective in comparison with alternative means of attaining or maintaining the NAAQS other than mobile source programs. As described below, we have concluded that Tier 2/gasoline sulfur is cost effective considering the anticipated cost of other technologies that will be needed to help attain and maintain the NAAQS.

For purposes of estimating the cost of implementing the new ozone and PM NAAQS, the Agency assumed certain baseline controls and compiled a list of additional known technologies that could be considered in devising emission reductions strategies.[69] Through this broad review, over 50 technologies were identified as reducing NO_X or VOC. The average cost effectiveness of these technologies varied from hundreds of dollars a ton to tens of thousands of dollars a ton. The Agency selected from this list all those technologies that could be applied with an average cost effectiveness of $10,000/ton or less, and showed that substantial progress toward attainment could be made when operating within that limit.

While many areas still remained in nonattainment under the NAAQS analysis, we assumed that other methods would be identified in the future that on average could help achieve the NAAQS at $10,000 per ton or less. We believe that Tier 2/gasoline sulfur is one of those methods. In fact, it will deliver critical further reductions that are not readily obtainable by any other means known to the Agency. By way of comparison, if all of the technologies identified for the NAAQS analysis costing less than $10,000/ton were implemented nationwide, they would produce NO_X emission reductions of about 2.9 million tons per year. The Tier 2/gasoline sulfur proposal by itself will generate about 2.8 million tons per year once fully implemented. To obtain significant further reductions using the other technologies identified in the NAAQS analysis rather than Tier 2/gasoline sulfur could mean adopting measures costing well beyond $10,000/ton. Given the continuing need for further emission reductions, we believe that Tier 2/gasoline sulfur control is clearly a cost effective approach, in addition to those technologies assumed for the NAAQS analysis, for attaining and maintaining the NAAQS.

We recognize that the cost effectiveness calculated for Tier 2/gasoline sulfur is not strictly comparable to a figure for measures targeted at nonattainment areas, since Tier 2/gasoline sulfur is a nationwide program. However, there are several additional considerations that have led us to conclude that Tier2/gasoline sulfur is cost effective considering alternative means of attaining and maintaining the NAAQS.

First, given the fact that Tier 2/gasoline sulfur is at most only 20 percent as costly per ton as the NAAQS figure for additional control measures, we believe that there can be little doubt that the cost effectiveness of Tier 2/gasoline sulfur is well within the cost effectiveness range that the NAAQS cost analysis anticipated for unspecified additional technologies that will be needed to attain the NAAQS—technologies that the analysis noted might be applied in limited areas or nationwide. Furthermore, as a national program, Tier 2/gasoline sulfur can be implemented as a single unified rule without the need for individual action by each of the states. Moreover, as noted above, for states to obtain further substantial emission reductions beyond those identified in the NAAQS could mean adopting measures costing well beyond $10,000/ton, something that few areas of the country to date have done.

In dealing with the question of comparing local and national programs, it is also relevant to point out that, because of air transport, the need for NO_X control is a broad regional issue not confined to non-attainment areas only. To reach attainment, future controls will need to be applied over widespread areas of the country. In the analyses supporting the recent NO_X standards for highway diesel engines,[70] we looked at this question in some detail and concluded that the regions expected to impact ozone levels in ozone nonattainment areas accounted for over 85% of total NO_X emissions from a national heavy-duty engine control program. Similarly, NO_X emissions in attainment areas also contribute to particulate matter nonattainment problems in downwind areas. Thus, the distinction between local and national control programs for NO_X is less important than it might appear.

Finally, the statute indicates that in considering the cost effectiveness of Tier 2/gasoline sulfur EPA should consider not only attainment, but also maintenance of the standards. Tier 2/gasoline sulfur—unlike nonattainment area measures—will achieve attainment area reductions that, among other effects, will help to maintain air quality that meets the NAAQS. These reductions relate not only to the ozone and PM NAAQS, but also to SO_2 and NO_2, and to CO.

In summary, given the array of controls that will have to be implemented to make progress toward attaining and maintaining the NAAQS, we believe that the weight of the evidence from alternative means of providing substantial NO_X + NMHC emission reductions indicates that the Tier 2/gasoline sulfur proposal is cost effective. This is true from the perspective of other mobile source control programs or from the perspective of other stationary source technologies that might be considered.

5. Does the Value of the Benefits Outweigh the Cost of the Proposed Standards?

While relative cost effectiveness is the principal economic policy criterion established for these standards in the Clean Air Act (see CAA 202(i)), further insight regarding the merits of the proposed standards can be provided by benefit-cost analysis. The purpose of this section is to summarize the methods we used and results we obtained in conducting a preliminary analysis of the economic benefits of the proposed standards, and to compare these economic benefits with the estimated costs of the proposal. In summary, the results of our analysis indicate that the economic benefits of the proposed standards will likely exceed the costs of meeting the standards by a substantial margin, and the significant uncertainties underlying the analysis are unlikely to alter this outcome of positive net benefits.

a. *What Is the Purpose of this Benefit-Cost Comparison?* Benefit-cost analysis (BCA) is a useful tool for evaluating the economic merits of proposed changes in environmental programs and policies. In its traditional application, BCA

[69] ''Regulatory Impact Analyses for the Particulate Matter and Ozone National Ambient Air Quality Standards and Proposed Regional Haze Rule,'' Appendix B, ''Summary of control measures in the PM, regional haze, and ozone partial attainment analyses,'' Innovative Strategies and Economics Group, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC, July 17, 1997.

[70] Final Regulatory Impact Analysis: Control of Emissions of Air Pollution from Highway Heavy-Duty Engines, September 16, 1997.

estimates the economic ''efficiency'' of proposed changes in public policy by organizing the various expected consequences and representing those changes in terms of dollars. Expressing the effects of these policy changes in dollar terms provides a common basis for measuring and comparing these various effects. Because improvement in economic efficiency is typically defined to mean maximization of total wealth spread among all members of society, traditional BCA must be supplemented with other analyses in order to gain a full appreciation of the potential merits of new policies and programs. These other analyses may include such things as examinations of legal and institutional constraints and effects; engineering analyses of technology feasibility, performance and cost; or assessment of the air quality need.

In addition to the narrow, economic efficiency focus of most BCAs, the technique is also limited in its ability to project future economic consequences of alternative policies in a definitive way. Critical limitations on the availability, validity, or reliability of data; limitations in the scope and capabilities of environmental and economic effect models; and controversies and uncertainties surrounding key underlying scientific and economic literature all contribute to an inability to estimate the economic effects of environmental policy changes in exact and unambiguous terms. Under these circumstances, we consider it most appropriate to view BCA as a tool to inform, but not dictate, regulatory decisions such as the ones reflected in today's proposal.

Despite the limitations inherent in BCA of environmental programs, we considered it useful to estimate the potential benefits of today's proposed standards both in terms of physical changes in human health and welfare and environmental change, and in terms of the estimated economic value of those physical changes. The BCA presented herein should be considered preliminary, however, due to limitations in the data and models available for analysis in advance of today's proposal. Additional, more refined analysis will be conducted prior to issuance of final standards. This post-proposal analysis will take account of public comments on the proposed standards and this BCA and will also make use of more extensive and refined data and models currently being developed. Our expectation is that the more extended and refined economic analysis conducted prior to final rulemaking will further help inform and guide decisions on the appropriateness of the final rules. Toward this end, we are presenting this preliminary BCA and requesting public comments on the assumptions, data, and modeling efforts supporting the analysis and its results, and the appropriate interpretations and uses of those results.

b. *What Was Our Overall Approach to the Benefit-Cost Analysis?* The basic question we sought to answer in the preliminary BCA was: ''What are the net yearly economic benefits to society of the reduction in mobile source emissions likely to be achieved by today's proposed standards?'' In designing an analysis to answer this question, we adopted an analytical structure and sequence similar to that used in the so-called ''section 812 studies'' [71] to estimate the total benefits and costs of the entire Clean Air Act. Moreover, we used many of the same data sets, models, and assumptions actually used in the Section 812 studies and/or the recent Regulatory Impact Analyses (RIAs) for the Particulate Matter and Ozone National Ambient Air Quality Standards and for the NO_X SIP Call (also known as the Regional Ozone Transport Rule, as discussed in Section III above).[72] By adopting the major design elements, data sets, models, and assumptions developed for the recent RIAs, we have largely relied on methods that have already received extensive review by the public and by other federal agencies. Furthermore, the data sets adopted from the Section 812 studies have received extensive review by the independent Science Advisory Board and by the public.

As described in more detail in the Draft RIA for today's proposal, this overall analytical design involves the following sequential steps:

1. Identify the *technologies* likely to be used to comply with the proposed standards
2. Estimate the *costs* society would incur to employ the technologies
3. Estimate the *emissions reductions* achieved by application of the technologies
4. Estimate the change in *air quality* conditions resulting from the estimated emissions reductions
5. Estimate the changes in *human health and well-being and environmental quality* associated with the estimated changes in air quality
6. Estimate the *economic value* of the estimated changes in human health, human welfare, and environmental outcomes
7. Compare the resulting estimate of economic benefits with the estimated costs, and calculate the *net monetized benefits* of the proposed standards
8. Evaluate the *uncertainty* surrounding the estimate of net monetized benefit by developing ranges of results that reflect the key underlying scientific, economic, data, and modeling uncertainties

c. *What Are the Significant Limitations of the Benefit-Cost Analysis?* Every BCA examining the potential effects of a change in environmental protection requirements is limited to some extent by data gaps, limitations in model capabilities (such as geographic coverage), and uncertainties in the underlying scientific and economic studies used to configure the benefit and cost models. Deficiencies in the scientific literature often result in the inability to estimate changes in health and environmental effects, such as potential increases in premature mortality associated with increased exposure to carbon models. Deficiencies in the economics literature often result in the inability to assign economic values even to those health and environmental outcomes that can be quantified, such as changes in lung function caused by increased exposure to ozone. While these general uncertainties in the underlying scientific and economics literatures are discussed in detail in the RIA and its supporting documents and references, the key uncertainties that have a bearing on the results of the preliminary BCA of today's proposed standards are:

1. The exclusion of potentially significant benefit categories (e.g., health and ecological benefits of incidentally controlled hazardous air pollutants)
2. Scientific uncertainties regarding whether the observed statistical relationship between exposure to elevated particulate matter and incidences of adverse health effects reflects a causal relationship (especially premature mortality and chronic bronchitis)
3. Scientific uncertainty regarding the potential existence of a concentration threshold below which adverse health effects of exposure to particulate matter might not occur
4. Scientific uncertainty regarding whether tropospheric ozone exposure contributes to premature mortality

In addition to these uncertainties and shortcomings that pervade all analyses of criteria air pollutant control

[71] The ''section 812 studies'' refers to (1) USEPA, Report to Congress: The Benefits and Costs of the Clean Air Act, 1970 to 1990, October 1997 (also known as the ''section 812 Retrospective); and (2) the first in the ongoing series of prospective studies estimating the total costs and benefits of the Clean Air Act, expected to be published later in 1999.

[72] Regulatory Impact Analysis for the NO_X SIP Call, FIP, and Section 126 Petitions'' September 1998, EPA–452/R–98–003.

programs, a number of limitations apply specifically to the preliminary BCA of today's proposed rules. Though we used the best data and models currently available, we were required to adopt a number of simplifying assumptions and to use data sets that, while reasonably close, did not match precisely the conditions and effects expected to result from implementation of the standards proposed today. For example, the year 2010 emissions data sets available for use in this analysis do not fully reflect the emissions reductions expected to be achieved by other recently-enacted standards and by expected near-future control programs, such as additional measures aimed at full attainment of the new fine particulate matter National Ambient Air Quality Standards. In addition, we have used the year 2010 as a proxy for the time (actually circa 2040) when all non-complying vehicles would be fully retired from the fleet and full implementation of today's proposed standards would be finally achieved, requiring adjustments described more fully in the next section. The key limitations and uncertainties unique to the preliminary BCA of today's proposed rules, therefore, include:

1. A mismatch between the 2010 air quality base year adopted for the BCA and the eventual timing of fleet turnover
2. Potential mis-estimation of future year emissions inventories, such as those associated with nonroad vehicle emissions and with measures aimed at attaining and maintaining compliance with newly revised ambient air quality standards
3. Uncertainties associated with the extrapolation of air quality monitoring data to distant sites required to capture the effects of the proposed standards on all affected populations

Despite these additional important uncertainties, which are discussed in more detail or referenced in the Draft RIA, we believe the preliminary BCA does provide a reasonable indication of the potential range of net economic benefits of the standards proposed today. This is because the analysis focuses on estimating the economic effects of the *changes* in air quality conditions expected to result from today's proposed rules, rather than focusing on developing a precise prediction of the *absolute* levels of air quality likely to prevail at some particular time in the future. An analysis focusing on the changes in air quality can give useful insights into the likely economic effects of emission reductions of the magnitude expected to result from today's proposed rule.

d. *How Did We Perform the Benefit-Cost Analysis?* As summarized above, the analytical sequence begins with a projection of the mix of technologies likely to be deployed to comply with the new standards, and the costs incurred and emissions reductions achieved by these changes in technology. The program proposed today has various cost and emission related components, as described earlier in this section. These components would begin at various times and in some cases would phase in over time. This means that during the early years of the program there would not be a consistent match between cost and benefits. This is especially true for the vehicle control portions of the proposal, where the full vehicle cost would be incurred at the time of vehicle purchase, while the fuel cost along with the emission reductions and benefits would occur throughout the lifetime of the vehicle. To deal with this question, we might have wished to perform a per-vehicle analysis corresponding to the cost effectiveness analysis described above. However, the modeling used for benefits estimates cannot be done on a per-vehicle basis, so we have instead used an annual cost and annual benefit approach.

To develop a representative benefit-cost number, we need to have a stable set of cost and emission reductions to use. This means using a future year where the fleet is fully turned over and there is a consistent annual cost and annual emission reduction. For today's proposal this stability wouldn't occur until well into the future. However, for the purpose of the benefit calculations, we have no available baseline data set beyond the year 2010. We have therefore made adjustments to allow use of 2010 as a surrogate for a future year in which the fleet consists entirely of Tier 2 vehicles.

For emissions, we calculated reductions by treating 2010 as if the fleet had already turned over. We did this by applying the control case emission factor from a fully turned over fleet year (from the year 2040) to the fleet mileages for this year. Clearly, this approach does not, nor is it intended to, predict actual expected emission reductions for 2010. This is not its purpose. It is intended to portray the characteristics of the vehicle fleet after it is fully turned over, within the constraint that 2010 was the latest year for which we could perform an analysis.

The resulting analysis represents a snapshot of benefits and costs in a future year in which the light-duty fleet consists entirely of Tier 2 vehicles. As such, it depicts the maximum emission reductions (and resultant benefits) and among the lowest costs that would be achieved in any one year by the program on a ''per mile'' basis. (Note, however, that net benefits would continue to grow over time beyond those resulting from this analysis, but only because of growth in vehicle miles traveled.) Thus, based on the long-term costs for a fully turned over fleet, the resulting benefit-cost ratio will be close to its maximum point (for those benefits that we have been able to value).

Costs to be compared to the monetized value of the benefits were also developed for a fleet the size of the year 2010 fleet. For this purpose we used the long term cost once the capital costs have been recovered and the manufacturing learning curve reductions have been realized, since this most closely represents the makeup of a fully turned over fleet.

We also made adjustments in the costs to account for the fact that there is a time difference between when some of the costs are expended and when the benefits are realized. The vehicle costs are expended when the vehicle is sold, while the fuel related costs and the benefits are distributed over the life of the vehicle. We resolved this difference by using costs distributed over time such that there is a constant cost per ton of emissions reduction and such that the net present value of these distributed costs corresponds to the net present value of the actual costs.

The resulting adjusted costs are somewhat greater than the expected actual annual cost of the program, reflecting the time value adjustment. Thus, both because of the assumption of a fully turned over fleet and because of the time value adjustment, the costs presented in this section do not represent expected actual annual costs for 2010. Rather, they represent an approximation of the steady-state cost per ton that would likely prevail in 2015 and beyond. The benefit cost ratio for the earlier years of the program would be expected to be lower than that based on these costs, since the fleet-adjusted costs are larger in the early years of the program while the benefits are smaller.

Finally, at the time that we undertook the development of the benefit estimates for this rule, we did not have quantitative estimates of the VOC emission reductions that would result from the evaporative emission standards in the proposal. Therefore, the benefit estimates do not include the value of the evaporative emission standard. Consistent with this, the program cost estimates also exclude the evaporative emission control cost. Since the evaporative emission reductions and costs are both relatively small compared to the rest of the program, they are not

expected to significantly affect the overall cost-benefit ratio.

In order to estimate the changes in air quality conditions that would result from these emissions reductions, we developed two separate, year 2010 emissions inventories to be used as inputs to the air quality models. The first, baseline inventory reflects the best available approximation of the county-by-county emissions for NO_X, NMHC, and SO_2 expected to prevail in the year 2010 in the absence of the standards proposed today. To generate the second, control case inventory, we first estimated the change in vehicle emissions, by pollutant and by county, expected to be achieved by the 2010 control scenario described above. We then took the baseline emissions inventory and subtracted the estimated reduction for each county-pollutant combination to generate the second, control case emissions inventory. Taken together, the two resulting emissions inventories reflect two alternative states of the world and the differences between them represent our best estimate of the reductions in emissions that would result from our control scenario.

With these two emissions inventories in hand, the next step was to ''map'' the county-by-county and pollutant-by-pollutant emission estimates to the input grid cells of two air quality models and one deposition model. The first model, called the Urban Airshed Model (UAM), is designed to estimate the tropospheric ozone concentrations resulting from a specific inventory of emissions of ozone precursor pollutants, particularly NO_X and NMHC. The second model, called the Climatological Regional Dispersion Model Source-Receptor Matrix model (S–R Matrix), is designed to estimate the changes in ambient particulate matter and visibility that would result from a specific set of changes in emissions of primary particulate matter and secondary particulate matter precursors, such as SO_2, NO_X, and NMHC. Also, separate factors relating nitrogen emissions to watershed deposition were developed using the Regional Acid Deposition Model (RADM). By running both the baseline and control case emissions inventories through these models, we were able to estimate the expected 2010 air quality conditions and the changes in air quality conditions that would result from the emissions reductions expected to be achieved by the standards proposed today.

After developing these two sets of year 2010 air quality profiles, we used the same health and environmental effect models used in the 812 studies to calculate the differences in human health and environmental outcomes projected to occur with and without the proposed standards. Specifically, we used the Criteria Air Pollutant Modeling System (CAPMS) to estimate changes in human health outcomes, the Agricultural Simulation Model (AGSIM) to estimate changes in yields of a selected few agricultural crops, and a Household Soiling Damage function to estimate the value of reduced household soiling due to particulate matter. In addition, the benefits of reduced visibility impairment were estimated using the same overall methodology used in the 812 studies, updated to reflect recent advancements in the literature. Finally, we developed estimates of the effect of changes in nitrogen deposition to sensitive estuaries using methodologies applied in the PM/Ozone NAAQS RIA (1997) and in the recent NO_X SIP Call rulemaking. (These benefits models and methodologies are described in detail in the RIAs associated with these actions.) Several air quality-related health and environmental benefits, however, could not be calculated for the preliminary BCA of today's proposed standards. Changes in human health and environmental effects due to changes in ambient concentrations of carbon monoxide (CO), gaseous sulfur dioxide (SO_2), gaseous nitrogen dioxide (NO_2), and hazardous air pollutants could not be included, though some of these may be included in the extended analysis to be conducted for the final rule.

To characterize the total economic value of the reductions in adverse effects achieved across the lower 48 states,[73] we used the same set of economic valuation coefficients and models used in the section 812 studies and the recent NO_X SIP Call RIA to convert each type of adverse effect into a dollar value equivalent. The net monetary benefits of today's proposed standards were then calculated by subtracting the estimated costs of compliance from the estimated monetary benefits of the reductions in adverse health and environmental effects.

In the final step of the analysis, we estimated the range of net benefit estimates that might occur if important but uncertain underlying factors were allowed to vary. By conducting this ''uncertainty analysis,'' we sought to demonstrate how much the overall net benefit estimate might vary based on the particular uncertainties underlying the estimates for human health and environmental effect incidence and the economic valuation of those effects. To accomplish this, we calculated a range of possible monetized benefit estimates using two sets of assumptions surrounding the modeling techniques.

The method for presenting uncertainty, referred to here as the sensitivity approach, identifies the uncertain variables that appear to most strongly influence the overall uncertainty in the monetized benefit estimate. These included, among others, (1) The potential that a concentration threshold exists below that adverse PM-related health effects may not occur, (2) alternative methods for valuing mortality, (3) the potential contribution of tropospheric ozone to premature mortality, (4) alternative methods for valuing reduced cases of chronic bronchitis, (5) the extent to which agricultural crops included in our benefits model are resistant to damage from tropospheric ozone, (6) alternative approaches for valuing visibility. After identifying these key variables, we defined lower bound and upper bound values for each variable and combined these into a Low Case and a High Case. This approach allowed us to demonstrate the sensitivity of the total benefits to uncertainties in important variables. For example, there is no compelling scientific evidence that a PM concentration threshold exists below that adverse health effects do not occur. However, there is also no scientific evidence ruling out the potential existence of a threshold. As a result, there are no data available that would support estimating the probability that a threshold exists at any particular PM concentration. Under these circumstances, using the sensitivity approach allows us to demonstrate the effect of assuming different levels for a PM threshold.

This uncertainty calculation method does not provide a definitive or complete picture of the true range of monetized benefits estimates. This approach, as implemented in this preliminary BCA, does not reflect important uncertainties in earlier steps of the analysis, including estimation of compliance technologies and strategies, emissions reductions and costs associated with those technologies and strategies, and air quality and deposition changes achieved by those emissions reductions. Nor does this approach provide a full accounting of all potential benefits (or disbenefits) associated with the Tier 2 standards, due to data or methodological

[73] Though California is included based on the expectation that reductions in surrounding states will achieve some benefits in California, this analysis does not assume additional reductions in California emissions beyond those already achieved by prevailing standards.

limitations. Therefore, the uncertainty range is only representative of those benefits that we were able to quantify and monetize.

e. *What Were the Results of the Benefit-Cost Analysis?* The preliminary BCA for the proposed standards reflects a single year ''snapshot'' indicative of the relative yearly benefits and costs expected to be realized once the proposed standards have been fully implemented and non-compliant vehicles have all been retired. By necessity, we chose to model the year 2010 because essential data on emissions and air quality were available for this year, but not for later years, even though the complete turnover of the fleet to Tier 2 compliant vehicles will not occur until well after 2010. Consequently, these results are best viewed as a representation of yearly benefits and costs over the long-term and should not be interpreted as reflecting actual benefits and costs likely to be realized for the year 2010 itself. Benefits of the amounts shown here are likely to be realized in the 2015–2020 time frame. In reality, near-term costs will be higher than long-run costs as vehicle manufacturers and oil companies invest in new capital equipment and develop and implement new technologies. In addition, near-term benefits will be lower than long-run benefits because it will take a number of years for Tier 2-compliant vehicles to fully displace older, more polluting vehicles. However, as described earlier, we have adjusted the cost estimates upward to compensate for this discrepancy in the timing of benefits and costs and to ensure that the benefits and costs are calculated on a consistent basis. Because of this adjustment, the cost estimates also should not be interpreted as reflecting the actual costs expected to be incurred in the year 2010. Actual program costs can be found in Section IV.D.3.

Earlier in this section, we described in more detail our approach to estimating and adjusting our cost estimates, based upon the long-run costs expected to be incurred in future years after the initial capital and technology investments have been made. The resulting adjusted cost values are given in Table IV.D.–5. Since the long term costs are not representative of the per vehicle costs in the early phases of the program, we also estimated an adjusted cost based on the near term cost effectiveness value. Using the near term cost effectiveness value of $2134/per ton, the adjusted cost would be $4.3 billion. While no actual in-use fleet could consist entirely of vehicles experiencing this near term cost, this value does present an upper bound on the cost figure.

TABLE IV.D.–5.—ADJUSTED COST FOR COMPARISON TO BENEFITS

Cost basis	Adjusted cost (billions of dollars)
Long term	3.5

With respect to the benefits, several different measures of benefits can be useful to compare and contrast to the estimated compliance costs. These benefit measures include: (a) The tons of emissions reductions achieved, (b) the reductions in incidences of adverse health and environmental effects, and (c) the estimated economic value of those reduced adverse effects. Calculating the cost per ton of pollutant reduced is particularly useful for comparing the cost effectiveness of proposed new standards or programs against existing programs or alternative new programs achieving reductions in the same pollutant or combination of pollutants. The cost-effectiveness analysis presented earlier in this preamble provides such calculations on a per-vehicle basis. Considering the absolute numbers of avoided adverse health and environmental effects can also provide valuable insights into the nature of the health and environmental problem being addressed by the rule as well as the magnitude of the total public health and environmental gains potentially achieved by the proposed rule. Finally, when considered along with other important economic dimensions—including environmental justice, small business financial effects, and other outcomes related to the distribution of benefits and costs among particular groups—the direct comparison of quantified economic benefits and economic costs can provide useful insights into the overall estimated net economic effect of the proposed standards.

Table IV.D.–6 presents our range of estimates of both the estimated reductions in adverse effect incidences and the estimated economic value of those incidence reductions. Specifically, the table lists the avoided incidences of individual health and environmental effects, the pollutant associated with each of these endpoints, and the range of estimated economic value of those avoided incidences. For several effects, particularly environmental effects, direct calculation of economic value in response to air quality conditions is performed, eliminating the intermediate step of calculating incidences. Table IV.D.–7 supplements Table IV.D.–6 by listing those additional health and environmental benefits that could not be expressed in quantitative incidence and/or economic value terms. A full appreciation of the overall economic consequences of today's proposed standards requires consideration of all benefits and costs expected to result from the new standards, not just those benefits and costs that could be expressed here in dollar terms.

TABLE IV.D.–6.—AVOIDED INCIDENCE AND MONETIZED BENEFITS ASSOCIATED WITH THE TIER 2 RULE FOR A RANGE OF ASSUMPTION SETS

Endpoint	Avoided incidence (cases/year)		Monetary benefits (millions 1997$)	
	Low [a]	High [b]	Low	High
PM:				
Mortality (long-term exp.—ages 30+)	832	2,416	2,275	14,256
Mortality (long-term exp.—infants)	.....	10	.....	56
Chronic bronchitis	3,885	3,914	281	1,354
Hosp. Admissions—all respiratory (all ages)	504	836	4.6	7.6
Hosp. Admissions—congestive heart failure	127	138	1.5	1.7
Hosp. Admissions—ischemic heart disease	146	159	2.2	2.4
Acute bronchitis	984	4,072	0.1	0.2
Lower respiratory symptoms (LRS)	19,782	37,437	0.3	0.5
Upper respiratory symptoms (URS)	3,093	3,387	0.1	0.1
Work loss days (WLD)	233,000	415,000	23.8	42.3
Minor restricted activity days (MRAD)	1,856,000	3,370,000	87.7	159.3

TABLE IV.D.–6.—AVOIDED INCIDENCE AND MONETIZED BENEFITS ASSOCIATED WITH THE TIER 2 RULE FOR A RANGE OF ASSUMPTION SETS—Continued

Endpoint	Avoided incidence (cases/year)		Monetary benefits (millions 1997$)	
	Low [a]	High [b]	Low	High
Household soiling damage			60.1	60.1
Ozone:				
Mortality (short-term; four U.S. studies)		388		2,312
Hospital admissions—all respiratory (all ages)	549	736	5.3	7.1
Any of 19 acute symptoms	54,101	71,545	1.3	1.7
Decreased worker productivity			43.0	60.4
Agricultural crop damage			−1	301
Visibility			165	701
Nitrogen Deposition			200	200
Total (PM + ozone + visibility + N deposition)			3,150	19,525

[a] The low assumption set assumes effects from PM do not occur below concentrations of 15 μg/m³, that all mortality and chornic bronchitis effects occur within the same year of the PM reduction (see Section 7.a. of the Draft RIA for a discussion of this uncertainty), utilizes the value of statistical life year lost approach, ozone-related mortality and PM-related infant mortality are not included in the benefits estimate, chronic bronchitis valued with the cost of illness approach, plantings of commodity crop cultivars are assumed to be insensitive to ozone, does not value residential visibility benefits, and uses the lower-bound estimate of ''willingness to pay'' for recreational visibility to reflect variation.

[b] The high assumption set assumes a PM threshold of background, utilizes the value of a statistical life approach, both ozone-related mortality and PM-related mortality are included in the estimation of benefits, chronic bronchitis valued with a willingness-to-pay approach, plantings of commodity crop cultivars are assumed to be sensitive to ozone, and full accounting for recreational and residential visibility benefits.

TABLE IV.D.–7.—ADDITIONAL, NON-MONETIZED BENEFITS OF PROPOSED TIER 2 STANDARDS

Pollutant	Nonmonetized adverse effects
Particulate Matter	Large Changes in Pulmonary Function. Other Chronic Respiratory Diseases. Inflammation of the Lung. Chronic Asthma and Bronchitis.
Ozone	Changes in Pulmonary Function. Increased Airway Responsiveness to Stimuli. Centroacinar Fibrosis. Immunological Changes. Chronic Respiratory Diseases. Extrapulmonary Effects (i.e., other organ systems). Forest and other Ecological Effects. Materials Damage.
Carbon Monoxide	Premature Mortality. Decreased Time to Onset of Angina. Behavioral Effects. Other Cardiovascular Effects. Developmental Effects.
Sulfur Dioxide	Respiratory Symptoms in Non-Asthmatics. Hospital Admissions. Agricultural Effects. Materials Damage.
Nitrogen Oxides	Increased Airway Responsiveness to Stimuli. Decreased Pulmonary Function. Inflammation of the Lung. Immunological Changes. Eye Irritation. Materials Damage. Acid Deposition.
Hazardous Air Pollutants	All Human Health Effects. Ecological Effects.

These results indicate that, based on the particular assumptions, models, and data used in this preliminary BCA, the range of monetary benefits realized after full turnover of the fleet to Tier 2 vehicles would be approximately 3.2 billion to 19.5 billion dollars per year. Comparing this estimate of the economic benefits with the adjusted cost estimate indicates that the net economic benefit of the proposed standards to society could be from a net cost of 0.4 billion to a net benefit of 16.0 billion dollars per year.

The breadth of the ranges of net economic benefit estimates presented in this preliminary BCA reinforces our conclusion that these BCA results may be indicative of potential overall economic effects, but they should by no means dictate whether or not the standards proposed today should be promulgated.

f. *What Additional Efforts Will Be Made Following Proposal?* While we believe that the preliminary BCA provides a strong indication that the standards proposed today will yield positive overall economic benefits, we

believe it is important to do additional analysis prior to the final decision regarding these standards. In particular, we plan to develop an updated and extended set of emissions inventories, and to expand the range of pollutant-specific effects to include the benefits of reductions in carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and perhaps hazardous air pollutants. We will also carefully review the public comments submitted on the preliminary BCA and review each of the assumptions and methods used in light these public comments and the advice of the Science Advisory Board charged with reviewing these and other methods being used in the pending section 812 Prospective Study Report to Congress.

E. Other Program Design Options We Have Considered

In addition to the proposed program combining Tier 2 vehicle standards and gasoline sulfur controls, we have considered two other major alternatives to a comprehensive vehicle/fuel program. This section identifies these two alternatives and seeks comment on specific aspects of each.

1. Corporate Average Standards Based on NMOG or NMOG+NO_X

We have described in great detail in previous sections of this preamble why NO_X is our main pollutant of concern for this rulemaking. Based on this conclusion, we are proposing a Tier 2 program that is centered around a full useful life corporate average NO_X standard (0.07 g/mi). Our proposed interim program for non-Tier 2 vehicles is also centered around a corporate average NO_X standard (0.30 or 0.20 g/mi, depending on vehicle type).

California's program, by contrast, is centered on corporate average NMOG standards. We recognize that for Tier 2 vehicles we could also set up the bins of emission standards and impose an average NMOG standard in a similar fashion. A program centered on corporate average NMOG standards could even be defined in such a way that NO_X emissions would be indirectly driven down to the levels we have defined with our proposed Tier 2 standards. Such an approach would provide more consistency with California's program, and would be consistent with our own NLEV program. However, we believe it is best, for the federal program, to use a NO_X average standard.

With a NO_X average standard we can better tailor the various aspects of the program to reduce the pollutant with which we are most concerned. Thus, our averaging, banking and trading program has been set up to provide NO_X credits for early compliance with the Tier 2 NO_X average standard and to provide additional NO_X credits for manufacturers certifying to extended useful lives. Also, the NO_X average standard allows us to set up bins in such a way as to provide manufacturers with incentives to strive for additional NO_X reductions.

Although the use of an average NO_X requirement conflicts with California's requirements, we do not believe any additional burden is imposed on manufacturers. Under an NMOG averaging requirement, manufacturers would still have to compute separate NMOG averages for their California and Federal vehicles. This would be no smaller burden than computing an NMOG average for California vehicles and a NO_X average for Federal vehicles. We request comment on the appropriateness and burden of our NO_X averaging standards and on what benefits, if any, might be afforded by an NMOG standard for the federal program in lieu of the proposed NO_X average.

2. More Stringent Tier 2 NO_X and Gasoline Sulfur Standards

We considered whether average NO_X levels even lower than 0.07 g/mi (which would likely result in lower NO_X standards for all of the Tier 2 certification bins and substantially limit the number of vehicles certified at NO_X emissions levels significantly higher than 0.07 g/mi) might be possible and cost effective in a scenario where sulfur levels in gasoline would be reduced to an average level on the order of 10 ppm (with perhaps a 20 ppm cap). Manufacturers have requested that California consider such a ''near zero'' sulfur limit to help them to meet the mandatory bins in the CAL LEV II program, which are more stringent than what would be required in the proposed Tier 2 program. We believe our proposed Tier 2 standards can be met with the proposed gasoline sulfur standards. However, tighter Tier 2 standards could require even lower gasoline sulfur limits.

We selected our proposed Tier 2 standards and gasoline sulfur levels based on air quality need, technical feasibility, and cost effectiveness. Hence, we believe the proposed requirements are reasonable and are as stringent as is warranted. However, in consideration of the alternative discussed here, we request comment on the ability of manufacturers to produce vehicles meeting a corporate average NO_X emission level substantially lower than 0.07 g/mi. How would the cost of producing such a vehicle differ from the costs estimated for the proposed Tier 2 vehicles? How sensitive would such a vehicle be to the sulfur level of gasoline, and what sulfur level would be required? How soon could manufacturers be expected to be able to comply with a lower NO_X standard, given that they will be producing LEVII vehicles for California beginning in 2004?

We also request comment on the magnitude of additional sulfur reduction that would be necessary to reduce average full useful life NO_X to levels significantly below 0.07 g/mi, and whether such low levels of sulfur can be met with the technology EPA expects refiners to use to meet the requirements we are proposing today. We request comment on the costs of such sulfur reductions and the timing needed to acquire and implement any additional refinery controls. If refiners invest today to achieve 30 ppm average sulfur levels, will those investments be rendered obsolete by a future sulfur requirement of a near-zero average, or would the technologies complement one another? How much time would refiners need to comply with a near-zero sulfur standard following compliance with a 30 ppm standard?

V. Additional Elements of the Proposed Vehicle Program and Areas for Comment

The section describes several additional provisions of the vehicle proposal and issues on which we are requesting comment that were not previously discussed in this preamble.

A. Other Vehicle-Related Elements of the Proposal

1. Proposed Tier 2 CO, HCHO and PM Standards

Table IV.B.–1 in Section IV.B.4.a. above presented the proposed Tier 2 standards for carbon monoxide (CO), formaldehyde (HCHO), and particulate matter (PM). The following paragraphs discuss our selection of these specific standards for proposal.

a. *Carbon Monoxide (CO) Standards.* Beyond aligning carbon monoxide (CO) standards for all LDVs and LDTs, and allowing harmonizing with California vehicle technology, reduction in CO emissions is not a primary goal of the Tier 2 program. Thus the CO standards we are proposing for all Tier 2 LDVs and LDTs are essentially the same as those from the NLEV program for LDVs and LDT1s. These standards would harmonize with CalLEV II CO standards except at California's SULEV level (EPA Bin 2). This lone divergence would not pose additional burden to

manufacturers because the proposed federal Tier 2 CO standards for these vehicles would be less stringent than California's. Our proposed interim standards during the phase-in of Tier 2 standards would apply these same CO standards.

As we indicated in the Tier 2 Report to Congress, the number and severity of CO NAAQS violations have decreased greatly in recent years. Presently, CO exceedances occur primarily during cold weather. The need for more stringent cold CO standards is a subject of a separate EPA study that is now underway. Consequently, in this rulemaking we propose to simply align CO standards for all categories with those applicable to LDVs and LDT1s under NLEV. This alignment is consistent with our goal of bringing all LDVs and all categories of LDTs under common standards that allow for technology to be harmonized to the extent possible with California.

We believe that technological changes to bring LDT2s and HLDTs [74] under tighter NMOG standards should easily ensure compliance with the CO standards at no additional cost. In fact, certification data on current model year LDTs indicate that there are LDTs in all categories that can already meet the LDV/LDT1 NLEV CO standard.

We recognize that the vast majority of CO emissions are from motor vehicles and that increases in population in some areas combined with increases in vehicle miles traveled could lead to additional incidences of CO nonattainment. Consequently, we request comment on the need for and implications of tighter CO standards for any category of vehicles affected by today's document.

b. *Formaldehyde (HCHO) Standards.* Similar to our approach to the proposed CO standards, we are proposing to align all Tier 2 LDVs and LDTs under the formaldehyde standards for LDVs and LDT1s from the NLEV program. For new bins below Bin No. 4, we propose to adopt the CalLEV II standards for formaldehyde. HLDTs, which are not subject to the NLEV program, would become subject to HCHO standards for the first time under the provisions of this rulemaking. The Tier 2 formaldehyde standards would be essentially replicated in the interim standards we are proposing for LDVs and LDTs.

Formaldehyde is a component of NMOG but is primarily of concern for methanol-fueled vehicles, because it is chemically similar to methanol and is likely to occur when methanol is not completely burned in the engine. HLDTs are not included under the NLEV program and will therefore not face formaldehyde standards as LDVs and LLDTs will in 2001 (1999 in the northeast states). We believe it is appropriate to bring HLDTs under HCHO standards in this rulemaking. Applying formaldehyde standards to HLDTs would be consistent with our goals of aligning standards for all LDVs and LDTs regardless of fuel type and harmonizing technologically with California standards wherever possible and reasonable and the burden would be minimal.

Consequently, we are proposing to include formaldehyde standards for HLDTs under the Tier 2 program as well as under the interim programs. We note that HCHO is actually a component of NMOG, and as with CO, we expect that all vehicles able to meet the Tier 2 or interim NMOG standards (including methanol-fueled vehicles) would readily comply with the HCHO standards.

c. *Particulate Matter (PM) Standards.* We are proposing to adopt tighter PM standards, although in this case only full useful-life standards. For Tier 2 vehicles, we are proposing a 0.01 g/mi standard for all categories at the Tier 2 (Bin 5) level or below (except ZEV which, of course, is 0.0). To provide manufacturers with additional flexibility, we are proposing a 0.02 g/mi PM standard for vehicles that certify to Bins 6 or 7 standards.

For non-Tier 2 LDV/LLDTs during the phase-in period, we are proposing a PM standard of 0.06 g/mi for Bins 4 and 5. The other standards would be 0.04 for Bin 3 and 0.01 for Bin 2. For non-Tier 2 HLDTs, similar standards would apply except that the highest bin would have a PM standard of 0.06 g/mi, gradually decreasing in the other bins to 0.01 g/mi (Bin 2).

PM standards are primarily a concern for diesel-cycle vehicles, but they also apply to gasoline and other otto-cycle vehicles. We propose to continue to permit otto-cycle vehicles to certify to PM standards based on representative test data from similar technology vehicles. We request comment on the degree to which these standards would affect the certification of diesel-fueled vehicles.

2. Useful Life

The ''useful life'' of a vehicle is the period of time, in terms of years and miles, during which a manufacturer is formally responsible for the vehicle's emissions performance. For LDVs and LDTs, there have historically been both ''full useful life'' values, approximating the average life of the vehicle on the road, and ''intermediate useful life'' values, representing about half of the vehicle's life. We are proposing several changes to the current useful life provisions for LDVs and LDTs.

a. *Mandatory 120,000 Mile Useful Life.* We are today proposing to equalize full useful life values for all 2004 and later model year LDVs and LDTs at 120,000 miles. This value would apply to Tier 2 and interim non-Tier 2 vehicles. California, in its LEV II program, has adopted full useful life standards for all LDVs and LDTs of 10 years or 120,000 miles, whichever occurs first. We are proposing that the time period for federal LDV/LLDTs would be 10 years, but it would remain at 11 years for HLDTs consistent with the Clean Air Act.[75] Intermediate useful life values, where applicable, would remain at 5 years or 50,000 miles, whichever occurs first. Where manufacturers elect to certify Tier 2 vehicles for 150,000 miles to gain additional NO_X credits, as discussed below, the useful life of those vehicles would be 15 years and 150,000 miles. We are not proposing to harmonize with California on the mandatory useful life for evaporative emissions of 15 years and 150,000 miles, but rather we are proposing that this useful life be mandatory for evaporative emissions only when a manufacturer elects optional 150,000 mile exhaust emission certification.

b. *150,000 Mile Useful Life Certification Option.* We are proposing to adopt a provision to provide additional NO_X credit in the fleet average calculation for vehicles certified to a useful life of 150,000 miles. In our proposal, a manufacturer certifying an engine family to a 150,000 mile useful life would incorporate those vehicles into its corporate NO_X average as if they were certified to a full useful life standard 0.85 times the applicable 120,000 mile NO_X standard. To use this option, the manufacturer would have to agree to (1) certify the engine family to the applicable 120,000 mile exhaust and evaporative standards at 150,000 miles for all pollutants; and (2) increase the mileage on the single extra-high mileage in-use test vehicle from a minimum of

[74] As defined earlier, the category called HLDT, or heavy light-duty truck, includes all LDTs greater than 6000 pounds GVWR. This term includes the categories LDT3 and LDT4.

[75] Section 202(h) of the Clean Air Act specifies a useful life of 11 years/120,000 miles for HLDTs. California is able to use a 10 year figure because it has a waiver under section 209 of the Act to implement its own emission control program when such program is found to be at least as protective of public health and welfare ''in the aggregate'' as the federal program.

90,000 miles to a minimum of 105,000 miles.

Congress, in directing EPA to perform the Tier 2 study, also directed EPA to consider changing the useful lives of LDVs and LDTs. Manufacturers have made numerous advances in quality, materials and engineering that have led to longer actual vehicle lives and data show that each year of a vehicle's life, people are driving more miles. Current data indicate that passenger cars are driven approximately 120,000 miles in their first ten years of life. Trucks are driven approximately 150,000 miles. Current regulatory useful lives are 10 years/100,000 miles for LDV/LLDTs and 11 years/120,000 miles for HLDTs. We project based on our Tier 2 model that approximately 13 percent of light-duty NO_X and 11 percent of light-duty VOCs is produced between 100,000 and 120,000 miles. Given the trend toward longer actual vehicle lives and increases in annual mileage, we believe that it is reasonable to propose extension to the regulatory useful life requirements.

Additionally, 41 percent of light-duty NO_X and 59 percent of light-duty VOC is produced beyond 120,000 miles. Based on this data, we believe it is also appropriate to propose incentives to manufacturers to certify their vehicles to extended useful lives beyond 120,000 miles. This is why we are proposing, as discussed above, to provide additional NO_X credits for Tier 2 vehicles certified to a useful life of 150,000 miles.

3. Light Duty Supplemental Federal Test Procedure (SFTP) Standards

Supplemental Federal Test Procedure (SFTP) standards require manufacturers to control emissions from vehicles when operated at high rates of speed and acceleration (the US06 test cycle) and when operated under high ambient temperatures with air conditioning loads (the SC03 test cycle). The existing light duty SFTP requirements begin a three year phase-in in model year 2000 for Tier 1 LDV/LLDTs . For HLDTs, SFTP requirements begin a similar phase-in in 2002. Intermediate and full useful life standards exist for all categories. SFTP standards do not apply to diesel fueled Tier 1 LDT2s and HLDTs. Table V.A.–1 shows the full useful life federal SFTP requirements applicable to Tier 1 vehicles.

TABLE V.A.–1.—FULL USEFUL LIFE FEDERAL SFTP STANDARDS APPLICABLE TO TIER 1 VEHICLES

Vehicle category	NMHC + NO_X (weighted g/mi) [a]	CO (g/mi) [b]		
		US06	SC03	Weighted
LDV/LDT1 (gasoline)	0.91	11.1	3.7	4.2
LDV/LDT1 (diesel)	2.07	11.1	.....	4.2
LDT2	1.37	14.6	5.6	5.5
LDT3	1.44	16.9	6.4	6.4
LDT4	2.09	19.3	7.3	7.3

[a] Weighting for NMHC+NO_X and optional weighting for CO is 0.35×(FTP)+0.28×(US06)+0.37×(SC03).
[b] CO standards are stand alone for US06 and SC03 with option for a weighted standard.

The NLEV program includes SFTP requirements for LDVs, LDT1s and LDT2s. These requirements impose the Tier 1 intermediate and full useful life SFTP standards on Tier 1 and TLEV vehicles, but impose only 4000 mile standards on LEVs and ULEVs.[76] NLEV SFTP standards for LEVs and ULEVs are shown in Table V.A.–2. These standards do not provide for a weighted standard for NMHC+NO_X or for CO, but rather employ separate sets of standards for the US06 and SC03 tests. Also, while the NLEV SFTP standards apply to gasoline and diesel vehicles, they do not include a standard for diesel particulates (PM).

TABLE V.A.–2.—SFTP STANDARDS FOR LEVS AND ULEVS IN THE NLEV PROGRAM

	US06		SC03	
	NMHC+NO_X (g/mi)	CO (g/mi)	NMHC+NO_X (g/mi)	CO (g/mi)
LDV/LDT1	0.14	8.0	0.20	2.7
LDT2	0.25	10.5	0.27	3.5

Since no significant numbers of vehicles certified to SFTP standards below TLEV levels will enter the fleet until 2001, manufacturers have raised concerns regarding significant changes to the SFTP program before its implementation. At this point, it seems reasonable not to increase SFTP stringency for the Tier 2 program, but we are proposing to substitute SFTP standards adjusted for intermediate and full useful life deterioration where there are currently only 4000 mile standards.

Full useful life standards for Tier 2 vehicles are consistent with our mandate under the Clean Air Act. The 4000 mile standards exist in the federal program only because they were adopted in the NLEV program—a voluntary program under which California requirements were adopted nationwide. We derived the full and intermediate useful life standards by applying deterioration allowances proposed for our MOBILE 6 model to the existing 4000 mile standards for LDVs and LLDTs. For HLDTs we applied similarly derived deterioration allowances to California's LEV I SFTP standards for MDV2s and MDV3s, which are the corresponding categories to LDT3s and LDT4s in the California program. The full and intermediate useful life SFTP standards we are proposing are shown in Tables V.A.–3

[76] This disparity in useful lives arose because neither EPA nor CARB had full useful life SFTP standards for LEVs or ULEVs when the NLEV program was adopted. Since a major requirement of the NLEV program was harmony with California standards, EPA adopted the California SFTP standards in place for the NLEV time frame (2001 and later).

and V.A.–4. These standards would apply to all Tier 2 vehicles including Tier 2 LDT3s and LDT4s.

TABLE V.A.–3.—PROPOSED FULL USEFUL LIFE SUPPLEMENTAL EMISSION STANDARDS

[(SFTP Standards (grams/mile)]

	USO6 NMHC+NO_X	USO6 CO	SCO3 NMHC+NO_X	SCO3 CO
LDV/LDT1	0.2	11.1	0.26	4.2
LDT2	0.37	14.6	0.39	5.5
LDT3	0.53	16.9	0.44	6.4
LDT4	0.78	19.3	0.62	7.3

TABLE V.A.–4.—PROPOSED INTERMEDIATE USEFUL LIFE SUPPLEMENTAL EMISSION STANDARDS

[(SFTP Standards)(grams/mile)]

	USO6 NMHC+NO_X	USO6 CO	SCO3 NMHC+NO_X	SCO3 CO
LDV/LDT1	0.16	9.0	0.22	3.0
LDT2	0.30	11.6	0.32	3.9
LDT3	0.45	11.6	0.36	3.9
LDT4	0.67	13.2	0.51	4.4

Because our proposed interim standards for LDV/LLDTs (see section VI.A.3.d. above) are derived from NLEV standards, we believe that the SFTP standards we are proposing for Tier 2 vehicles should also apply to the interim non-Tier 2 LDV/LLDTs. However, we propose that TLEV vehicles (EPA interim Bin 5 in Table IV.B.–6), which are not subject to new SFTP standards under NLEV, could continue to meet Tier 1 SFTP standards, and HLDTs under the interim programs could continue to meet Tier 1 SFTP standards that do not fully phase in until the 2004 model year.

LDT3 and LDT4 SFTP standards do not currently apply to diesels. Further, the standards applicable to Tier 1 diesel LDVs and LDT1s are less stringent than gasoline standards and do not apply to the SC03 cycle. We are proposing to apply the approach we are using with other standards in this document to the Tier 2 and interim SFTP standards. Consequently, we are proposing that Tier 2 and interim LDVs and LDTs with diesel or gasoline engines comply with the same NMHC+NO_X and CO SFTP limits. We are also requesting comment on the appropriate SFTP PM standards for diesel vehicles. We believe it would be appropriate to establish a margin between 10% and 50% above the applicable FTP PM standard to serve as the SFTP standard. As an example of how EPA has recently used such a margin, in recent consent decrees, heavy-duty engine manufacturers have agreed not to exceed emission levels 1.25 times the applicable exhaust standards (including PM standards) when engines are operated over a wide range of operating conditions. We request comment on the appropriate standard for PM in the SFTP.

4. LDT Test Weight

Historically, HLDTs (LDT3s and LDT4s) have been emission tested at their adjusted loaded vehicle weight (ALVW), while LDVs, LDT1s, and LDT2s have been tested at their loaded vehicle weight (LVW). ALVW is equivalent to the curb weight of the truck plus half its maximum payload, while LVW is equivalent to the curb weight of the truck plus a driver and one adult passenger (300 pounds). As we are proposing in this document to equalize standards and useful lives across LDVs and all categories of LDTs, we believe it is appropriate to test all the vehicles under the same conditions. Therefore, consistent with the CalLEV II program, we are proposing to test HLDTs at their loaded vehicle weight. We recognize that removing all but 300 pounds of load from these trucks during the test provides them with a somewhat ''easier'' test cycle than they currently have. However, the standards we are proposing for HLDTs under Tier 2, are considerably more stringent than the Tier 1 standards. Further, one of our reasons for bringing HLDTs under the same standards as passenger cars is that these trucks include many vans and sport utility vehicles that are often used as passenger cars with just one or two passengers. Consequently, we believe it is appropriate to test them at LVW.

5. Test Fuels

As discussed elsewhere in this preamble, the NLEV program was adopted virtually in its entirety from California's program. Because California's standards were developed around the use of California Phase II reformulated gasoline (RFG) as the exhaust emission test fuel, we adopted California Phase II test fuel as the exhaust emission test fuel for gasoline-fueled vehicles in the federal NLEV program, although we recognized at the time that vehicles outside of California would be unlikely to operate on that fuel in use.

We believe that it is best to establish compliance with standards based on the fuel that the vehicles will operate upon. However, we also believe that the major exhaust emission related issues between California Phase II fuel and federal test fuel are related to sulfur and we do not believe the other differences between the two fuels will significantly impact NMOG, CO or NO_X exhaust emissions in Tier 2 (or interim) gasoline fueled vehicles.

In this document, we are proposing to reduce the sulfur in federal test fuel to reflect the reductions in sulfur we are proposing for commercial gasoline. Currently, federal test gasoline is subject to a limit of 0.10 percent by weight. We are proposing to amend that to an allowable range of 30 to 80 ppm (0.003 to 0.008 percent by weight). We also propose that vehicles be certified and in-use tested using federal test fuel. However, where vehicles are certified for 50 state sale, and where other testing issues do not arise, we are proposing to accept the results of testing done for California certification on California Phase II fuel. We would reserve the right to perform or require in-use testing on

federal fuel. Where vehicles are only certified for non-California sale, we propose to require certification and in-use testing on federal fuel. We request comments with supporting emission data on all aspects of these two possible test fuels.

Because differences exist between the California and federal evaporative emission testing procedures, we propose to continue to require the use of federal certification fuel as the test fuel in evaporative emission testing. Under current programs, where California and federal evaporative emission standards are nearly identical, California accepts evaporative results generated on the federal procedure (using federal test fuel), because available data indicates the federal procedure to be a ''worst case'' procedure. The evaporative standards California has adopted for their LEV II program are more stringent than those we are proposing in this document. We request comment and supporting emission test data on whether vehicles certified to CalLEV II evaporative standards using California fuels will necessarily comply with the federal Tier 2 evaporative standards, including ORVR standards, when tested with federal test fuel.

6. Changes to Evaporative Certification Procedures to Address Impacts of Alcohol Fuels

Current certification procedures, including regulations under the CAP2000 program,[77] allow manufacturers to develop their own durability process for calculating deterioration factors for evaporative emissions. The regulations (§ 86.1824–01) permit manufacturers to develop service accumulation (aging) methods based on ''good engineering judgement'', subject to review and approval by EPA. The manufacturer's durability process must be designed to predict the expected evaporative emission deterioration of in-use vehicles over their full useful lives. We are proposing to require that these aging methods include the use of alcohol fuels to address concerns that alcohol fuels increase the permeability and thus the evaporative losses from hoses and other evaporative components.

We have reviewed data indicating that the permeability, and therefore the evaporative losses, of hoses and other evaporative components can be greatly increased by exposure to fuels containing alcohols.[78] Alcohols have been shown to promote the passage of hydrocarbons through a variety of different materials commonly used in evaporative emission systems. Data from component and fuel line suppliers indicate that alcohols cause many elastomeric materials to swell, which opens up pathways for hydrocarbon permeation and also can lead to distortion and tearing of components like ''O'' ring seals. Ethers such as MTBE and ETBE have a much smaller effect. Alcohol-resistant materials such as fluoroelastomers are available and are currently used by manufacturers to varying extents.

Alcohols do not impact evaporative components and hoses immediately, but rather it may take as long as one year of exposure to alcohol fuels for permeation rates to stabilize. The end result in higher permeation and increased in-use evaporative emissions.[79]

Today, roughly 10% of fuel sold in the U.S. contains alcohol, mainly in the form of ethanol, and such fuels are often offered in ozone nonattainment areas. We believe it is appropriate to ensure that evaporative certification processes expose evaporative components to alcohols and do so long enough to stabilize their permeability. Therefore, we are proposing to amend evaporative certification requirements to require manufacturers to develop their deterioration factors using a fuel that contains the highest legal quantity of ethanol available in the U.S.

To implement this change, we are proposing to modify the Durability Demonstration Procedures for Evaporative Emissions found at § 86.1824–01. Our proposal would require manufacturers to age their systems using a fuel containing the maximum concentration of alcohols allowed by EPA in the fuel on which the vehicle is intended to operate, i.e., a ''worst case'' test fuel. (Under current requirements, this fuel would be about 10% ethanol, by volume.) We are also proposing to modify the Durability Demonstration Procedures to require manufacturers to ensure that their aging procedures are of sufficient duration to stabilize the permeability of the fuel and evaporative system materials.

It is our desire to find an alternative way by which a manufacturer could document or demonstrate that its tanks, hoses, connectors and other evaporative components are made of materials whose permeability is not significantly affected by alcohols. Successful manufacturers would not have to use alcohol fuel in certification. There are a variety of test methods to evaluate permeation losses from materials, components or subassemblies described in the literature.[80] However, from our discussions with component and materials suppliers, we conclude that there is currently no consensus test procedure or standard available that we could rely on to establish whether a fuel/evaporative system is likely to be sufficiently impermeable to alcohol fuels. We request comment on the availability and appropriateness of such procedures and standards and we request comment on the need for and benefits of certification enhancements to account for the effects of alcohols in fuels. We also seek comment on whether certification test fuel for evaporative emissions should include 10% ethanol.

7. Other Test Procedure Issues

California's LEV II program implements a number of minor changes to exhaust emissions test procedures. We have evaluated these changes and found that, for tailpipe emissions, the California test procedures fall within ranges and specifications permitted under the Federal Test Procedure.

With regard to HEVs and ZEVs, we believe that these vehicles will be predominantly available in California, or that they will typically be first offered for sale in California, because of California's ZEV requirement, which promotes the sale of HEVs and ZEVs. Where manufacturers market HEVs or ZEVs outside of California, it is likely that they will market the same vehicles in California. Consequently, we intend to incorporate by reference California's exhaust emission test procedures for HEVs and ZEVs.[81] We request comment on the appropriateness of this proposed incorporation and an emission allowance for HEVs.

In the NLEV program, we provided a specific formula used by California that could be used to compute an HEV contribution factor to NMOG emissions. This formula took into consideration the

[77] The Compliance Assurance Program, CAP2000, was proposed in an NPRM (63 FR 39654, July 23, 1998). The final rule was signed on March 15, 1998. As today's NPRM went forward for signature, the CAP2000 final rule had not been published, so no citation for the final rule is available. You should check our web site (http://www.epa.gov/omswww/) for the most current information on publication of the CAP2000 rule takes effect in the 2000 model year.

[78] Numerous SAE papers examine the permeability of fuel and evaporative system materials as well as the influence of alcohols on permeability. See, for example SAE Paper #s 910104, 920163, 930992, 970307, 970309, 930992, and 981360, copies of which are in the docket for this rulemaking.

[79] *Ibid.*

[80] *Ibid.*

[81] California Zero-Emission and Hybrid Electric Vehicle Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles. September 18, 1998 for the Board Hearing of November 5, 1998.

range without engine operation of various types of HEVs and had the effect of reducing the NMOG emission standard for a given emission bin (for HEV vehicles only). This would have obvious beneficial effects on a manufacturer's calculation of its corporate NMOG average.

The technology of HEVs is under rapid change and we do not believe that we can design a formula now that will accurately predict the impact of HEVs on corporate average NO_X emissions in the Tier 2 time frame. Consequently, we are including a provision by which manufacturers could propose HEV contribution factors for NO_X to EPA. If approved, these factors could be used in the calculation of a manufacturer's fleet average NO_X emissions and would provide a mechanism to credit an HEV for operating with no emissions over some portion of its life.

These factors would be based on good engineering judgement and would consider such vehicle parameters as vehicle weight, the portion of the time during the test procedure that the vehicle operates with zero emissions, the zero emission range of the vehicle, NO_X emissions from fuel-fired heaters and any measurable NO_X emissions from on-board electricity production and storage.

The final NLEV rule (*See* 62 FR pg 31219, June 6, 1997) incorporates by reference California's NMOG measurement procedure and adopts California's approach of using Reactivity Adjustment Factors (RAFs) to adjust vehicle emission test results to reflect differences in the impact on ozone formation between an alternative-fueled vehicle and a vehicle fueled with conventional gasoline. While we intend to bring all LDVs and LDTs under NMOG standards beginning in 2004 and while we desire to harmonize with California when practical and reasonable, we are not proposing to allow the use of RAFs for Tier 2 vehicles and interim non-Tier 2 vehicles. As has been discussed elsewhere in this preamble, the NLEV program is a special case in which California standards and provisions were adopted virtually in their entirety. In the preamble to the final NLEV rule (*See* 62 FR 31203), we expressed our reservations about the use of RAFs. We also addressed our reservations about the use of reactivity factors developed in California in a program that spans a range of climate and geographic locations across the United States in the final rule on reformulated gasoline (RFG) (see 59 FR 7220). We are concerned about the validity of RAFs to predict ozone formation nationwide and have asked the National Academy of Sciences to look at the scientific evidence in support of the use of these factors nationwide. We expect to receive their report prior to making our final decisions about the Tier 2 standards.

Recognizing that we are not proposing a corporate average NMOG standard, and that RAFs impact only the calculation of NMOG emissions, we request comment on all aspects of RAFs including the impact of not using them on the severity of our proposed standards, their validity to predict ozone formation nationwide, and any impact the lack of RAFs may have on alternative fueled vehicles.

In its LEV II program, California is also implementing a number of changes to evaporative emission test procedures.[82] Many of these changes address the evaporative emission testing of hybrid electric vehicles. We are generally not proposing to adopt California's changes, because California uses different test temperatures and different test fuel in its evaporative emission testing of gasoline vehicles than we use in the federal program. The preamble to the final NLEV rule (*See* 62 FR 31227) explains that California and EPA are reviewing an industry proposal to streamline and reconcile the California and federal procedures. That work has not been completed. However, where California proposes procedures specific to HEVs and ZEVs, we do intend to adopt those procedures, except that our testing would occur at lower temperatures, and use a fuel determined by EPA to be representative of federal usage (for HEVs only). Given the small number of HEVs and ZEVs likely to be sold in states other than California early in the Tier 2 program, and given the small quantities of fuel likely to be used by HEVs in any event, we request comment on the appropriateness of simply accepting California evaporative results for HEVs and ZEVs to show compliance with the less stringent federal evaporative standards. We also request comment on whether any or all of the changes California has adopted for evaporative emission testing should be adopted into federal testing requirements.

8. Small Volume Manufacturers

Our proposal includes the following flexibilities intended to assist all manufacturers in complying with the stringent proposed standards without harm to the program's environmental goals: (1) A four year phase-in of the standards for LDV/LLDTs; (2) a delayed phase-in for HLDTs; (3) the freedom to select from specific bins of standards; (4) a standard that can be met through averaging, banking and trading of NO_X credits; (5) provisions for NO_X credit deficit carryover; and (6) provisions by which a manufacturer may generate additional NO_X credits.

These flexibilities would apply to all manufacturers, regardless of size, and in general we believe they eliminate the need for more specific provisions for small volume manufacturers. However, we are proposing one additional flexibility for small volume manufacturers.[83] Our proposal would exempt small volume manufacturers from the 25%, 50% and 75% Tier 2 phase-in requirements applicable to the 2004, 2005 and 2006 LDV/LLDTs and the 50% phase-in requirement applicable to 2008 HLDTs. Instead, small volume manufacturers would simply comply with the appropriate 100% requirement in the 2007 or 2009 model year. Our proposal would also exempt small volume manufacturers from the 25%, 50% and 75% phase-in requirements applicable to interim HLDTs in 2004–2006. Instead, small volume HLDT manufacturers would simply comply with the interim standards, including the corporate average NO_X standard, in 2007 for 100% of their vehicles. During model years 2004–2006, these same small volume manufacturers would comply with any of the interim bins of HLDT standards for 100% of their HLDTs.[84]

Also, we will continue to apply the federal small volume manufacturer provisions, which provide relief from emission data and durability showing and reduce the amount of information required to be submitted to obtain a certificate of conformity. In addition, the CAP2000 program contains reduced in-use testing requirements for small volume manufacturers. Under section V.B.1. below, we describe and request comment on possible additional special provisions for certifiers that qualify as small businesses.

Our proposal to exempt small volume manufacturers from the Tier 2 phase-in requirements eliminates a dilemma that the phase-in percentages might pose to a manufacturer that has a limited product line, i.e., how to address percentage phase-in requirements if the

[82] California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles; September 18, 1998. Prepared for the November 5, 1998 Hearing of the California Air Resources Board.

[83] We define small volume manufacturers to be those with total U.S. sales of less than 15,000 highway units per year. Independent commercial importers (ICIs) with sales under 15,000 per year would be included under this term.

[84] For a graphical illustration of the phase-ins through time, see Figure IV.B.–1.

manufacturer makes vehicles in only one or two test groups. We have proposed similar provisions for small entities in other rulemakings. Approximately 15–20 manufacturers that currently certify vehicles, many of which are independent commercial importers (ICIs), would qualify. These manufacturers represent just a fraction of one percent of LDVs and LDTs produced. We do not believe that this provision would have any measurable impact on air quality.

9. Compliance Monitoring and Enforcement

a. *Application of EPA's Compliance Assurance Program, CAP2000.* The CAP2000 program (final rule signed March 15, 1998; **Federal Register** cite not yet available) streamlines and simplifies the procedures for certification of new vehicles and would also require manufacturers to test in-use vehicles to monitor compliance with emission standards. The CAP2000 program was developed jointly with the State of California and involved considerable input and support from manufacturers. As the name implies, it can be implemented as early as the 2000 model year.

In today's document, we are proposing that the Tier 2 and the interim requirements would be implemented subject to the requirements of the CAP2000 program. Certain CAP2000 requirements would be slightly modified to reflect changes to useful lives, standard structure and other aspects of the Tier 2 program, but we are proposing no major changes to fundamental principles of the CAP2000 program.

Although we are proposing changes to useful lives in this document, we are not proposing to amend the 50,000 mile minimum mileage used in manufacturer in-use verification testing or in-use confirmatory testing under the CAP2000 program at this time. The CAP2000 in-use program is not yet implemented and we believe it is appropriate to allow manufacturers to gain experience with procuring and testing vehicles at the 50,000 mile level before making significant changes. However, where one vehicle from each in-use test group would have a minimum mileage of 75,000 miles under the CAP2000 program, we are proposing, consistent with California, to change that figure to 90,000 miles for Tier 2 vehicles.

We may, in our own in-use program, procure and test vehicles at mileages higher than 50,000 and pursue remedial actions (e.g. recalls) based on that data. We may also use that data as the basis to initiate a rulemaking to make changes in theCAP2000 in-use requirements, if the data indicate significant non-conformity at higher mileages.

b. *Compliance Monitoring.* We plan no new compliance monitoring activities or programs for Tier 2 vehicles. These vehicles would be subject to the certification and manufacturer in-use testing provisions of the CAP2000 rule. Also, we expect to continue our own in-use testing program for exhaust and evaporative emissions. We will pursue remedial actions when substantial numbers of properly maintained and used vehicles fail any standard in either in-use testing program.

We retain the right to conduct Selective Enforcement Auditing of new vehicles at manufacturer's facilities. In recent years, we have discontinued SEA testing of new light-duty vehicles and trucks, because compliance rates were routinely at 100%. We recognize that the need for SEA testing may be reduced by the low mileage in-use testing requirements of the CAP2000 program. However, we expect to re-examine the need for SEA testing as standards tighten under the NLEV and Tier 2 programs.

We have established a data base to record and track manufacturers' compliance with NLEV requirements including the corporate average NMOG standards. We expect to monitor manufacturers' compliance with the Tier 2 and interim corporate average NO_X standards in a similar fashion and also to monitor manufacturers' phase-in percentages for Tier 2 vehicles.

c. *Relaxed In-Use Standards for Tier 2 Vehicles Produced During the Phase-in Period.* As we have indicated numerous times in this preamble, the Tier 2 standards we are proposing would be challenging for manufacturers to achieve, and some vehicles would pose more of a challenge than others. Not only would manufacturers be responsible for assuring that vehicles can meet the standards at the time of certification, they would also have to ensure that the vehicles could comply when tested in-use by themselves under the provisions of the CAP2000 program, and by EPA under its in-use (''Recall'') test program.

With any new technology, or even with new calibrations of existing technology, there are risks of in-use compliance problems that may not appear in the certification process. In-use compliance concerns may discourage manufacturers from applying new technologies or new calibrations. Thus, it may be appropriate for the first few years, for those bins most likely to require the greatest applications of effort, to provide assurance to the manufacturers that they will not face recall if they exceed standards by a specified amount.

We are proposing, for Tier 2 vehicles only, that for the first two years after a test group meeting a new standard is introduced, that test group be subject to more lenient in-use standards. These ''in-use standards'' would apply only to Tier 2 Bins 5 and below, only for the pollutants indicated, and only for the first two model years that a test group was certified under that bin. The in-use standards would not be applicable to any test group first certified to a new standard after 2007 for LDV/LLDTs or after 2009 for HLDTs.

The in-use standards we are proposing are shown in Table V.A.–5 below.

TABLE V.A.–5.—IN-USE COMPLIANCE STANDARDS FOR TIER 2 VEHICLES (G/MI)

[Certification standards shown for reference purposes]

Bin No.	Durability period (miles)	NO_X In-use	NO_X certification	NMOG in-use	NMOG certification
5, 4	50,000	0.07	0.05	N/a	0.075, 0.04.
5, 4	120,000	0.10	0.07	N/a	0.090, 0.055.
3	120,000	0.06	0.04	N/a	0.070.
2	120,000	0.03	0.02	0.02	0.010.

We believe manufacturers should and will strive to meet the Tier 2 certification standards for the full useful lives of the vehicles, but we recognize that the existence of such in-use standards poses some risk that a

manufacturer might aim for the in-use standard in its design efforts rather than the certification standard, and thus market less durable designs. We do not believe that risk to be significant. We believe that such risks are more than balanced by the gains that could result from earlier application of new technology or new calibration techniques that might occur in a scenario where in-use liability is slightly reduced. Further, we believe that the in-use standards will be of short enough duration that any risks are minimal.

We note that the in-use provisions proposed above are similar to those included in California's LEV II program. We request comment on all aspects of the proposed in-use standards including the appropriateness of and need for separate in-use compliance standards for the early years of the Tier 2 program.

d. *Enforcement of the Tier 2 and Interim Corporate Average NO_X Standards.* Under the proposed programs, manufacturers could either report that they met the relevant corporate average NO_X standard in their annual reports to the Agency or they could show via the use of NO_X credits that they have offset any exceedence of the corporate average NO_X standard. Manufacturers would also report their NO_X credit balances or deficits.

The averaging, banking and trading program would be enforced through the certificate of conformity that the manufacturer would need to obtain in order to introduce any regulated vehicles into commerce. The certificate for each test group would require all vehicles to meet the applicable Tier 2 emission standards from the applicable bin of the Tier 2 program, and would be conditioned upon the manufacturer meeting the corporate average NO_X standard within the required time frame. If a manufacturer failed to meet this condition, the vehicles causing the corporate average NO_X exceedence will be considered to be not covered by the certificate of conformity for that engine family. A manufacturer would be subject to penalties on an individual vehicle basis for sale of vehicles not covered by a certificate. These provisions would also apply to the interim corporate average standards.

As outlined in detail in the preamble to the final NLEV rule, EPA would review the manufacturer's sales to designate the vehicles that caused the exceedence of the corporate average NO_X standard. We would designate as nonconforming those vehicles in those test groups with the highest certification emission values first, continuing until a number of vehicles equal to the calculated number of noncomplying vehicles as determined above is reached. In a test group where only a portion of vehicles would be deemed nonconforming, we would determine the actual nonconforming vehicles by counting backwards from the last vehicle produced in that test group. Manufacturers would be liable for penalties for each vehicle sold that is not covered by a certificate.

We are proposing in today's action to condition certificates to enforce the requirements that manufacturers not sell NO_X credits that they have not generated. A manufacturer that transferred NO_X credits it did not have would create an equivalent number of debits that it would be required to offset by the reporting deadline for the same model year. Failure to cover these debits with NO_X credits by the reporting deadline would be a violation of the conditions under which EPA issued the certificate of conformity, and nonconforming vehicles would not be covered by the certificate. EPA would identify the nonconforming vehicles in the same manner described above.

In the case of a trade that resulted in a negative credit balance that a manufacturer could not cover by the reporting deadline for the model year in which the trade occurred, we propose to hold both the buyer and the seller liable. This is consistent with other mobile source rules, except for the NLEV rule as discussed below. We believe that holding both parties liable will induce the buyer to exercise diligence in assuring that the seller has or will be able to generate appropriate credits and will help to ensure that inappropriate trades do not occur.

In the NLEV program we implemented a system in which only the seller of credits would be liable. In the preamble to the final NLEV rule (*See* 62 FR 31216), we explained that a multiple liability approach would be unnecessary in the context of the NLEV program given that the main benefit to a multi-party liability approach would be to ''protect against a situation where one party sells invalid credits and then goes bankrupt, leaving no one liable for either penalties or compensation for the environmental harm.'' Our preamble stated further that EPA would not necessarily take the same approach for ''other differently situated trading programs.''

The NLEV program was implemented to be a relatively short duration program, during which time we could expect relative stability in the industry. Also, given that NLEV is a voluntary program of lower than mandated standards, we did not expect that the smallest manufacturers would opt in. These are the companies whose stability is most in jeopardy in a dynamic and very competitive worldwide business.

We currently believe that the Tier 2 program and its framework will remain for many years. We note that the program is not scheduled for complete phase-in for almost nine years after the publication of this proposal. All manufacturers, large and small, will ultimately have to meet the Tier 2 standards. We cannot predict that in the Tier 2 time frame there will not be companies that leave the market or are divided between other companies in mergers and acquisitions. Thus we believe it is prudent to implement a program to provide inducements to the seller to assure the validity of any credits that it purchases or contracts for. However, we request comment on whether we should implement a program that would only deem the seller to be in violation if it sold credits it could not supply.

10. Miscellaneous Provisions

We are proposing to continue existing emission standards from Tier 1 and NLEV that apply to cold CO, certification short testing, refueling, running loss, idle CO for LDTs, and highway NO_X. We are not proposing to continue the 50 degree (F) standards and testing included in the NLEV program. The 50 degree standards are a part of the NLEV program because that national program adopted California requirements virtually in their entirety. These standards had not previously been part of any federal program. We request comment on the need and the associated burden for any of the standards mentioned in this paragraph.

B. Other Areas on Which We are Seeking Comment

1. LDV/LDT Program Options

The alternatives for which we seek comment would have impacts on the level of emission reductions achieved by the program as well as on the cost and technological impacts of the program. Any decision to adopt an alternative would have to consider those factors. We welcome comments on all of the options described below. Commenters should address cost, technological feasibility and emission impact whenever possible.

a. *Alternatives to Address Stringency of the Standards.*

i. *Alternative Standards and Implementation Schedules.*

We believe that the Tier 2 standards and phase-in schedule contained in this proposal provide appropriate lead time and flexibility for manufacturers to

achieve cost-effective emission reductions in a reasonable time period. Further, our standards and phase-in schedules are reasonably harmonized with California's LEV II program to facilitate the sale of 50-state vehicles and to minimize the administrative burdens involved with having to meet the requirements of both California and EPA simultaneously. We believe our proposed fuels provisions will ensure that appropriate fuels are available to enable Tier 2 vehicles to provide substantive in-use emission reductions. Some have suggested delays in the program to 2007 and later. However, many states need reductions as soon as possible for 2007 NAAQS compliance, so there is a need for an aggressive but achievable implementation schedule.

Nevertheless, we are interested in reviewing alternative standards, implementation schedules and averaging schemes. Therefore we request comment on all aspects of the standards and schedules we are proposing today, including the interim standards and schedules, and we request comment on what alternative standards and implementation approaches might provide comparable emission reductions that are cost-effective in the same time frame as our proposal.

We recognize that the Tier 2 program as proposed today does not provide for further reductions in average certification levels after 2008 as California's LEV II program does. We request comment on the technological feasibility, necessity, cost and likely benefits of further reductions in corporate average standards after 2009, including comments on the reduction of the corporate average NO_X standard to a level of approximately 0.05 g/mi in the 2011–2012 time frame. We also request comment on a traditional, non-averaging standard of 0.07 g/mi NO_X with related standards for NMOG, CO, HCHO, and PM in the 2011–2012 time frame, applicable to all LDVs and LDTs.

ii. *Use of Family Emission Limits (FELs) Rather than Bins.*

A bins-based program with an overarching corporate average standard has worked well in California for many years and is being implemented nationwide beginning in 1999 under the NLEV program. We believe that a phased in, bins-based program is the best way to implement the Tier 2 exhaust emission standards and, at the same time, encourage the development of advanced emission control technology. We believe that manufacturers of light duty vehicles and trucks are accustomed to such programs and will appreciate the flexibility and opportunities for 50-state certification that a bins-based program affords.

We are aware, of course, that in other EPA mobile source emission programs, we have implemented averaging standards that were not based upon bins. In these programs, manufacturers declare a family emission limit (FEL) either above or below the averaging standard set by EPA. The FEL becomes the standard for that family. Similar to the bins approach, manufacturers compute a sales weighted average for the subject pollutant at the end of the model year and then determine credits generated or needed based on the distance of that average above or below the standard.

In an FEL based program, every test group can have a different FEL—essentially there is an unlimited continuum of bins to choose from (although there is usually an upper limit or cap on the FELs). The FEL approach adds flexibility and could increase the incentive for cost-effective improvements in vehicle emissions performance. Under a bins approach, a manufacturer is limited to step-wise improvements. An FEL approach could provide incentive for manufacturers to realize smaller, low cost emissions improvements that could be achieved, for example, through engine re-calibration.

However, FEL-based programs create other concerns. One concern with an FEL approach is that it may be viewed as providing too much flexibility since a manufacturer could request a change in an FEL based on a change in desired compliance margin above the certification level or based on concern about its credit balance rather than a change in technology. In EPA's FEL-based programs, it is not uncommon for a manufacturer to declare an FEL that is identical to its certification level. It is also not uncommon for a manufacturer to change its FEL several times during a model year, based, among other reasons, on the availability of or need for credits. In a bins approach, such changes are unlikely, since a change in bins involves more of an increment in emissions and involves compliance with all pollutants in that bin. Consequently, a bins approach eases EPA's compliance monitoring burden. It provides additional assurance that expected emission reductions will occur in use because some vehicles may ''over-qualify'' for their bin resulting in greater than expected reductions than if they exactly met the standard for that bin. Of course, an FEL approach could be modified to restrict or prohibit changes in certification levels during a model year.

Also, in an FEL-based program, it may be necessary to establish corporate average standards for other pollutants besides NO_X. These standards would then require manufacturers to establish FELs for additional pollutants. In a bins-based program, the standards for the other pollutants are simply set by the different bins.

An FEL approach could also lead to additional complexity in manufacturer in-use testing under the CAP2000 program and in EPA in-use testing because if FEL changes are made, the issue of which standard to measure compliance against arises as does the issue of how many vehicles to test for each different FEL. If we were to adopt an FEL approach, we would have to consider significant changes to the in-use provisions of the CAP2000 program to assure that all variations of a test group were adequately covered by manufacturer in-use testing.

We request comment on the appropriateness and need for an FEL-based program for the Tier 2 and/or interim standards. Commenters supporting the use of an FEL-based program should also provide comment as to how EPA can best manage the issues related to in-use testing and how EPA can best assure that FEL changes are closely linked to real changes in vehicle emissions.

iii. *Use of Different Averaging Sets.*

We chose for our proposal the broadest possible—and therefore most flexible—averaging set for the Tier 2 vehicles. We are proposing that, beginning in 2009 when phase-in of all vehicles is complete, all LDVs and LDTs could be averaged together to meet the corporate average NO_X standard. We believe this approach is appropriate because it treats LDTs like LDVs, considering that LDTs are used as passenger cars much of the time. Also, by permitting this broad averaging, a manufacturer of larger LDTs that might have difficulty meeting a 0.07 g/mi NO_X level can certify the LDTs to Bin 6 or 7 and offset the emissions of these trucks with cars or smaller trucks that it certifies to levels below 0.07 g/mi.

While we believe our proposed averaging program is appropriate, we recognize that most manufacturers do not produce larger LDTs and may be able to meet the corporate average NO_X standard of 0.07 g/mi with less overall effort. Therefore, we request comment as to whether another approach to averaging might be more appropriate such as a segregated approach where LDTs are averaged separately from LDVs or where HLDTs (LDT3s and 4s) are averaged separately from LDV/LLDTs.

iv. *Different Standards for Different Categories of Vehicles.*

We have explained several times in this preamble that we believe the same standards should apply to all LDVs and LDTs because LDTs are so often used as passenger vehicles, and because the standards are feasible for all LDVs and LDTs. The technological challenge may be greater for larger trucks, so our proposal provides additional leadtime and a later start date for HLDTs to provide more opportunity to resolve potential problems. However, we recognize that other approaches exist that could yield comparable environmental benefit. Therefore, we request comment on other approaches such as one that would employ a lower corporate average NO_X standard for LDV/LLDTs, with a higher corporate average standard for HLDTs.

v. *Consideration of Special Provisions for the Largest LDTs and Advanced Technology.*

California has adopted a provision in its LEV II program, under which a manufacturer could certify up to 4 percent of its larger LDTs to a higher NO_X standard. These trucks could meet a 0.10 g/mi NO_X standard rather than a 0.07 g/mi NO_X standard, provided they have a payload of at least 2500 pounds. California chose the figure of 4% because it approximates the fraction of such trucks in the largest volume manufacturer's fleet.

We have not proposed such an option in the federal program because we are providing additional lead time and compliance on average for all cars and trucks beginning in 2009. Nevertheless, we do recognize that the largest trucks will likely require the greatest application of emission control technology to comply with Tier 2 standards and we expect that larger trucks will likely be the last, and the most difficult, vehicles to phase into the Tier 2 program.

In the context of the flexibilities already proposed for the federal program, we request comment on the need for and environmental impact of additional program flexibility for the largest trucks. One option we have considered would allow manufacturers to exclude a small fraction (perhaps 4 percent) of their largest Tier 2 trucks (HLDTs) from the corporate average NO_X calculation beginning in 2009 and lasting through approximately model year 2011. These trucks would still be subject to a NO_X standard of 0.20 g/mi and all other standards and provisions of the Tier 2 program, including the requirement to fit within a Tier 2 bin for other emission standards.

This provision would provide a less stringent standard for the heaviest LDTs. We believe these LDTs are the most likely to be used primarily for work and commercial purposes, while at the same time having the most difficulty complying with Tier 2 requirements. We request comment on all aspects of this provision, including whether the allowable sales fraction (4%) and payload minimum (2500 pounds) set by California would be appropriate for the federal provision, and whether such a concept should also be applied to only LDT4s or both LDT3s and 4s. Supporters of such an approach should comment on the appropriate allowable sales fraction for the interim vehicles.

Some have suggested that a potential way of providing flexibility for advanced technology vehicles would be to provide bins with less stringent standards while retaining the stringency of the 0.07 NO_X average. These additional bins would augment the current flexibilities offered to manufacturers. We request comment on this idea, specifically on including additional bins with NO_X standards up to 0.60 g/mi, with any other modifications that are appropriate. We also ask comment on whether such bins should be a temporary part of the Tier 2 program.

vi. *Measures to Prevent LDT Migration to Heavy-Duty Vehicle Category.*

Existing regulations define a light-duty truck to be any motor vehicle rated at 8500 pounds gross vehicle weight rating (GVWR) or less that has a curb weight of 6000 pounds or less and that has a basic frontal area of 45 square feet or less, which is:

- Designed primarily for purposes of transportation of property or is a derivation of such a vehicle, or
- Designed primarily for transportation of persons and has a capacity of more than 12 persons, or
- Available with special features enabling off-street or off-highway operation and use.

For the heaviest LDTs, we are concerned that manufacturers may, in some cases, find it attractive to add GVWR capacity, curb weight or frontal area to their vehicles such that they would no longer meet one or more of the criteria to be considered an LDT. The vehicles would then fall into the heavy-duty category and would be subject to less technologically challenging standards.

We would like to develop reasonable restrictions to prevent this ''gaming'' of the LDT definition. The ideal restrictions would prevent migration of LDTs above the limiting criteria, but would not impact vehicles with legitimate needs to be outside, but close to, the LDT definition. Our objective is complicated by the fact that many LDTs currently have derivatives or corresponding models that are over 8500 pounds GVWR.

We have considered various approaches to restrictions on LDTs. Some of the ideas we have considered are as follows:

- Require all complete trucks in the 8500–10,000 pound GVWR range to meet light-duty standards.
- Raise the GVWR cutoff from 8500 pounds to some other number such as 8750, 9000 or 9500 pounds.
- Require manufacturers of vehicles that are above but close to any of the three size criteria to provide justification that they cannot accomplish their intended function if built to a lower size criterion.
- Require manufacturers to provide supporting data, surveys, etc., that vehicles above, but close to, any of the LDT cutoffs are primarily used for commercial purposes.

We request comment on all aspects of this vehicle migration issue, including specific comment on the ideas presented above and on other approaches that might be appropriate. This discussion serves as notice that we are very likely to finalize a provision to address this vehicle migration issue. You are encouraged to consider the approaches we have outlined above and provide specific suggestions on other approaches as well as comments as to the need for such controls, their feasibility and their cost.

In the longer term, the best way to address the vehicle migration issue is to implement standards for complete heavy-duty vehicles that have a stringency comparable to their HLDT counterparts. In the near future, we expect to publish an NPRM addressing emissions from gasoline-fueled heavy-duty engines and vehicles for 2004 and later model years. As part of that effort we are considering chassis-based standards for gasoline-fueled complete vehicles between 8,500 and 14,000 lbs GVWR. The degree to which such standards discourage migration depends upon the relative stringency of the standards. EPA requests comment on the potential effectiveness of such a strategy in addressing migration concerns and the timing and level of emission standards necessary to do so.

vii. *Use of Non-conformance Penalties (NCPs).*

NCPs are monetary payments that manufacturers can pay to meet an adjusted standard in lieu of complying with a prescribed emission standard or set of emission standards. *See* CAA

section 206(g). Current regulations at 40 CFR part 86 Subpart L provide for NCPs for HLDTs, and for heavy-duty engines. However, in order to establish NCPs for a specific standard or set of standards for these vehicles and engines, EPA must first determine that (1) substantial work will be required to meet the standard for which the NCP is offered; and (2) that there will be a manufacturer that is a technological laggard in complying with that standard. EPA must also, through rulemaking, determine compliance costs so that the penalty rates can be established appropriately.

NCPs were used extensively by manufacturers of on-highway heavy-duty engines in the late 1980s, prior to the implementation of our heavy-duty averaging, banking and trading program. Since that time, their use has been rare. We believe manufacturers have used the flexibility of an averaging, banking and trading scheme as a preferred alternative to incurring the monetary losses associated with NCPs.

We are not proposing NCPs for HLDTs in the primary Tier 2 program or in the interim programs. This is because we believe that the NO_X averaging program we are proposing makes it unlikely that the criteria for NCPs mentioned above will be met, as NO_X credits from other vehicles may be used to enable HLDTs to meet the 0.07 g/mi average NO_X standard.

We have considered whether NCPs might be appropriate for the Tier 2 diesel particulate standards, for which our proposal contains no averaging provisions. We are not proposing PM NCPs for those diesel powered trucks, but we request comment on whether such NCPs would be appropriate. We believe that appropriate technologies will be available from component vendors and diesel engine suppliers. We request comment on the need for and appropriateness of NCPs for any Tier 2 standard for HLDTs.

viii. *Additional NO_X Credits for Vehicles Certifying to Low NO_X Levels.*

There is currently substantial work underway to develop vehicles with extremely low emissions. We believe that it is appropriate to encourage such technology by providing incentives for its use. Consequently, we are requesting comment as to whether we should implement a provision by which manufacturers can earn additional NO_X credits for certifying to levels below 0.07 g/mi. As we envision such a provision, manufacturers would be allowed, in the calculation of their year end corporate average NO_X level, to multiply the number of vehicles sold which are certified to bins below 0.07 g/mi NO_X by some preset multiplier, or set of multipliers. For example, the number of vehicles certified to the 0.04 bin might be multiplied by 1.5, those in the 0.02 bin might be multiplied by 2.0 and those in the 0.0 bin (ZEVs) might be multiplied by 3.0.

We recognize that such a program would enable manufacturers to use more credits than actually generated in use, and that the use of these credits would likely result in some additional NO_X emissions. However, we believe that it may be appropriate to provide inducements to manufacturers to strive for ever lower NO_X emissions and that these inducements may help pave the way for greater and/or more cost effective emission reductions from future vehicles. We request comment on all aspects of such incentive credits. Issues related to these credits include the value of a multiplier or multipliers, whether early credits should be subject to the multipliers, and whether there should be a ''sunset'' provision to limit the time period in which manufacturers could obtain and/or use these extra credits. We request comment on a sunset year of 2009, since it is the end of the proposed Tier 2 program phase-in.

ix. *Incentives for Manufacturers to Bank Additional Early NO_X credits.*

We are interested in exploring any reasonable approaches that would provide incentives to manufacturers to produce vehicles meeting the 0.07 g/mi NO_X standard earlier than required. We believe that early certification to this level will help manufacturers gain experience with new or enhanced technologies on a limited scale before they must be applied to the entire fleet, and that such experience would have a positive, although hard to quantify, environmental benefit.

We have proposed an approach elsewhere in this preamble that permits manufacturers to utilize alternative phase-in schedules. Manufacturers that introduce Tier 2 vehicles before the first required year in the primary phase-in schedule could follow a more flexible phase-in path to 100% compliance than required under the primary option. Manufacturers would also be able to generate NO_X credits if these ''early'' vehicles met a corporate average NO_X level of less than 0.07 g/mi.

We have considered whether a mechanism that provided additional NO_X credits could induce manufacturers to introduce more Tier 2 vehicles sooner than required. Such a mechanism might substitute a number higher than the 0.07 g/mi NO_X standard in the credit calculation so that the manufacturer would subtract its corporate average NO_X level from, say, 0.10 and then multiply the difference by the number of Tier 2 vehicles to determine credits earned. While we believe such a scheme might induce manufacturers to accelerate the introduction of Tier 2 vehicles, we have concerns about whether this approach would lead to windfall credits and whether we would need to employ a discount to compensate for them. Should the resulting credits have finite or infinite life? Should we apply such a scheme to LDV/LLDTs only; or should we also apply it to HLDTs; and should we apply such a scheme to the interim standards for HLDTs? We request comment on these and all other aspects of permitting additional NO_X credits for Tier 2 and interim vehicles.

x. *Flexibilities for Small Volume Manufacturers and Small Businesses.*

In section V.A.8. above, we propose to waive the Tier 2 phase-in requirements for small volume manufacturers.[85] These manufacturers, which each produce 15,000 or fewer vehicles per year, would simply comply with the 100 % requirement in 2007 (2009 for HLDTs).

Some very small volume manufacturers of LDVs and LDT1s and LDT2s elected not to opt into NLEV and thus will produce Tier 1 vehicles during the NLEV program. We are seeking comment about the burden that our interim standards might impose on very small manufacturers in 2004 given that they will have to meet the Tier 2 standards no later than 2007 under today's proposal. Similarly we are concerned about the burden that the interim standards might impose on any small volume HLDT manufacturers. We request comment on the need for and appropriateness of a provision that would waive the interim standards for very small volume manufacturers who produce, say, less than 1,000 vehicles per year, or who qualify as small businesses (see below).

The panel convened under the Small Business Regulatory Enforcement Fairness Act (SBREFA),[86] recommended that we seek comment on five provisions outlined below to ease our

[85] A ''small volume manufacturer'' is not necessarily a ''small business''. Rather, ''small volume manufacturer'' is an EPA term that refers to entities whose annual on-highway sales are 15,000 or fewer vehicles per year. However, most if not all small businesses covered under this discussion are also ''small volume manufacturers,'' though most small volume manufacturers are not small businesses.

[86] This panel was convened, consistent with SBREFA, by EPA, the Small Business Administration, and the Office of Management and Budget to review of the likely impact of Tier 2 requirements on small businesses.

proposal's impact on small businesses. These provisions, if adopted, would apply to ''small businesses'' as defined by Small Business Administration. The size of a ''small business'' varies by industry type as represented by SIC codes. Tables V.B.–2 and V.B.–3 contain the SIC codes that could potentially be impacted by the Tier 2 rule and the maximum number of employees or maximum revenue a business can have to be considered a small business.

TABLE V.B.–2.—SBA SMALL BUSINESS CATEGORIES FOR SMALL INDEPENDENT COMMERCIAL IMPORTERS

SIC code	Description	Size standard (annual revenues in millions)
7533	Auto Exhaust System Repair Shops	$5
7549	Automotive Services	5
8742	Management Consulting Services	5

TABLE V.B.–3.—SBA SMALL BUSINESS CATEGORIES FOR ALTERNATIVE FUEL VEHICLE CONVERTERS

SIC code	Description	Size standard ($ =annual revenues)
3592	Carburetors, Pistons, Rings and Valves	500 employees.
3714	Motor Vehicle Parts and Accessories	750 employees.
5172	Petroleum Products	100 employees.
5984	Liquefied Petroleum Gas Dealers	$5 million.
7549	Automotive Services	$5 million.
8742	Management Consulting Services	$5 million.
8931	Commercial Physical Research	500 employees.

The vast majority of businesses in these categories are not subject to these EPA requirements. However, some businesses in these categories may in fact manufacture LDVs and LDTs or may modify vehicles produced by others in a manner that will subject them to the requirements applicable to manufacturers under EPA regulations. For example, Independent Commercial Importers (ICIs) modify imported motor vehicles into configurations that they certify to meet federal emission requirements. Approximately 15–20 small businesses qualified as manufacturers and received certificates of conformity each year over the last five years.

For simplicity, and consistency with the report of the SBREFA panel, we refer to these small businesses as small certifiers in the following discussion. The requirements to certify continue to apply only to parties that meet the definition of ''manufacturer.''

Consistent with the recommendations of the SBREFA panel, we request comment on the following ideas:

For small certifiers that convert imported vehicles to U.S. standards (independent commercial importers or ICIs) and for small certifiers that convert vehicles to operate on alternative fuels, provide a delay in required compliance of two years after the particular model vehicle is certified to Tier 2 standards by the original equipment manufacturer.

This provision would provide time for development of appropriate emission control systems and test data for small businesses who may need to first obtain a regular production vehicle certified by the OEM before they can begin work.

Although it was not a specific recommendation of the SBREFA panel, we are also requesting comment on whether ICIs should be exempted from the Tier 2 and interim fleet average NO_X standards. ICIs may not be able to predict their sales of vehicles and control their fleet average emissions because they may be dependant upon vehicles brought to them by individuals attempting to import uncertified vehicles. Presently, the NLEV requirements are optional for ICIs and ICIs are specifically exempted from complying with the fleet average NMOG standard under the NLEV program. (*See* 40 CFR 85.1515(c)). Further, a prohibition in the current ICI regulations specifically bars ICIs from participating in any emission related averaging, banking or trading program. (*See* 40 CFR 85.1515(d)). If we do not amend this prohibition, the likely outcome would be that ICIs could choose any bin to certify their vehicles and would pick the least stringent standards.

Given the historically very low sales of ICIs and the probable challenges that even the least stringent Tier 2 and interim non-Tier 2 bins will impose upon ICIs, we do not expect ICIs to grow significantly in number or size. Therefore, we do not expect that provisions exempting or prohibiting ICIs from the fleet average NO_X standard would have any air quality impact. However, we request comment on all aspects of the applicability of the fleet average NO_X standards to ICIs.

Establish a credit program and provide incentives for large manufacturers so that they would make credits available to small certifiers.

This provision would address the problem inherent with any emission credit trading program that manufacturers holding credits don't have to trade them. While the panel proposed this option, it did not provide any thoughts on what type of incentives might be appropriate and necessary to induce larger manufacturers to supply credits at reasonable prices to small businesses.

Develop a program to provide credits to small certifiers for taking older vehicles off of the road (i.e., a scrappage program).

Because older vehicles often have very high emissions, removing one from use could more than offset the emissions of a new vehicle produced by a small certifier that was unable to fully comply with the Tier 2 standards. Scrappage programs must be designed so that they remove vehicles from the fleet that see significant annual mileage. They must be adequately funded and managed. They must have controls and oversight to ensure that they don't remove vehicles that would have been scrapped anyway.

Design a case-by-case hardship relief provision that would delay required

compliance for small certifiers that demonstrate that they would face a severe economic impact from meeting the Tier 2 standards.

We have implemented case-by-case hardship provisions in some rules subject to specific limiting constraints. Typically, these would provide that small businesses that have tried all other regulatory options and apply in writing before they experience nonconformity, could obtain a 1 year delay in the implementation of the standards. The small business would have to show that failure to comply was the fault of external and extenuating circumstances and that inability to sell the subject vehicles would have a major impact on the company's solvency.

If the Tier 2 program involves a phase-in of standards, allow small certifiers to comply at the end of such a phase-in.

As indicated at the beginning of this section, we are proposing this option for all phase-ins associated with the Tier 2 program including the phase-in of the Interim standards for HLDTs (see Section V.A.8. above).

We request comment on the need for, appropriateness and environmental impact of all of the items proposed by the SBREFA panel. Also, we request comment on whether any such provisions would be necessary and appropriate for the interim standards for non-Tier 2 vehicles.

xi. *Adverse Effects of System Leaks.*

For the emission control system to operate as designed, the air-fuel (A/F) ratio must stay within strictly prescribed limits that vary with vehicle/engine operating conditions and engine controls must respond quickly to the slightest changes in this ratio. Even the smallest air leak in either the exhaust manifold or exhaust pipe or any related connection can provide the oxygen sensor incorrect information on the oxygen content of the exhaust gas it uses to calibrate the engine A/F ratio.

Some manufacturers have taken steps to address this concern as part of their overall design process by incorporating features such as corrosion-free flexible couplings, corrosion-free steel, and improved welding of catalyst assemblies. EPA is concerned that either as a result of manufacturing or installation errors or errors in a repair action, there will be an unintentional and unobserved increase in emissions and perhaps a failure to meet FTP and a SFTP emission standards in-use.

EPA seeks comment on design or onboard monitoring requirements that might be useful to address this concern. EPA would also seek comment on a provision that would require a manufacturer to demonstrate through engineering analysis or design that such possibilities have been taken into account.

xii. *Consideration of Other Corporate Averaging Approaches.*

We welcome comments on the pros and cons, including regulatory burden, of establishing a combined NMOG plus NO_X corporate average standard in lieu of either the proposed NO_X average or a California-like NMOG average. We also request comments, if not provided in response to Section IV.B. above, on the concept of requiring a declining corporate average NO_X standard or a declining corporate average NMOG standard at the federal level. For example, we would consider a declining average approach that reduces NMOG/NO_X corporate average emissions by 20–25% over the period 2008–2012, or nominally to 0.07 NMOG/0.05 NO_X. Such a reduction might involve a reduction in gasoline sulfur levels as discussed in Section IV.E.2. above. We also seek comment on the idea of eliminating the averaging concept in 2011 or 2012 and setting the LDV/LDT standards at the levels of Bin No. 5 in Table IV.B.-2 (0.07 g/mi NO_X plus the other standards). Commenters should address the cost and feasibility of these approaches.

2. Tighter Evaporative Emission Standards

We considered proposing tighter evaporative emission standards, including California's LEV II standards for evaporative emissions, shown in Table V.B.-4 below.

TABLE V.B.–4.—CALIFORNIA'S LEV II EVAPORATIVE HYDROCARBON STANDARDS

[Grams per test]

Vehicle class	Three day diurnal + hot soak standard	Supplemental two day diurnal + hot soak standard
LDV	0.50	0.65
LDT1 AND LDT2	0.65	0.85
LDT3 AND LDT4	0.90	1.15

These standards are based on an evaporative emission test procedure that is conducted at different temperatures using fuel with lower vapor pressure than the corresponding federal evaporative test procedure. Under current evaporative standards, California accepts the results of federal evaporative testing, because it represents a worst case test. We do not know whether California's standards are feasible under the federal test conditions.

We are concerned about evaporative hydrocarbons and we recognize that they constitute a portion of the mobile source VOC inventory that will be similar in size to the light duty exhaust contribution when NLEV exhaust standards are in place. Our proposed standards, which are found in section IV.B.4.a. above, are roughly in line with current average certification levels but will nonetheless yield real in-use evaporative reductions as manufacturers reduce certification levels to gain safety margins under the new standards. These standards will also prevent manufacturers from ''backsliding'' from their current low certification levels upward toward the existing standards as they seek cost reductions. Our proposed standards will require manufacturers to capture the abilities of available fuel system materials to minimize evaporative emissions. Further, we are proposing certification enhancements to address the impact of alcohol fuels on evaporative emissions, and we expect that these measures will lead to more uniform use of lower permeability materials that will result in in-use reductions in non-attainment areas where alcohol fuels are the most prevalent.

We request comment on the appropriateness and cost effectiveness of applying tighter evaporative standards in the federal program.

3. Credits for Innovative VOC, NO_X and Ozone Reduction Technologies Not Appropriately Credited by EPA's Emission Test Procedures

Compliance with the current and proposed EPA motor vehicle emission standards is based on the emission performance of a vehicle over EPA's prescribed test procedure. While this test procedure addresses many of the aspects of a vehicle's impact on air quality, it does not address all such impacts. Two developing technologies have been brought to EPA's attention that have shown significant potential to improve ozone-related air quality, but that would not do so over the current EPA test procedure.

The first example is a device that removes ozone from the air as the vehicle is driven. A major producer of automotive catalysts, Englehard, has approached both California and EPA with a proposal for a technology (called Premair) in which vehicle radiators would be coated with a catalyst that converts ambient ozone to oxygen. In its CalLEVII program, California has adopted some basic ground rules concerning the types of information that

would have to be submitted in order to certify such ozone reduction technologies and determine the amount of allowable NMOG credits.[87] This determination would be made on a case-by-case basis. The manufacturer would have to provide an evaluation of the system's performance and durability, as well as a description of the on-board diagnostic strategy to monitor the performance of the device in use. The NMOG credit would be based upon the running of an approved airshed model, which would determine the amount of NMOG emission reductions that would produce the same change in one-hour peak ozone as the use of the ozone reduction device being evaluated.

Englehard has asked EPA to develop a similar procedure to that adopted by ARB and to consider granting their technology a NO_X credit, as well as an NMOG credit. The manufacturer of the vehicle employing Premair would then have the option of which credit to use.

There are a number of issues that would have to be resolved before such credits could be granted, including:

- The methods to be used to certify in-use performance over the useful life of the vehicle,
- The requirement for, and the design and certification of, an onboard diagnostic system to monitor in-use performance, and
- Which airshed model to use, including what cities and episodes to use in modeling the 8-hour peak ozone reduction, and
- The methods for determining either the NMOG or NO_X credit, or both.

EPA has placed information provided to date by Englehard in the docket to this rule, and requests comments on the appropriateness of such credits, and on the procedures that should be used to determine those credits, should we proceed.

The second example is an insulated catalyst. The insulation retains heat for extended periods of time, increasing the catalyst temperature when the engine is started and reducing the time required for the catalyst to reach an operational temperature. This technology can reduce cold start emissions for engine off times (called soaks) of 24 hours or less. The vast majority of engine soaks in-use are less than 24 hours. However, EPA's test procedure only tests emissions at two fairly extreme soak times: 10 minutes and 12–36 hours. The 10 minute soak is so short that even an uninsulated catalyst is warm enough to quickly begin working upon restart. The 36 hour soak is beyond the practical limit of cost-effective insulating techniques.

In 1994, as part of its proposed SFTP standards, EPA proposed adding an intermediate soak of 1 hour to the test procedure, due both to the large number of in-use soaks falling between the current 10 minute and 12–36 hour soaks and to the desire to encourage catalyst technology that reduced cold start emissions for such intermediate soaks. EPA did not promulgate this aspect of its SFTP standards, due in part to concerns about the cost effectiveness of mandating such controls. However, the efficacy of such technology was not questioned. Thus, there appears to be little reason to prohibit a manufacturer from using such technology to reduce in-use emissions in lieu of other technology needed to meet the proposed Tier 2 standards.

As mentioned above concerning Premair, a methodology would need to be developed to estimate the impact of an insulated catalyst, or other any other similar technology, on in-use emissions so that equivalent NMOG and NO_X emission credits could be determined. Also, procedures for certifying in-use performance and durability and onboard diagnostics would also have to be addressed. EPA requests comments on the appropriateness of allowing emission credits for insulated catalysts and other technologies not appropriately assessed under current test procedures. EPA also requests comments on the procedures to be used to develop such credits.

EPA also requests comments on whether the credits granted for either ozone or emission reduction technologies should be restricted to the proposed Tier 2 standards, or whether they should also be granted under the current NLEV standards and the proposed interim standards for non-Tier 2 vehicles, as well.

4. Need for Intermediate Useful Life Tier 2 Standards

For our Tier 2 and interim standards we have generally proposed both full useful life and intermediate useful life FTP exhaust emission standards. (See Tables IV.B.–2, –3, –6,–7,–10 and –11.) We have also proposed full and intermediate life SFTP standards. (See Tables V.A.–3 and –4.) Intermediate useful life standards are more stringent than full useful life standards and reflect our experience that better emission performance can be expected at lower mileages.

We are not proposing intermediate useful life standards for the three lowest Tier 2 FTP bins, and we are not proposing intermediate standards for the lowest FTP bin (the Zero Emission Vehicle or ZEV bin) in any case. This is because the full life standards in those bins are already so low as to allow little deterioration between a new vehicle and a vehicle at full useful life.

We request comment on the appropriateness of and need for intermediate useful life and what the environmental consequences might be from deleting intermediate useful life standards for all Tier 2 vehicles and from the interim standards bins that match those of the Tier 2 program.

VI. Additional Proposed Elements and Areas for Comment: Gasoline Program

Section VI.A. presents two additional issues that have some impact on our proposed program: whetherstates are preempted from requiring gasoline sulfur reductions as a result of today's action, and whether other gasoline properties may also need to be controlled in the future. We encourage your comment on all of these issues. Section VI.B. provides additional detailed information about our proposed requirements for establishing compliance with the gasoline sulfur standards, as well as how we will enforce these standards. The major details of our proposed gasoline sulfur control program were explained in Section IV.C.; the information presented here is supplementary.

A. Other Areas for Comment

The following sections raise additional issues that are relevant to our decisions regarding gasoline sulfur control and the design of our gasoline sulfur program. We encourage you to comment on these issues if they are of interest to you.

1. Would States Be Preempted From Adopting Their Own Sulfur Control Programs?

When we adopt federal fuel standards, states are preempted from adopting similar state-level controls. Section 211(c)(4)(A) of the CAAA prohibits states from prescribing or attempting to enforce controls or prohibitions respecting any fuel characteristic or component if EPA has prescribed a control or prohibition applicable to such fuel characteristic or component under section 211(c)(1). This preemption applies to all states except California, as explained in section

[87] See page II–28 of the following California document for a full discussion: Proposed Amendments to California Exhaust and Evaporative Emission Standards and Test Procedures for passenger Cars, Light-Duty Trucks and Medium Duty Vehicles (''LEV II'') and Proposed Amendments to California Motor Vehicle Certification, Assembly-Line and In-Use Test Requirements (''CAP2000''). Released September 18, 1998 for the Air Resources Board Hearing of November 5, 1998.

211(c)(4)(B). For these states other than California, the Act provides two mechanisms for avoiding preemption. First, section 211(c)(4)(A)(ii) creates an exception to preemption for state prohibitions or controls that are identical to the prohibition or control adopted by EPA. Second, states may seek EPA approval of SIP revisions containing fuel control measures, as described in section 211(c)(4)(C). EPA may approve such SIP revisions, and thereby ''waive'' preemption, only if it finds the state control or prohibition ''is necessary to achieve the national primary or secondary ambient air quality standard which the plan implements.''

We are proposing to adopt the sulfur standards pursuant to our authority under section 211(c)(1). Thus, we believe final promulgation of the sulfur standards would result in the clear preemption of future state actions to adopt fuel sulfur controls.[88] States would therefore need to obtain a waiver from us under the provisions described in section 211(c)(4)(C) for all state fuel sulfur control measures adopted following promulgation, unless the state standard were identical to our final sulfur standard. We welcome your comments on our interpretation of the source and effect of federal preemption.

Section 211(c)(4)(A) preempts state fuel controls if EPA has ''prescribed'' federal controls. We read this language to preempt non-identical state standards on the effective date of the standards, as opposed to the date the standards become enforceable. Thus, if the proposed standards are finalized according to our expected schedule, this rulemaking would preempt state actions upon promulgation at the end of 1999, even though the standards would not require sulfur reductions until 2004. This interpretation is consistent with EPA actions applying other federal fuel measures. *See* 54 FR 19173 (May 4, 1989) (noting preemption of Massachusetts state RVP measure before start of first control period for federal RVP). We also believe this interpretation is consistent with the intent behind section 211(c)(4)(A). Though the standards are not immediately enforceable, they will have an immediate impact on refiners' investment decisions. We believe, by adopting 211(c)(4)(A), Congress intended to provide security for these investment decisions by preventing unnecessary conflict between state and federal fuel controls.

2. Potential Changes in Gasoline Distillation Properties

During the last several years, representatives of the automotive industry have presented information to us suggesting that control of certain gasoline distillation properties can provide reductions in both exhaust hydrocarbon emissions as well as the frequency of performance problems such as hesitation, cold startability, and impeded acceleration. Automotive industry representatives contend that the source of most performance problems—slower atomization and vaporization due to fuels with higher boiling points—also leads to less efficient combustion, and thus higher levels of hydrocarbons in the exhaust.

With regard to Tier 2 vehicles, some automakers have claimed that in-use fuels with high boiling points would impact their ability to control the mixture of air and fuel entering the engine, and thus could result in in-use emissions that are higher than expected based on certification levels. Thus, automakers argue, controls on the distillation properties of gasoline would not only produce emission benefits for the in-use fleet, but would also ensure the viability and benefits of Tier 2 vehicles.

On January 27, 1999, we received a petition[89] from a group of automakers in which they provided a more detailed analysis of the costs and benefits of controlling gasoline distillation properties. In this petition, they specifically requested that the Distillation Index (DI) be capped at 1200 for all summer-grade gasolines nationwide. They have defined the distillation index by the equation 1.5xT10 + 3xT50 + T90 +20xOxy, where T10 represents the temperature at which 10% of the fuel has evaporated in a standard distillation test, and likewise for T50 and T90, and Oxy is the oxygen content contributed by ethanol. This petition includes a study conducted by MathPro Inc.[90] to estimate the feasibility and cost to the refining industry of capping all summer grade gasoline at a DI level of 1200. MathPro concluded that the cost of such control would be approximately 0.4 ¢/gal on average for all summer grade gasoline.

We believe that the analyses presented by this petition have merit. However, we do not believe that they are sufficient to justify capping DI at 1200 at this time, since there are a number of issues that it does not address. Before we could formally propose a DI cap, we would need to have a justification for the cap based on air quality need, peer-reviewed estimates of the cost to the refining industry and to consumers, and comparisons of the cost effectiveness of this strategy to that for other potential hydrocarbon control strategies. Therefore, we are not today proposing controls on gasoline distillation properties. However, we request comment on the automakers' DI petition and the included MathPro report in terms of their sufficiency in demonstrating that a DI cap of 1200 is appropriate.

B. Gasoline Sulfur Program Compliance and Enforcement Provisions

1. Overview

We are proposing enforcement mechanisms that track those of the reformulated gasoline/conventional gasoline (RFG/CG) rule, because of significant similarities between the two programs, including refinery average standards, refinery level and downstream level caps, and the generation and use of credits. These features raise similar compliance issues for both programs. Because of the importance of assuring that all gasoline meets the sulfur standards, measures are needed to assure the accuracy of refiner and importer testing, and to assure that the quality of gasoline is not adversely affected downstream of the refinery. Downstream enforcement would be based primarily on EPA sampling and testing, and examination of product transfer documents (PTDs) and other evidence.

More specifically, we are proposing:

- That refiners and importers test each batch of RFG and CG produced or imported for sulfur content and maintain testing records and retain test samples.
- That refiners and importers of gasoline submit reports regarding compliance with averaging and credits provisions.
- That the current attest procedures of the RFG/CG rule[91] be applied to sulfur rule compliance.

[88] Even in the absence of final promulgation of federal sulfur standards, existing federal fuel controls for RFG and conventional gasoline have raised issues of preemption of state fuel sulfur measures. In any case, it is clear that state sulfur standards would be preempted as of the date of promulgation of the proposed federal sulfur standard.

[89] ''Petition to regulate gasoline distillation properties''. Submitted by DaimlerChrysler Corporation, Ford Motor Company, General Motors Corporation, and the Association of International Automobile Manufacturers. Submitted to EPA Administrator Carol Browner on January 27, 1999. EPA Air Docket A–97–10, Document No. II–G–286.

[90] ''Technical and economic implications of controlling the distillation index of gasoline.'' MathPro Inc., October 21, 1998. EPA docket A–97–10, document II–G–268.

[91] 40 CFR part 80 subpart F.

• Enforcement provisions regarding the credit program, to prevent the use, sale or purchase of invalid credits, and to require adjustments to compliance calculations based on use of invalid credits.

• Requirements to ensure compliance by small foreign refiners subject to individual refinery sulfur standards and to ensure the separation of such foreign gasoline from all other gasoline to the U.S. port of entry.

• Downstream maximum sulfur caps, which would apply to all persons in the chain of distribution of gasoline, including distributors, resellers, carriers, retailers and wholesale purchaser-consumers of gasoline.

• Voluntary downstream quality assurance testing by distributors and refiners to help assure compliance.

The sulfur standards proposed today would apply, as in other fuels programs, to all motor vehicle fuel that meets the definition of gasoline. See 40 CFR 80.2. This definition typically includes all the gasoline that is produced and distributed through the gasoline distribution system, including gasoline, such as marina gas, that is ultimately used in nonroad equipment. Such fuel meets the definition of gasoline and is subject to the standards proposed today. For example, where gasoline makes up only a small portion of what a refinery produces, and is perhaps a byproduct of other processing, the refiner could not avoid the sulfur standard by designating the product as marina gasoline or nonroad gasoline. EPA would apply the sulfur standard to the same broad group of products that meets the definition of gasoline for its other gasoline fuel programs.

We are aware that there are certain fuels, such as aviation fuel and racing fuel, that are generally segregated from gasoline throughout the distribution system. Where such fuels are segregated from motor vehicle gasoline and not made available for use in motor vehicles, the fuel would not be subject to sulfur rule standards.[92] We propose that such fuel become subject to the sulfur standards and other regulatory requirements and prohibitions if its segregation from gasoline at any point in the distribution system is compromised. Offering such fuel for motor vehicle use or dispensing such fuel for motor vehicle use would be prohibited. We are also proposing specific PTD requirements and labeling requirements to prevent introduction of high sulfur fuels into motor vehicles. EPA invites comment on whether such fuel should also be subject to refinery level sulfur standards, or whether it should be subject to the standards from the point at which it is made available for use in motor vehicles.

The proposal would clarify the definition of refinery at 40 CFR 80.2(h). Specifically, we are proposing to clarify that ''refinery'' means any facility, including a plant, tanker truck or vessel where gasoline or diesel fuel is produced, including any facility at which blendstocks are combined to produce gasoline or diesel fuel, or at which blendstock is added to gasoline or diesel fuel.[93]

We propose that any oxygenate blender that only adds oxygenate to gasoline or to ''reformulated blendstocks for oxygenate blending'' (RBOB), be exempt from sulfur standards and would not be required to conduct any new testing, or perform any new recordkeeping or reporting, because we believe the sulfur level of EPA-allowed oxygenates added downstream from the refinery is very low. We believe it is an appropriate assumption, barring special circumstances, that the sulfur content of the gasoline will be diluted in proportion to the addition of the oxygenate.

In the remainder of this section we address enforcement issues regarding today's proposed rule that are not discussed in section IV.C.3., above.

2. What Requirements is EPA Proposing for Foreign Refiners and Importers?

As discussed in section IV.C, under today's proposal, standards for gasoline produced by foreign refineries that are not subject to small refiner individual refinery standards would be met by the importer. Standards for gasoline produced by a foreign refinery subject to an individual sulfur rule standard would be met by the foreign refinery, with certain limited exceptions. The provisions would be very similar to the foreign refinery provisions of the RFG/CG rule, under 40 CFR 80.94.

a. What Are the Proposed Requirements for Small Foreign Refiners with Individual Refinery Sulfur Standards?

Under the RFG/CG rule, EPA has promulgated regulations[94] addressing establishment and implementation of individual baselines for CG produced by certain foreign refiners. The purpose of these regulations is to assure the compliance of gasoline supplied from foreign refineries with individual compliance baselines. It includes comprehensive controls, requirements and enforcement mechanisms to monitor the movement of gasoline from the foreign refinery to the U.S., to monitor gasoline quality and to provide for compliance and enforcement as necessary.

Today we are proposing similar requirements that would apply to any foreign refiner that can demonstrate that it meets the small refiner criteria. Foreign refinery baselines would be based on average sulfur levels and the volume of gasoline imported to the U.S. in 1997–98. Any foreign refiners that obtain a foreign refinery sulfur rule baseline would be subject to the same requirements as domestic small refiners with individual refinery sulfur rule standards. Additionally, provisions similar to the provisions at 40 CFR 89.94 would apply, that include:

1. Segregating gasoline produced at the small refinery until it reaches the U.S.;
2. Refinery registration;
3. Controls on product designation;
4. Load port and port of entry testing;
5. Attest requirements; and
6. Requirements regarding bonds and sovereign immunity.

The rationale for these enforcement provisions is discussed more fully in the Agency's August 28, 1997 preamble to the final RFG/CG foreign refineries rule. (See 62 FR 45533 (Aug. 28, 1997)).

By no later than January 1, 2010,[95] all gasoline would be subject to a single national averaged standard and one national refinery level cap. Thus, EPA is proposing that, beginning on that date, the use of foreign small refinery baselines would sunset and standards for all imported gasoline would be met by U.S. importers. With a single national standard and cap, gasoline sulfur content could most readily be monitored at the U.S. importer level, since there would no longer be a special class of gasoline with different standards that would need to be monitored.

b. *What Are the Proposed Requirements for Truck Importers?* The proposed sampling and testing requirements for importers require sampling and testing of each batch of gasoline. For parties that import gasoline into the U.S. by truck, the every-batch testing requirement would include testing the gasoline in each

[92] If a fuel is not segregated throughout the gasoline distribution system, but is fungibly mixed with gasoline, then it becomes a gasoline that is subject to the standard.

[93] This is consistent with all current EPA fuels rules, interpretations, policies and question and answer documents, and is only a clarification.

[94] 40 CFR 80.94.

[95] As stated in section IV.C. of the preamble, small refiner individual refinery standards would sunset January 1, 2008, except for any small refineries that receive a hardship extension not to exceed two years.

truck compartment, or if the gasoline is homogeneous, testing the gasoline in the truck. However, EPA is concerned that this testing requirement may not be feasible for truckers hauling many small loads of gasoline. Since some northern U.S. communities rely, in large part, on gasoline transported into the U.S. by truck from Canadian terminals, these communities could suffer gasoline shortages if this requirement proves too burdensome for truck importers. We therefore propose to allow alternative requirements for truck-imported gasoline only.

i. *Truck Transports of Gasoline (Excluding Gasoline Subject to Small Foreign Refiner Individual Refinery Standards).*

EPA is proposing a limited alternative approach for truck importers in lieu of every-batch testing. This proposal would be based on the importer meeting the 30 ppm sulfur average standard on a per-gallon basis. Under this proposal, the importer would be allowed to rely on the sulfur results of sampling and testing conducted by the operator of the truck loading terminal in Canada. The environmental consequences of this proposal would be neutral, because by meeting the 30 ppm sulfur standard on an every-gallon basis the standard also is being met on average.

The importer would be required to demonstrate the gasoline meets the 30 ppm sulfur standards on an every-gallon basis. The gasoline in the storage tank from which the importer's trucks are loaded would have to be sampled and tested subsequent to each receipt of gasoline into the terminal tank, and these tests would have to show the gasoline meets the 30 ppm sulfur standard. For each truck load of gasoline, the importer would have to obtain documents that accurately state the sulfur content of the gasoline. The importer then would treat each truck load of imported gasoline as a separate batch for purposes of the recordkeeping and reporting requirements.

The terminal operator in most cases would not be subject to United States laws, so the proposal contains safeguards that are intended to ensure the gasoline in fact meets the applicable standard. First, the importer would be required to conduct an independent program of quality assurance sampling and testing of the gasoline dispensed to the importer. This sampling and testing would have to be at a rate specified in the proposed regulations, and the sampling would have to be unannounced to the terminal operator. In addition, EPA inspectors would have to be given access to conduct inspections at the truck loading terminal and at any laboratory where samples collected pursuant to this proposed approach are analyzed. These inspections could be unannounced, and would include gasoline sampling and testing, and record reviews.

EPA requests comment on this proposal for parties that import gasoline by truck. Specifically, EPA requests comment on the provisions that apply to persons located outside the United States, and the need for EPA inspectors to conduct inspections at terminals located outside the United States. In addition, EPA recognizes that the proposed per-gallon standard of 30 ppm is more restrictive than an annual average standard with per-gallon caps, although it provides assurance that gasoline imported by truck will meet the requirements of the sulfur control program. However, establishing an averaged standard with per-gallon caps for truck-imported gasoline would require more substantial recordkeeping, reporting and auditing by the importers and more compliance monitoring by the EPA. EPA requests comments on the alternative of allowing an annual average standard with per-gallon caps for truck importers and the appropriate sulfur standards that should apply under such an approach.

ii. Truck-Imported Gasoline Subject to Small Foreign Refiner Individual Refinery Standards

There are additional compliance concerns related to the gasoline produced by small foreign refiners whose gasoline is imported into the U.S. by truck. The proposed requirements for gasoline produced at a small foreign refinery with an individual baseline, and certified as subject to the individual standard (S–FRGAS), include the necessity of segregating the gasoline from all other gasoline, from the refinery gate to the U.S., so that compliance with standards can be tracked. Under our proposed certified S–FRGAS provisions applicable to other importers, each batch of gasoline must be tested at the load port and port of entry. However, in the case of gasoline imported by truck, each truckload of such gasoline would constitute a batch. Given the small batch volumes for truck imports, the testing and other procedures proposed for certified S–FRGAS may not be feasible. The issue is further complicated because the load port, in effect, stretches from the refinery, through a pipeline and to a terminal in Canada. Therefore, EPA is proposing an alternative to the requirement for testing every truckload of imported certified S–FRGAS.

EPA is proposing that small foreign refiners whose gasoline is exported to the U.S. by truck would, as part of their petition for an individual baseline, submit a plan designed to ensure that certified S–FRGAS remains segregated from all other gasoline from the refinery to the U.S. The proposed plan would be reviewed for approval in conjunction with the baseline petition.

Rather than specifying the precise requirements of such a plan in the regulations, EPA would allow the refiner to develop its own procedures for ensuring that S–FRGAS remains segregated until it reaches the U.S. However, EPA believes that any plan would have to include certain elements. For example, PTDs would have to accompany each transfer of certified S–FRGAS through the distribution system, clearly identifying the origin of the gasoline and prohibiting its commingling with any product other than certified S–FRGAS from that refinery. The refiner may need to enter into contracts with pipelines and terminals, if the gasoline is shipped in this manner, that ensure segregation and prohibit commingling. This certified product could then only be loaded into trucks if they were importing the gasoline into the U.S.

The refiner of such gasoline would have to receive and maintain all such product shipment documents, including U.S. import documents, for five years and review these on an ongoing basis to ensure segregation is maintained until reaching the U.S. To further ensure that this review occurs, EPA is proposing that the refiner's plan would include attest audit procedures to be conducted annually by an independent third party that would review the refiner's procedures and records to ensure that the certified S–FRGAS is segregated at all times. For example, these procedures would likely include volume reconciliation to confirm that product is transferred without commingling. However, additional procedures may be needed to accomplish the goal of ensuring that certified-S–FRGAS remains segregated from all other gasoline.

3. What Standards Would Apply Downstream?

EPA is proposing downstream per-gallon cap standards that would apply to all parties in the distribution system downstream of the refinery-level, including pipelines, terminals, distributors, carriers, retailers and wholesale purchaser-consumers. Downstream standards would help ensure the sulfur level of gasoline remains below the cap level when dispensed for use in motor vehicles, thereby avoiding the adverse emissions

consequences of using gasoline with a sulfur content above the cap level.

EPA is proposing that downstream standards would be more lenient than the refinery-level cap standards so that refiners and importers can produce gasoline that equals the refinery-level cap standard. It has been EPA's experience that if a refiner produces gasoline that equals, or almost equals a standard, that gasoline may be shown to violate the standard when subsequently tested at a location downstream of the refinery due to testing variability. As a result, parties downstream of the refinery (primarily pipelines) set commercial specifications for the quality of the gasoline they will accept that are more stringent than the standard that applies to the downstream party. This, in effect, forces refiners to produce gasoline that is ''cleaner'' than the refinery-level standard.

In other fuels programs (for example, the benzene per-gallon standard for RFG) EPA has resolved this concern by announcing enforcement tolerances for fuels standards that apply downstream of the refinery-level, thereby reducing the need for pipelines to set specifications more stringent than the refinery level standards. EPA believes the approach proposed for the gasoline sulfur cap standards—more lenient downstream standards—would have the same effect as announced enforcement tolerances.

EPA is proposing that the values of the downstream cap standards would reflect the testing variability that could reasonably be expected when different laboratories test gasoline for sulfur content, that is, lab-to-lab variability, or reproducibility. For gasoline subject to the 80 ppm refinery-level sulfur cap the proposed downstream standard would be 95 ppm. This difference reflects the lab-to-lab variability established by the American Society for Testing and Materials (ASTM).[96] For gasoline subject to refinery-level sulfur caps higher than 80 ppm, which would be the case for gasoline produced before 2006 and by certain small refiners, the proposed downstream cap would be similarly established by using the most recent available ASTM reproducibility data.

As described in section IV.C.3, EPA is proposing that the cap standards that apply to some small refiners would be higher than the cap standards that apply to refiners generally. The downstream standards that apply to this small refiner gasoline would be correspondingly higher, based on ASTM reproducibility for each refinery's assigned cap. If gasoline produced by a small refiner with a higher cap standard is mixed in the distribution system with other gasoline with a lower cap standard, the entire mixture then would be subject to the higher cap standard. For this reason, EPA is concerned that the small volume of small refinery gasoline could drive up the downstream standard for all gasoline, most of which would have been subject to the much lower national cap standard.

Therefore, EPA is proposing that during the period small refinery individual standards are in effect, PTDs must identify whether gasoline is comprised, in whole or in part, of gasoline produced at a small refinery with a higher sulfur cap standard than the national cap standard, and the level of the downstream cap applicable to the gasoline. A downstream party could rely on the information contained in the PTDs for gasoline received by that party as the basis for whether gasoline contains any small refinery gasoline.

However, as gasoline is mixed, and re-mixed, in downstream pipelines and tanks, the percentage of a particular gasoline that is small refinery gasoline normally will progressively diminish. For this reason EPA also is proposing that a downstream party must classify gasoline as containing no small refinery gasoline if a test result for the gasoline shows a sulfur content below the applicable national downstream cap.

Under these proposed requirements, downstream parties and EPA would know the downstream standard that applies to any particular gasoline. If the gasoline contains no small refiner gasoline, the downstream standard would be based on the national cap. If the gasoline is comprised in whole or in part of small refiner gasoline subject to a higher cap standard, the downstream standard would be based on this higher cap standard. This approach would require regulated parties and EPA to review and rely on the information contained in PTDs.

Following are two examples of how gasoline from small refineries with individual standards (S–RGAS) would be identified downstream of the refinery and how the downstream cap would apply:

(1) In 2005 the national refinery cap standard is 180 ppm. If a small refinery with an individual sulfur cap standard produces a batch of gasoline that contains 175 ppm sulfur, the transfer document that accompanies that batch of gasoline into a pipeline may not indicate the batch contains S–RGAS.

(2) In 2006, when the national downstream cap is 95 ppm, a terminal receives three shipments of gasoline that are identified in the PTD's as S–RGAS subject to downstream per-gallon cap standards of 205, 325 and 410 ppm. The terminal operator combines these shipments in a storage tank. That gasoline mixture is subject to a downstream cap standard of 410 ppm and any PTD subsequently provided to transferees must identify the gasoline as containing S–RGAS and state the gasoline is subject to a downstream cap standard of 410 ppm.

After several additional receipts of gasoline into the storage tank, the terminal operator obtains a test result indicating the sulfur level of the mixture is 90 ppm. Based on this test result, the gasoline mixture becomes subject to the national cap standard of 95 ppm and any PTD subsequently provided to transferees may not state the gasoline contains S–RGAS.

EPA requests comment on these proposed downstream standards. Specifically, we request comment on an alternative whereby gasoline would be presumed to be subject to the national cap downstream standard, unless the responsible regulated party were able to demonstrate through PTDs the presence of small refinery gasoline. EPA also requests comment on any alternatives that would allow enforcement of the national downstream cap standards during the period small refiner individual refinery standards were in effect.

4. What Are the Proposed Testing and Sampling Methods and Requirements?

a. *What Is the Primary Test Method for Gasoline?* We propose that the ASTM standard method D 2622–98 be the primary test method for testing for sulfur in gasoline by refiners and importers. This is the regulatory method under the RFG/CG rule.[97] However, we are requesting comment on whether ASTM method D 5453–93, entitled ''Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence,'' should be the primary method. We are specifically concerned about the suitability of these test methods for sulfur levels between 0–10 ppm, and invite comment on other appropriate test methods, including ASTM D 4045, which is used under the California fuels program for sulfur levels below 10 ppm. We are also requesting

[96] ASTM standard method D–2622–98, entitled ''Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry.'' The California Air Resources Board found nearly identical reproducibility under ASTM D–2622–94, according to a round robin study conducted by ARB and received by EPA Feb. 11, 1999.

[97] See 40 CFR 80.46(a). The proposed rule would update the current method, ASTM D 2622–94.

comment on relative costs of the methods. We believe that ASTM D 5453 would significantly reduce capital costs for test equipment and that operational costs would be similar to ASTM D 2622. A description of these ASTM test methods, as well as other methods discussed later in this section, can be found in Table VI–1, below.

TABLE VI.–1.—ASTM STANDARD TEST METHODS AND PRACTICES DESCRIBED IN THIS SECTION

ASTM No.	Title
D 2622	Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry.
D 4045	Standard Test Method for Sulfur in Petroleum Products by Hydrogenolysis and Rateometric Colorimetry.
D 4057	Standard Practice for Manual Sampling of Petroleum and Petroleum Products.
D 4177	Standard Practice for Automatic Sampling of Petroleum and Petroleum Products.
D 5453	Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence.
D 5842	Standard Practice for Sampling and Handling of Fuels for Volatility Measurement.

b. *What Is the Proposed Test Method for Sulfur in Butane?* We are proposing that ASTM D 5623 would be the regulatory method for testing the sulfur content of butane. This is the sulfur test method for butane that the Agency proposed under the RFG/CG rule (proposal published at 62 FR 37338 (July 11, 1997)). However, we received several negative comments regarding this test method in response to our proposal. We are requesting comments on other methods and correlation of those methods to ASTM D 5623. We are also requesting comment on appropriate correlation procedures and other issues such as bias, accuracy, and precision.

c. *Is EPA Proposing a Requirement To Test Every Batch of Gasoline Produced or Imported?* Under today's proposal, all refiners and importers [98] would be required to sample and test the sulfur content of each batch of gasoline produced or imported. Test results would be used to calculate a refiner's or importer's annual average sulfur level. Any batch of gasoline that exceeded the applicable sulfur cap could not be distributed or sold in the U.S., unless it was exempted from this rule, as described later in this section. This ''every-batch'' testing requirement is not a new requirement for RFG refiners and importers. However, it would be a new requirement for refiners and importers of CG.

In the past, CG refiners and importers have been allowed to prepare composite samples of gasoline from multiple gasoline batches and test the composite sample. However, we believe that every-batch sulfur testing by refiners and importers is necessary to ensure compliance with upstream and downstream sulfur caps contained in the proposed rule. We have proposed the use of alternative test methods to reduce the cost of testing. We are requesting comment on this proposed requirement.

i. Butane Blenders' Every-Batch Testing Requirement

Under the RFG rule, refiners that blend butane to previously certified gasoline (PCG) must determine the volume and parameter values of the butane, including sulfur content, by testing the gasoline, before and after blending, and calculating the properties of the butane by subtracting the volume and parameter values of the PCG. For CG only, under certain conditions, we have allowed butane blenders to use the parameter specifications of butane as tested by the butane producer. This includes an assumed sulfur content of 140 ppm. We have allowed this alternative to every-batch testing because of the costs of testing each load of butane.[99]

We are proposing a similar alternative to every-batch testing for butane blenders under today's sulfur program. We propose that butane blenders could use the actual sulfur test result of their suppliers, if the butane contained less than 30 ppm sulfur and if the butane blender undertook a quality assurance program to ensure that the supplier's sampling and testing was accurate. If the butane were tested and found to violate the 30 ppm cap, the butane blender would be in violation for the volume of product that exceeded the 30 ppm cap that was added to gasoline and for any violations of the national downstream cap resulting from the butane sulfur content. We believe this is a fair alternative to every batch testing and the only alternative that gives EPA reasonable ability to monitor compliance. We request comment on this proposal.

ii. Refiners Blending Other Blendstocks into Previously Certified Gasoline

Refiners that blend blendstock into PCG would be required to sample and test each batch of gasoline produced. This would normally include sampling and testing the PCG to determine its sulfur content and volume; then sampling and testing the combined product subsequent to blending; and calculating the sulfur content and volume of the blendstock (which is the blender's batch for annual average compliance and reporting purposes), by subtracting the volume and sulfur content of the PCG from the volume and sulfur content of the combined product. We are proposing to allow such refiners to meet an alternative testing requirement in lieu of testing every batch of gasoline. Provided that the refiner's test result for the sulfur content of each of the blendstocks is less than the national refinery level per-gallon cap standard, a refiner could sample and test each blendstock when received at the refinery, and treat each blendstock receipt as a separate batch for purposes of compliance calculations for the annual average sulfur standard.

d. *What Sampling Methods Are Proposed?* Sampling methods apply to all parties that conduct sampling and testing under the rule. We are proposing requiring the use of sampling methods that were proposed in the July 11, 1997 **Federal Register** notice (62 FR 37338, at 37341–37342, 37375–37376), which proposes modifications to the RFG/CG rule. These sampling methods include ASTM D 4057–95 (manual sampling), D 4177–95 (automatic sampling from pipelines/in-line blending), and ASTM D 5842 (this sampling method is primarily concerned with sampling where gasoline volatility is going to be tested, but it would also be an appropriate sampling method to use when testing for sulfur). We are proposing requiring use of these ASTM methods instead of the methods provided in 40 CFR part 80, Appendix D. That is because the proposed methods have been updated by ASTM, the updates have provided clarification and they have eliminated certain requirements, such as storage tank tap extensions, that are not necessary for sampling light petroleum products such as gasoline.

e. *What Are the Proposed Gasoline Sample Retention Requirements?*

We are proposing a refiner and importer sampling and testing program to establish the sulfur compliance of each batch of gasoline produced or

[98] Except for certain truck importers, as noted above.

[99] In addition, commercial grade butane easily meets conventional gasoline standards, but that is not the case with regard to the proposed gasoline sulfur standards.

imported. However, we are aware of the inherent drawbacks to a self-testing scheme. There is the possibility that a party might sample or test gasoline in a manner not consistent with the required procedures, or that employees might inaccurately record the test results, by mistake or otherwise. Under such a scheme, parties might also attempt to conceal a discovered violation or to save money by not correcting a violation.

In an attempt to address these concerns about self-testing, we considered the option of requiring independent sampling and testing for all gasoline, including conventional gasoline. Under current regulations, only refiners or importers of reformulated gasoline are obligated to do this. However, because of the costs of independent sampling and testing [100] EPA is instead proposing an alternative strategy to help ensure refinery and importer sulfur compliance. Refiners and importers would be required to retain for thirty days a representative sample from each batch of gasoline produced, and to provide such samples to the Agency upon request. By means of this option, EPA could verify the refiner test results.

This limited duration sample retention would be useful to address many of the potential problems concerning a refiner self-testing program. Through this requirement, parties would be faced with the knowledge that EPA could easily and randomly confirm the accuracy of the refiner's test results and could discover unrecorded violations. We believe that this would create an incentive for refiners to sample, test, and record their sulfur results in an accurate and truthful manner.

The Agency also is proposing that refiners be required to certify annually that the samples have been collected in the manner required under the sulfur rule. This requirement is intended to assure that refinery officials insist on accurate and honest sampling and retention of samples at their refineries. We are also proposing that specific procedures be followed by refiners to properly collect retain, and ship the samples in a manner consistent with requirements already imposed or proposed under the RFG program. Under today's proposal, a minimum representative sample of 330 ml of each gasoline batch would need to be retained.[101]

The Agency does not believe that the proposed sulfur rule sample retention requirements would impose an undue financial burden on regulated parties. Many refineries already engage in some sample retention for their own purposes, and the retention procedures proposed in today's proposal would merely require that typical industry retention standards be applied. Shipping samples to us would entail some expense, but this shipping would only occur periodically, and would certainly cost less than hiring an independent laboratory to regularly sample and test gasoline.

The Agency requests comments on the costs and effectiveness of the proposed sample retention requirements, and invites comments on any alternative plan to promote accuracy of refiner self-testing of gasoline for sulfur compliance. In particular, we are interested in information on the cost and effectiveness of a nationwide, independent sampling and testing program

5. What Federal Enforcement Provisions Would Exist for California Gasoline and When Could California Test Methods Be Used to Determine Compliance?

a. *Requirement to Segregate Gasoline and To Use Product Transfer Document Requirements.* Today's proposal would generally exempt California gasoline from regulation under the sulfur rule for the reasons previously described in this preamble. However, today's NPRM does propose two requirements that would apply to some California gasoline. The first would require that gasoline produced outside of California, that is intended for California use, be segregated from all other gasoline at all points in the distribution system. Second, the Agency is proposing that out-of-state producers of gasoline intended for sale in California be required to create PTDs identifying the product as California gasoline, and that such PTDs be provided to all transferees of this gasoline in the distribution system. Such documentation is intended to facilitate our enforcement of the proposed sulfur control program through identifying the gasoline not covered by the federal regulation, even though it is produced in areas otherwise subject to this proposed regulation. This documentation would also assist regulated parties in identifying the gasoline as non-federally regulated to facilitate segregation of California gasoline from federal gasoline.

The sulfur program PTD requirements for California gasoline produced out-of-state should not create any new burdens on regulated parties, since the same requirements currently apply under the RFG program.[102] Today's proposal would incorporate and restate the RFG rule's PTD requirements for this California gasoline. The Agency does not believe that it is necessary to impose additional PTD requirements under the sulfur program, since the California gasoline identification requirements under the RFG rule would also satisfy the identification needs of this rule. Having the same requirements in both rules means that regulated parties that fail to produce and transfer the necessary PTD identification would be in violation of both programs.

b. *Use of California Test Methods for 49 State Gasoline.* As stated previously, we are proposing to exclude gasoline produced in California for California use from federal sulfur standards. However, refineries or importers located in California would have to meet the standards and other requirements with regard to ''federal'' gasoline used outside of California. Nevertheless, EPA is proposing that gasoline produced in California for sale outside of California could be tested for compliance under the federal sulfur rule using the methodologies approved by the ARB, provided that the producer complies with the procedures for such testing as already required under 40 CFR 80.81(h), which permits California test methods not identical to federal test methods to be used for conventional gasoline only.

6. What Are the Proposed Recordkeeping and Reporting Requirements?

a. *What Are the Proposed Product Transfer Document Requirements?* We are proposing that the PTDs that accompany each transfer of custody or title of gasoline that includes gasoline produced by any small refiner subject to sulfur rule individual refinery standards be required to identify the gasoline as such, including the applicable downstream cap, as an aid to enforcing the national downstream cap. Other PTD information is currently required under the RFG/conventional gasoline regulations. We believe that the additional PTD information regarding sulfur compliance required under today's proposal would impose little additional burden on industry. We request comment on this proposed requirement.

[100] See the discussion on this subject in the preamble to the reformulated gasoline program's final rule, 59 FR 7765 (Feb. 16, 1994).

[101] See 40 CFR 80.65(f)(3)(F)(ii), and the Proposed Rule for Modifications to Standards and Requirements for Reformulated and Conventional Gasoline, 62 FR 37337 *et seq,* proposed 40 CFR 80.101(i)(l)(i)(C)(iii).

[102] See CFR 80.81(g).

b. *What Are the Proposed Recordkeeping Requirements?* We are proposing to require that refiners and importers keep and make available to EPA certain records that demonstrate compliance with the sulfur program standards and requirements. The RFG/CG regulations currently require refiners and importers to retain records that include much of the information proposed to be required under today's rule. As a result, we believe that the proposed reporting requirements would impose very little additional burden on these regulated parties.

We are proposing to require all parties in the gasoline distribution system, including refiners, importers, retailers, and all types of distributors to retain PTDs and records of quality assurance programs that parties conduct to establish a defense to downstream violations. All parties in the gasoline distribution system currently are required to keep PTDs for RFG. However, since there are no downstream CG standards, only refiners and importers are required to retain PTDs for conventional gasoline. Because today's proposed sulfur rule, like the RFG rule, includes downstream standards, we believe that a requirement to retain PTDs for all parties in the gasoline distribution system would be appropriate under the sulfur rule. The PTD information would help us identify the source of any gasoline found to be in violation of the sulfur standards. The PTDs would also provide downstream parties with information regarding the applicable downstream standard.

Today's proposal would require parties to keep records for a period of five years, with additional requirements for records pertaining to credits. Records pertaining to credits that were banked and never transferred to another party would need to be retained for five years after the credits are used for compliance purposes. Records pertaining to credits that were transferred would need to be retained by both parties (transferee and transferor) for ten years after the date the credits were generated (which would ensure the records are retained at least years after they are used, since use would have to occur within five years of generation even if the credits were transferred).

Most of the records that would be required to be kept for five years already are subject to that requirement by the RFG/CG rule. Five years is the applicable statute of limitations for the RFG and other fuels programs. See 28 U.S.C. 2462. We request comment on these proposed recordkeeping requirements for refiners, importers and downstream regulated parties. In particular, we request comment on the record retention provisions specific to credits that were transferred. While we recognize that retaining records for ten years could be problematic for both parties, we believe that both parties would need to retain records so that we could be reasonably sure that credits used for compliance were appropriate. An alternative, raised earlier in this proposal, would be to give a more finite life to credits or to require, beginning in 2006, credits to be used in the same year they were generated or transferred. We welcome comments on this solution or any other way in which we can be assured that adequate records would be available should a credit transaction come into question at some date longer than five years after the transaction.

c. *What Are the Proposed Reporting Requirements?* Today's proposed rule would require refiners and importers to submit to us, on an annual basis, a report that demonstrated compliance with the applicable sulfur standards and data on individual batches of gasoline, including batch volume and sulfur content. The RFG/CG programs contain similar reporting requirements. Based on our experience with these programs, we believe that requiring an annual sulfur report and batch information would provide an appropriate and effective means of monitoring compliance with the average standards under the sulfur program. The batch data also would serve to verify that each batch of gasoline met the applicable sulfur cap standard when it left the refinery. In addition, the annual report would provide a vehicle for accounting for any sulfur credits created, sold or used to achieve compliance during the averaging period.

d. *What Are the Proposed Attest Requirements?* We are also proposing to require refiners and importers to arrange for a certified public accountant or certified internal auditor to conduct an annual review of the company's records that form the basis of the annual sulfur compliance report (called an ''attest engagement''). The purpose of the attest engagement is to determine whether representations by the company are supported by the company's internal records. Attest engagements are required under the RFG/CG regulations. We believe that an attestation for sulfur could be included in a refiner's current attest engagement with little additional burden.

We believe that the proposed reporting requirements under today's rule would impose minimal additional reporting burdens on industry while providing us with information necessary to monitor compliance with the sulfur standards. We request comment on these proposed reporting requirements.

7. What Are the Proposed Exemptions for Research, Development, and Testing?

We are proposing to exempt from the sulfur requirements gasoline used for research, development and testing purposes. We recognize that there may be legitimate research programs that require the use of gasoline with higher sulfur levels than those allowed under today's proposed rule. As a result, today's rule contains proposed provisions for obtaining an exemption from the prohibitions for persons distributing, transporting, storing, selling or dispensing gasoline that exceeded the standards, where such gasoline is necessary to conduct a research, development or testing program.

Under the proposal, parties would be required to submit to EPA an application for exemption that would describe the purpose and scope of the program and the reasons why use of the higher sulfur gasoline is necessary. In approving any application, EPA would impose reasonable conditions such as recordkeeping, reporting and volume limitations. We believe that the proposal includes the least onerous requirements for industry that also would ensure that higher sulfur gasoline is used only for legitimate research purposes. We request comment on these proposed provisions. We also request comment on whether in lieu of an approval process, parties should be required to submit the required information to EPA at the start of the program, and annually thereafter, with the condition that EPA could provide a party with written notification in the event the Agency determines the exemption is not justified. We also request comment on whether the regulations should impose a volume limit on the amount of gasoline that could be used in a research program, as a way of minimizing any adverse environmental effects that could result from allowing such an exemption from the sulfur requirements.

8. What Are the Proposed Liability and Penalty Provisions for Noncompliance?

Today's proposed rule contains provisions for liability and penalties that are similar to the liability and penalty provisions of the RFG and other fuels regulations.[103] Under the proposed

[103] See section 80.5 (penalties for fuels violations); section 80.23 (liability for lead violations); section 80.28 (liability for volatility violations); section 80.30 (liability for diesel violations); section 80.79 (liability for violation of

rule, regulated parties would be liable for committing certain prohibited acts, such as selling or distributing gasoline that does not meet the sulfur standards, or causing others to commit prohibited acts. In addition, parties would be liable for a failure to meet certain affirmative requirements, or causing others to fail to meet affirmative requirements. For example, persons who produce or import gasoline would be liable for a failure to fulfill any of the requirements for refiners and importers, including the sampling and testing requirements, the reporting and attest audit requirements, the averaging requirements, the small refinery requirements, and the credit creation and trading requirements. In such cases the regulated party would also be liable for any violation of the sulfur standard based on corrected information. All parties in the gasoline distribution system, including refiners, importers, distributors, carriers, retailers, and wholesale purchaser-consumers, would be liable for a failure to fulfill the recordkeeping requirements and the PTD requirements.

a. *Presumptive Liability Scheme of Current EPA Fuels Programs.* Current EPA fuels programs include a presumptive liability scheme for violations of prohibited acts. Under this approach, presumptive liability is imposed on two types of parties: (1) That party in the gasoline distribution system that controls the facility where the violation was found or had occurred; and (2) those parties, typically upstream in the gasoline distribution system from the initially listed party, (such as the refiner, reseller, and any distributor of the gasoline), whose prohibited activities could have caused the program non-conformity to exist.[104] This presumptive liability scheme has worked well in enabling us to enforce our fuels programs, since it creates comprehensive liability for substantially all the potentially responsible parties. The presumptions of liability may be rebutted by establishing an affirmative defense.

To clarify the inclusive nature of these presumptive liability schemes, today's proposed rule would explicitly include causing another person to commit a prohibited act and causing the presence of non-conforming gasoline to be in the distribution system as prohibitions. This is consistent with the provisions and implementation of other fuels programs.

Today's proposed rule, therefore, provides that most parties involved in the chain of distribution would be subject to a presumption of liability for actions prohibited, including causing non-conforming gasoline to be in the distribution system and causing violations by other parties. Like the other fuels regulations, a refiner also would be subject to a presumption of vicarious liability for violations by any downstream facility that displays the refiner's brand name, based on the refiner's ability to exercise control at these facilities. Carriers, however, would be presumed liable only for violations arising from product under their control or custody, and not for causing non-conforming gasoline to be in the distribution system, except where we have specific evidence of causation.

b. *Affirmative Defenses for Each Presumptively Liable Party.* The proposal includes affirmative defenses for each party that is deemed presumptively liable for a violation, and all presumptions of liability are refutable. The proposed defenses are similar to the defenses available to parties for violations of the RFG regulations. We believe that these defense elements set forth reasonably attainable criteria to rebut a presumption of liability. The defenses include a demonstration that: (1) the party did not cause the violation; and (2) except for retailers and wholesale purchaser-consumers, the party conducted a quality assurance program. For parties other than tank truck carriers, the quality assurance program would be required to include periodic sampling and testing of the gasoline. For tank truck carriers, the quality assurance program would not need to include periodic sampling and testing, but in lieu of sampling and testing, the carrier would be required to demonstrate evidence of an oversight program for monitoring compliance, such as appropriate guidance to drivers on compliance with applicable requirements and the periodic review of records concerning gasoline quality and delivery.

As in the other fuels regulations, branded refiners would be subject to more stringent standards for establishing a defense because of the control such refiners have over branded downstream parties. Under today's rule, in addition to the other defense elements, branded refiners would be required to show that the violation was caused by an action by another person in violation of law, an action by another person in violation of a contractual agreement with the refiner, or the action of a distributor not subject to a contract with the refiner but engaged by the refiner for the transportation of the gasoline.

Based on experience with other fuels programs, we believe that a presumptive liability approach would increase the likelihood of identifying persons who cause violations of the sulfur standards. We normally do not have the information necessary to establish the cause of a violation found at a facility downstream of the refiner or importer. We believe that those persons who actually handle the gasoline are in the best position to identify the cause of the violation, and that a refutable presumption of liability would provide an incentive for parties to be forthcoming with information regarding the cause of the violation. In addition to identifying the party that caused the violation, providing evidence to rebut a presumption of liability would serve to establish a defense for the parties who are not responsible. Presumptive liability is familiar to both industry and to us, and we believe that this approach would make the most efficient use of EPA's enforcement resources. For these reasons, we are proposing a liability scheme for the sulfur program based on a presumption of liability. We request comment on the proposed liability provisions.

c. *Penalties for Violations.* Section 211(d)(1) of the CAA provides for penalties for violations of the fuels regulations.[105] Today's rule proposes penalty provisions that would apply this CAA penalty provision to the sulfur rule. The proposed provisions would subject any person who violates any requirement or prohibition of the sulfur rule to a civil penalty of up to $27,500 for every day of each such violation and the amount of economic benefit or savings resulting from the violation. A violation of the applicable average sulfur standard would constitute a separate day of violation for each day in the averaging period. A violation of a sulfur cap standard would constitute a

RFG prohibited acts); section 80.80 (penalties for RFG/conventional gasoline violations).

[104] Additional type of liability, vicarious liability, is also imposed on branded refiners under these fuels programs.

[105] Section 211(d)(1) reads, in pertinent part:

(d)(1) Civil Penalties.—Any person who violates * * * the regulations prescribed under subsection (c) * * * of this section * * * shall be liable to the United States for a civil penalty of not more than the sum of $25,000 for every day of such violation and the amount of economic benefit or saving resulting from the violation. * * * Any violation with respect to a regulation prescribed under subsection (c) * * * of this section which establishes a regulatory standard based upon a multi-day averaging period shall constitute a separate day of violation for each and every day in the averaging period. * * *

Pursuant to the Debt Collection Improvement Act of 1996 (31 U.S.C. 3701 note), the maximum penalty amount prescribed in section 211(d)(1) of the CAA was increased to $27,500. (See 40 CFR part 19.)

separate day of violation for each day the gasoline giving rise to the violation remained in the gasoline distribution system. The length of time the gasoline in question remained in the distribution system would be deemed to be twenty-five days unless there is evidence that the gasoline remained in the gasoline distribution system for fewer than or more than twenty-five days. The penalty provisions proposed in today's rule are similar to the penalty provisions for violations of the RFG regulations. EPA requests comment on these provisions.

9. How Would Compliance With the Sulfur Standards Be Determined?

We have often used a variety of evidence to establish non-compliance with requirements imposed under our current fuels regulations. Test results of the content of gasoline have been used to establish violations, both in situations where the sample has been taken from the facility at which the violation is found, and where the sample has been obtained from other parties' facilities when such test results have had probative value of the gasoline's characteristics at points upstream or downstream. The Agency has also commonly used documentary evidence to establish non-compliance or a party's liability for non-compliance. Typical documentary evidence has included transfer documents identifying the gasoline as inappropriate for the facility it is being delivered to, or identifying parties having connection with the non-complying gasoline.

a. *What Evidence Could Be Used to Establish Sulfur Rule Violations and Liability for these Violations?* A recent EPA Environmental Appeals Board decision, (In re: Commercial Cartage Company, Docket No. CAA–93–H–002, CAA Appeal No. 97–9) (the ''Cartage'' decision), interpreted the regulatory language of one of EPA's fuels programs as restricting the evidence that the Agency may use in establishing a violation of a standard under that program. Under the Cartage decision, in order to establish the existence of a violation of the gasoline volatility standards [106] at a particular carrier or retail outlet facility, we would have to produce non-compliant test results obtained only by using the regulatory method and only from a sample taken from the facility itself. Other potentially persuasive evidence establishing volatility standard violations would not be permitted under the Cartage decision's interpretation of the volatility rule.[107]

We believe that it would best serve the purposes of the proposed sulfur rule to not limit the evidence that may be used to show whether a violation occurred or liability for that violation. Our enforcement experience in other programs has shown that the Cartage-permitted evidence (test results from samples taken only from a particular facility, and using only the regulatory test methods) often does not exist, while other persuasive evidence of the existence of the violations does exist. If we are not able to use other forms of persuasive evidence to establish violations or other necessary facts short of test results such as those permitted by the volatility regulations under the Cartage interpretation, violators will continue to avoid liability for their actions.

To ensure that evidence with probative value could be used under the sulfur rule, the Agency is making explicit in today's proposal that any probative evidence could be used to establish compliance or non-compliance with the sulfur standards and requirements and liability for non-compliance. This would not remove or change the obligation on refiners and importers to perform testing on each batch of gasoline using the procedures authorized under these regulations. Compliance or non-compliance with sulfur standards would continue to be based on regulatory test methods. However, other probative evidence could be used to determine compliance with sulfur standards if the evidence is relevant to whether the sulfur content would have been in compliance if the appropriate sampling and testing methodologies had been performed.

Under today's proposal, the permitted probative evidence specifically includes information obtained from any source or any location, since Agency enforcement experience has proven the value of such widely-obtained material. Respondents in EPA enforcement actions would have the same right to present other evidence of compliance with the sulfur rule as the Agency would have to establish non-compliance.

VII. Public Participation

We received many comments from a range of interested parties on our Tier 2 Report to Congress. We have also received comments as part of the our outreach to small entities (see section V.B.). These comments have been very valuable in developing this proposal, and we look forward to additional comment during the rulemaking process. You can find comments on the issuance of Tier 2 standards and gasoline sulfur control we received prior to this proposed action in the rulemaking docket, and many of them are discussed in the context of various issues in this preamble. We have considered comments received during the development of the proposal and have addressed a number of them in today's document.

A. Comments and the Public Docket

Publication of this document opens a formal comment period on this proposal. You may submit comments during the period indicated under **DATES** above. The Agency encourages all parties that have an interest in the program described in this document to offer comment on all aspects of the action. Throughout this proposal you will find requests for specific comment on various topics.

The most useful comments are those supported by appropriate and detailed rationales, data, and analyses. We also encourage commenters who disagree with the proposed program to suggest and analyze alternate approaches to meeting the air quality goals of this proposed program. You should send all comments, except those containing proprietary information, to the EPA's Air Docket (see **ADDRESSES**) before the date specified above for the end of the comment period.

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

We will disclose information covered by a claim of confidentiality only to the extent allowed by the procedures set forth in 40 CFR Part 2. If no claim of confidentiality accompanies a submission when we receive it, we will make it available to the public without further notice to the commenter.

B. Public Hearings

We will hold four public hearings as noted under ''DATES'' above. If you would like to present testimony at the

[106] EPA's gasoline volatility regulations are found at 40 CFR 80.27 and 80.28.

[107] See 40 CFR 80.27(b) and 80.28(b) and (e).

public hearings, we ask that you notify the contact person listed above two weeks before the date of the hearing at which you plan to testify. You should include in this notification the date of the hearing at which the testimony will be presented, an estimate of the time required for the presentation, and any need for audio/visual equipment. We also suggest that sufficient copies of the statement or material to be presented be made available to the audience. In addition, it is helpful if the contact person receives a copy of the testimony or material before the hearing.

The hearings will be conducted informally, and technical rules of evidence will not apply. A sign-up sheet will be available at the hearings for scheduling the order of testimony. At the scheduled two day hearing, we suggest that testimony that primarily pertains to the proposed fuel requirements be presented on the first day of the hearings and that testimony that primarily pertains to the proposed vehicle standards (and/or other aspects of this proposal) be presented on the second day of the hearings. Written transcripts of the hearings will be prepared. The official record of the hearings will be kept open for 30 days after the hearing dates to allow submittal of supplementary information.

VIII. Administrative Requirements

A. Administrative Designation and Regulatory Analysis

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

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

- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or,
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, EPA has determined that this proposal is a ''significant regulatory action'' because the proposed vehicle standards, gasoline sulfur standards, and other proposed regulatory provisions, if implemented, would have an annual effect on the economy in excess of $100 million. Accordingly, a Draft Regulatory Impact Analysis (RIA) has been prepared and is available in the docket for this rulemaking. This action was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12866. Written comments from OMB on today's action and responses from EPA to OMB comments are in the public docket for this rulemaking.

B. Regulatory Flexibility Act

The Regulatory Flexibility Act, 5 U.S.C. 601–612, was amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Public Law 104–121, to ensure that concerns regarding small entities are adequately considered during the development of new regulations that affect them. In response to the provisions of this statute, EPA has identified industries subject to this proposed rule and has provided information to, and received comment from, small entities and representatives of small entities in these industries. An Initial Regulatory Flexibility Analysis (RFA) has been prepared by the Agency to evaluate the economic impacts of today's proposal on small entities.[108] The key elements of the Initial RFA include:

- The number of affected small entities;
- The projected reporting, record keeping, and other compliance requirements of the proposed rule, including the classes of small entities that would be affected and the type of professional skills necessary for preparation of the report or record;
- Other federal rules that may duplicate, overlap, or conflict with the proposed rule; and,
- Any significant alternatives to the proposed rule that accomplish the stated objectives of applicable statutes and that minimize significant economic impacts of the proposed rule on small entities.

The Agency convened a Small Business Advocacy Review Panel (the Panel) under section 609(b) of the Regulatory Flexibility Act as added by SBREFA. The purpose of the Panel was to collect the advice and recommendations of representatives of small entities that could be affected by today's proposed rule and to report on those comments and the Panel's findings as to issues related to the key elements of the Initial Regulatory Flexibility Analysis under section 603 of the Regulatory Flexibility Act. The report of the Panel has been placed in the rulemaking record.[109]

The contents of today's proposal and the Initial Regulatory Flexibility Analysis reflect the recommendations in the Panel's report. We summarize our outreach to small entities and our responses to the recommendations of the Panel below. The Agency continues to be interested in the potential impacts of the proposed rule on small entities and welcomes additional comments during the rulemaking process on issues related to such impacts.

1. Potentially Affected Small Businesses

The Initial Regulatory Flexibility Analysis identified small businesses from the industries in the following table as subject to the provisions of today's proposed rule:

TABLE VIII.1.—INDUSTRIES CONTAINING SMALL BUSINESSES POTENTIALLY AFFECTED BY TODAY'S PROPOSED RULE

Industry	NAICS [a] codes	SIC [b] codes	Defined by SBA as a small business if: [c]
Motor Vehicle Manufacturers	336111 336112 336120	3711	<1000 employees.
Alternative Fuel Vehicle Converters	336311 541690	3592 8931	<500 employees.
	336312	3714	<750 employees.

[108] The Initial RFA is contained in Chapter 8 of the Regulatory Impact Analysis.

[109] Report of the Small Business Advocacy Panel on Tier 2 Light-Duty Vehicle and Light-Duty Truck Emission Standards, Heavy-Duty Gasoline Engine Standards, and Gasoline Sulfur Standards, October 1998.

TABLE VIII.1.—INDUSTRIES CONTAINING SMALL BUSINESSES POTENTIALLY AFFECTED BY TODAY'S PROPOSED RULE—Continued

Industry	NAICS [a] codes	SIC [b] codes	Defined by SBA as a small business if: [c]
	422720	5172	<100 employees.
	454312	5984	<$5 million annual sales.
	811198	7549	
	541514	8742	
Independent Commercial Importers of Vehicles and Vehicle Components	811112	7533	<$5 million annual sales.
	811198	7549	
	541514	8742	
Petroleum Refiners	324110	2911	<1500 employees.
Petroleum Marketers and Distributors	422710	5171	<100 employees.
	422720	5172	

[a] North American Industry Classification System.
[b] Standard Industrial Classification system.
[c] According to SBA's regulations (13 CFR 121), businesses with no more than the listed number of employees or dollars in annual receipts are considered ''small entities'' for purposes of a regulatory flexibility analysis.

The Initial RFA identified about 15 small petroleum refiners, several hundred small petroleum marketers, and about 15 small certifiers of covered vehicles (belonging to the other categories in the above table) that would be subject to the proposed rule.

2. Small Business Advocacy Review Panel and the Evaluation of Regulatory Alternatives

The Small Business Advocacy Review Panel was convened by EPA on August 27, 1998. The Panel consisted of representatives of the Small Business Administration (SBA), the Office of Management and Budget (OMB), and EPA. During the development of today's proposal, EPA and the Panel were in contact with representatives from the small businesses that would be subject to the provisions in today's proposal. In addition to verbal comments from industry noted by the Panel at meetings and teleconferences, written comments were received from each of the affected industry segments or their representatives. These comments, alternatives suggested by the Panel to mitigate adverse impacts on small businesses, and issues the Panel requested EPA take additional comment on are contained in the report of the Panel and are summarized below. Today's proposal incorporates or requests comment on the alternatives and issues suggested by the Panel.

Fuel-Related Small Business Issues

Most of the small refiners stated that if they were required to achieve 30 ppm sulfur levels on average with an 80 ppm per-gallon cap without some regulatory relief, they would be forced out of business. Thus, the Panel devoted much attention to regulatory alternatives to address this concern. Most small refiners strongly supported delaying mandatory compliance for their facilities. On the other hand, most small refiners stated that a phase-in of gasoline sulfur standards would not be helpful because it would be more cost-effective for them to install the maximum technology required for the most stringent sulfur levels that would ultimately be imposed.

The Society of Independent Gasoline Marketers of America (SIGMA) commented that EPA should consider giving relief not only to refiners that meet the SBA definition of small refiner but also to refineries with relatively small production capacity that are owned by large refining companies. This was because a refinery with a small production capacity would operate essentially as an SBA-defined small refiner would. SIGMA also noted that small gasoline marketers would be affected by the closure of any refinery with small production capacity, whether it was owned by a large company or an SBA-defined small refining company.

The Panel recommended that small refiners be given a four to six year period of relief during which less stringent gasoline sulfur requirements would apply. The Panel also advised that EPA specifically request comment on an alternative duration of ten years for the relief period. Small refiners would be assigned interim sulfur standards during this relief period based on their current individual refinery sulfur levels. Following this relief period, small refiners would be required to meet the industry-wide standard, although temporary hardship relief would be available on a case-by-case basis. The additional time provided to small refiners before compliance with the industry-wide standard was required would allow (1) new sulfur-reduction technologies to be proven-out by larger refiners, (2) the costs of advanced technology units to drop as the volume of their sales increases, (3) industry engineering and construction resources to be freed-up, and (4) the acquisition of the necessary capital by small refiners. The provisions that EPA is proposing for small refiners and our requests for specific comments are found in Section IV.C.3.b.above. The Panel concluded that adding gasoline sulfur to the fuel parameters already being sampled and tested by gasoline marketers would likely result in little, if any, additional burden. Therefore, the Panel did not recommend any special provision for gasoline marketers.

Vehicle-Related Small Business Issues

Independent commercial importers of vehicles (ICIs) suggested that the new emissions standards be phased-in with the phase-in schedule based on the small vehicle manufacturer's annual production volume. Secondly, the ICIs requested that small testing laboratories be permitted to use older technology dynamometers than proposed for use by the Agency. Finally, the ICIs commented that the certification process should be waived for certain foreign vehicles. Small-volume vehicle manufacturers (SVMs) stated that a phase-in of Tier-2 emissions standards is essential. They further stated that SVMs should not be required to comply until the end of the phase-in period, which should not be before model year 2007. The SVMs also stated that a case-by-case hardship relief provision should be provided for their members. SVMs requested that a credit program be established with incentives for larger manufacturers to make credits available to SVMs in meeting their compliance goals.

Based on the above comments, the Panel advised that EPA consider several

alternatives, individually or in combination, for the potential relief that they might provide to small certifiers of vehicles. Our requests for comments on these alternatives are found in Section V.A.8 above.

The Initial Regulatory Flexibility Analysis evaluates the financial impacts of the proposed vehicle standards and fuel controls on small entities. EPA believes that the regulatory alternatives considered in today's document will provide substantial relief to small business from the potential adverse economic impacts of complying with today's proposed rule.

C. Paperwork Reduction Act

The information collection requirements (ICR) in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the *Paperwork Reduction Act*, 44 U.S.C. 3501 *et seq.* The Agency may not conduct or sponsor an information collection, and a person is not required to respond to a request for information unless the information collection request displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR chapter 15.

The information collection requirements associated with today's proposed rule belong to two distinct categories: (1) Those that pertain to the proposed amendments to the vehicle certification requirements, and (2) those that pertain to the proposed requirements for the control of gasoline sulfur content. The information collection requirements are contained in two separate ICR documents according to the category to which they belong.[110]

The *Paperwork Reduction Act* stipulates that ICR documents estimate the burden of activities that would be required of regulated parties within a three year time period. Consequently, the ICR documents that accompany today's proposed rule provide burden estimates for the activities that would be required under the first three years of the proposed program.

ICRs Pertaining to the Proposed Amendments to Vehicle Certification Requirements

The information collection burden to vehicle certifiers associated with the proposed amendments to the vehicle certification requirements in today's document pertain to the proposed fleet-average NO_X standard and emission credits provisions. These proposed requirements are very similar to those under the voluntary National Low Emission Vehicle (NLEV) program, which includes a fleet-average standard for nonmethane hydrocarbon organic gases (NMOG) and associated emission credits provisions. The hours spent annually by a given vehicle certifier on the information collection activities associated with the proposed recordkeeping and reporting requirements depends upon certifier-specific variables, including: the scope/variety of their product line as reflected in the number of test groups and strategy used to comply with the proposed fleet-average NO_X standard, the extent they utilize the proposed emissions credits provisions, and whether they opted into the NLEV program. Vehicle certifiers that use the proposed provisions for early banking of emission credits would be subject to the associated information collection requirements as early as September 1, 2000.[111] All vehicle certifiers would be required to comply with the information collection requirements associated with the amendments to the vehicle certification program beginning September 1, 2003.[112] The ICR document for the proposed amendments to the vehicle certification program provides burden estimates for all of the associated information collection requirements. The total information collection burden associated with the proposed amendments to the vehicle certification requirements is estimated at 8,361 hours and $564,172 annually for the certifiers of light-duty vehicles and light-duty trucks.

ICRs Pertaining to the Proposed Requirements for Gasoline Sulfur Control

The information collection burden to gasoline refiners, importers, marketers, distributors, retailers and wholesale purchaser-consumers (WPCs), and users of research and development (R&D) gasoline pertain to the proposed gasoline sulfur control requirements. The scope of the recordkeeping and reporting requirements for each regulated party, and therefore the cost to that party, reflects the party's opportunity to create, control, or alter the sulfur content of gasoline. As a result, refiners and importers would have significant requirements, which are necessary both for their own tracking, and that of downstream parties, and for EPA enforcement. Parties downstream from the gasoline production or import point, such as retailers, would have minimal burdens that are primarily associated with the transfer and retention of product transfer documents. Many of the reporting and recordkeeping requirements for refiners and importers regarding the sulfur content of gasoline on which the proposed rule would rely currently exist under EPA's Reformulated Gasoline (RFG) and Anti-Dumping programs. The ICR for the RFG program covered start up costs associated with reporting gasoline sulfur content under the RFG program. Consequently, much of the cost of the information collection requirements under the proposed gasoline sulfur control program has already been accounted for under the RFG program ICR.

The information collection requirements under the proposed sulfur control program would evolve over time as the program is phased-in. Beginning July 1, 2000, certain requirements would apply to parties that voluntarily opt to generate credits for early sulfur reduction under the proposed average banking and trading (ABT) provisions. Many of the requirements would not become applicable until the beginning of the sulfur control program on October 1, 2003, when all refiners would be required to meet the proposed standards. The information collection requirements under the proposed program would become stable after January 1, 2008, when the optional small refiner provisions would expire.[113]

The ICR document for the proposed gasoline sulfur control program provides burden estimates for the activities that would be required under the first three years of the sulfur control program, from July 1, 2000 through June 30, 2003. The burden associated with activities that would be required after June 30, 2003 will be estimated in later ICRs. The initial ICR for the gasoline sulfur control program, however, does

[110] The information collection requirements associated with the proposed amendments to the requirements for vehicle certification are contained in the Information Collection Request entitled ''Amendments to the Reporting and Recordkeeping Requirements for Motor Vehicle Certification Under the Proposed Tier 2 Rule''. The information collection requirements associated with the proposed gasoline sulfur control program are contained in the Information Collection Request entitled ''Recordkeeping and Reporting Requirements Regarding the Sulfur Content of Motor Vehicle Gasoline Under the Tier 2 Rule''.

[111] These ICRs would become effective on the date that model year 2001 vehicles are introduced into commerce. EPA assumes that September 1, 2000 is the earliest date that model year 2001 vehicles will be marketed.

[112] Assuming model year 2004 vehicles are introduced into commerce on this date.

[113] A refiner could petition EPA for an extension of the small refiner provisions beyond January 1, 2008, based on hardship.

provide a qualitative characterization of all of the required activities and associated burdens for the various regulated parties as they develop, and until they become stable after January 1, 2008.

We estimate that the total burden of the information collection requirements that would be applicable during the first three years of the proposed gasoline sulfur control program would be 42,479 hours and $2,149,865 annually. The estimated annual burden for the various regulated entities under the initial three year period of the proposed gasoline sulfur control program are as follows:

—Refiners: 31,231 hours, $1,879,822
—Importers: 40 hours, $2,067
—Pipelines: 85 hours, $2,785
—Terminals: 1,700 hours, $55,700
—Truckers: 3,333 hours, $118,000
—Retailers/WPCs: 6,087 hours, $ 91,298
—R&D Gasoline Users: 3 hours, $193

Total Burden of the Proposed ICRs

We estimate that the total burden of the recordkeeping and reporting requirements associated with the proposed vehicle certification and gasoline sulfur control requirements would be at 50,840 hours and $2,714,037 annually over the first three years that these requirements would be in effect.

Comments on EPA's Burden Estimates

We request comments on the Agency's need for the information proposed to be collected, the accuracy of our estimates of the associated burdens, and any suggested methods for minimizing the burden, including the use of automated techniques for the collection of information. Comments on the ICR should be sent to: the Office of Policy, Regulatory Information Division, U.S. Environmental Protection Agency (Mail Code 2136), 401 M Street, SW., Washington, DC 20460, marked ''Attention: Director of OP;'' and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW., Washington, DC 20503, marked ''Attention: Desk Officer for EPA.'' Include the ICR number in any such correspondence. OMB is required to make a decision concerning the ICR between 30 and 60 days after publication of a proposed rule. Therefore, comments to OMB on the ICR are most useful if received within 30 days of the publication date of today's document. Any comments from OMB and from the public on the information collection requirements in today's proposal will be placed in the docket and addressed by EPA in the final rule.

Copies of the ICR documents can be obtained from Sandy Farmer, Office of Policy, Regulatory Information Division, U.S. Environmental Protection Agency (Mail Code 2137), 401 M Street, SW., Washington, DC 20460, or by calling (202) 260–2740. Insert the ICR title and/or OMB control number in any correspondence. Copies may also be downloaded from the internet at http://www.epa.gov.icr.

D. Intergovernmental Relations

1. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for federal agencies to assess the effects of their regulatory actions on state, local, and tribal governments, and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''federal mandates'' that may result in expenditures to state, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more for any single year. Before promulgating a rule, for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative that is not the least costly, most cost-effective, or least burdensome alternative if EPA provides an explanation in the final rule of why such an alternative was adopted.

Before we establish any regulatory requirement that may significantly or uniquely affect small governments, including tribal governments, we must develop a small government plan pursuant to section 203 of the UMRA. Such a plan must provide for notifying potentially affected small governments, and enabling officials of affected small governments to have meaningful and timely input in the development of our regulatory proposals with significant federal intergovernmental mandates. The plan must also provide for informing, educating, and advising small governments on compliance with the regulatory requirements.

This proposed rule contains no federal mandates for state, local, or tribal governments as defined by the provisions of Title II of the UMRA. The rule imposes no enforceable duties on any of these governmental entities. Nothing in the proposed rule would significantly or uniquely affect small governments.

EPA has determined that this rule contains federal mandates that may result in expenditures of more than $100 million to the private sector in any single year. EPA believes that the proposed program represents the least costly, most cost-effective approach to achieve the air quality goals of the proposed rule. The cost-benefit analysis required by the UMRA is discussed in Section IV.D. above and in the Draft RIA. See the ''Administrative Designation and Regulatory Analysis'' section in today's preamble (VIII.A.) for further information regarding these analyses.

2. Executive Order 12875: Enhancing Intergovernmental Partnerships

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

Today's proposed rule would not create a mandate on state, local or Tribal governments. The proposed rule would not impose any enforceable duties on these entities. Accordingly, the requirements of section 1(a) of Executive Order 12875 do not apply to this rule.

3. Executive Order 13084: Consultation and Coordination With Indian Tribal Governments

Under Executive Order 13084, EPA may not issue a regulation that is not required by statute, that significantly or uniquely affects the communities of Indian Tribal governments, and that imposes substantial direct compliance

costs on those communities, unless the federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 13084 requires EPA to provide to the Office of Management and Budget, in a separately identified section of the preamble to the rule, a description of the extent of EPA's prior consultation with representatives of affected tribal governments, a summary of the nature of their concerns, and a statement supporting the need to issue the regulation. In addition, Executive Order 13084 requires EPA to develop an effective process permitting elected officials and other representatives of Indian tribal governments ''to provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities.''

Today's rule does not significantly or uniquely affect the communities of Indian Tribal governments. The proposed motor vehicle emissions, motor vehicle fuel, and other related requirements for private businesses in today's document would have national applicability, and thus would not uniquely affect the communities of Indian Tribal Governments. Further, no circumstances specific to such communities exist that would cause an impact on these communities beyond those discussed in the other sections of today's document. Thus, EPA's conclusions regarding the impacts from the implementation of today's proposed rule discussed in the other sections of today's document are equally applicable to the communities of Indian Tribal governments. Accordingly, the requirements of section 3(b) of Executive Order 13084 do not apply to this rule.

E. National Technology Transfer and Advancement Act

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

This proposed rule references technical standards adopted by the Agency through previous rulemakings. No new technical standards are proposed in today's document. The standards referenced in today's proposed rule involve the measurement of gasoline fuel parameters and motor vehicle emissions. The measurement standards for gasoline fuel parameters referenced in today's proposal are all voluntary consensus standards. The motor vehicle emissions measurement standards referenced in today's proposed rule are government-unique standards that were developed by the Agency through previous rulemakings. These standards have served the Agency's emissions control goals well since their implementation and have been well accepted by industry. EPA is not aware of any voluntary consensus standards for the measurement of motor vehicle emissions. Therefore, the Agency proposes to use the existing EPA-developed standards found in 40 CFR part 86 for the measurement of motor vehicle emissions.

EPA welcomes comments on this aspect of the proposed rulemaking and, specifically, invites the public to identify potentially-applicable voluntary consensus standards and to explain why such standards should be used in this regulation.

F. Executive Order 13045: Children's Health Protection

Executive Order (E.O.) 13045, ''Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that (1) is determined to be ''economically significant'' as defined under E.O. 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, section 5–501 of the Order directs the Agency to evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This proposed rule is subject to the Executive Order because it is an economically significant regulatory action as defined by E.O. 12866 and it concerns in part an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children.

This rulemaking will achieve significant reductions of various emissions from passenger cars and light trucks, primarily NO_X, but also NMOG and PM. These pollutants raise concerns regarding environmental health or safety risks that EPA has reason to believe may have a disproportionate effect on children, such as impacts from ozone, PM and certain toxic air pollutants. See Section III of this proposal and the RIA for a further discussion of these issues.

The effects of ozone and PM on children's health were addressed in detail in EPA's rulemaking to establish the NAAQS for these pollutants, and EPA is not revisiting those issues here. EPA believes, however, that the emission reductions from the strategies proposed in this rulemaking will further reduce air toxics and the related adverse impacts on children's health. EPA will be addressing the issues raised by air toxics from motor vehicles and their fuels in a separate rulemaking that EPA will initiate in the near future under section 202(l) of the Act. That rulemaking will address the emissions of hazardous air pollutants from vehicles and fuels, and the appropriate level of control of HAPs from these sources.

In this proposal, EPA has evaluated several regulatory strategies for reductions in emissions from passenger cars and light trucks. (See sections IV, V, and VI of this proposal as well as the RIA.) For the reasons described there, EPA believes that the strategies proposed are preferable under the Clean Air Act to other potentially effective and reasonably feasible alternatives considered by the Agency, for purposes of reducing emissions from these sources as a way of helping areas achieve and maintain the NAAQS for ozone and PM. Moreover, EPA believes that it has selected for proposal the most stringent and effective control reasonably feasible at this time, in light of the technology and cost requirements of the Act.

IX. Statutory Provisions and Legal Authority

Statutory authority for the vehicle controls proposed in today's document can be found in sections 202, 206, 207, 208, and 301 of the Clean Air Act (CAA), as amended, 42 U.S.C. sections 7521, 7525, 7541, and 7601.

Statutory authority for the fuel controls proposed in today's document comes from section 211(c) of the CAA, which allows EPA to regulate fuels that either contribute to air pollution which endangers public health or welfare or which impair emission control equipment. Both criteria are satisfied for

the proposed gasoline sulfur controls. Additional support for the procedural and enforcement-related aspects of the fuel's controls in today's proposal, including the proposed record keeping requirements, comes from sections 114(a) and 301(a) of the CAA.

List of Subjects

40 CFR Part 80

Environmental protection, Administrative practice and procedure, Fuel Additives, Gasoline, Imports, Labeling, Motor vehicle pollution, Penalties, Reporting and recordkeeping requirements.

40 CFR Part 85

Environmental protection, Confidential business information, Imports, Labeling, Motor vehicle pollution, Penalties, Reporting and recordkeeping requirements, Research, Warranties.

40 CFR Part 86

Environmental protection, Administrative practice and procedure, Confidential business information, Labeling, Motor vehicle pollution, Penalties, Reporting and recordkeeping requirements.

Dated: May 1, 1999.

Carol M. Browner,

Administrator.

For the reasons set forth in the preamble, we propose to amend parts 80, 85 and 86 of title 40, of the Code of Federal Regulations as follows:

PART 80—REGULATION OF FUELS AND FUEL ADDITIVES

1. The authority citation for part 80 continues to read as follows:

Authority: Secs. 114, 211, and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7414, 7545 and 7601(a)).

2. Section 80.2 is amended by removing and reserving paragraph (aa) and revising paragraphs (h), (s), (w) and (gg) to read as follows:

§ 80.2 Definitions.

* * * * *

(h) *Refinery* means any facility, including but not limited to, a plant, tanker truck, or vessel where gasoline or diesel fuel is produced, including any facility at which blendstocks are combined to produce gasoline or diesel fuel, or at which blendstock is added to gasoline or diesel fuel.

* * * * *

(s) *Gasoline blending stock, blendstock, or component* means any liquid compound which is blended with other liquid compounds to produce gasoline.

* * * * *

(w) *Previously certified gasoline* means gasoline or RBOB that previously has been included in a batch for purposes of complying with the standards for reformulated gasoline, conventional gasoline or gasoline sulfur, as appropriate.

* * * * *

(aa) [Reserved]

* * * * *

(gg) *Batch of gasoline* means a quantity of gasoline that is homogeneous with regard to those properties that are specified for conventional or reformulated gasoline.

* * * * *

3. Section 80.46 is amended by revising paragraphs (a) and (h) to read as follows:

§ 80.46 Measurement of reformulated gasoline fuel parameters.

(a) *Sulfur.* Sulfur content must be determined by using one of the following methods:

(1) *Primary method.* American Society for Testing and Materials (ASTM) standard method D–2622–98, entitled ''Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry.''

(2) *Alternative method.* ASTM D–5453–93, entitled ''Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor fuels and Oils by Ultraviolet Fluorescence.''

* * * * *

(h) *Incorporations by reference.* ASTM standard methods D–2622–98, D–5453–93, D–3606–92, D–1319–93, D–4815–93, and D–86–90 with the exception of the degrees Fahrenheit figures in Table 9 of D–86–90, are incorporated by reference. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428. Copies may be inspected at the Air Docket Section (LE–131), room M–1500, U.S. Environmental Protection Agency, Docket No. A–97–03, 401 M Street, SW., Washington, DC 20460, or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC.

4. Subpart H is added to read as follows:

Subpart H—Gasoline Sulfur

General Information

Sec.
80.180 What are the implementation dates for the gasoline sulfur program?
80.185 [Reserved]
80.190 Am I required to register with EPA under the sulfur program?

Gasoline Sulfur Standards

80.195 What are the gasoline sulfur standards for refiners and importers?
80.200 What gasoline is subject to the sulfur standards?
80.205 How is compliance with the annual average sulfur level determined?
80.210 What sulfur standards apply to gasoline downstream from refineries and importers?
80.215 What requirements apply to oxygenate blenders?
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Small Refiner Provisions

80.225 What is the definition of a small refiner?
80.230 Who is not eligible for the small refiner provisions?
80.235 How does a refiner obtain approval as a small refiner?
80.240 What are the small refiner gasoline sulfur standards?
80.245 How does small refiner apply for a sulfur baseline?
80.250 How is the small refiner sulfur baseline determined?
80.255 [Reserved]
80.260 What are the procedures and requirements for obtaining a hardship extension?
80.265 How will the EPA approve or disapprove of my hardship extension application?
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Sulfur Averaging, Banking, Trading—General Information

80.280 What is the sulfur Averaging, Banking and Trading (ABT) program?
80.285 Who may participate in the sulfur ABT program?

Sulfur ABT Program—Baseline

80.290 How do I apply for a sulfur baseline?
80.295 How is a refinery or importer sulfur baseline determined?
80.300 What if I did not produce or import gasoline during 1997 or 1998?

Sulfur ABT Program—Credit Generation

80.305 How are credits generated during the time period 2001 through 2003?
80.310 How are credits generated beginning in 2004?

Sulfur ABT Program—Credit Use

80.315 How are credits used?
80.320 What are the reporting requirements for the sulfur ABT program?
80.325 [Reserved]

Sampling, Testing and Retention Requirements for Refiners and Importers

80.330 What are the sampling and testing requirements for refiners and importers?

80.335 What gasoline sample retention requirements apply to refiners and importers?
80.340 What alternative standards, sampling and testing requirements apply to refiners producing gasoline by blending blendstocks into previously certified gasoline (PCG)?
80.345 [Reserved]
80.350 What alternative sulfur standards, sampling and testing requirements apply to importers who transport gasoline by truck?
80.355 [Reserved]

Recordkeeping and Reporting Requirements

80.360 What are the product transfer document requirements?
80.365 What records must be kept?
80.370 What are the annual reporting requirements?

Exemptions

80.375 What requirements apply to California gasoline?
80.380 What are the requirements for obtaining an exemption for gasoline used for research, development or testing purposes?

Violation Provisions

80.385 What acts are prohibited under the gasoline sulfur program?
80.390 What evidence may be used to determine compliance with the prohibitions and requirements of this subpart and liability for violations of this subpart?
80.395 Who is liable for violations under the gasoline sulfur program?
80.400 What defenses apply to persons deemed liable for a violation of a prohibited act?
80.405 What penalties am I subject to?

Provisions for Foreign Refiners With Individual Sulfur Baselines

80.410 What are the additional requirements for gasoline produced at foreign refineries having individual small refiner sulfur baselines?

Attest Engagements

80.415 What are the attest engagement requirements for gasoline sulfur compliance?

Subpart H—Gasoline Sulfur

General Information

§ 80.180 What are the implementation dates for the gasoline sulfur program?

(a) *July 1, 2000.* Deadline for submittal of sulfur baseline determinations for averaging, banking and trading program per § 80.290.

(b) *June 1, 2002.* Deadline for small refiner applications per § 80.235.

(c) *October 1, 2003.* Per-gallon caps apply, per § 80.195 or § 80.240, as applicable.

(d) *January 1, 2004.* Refinery and importer average standards apply and corporate pool average gasoline standards apply, per § 80.195. Small refinery average standards apply per § 80.240.

(e) *February 1, 2004.* Downstream caps apply, per § 80.210.

(f) *January 1, 2005.* Corporate pool average standards and per-gallon caps are made more stringent per § 80.195.

(g) *January 1, 2006.* Corporate pool average gasoline standards no longer apply. Per-gallon caps are made more stringent per § 80.195.

(h) *June 30, 2007.* Deadline for small refiner hardship extension applications per § 80.260.

(i) *January 1, 2008.* With the exception of gasoline produced by small refiners with approved hardship extensions, every batch of gasoline is subject to the 80 ppm cap. With the exception of small refiners with approved hardship extensions, refinery and importer average gasoline sulfur standards apply, per § 80.195.

(j) *January 1, 2010.* Every batch of gasoline is subject to the 80 ppm cap. Refinery and importer average gasoline sulfur standards apply, per § 80.195.

§ 80.185 [Reserved]

§ 80.190 Am I required to register with EPA under the sulfur program?

(a) Each refiner and importer must register with EPA according to the procedures specified in this section.

(b) Refiners and importers subject to the standards in § 80.195 who are registered by EPA under § 80.76(a) are deemed to be registered for purposes of this subpart. Refiners and importers subject to the standards in § 80.195 who are not registered by EPA under § 80.76(a) must provide to EPA the information required by § 80.76 by November 1, 2003 or not later than three months in advance of the first date that such person produces or imports gasoline, whichever is later.

(c) Refiners and individual refineries that are registered by EPA under § 80.76(a) and have established small refiner individual refinery standards status under § 80.235(f) are deemed to be registered for purposes of this subpart. Refiners having any refinery subject to the standards in § 80.240 who are not registered by EPA under § 80.76(a) must provide to EPA the information required by § 80.76 by June 1, 2002.

(d) Any refiner or importer who plans to generate credits in any year prior to 2004 must register with us no later than November 1 of the year prior to the first year of credit generation.

Gasoline Sulfur Standards

§ 80.195 What are the gasoline sulfur standards for refiners and importers?

(a)(1) The gasoline sulfur standards for refiners and importers, excluding small refiners subject to the standards at § 80.240, are shown in Table 1 of this section.

(2) The averaging period is January 1 through December 31 of each year. For each averaging period, a refiner's or importer's average sulfur level must be no greater than the levels specified in Table 1 of this section, as follows:

TABLE 1.—GASOLINE SULFUR STANDARDS

	For the averaging period beginning		
	January 1, 2004	January 1, 2005	January 1, 2006+
Refinery or Importer Average, ppm	30	30	30
Corporate Pool Average, ppm	120	90	([b])
Per-Gallon Cap, ppm	[a]300	180	80

[a] This per-gallon cap standard must be met beginning October 1, 2003.
[b] Not applicable.

(b) The refinery or importer average gasoline sulfur standard.

(1) The refinery or importer average gasoline sulfur standard is the maximum average sulfur level, measured in parts per million (ppm), allowed for the combined reformulated and conventional gasoline produced at a refinery or imported by an importer

during each calendar year starting January 1, 2004.

(2) The annual average sulfur level is calculated as specified in section § 80.205.

(3) The refinery or importer average gasoline sulfur standard may be met using credits according to § 80.315, or any other potential sources of credits or allowances, if applicable.

(c) The corporate pool average gasoline sulfur standard applicable in 2004 and 2005 is the maximum average sulfur level, in ppm, allowed for a refiner's or importer's combined reformulated and conventional gasoline production from all of a refiner's refineries and all gasoline imported by an importer in a calendar year. The corporate pool average is determined by volume-weighting each refinery's and importer's actual annual average sulfur levels by their respective production or import volumes, as specified in § 80.205.

(d) The per-gallon cap standard specified in Table 1 of this section for the averaging period beginning January 1, 2004, must be met beginning October 1, 2003.

§ 80.200 What gasoline is subject to the sulfur standards?

All gasoline is subject to the standards in this subpart, with the following exceptions:

(a) Gasoline that is used to fuel aircraft, racing vehicles or racing boats that are used only in sanctioned racing events, provided that:

(1) Product transfer documents associated with such gasoline, and any pump stand from which such gasoline is dispensed, identify the gasoline either as gasoline that is restricted for use in aircraft, or as gasoline that is restricted for use in racing motor vehicles or racing boats that are used only in sanctioned racing events;

(2) The gasoline is completely segregated from all other gasoline throughout production, distribution and sale to the ultimate consumer; and

(3) The gasoline is not made available for use as motor vehicle gasoline, or dispensed for use in motor vehicles.

(b) California gasoline as defined in § 80.81(a)(2).

(c) Gasoline that is exported for sale outside the U.S.

§ 80.205 How is compliance with the annual average sulfur level determined?

(a) The refinery or importer average gasoline sulfur level is calculated as follows:

$$S_a = \frac{\sum_{i=1}^{n} (V_i \times S_i)}{\sum_{i=1}^{n} V_i}$$

Where:

S_a = The refinery or importer annual average sulfur value.

V_i = The volume of gasoline produced or imported in batch i.

S_i = The sulfur content of batch i as determined in accordance with the requirements of § 80.330.

n = The number of batches of gasoline produced or imported during the averaging period.

i = Individual batch of gasoline produced or imported during the averaging period.

(b) A refiner or importer may include oxygenate added downstream from the refinery or import facility when calculating the sulfur content, provided the following requirements are met:

(1) For oxygenate added to conventional gasoline, the refiner or importer must comply with the requirements of § 80.101(d)(4)(ii).

(2) For oxygenate added to RBOB, the refiner or importer must comply with the requirements of § 80.69(a).

(c) Refiners and importers must exclude from compliance calculations all of the following:

(1) Gasoline that was not produced at the refinery or was not imported by the importer (or that was imported as Certified Sulfur-FRGAS).

(2) Blending stocks or gasoline that have been included in another refiner's compliance calculations.

(3) Gasoline exempted from standards under § 80.200.

(d) Compliance deficit. A refinery or importer may exceed the refinery or importer annual average sulfur standard specified in § 80.195 under the following conditions:

(1) In the calendar year following the year the standard is not met, the refinery or importer achieves compliance with the refinery or importer annual average sulfur standard specified in § 80.195; and

(2) In the calendar year following the year the standard is not met, and after achieving compliance with the refinery or importer annual average sulfur standard specified in § 80.195, the refinery or importer must have sufficient additional credits and/or actual reduction in sulfur levels to equal the compliance deficit of the previous year.

§ 80.210 What sulfur standards apply to gasoline downstream from refineries and importers?

(a) *Definition. S–RGAS* means gasoline produced by a domestic refinery that is subject to the standards in § 80.240, and to Certified Sulfur-FRGAS, as defined in § 80.410, except that no batch of gasoline may be classified as S–RGAS if the actual sulfur content is less than the national refinery cap standard specified in § 80.195.

(b) The sulfur cap standard for gasoline at any point in the gasoline distribution system downstream from refineries and import facilities, including gasoline at facilities of distributors, carriers, retailers and wholesale purchaser-consumers, is as follows:

(1) The following standards apply to gasoline except where product transfer documents indicate the presence of any S–RGAS:

During the Period	National Downstream Sulfur Cap Standard (ppm)
February 1, 2004, through January 31, 2005	≤326
February 1, 2005, through January 31, 2006	≤201
February 1, 2006, and thereafter	≤95

(2) For gasoline, including a mixture of gasoline batches from different refineries, where product transfer documents indicate the presence of any S–RGAS, the downstream cap standard for the gasoline is the highest downstream cap standard applicable to any gasoline in the mixture, except that if a test result indicates the sulfur content of the mixture is less than or equal to the applicable national downstream cap standard, the gasoline is subject to the national downstream cap standard.

§ 80.215 What requirements apply to oxygenate blenders?

Oxygenate blenders, as defined by § 80.2(mm), are subject to the requirements of this subpart except for the reporting requirements of § 80.370 and the requirements under § 80.330 to sample and test each batch of gasoline produced.

§ 80.220 [Reserved]

Small Refiner Provisions

§ 80.225 What is the definition of a small refiner?

(a) A *small refiner* is defined as any person, as defined by 42 U.S.C. 7602(e), which, as of January 1, 1999:

(1) Produced gasoline at a refinery by processing crude oil through refinery processing units; and

(2)(i) Employed no more than 1500 people, including subsidiaries, and in the case of a refiner who operates a refinery as a joint venture with other refiners, including the total number of employees of all corporate entities in the venture; or

(ii) Is a subsidiary, in which case the employees of the parent company and any wholly-owned subsidiaries of the parent company must be included in determining if the 1,500 employee limit is exceeded.

(b) This definition applies to domestic and foreign refiners.

(c) If, without merger with or acquisition of another business unit, a company with approved small refiner status exceeds 1500 employees after January 1, 1999, it will be considered a small refiner for the duration of the small refiner program.

(d) A refiner that was not in operation as of January 1, 1999, that begins operation before January 1, 2001, and meets all other criteria of this subpart, may apply for small refiner status according to § 80.235.

§ 80.230 Who is not eligible for the small refiner provisions?

(a) The following are not eligible for the small refiner provisions:

(1) Refineries built or started up after January 1, 1999, unless the criteria of § 80.225(d) are met; or

(2) Persons that employ more than 1500 people on January 1, 1999, but employ fewer than 1500 people after that date; or

(3) Importers; or

(4) Refiners employing 1500 or fewer people which were part of a larger corporation as of January 1, 1999 but subsequently were sold to form a new company.

(b) *Disqualification as a small refiner.* (1) Refiners who qualify as small under § 80.225, and subsequently employ more than 1500 people as a result of merger with or acquisition of another entity, are disqualified as small refiners and must meet the standards in § 80.195 beginning on January 1 of the first calendar year following such merger or acquisition.

(2) If a small refiner is no longer eligible for small refiner status or elects to change the status of any refinery operating under a small refiner individual refinery standard to subject the refinery to the standards in § 80.195, the refiner must notify EPA in writing within 20 days of the disqualifying event or, in the case of a voluntary election, no later than November 15 prior to the year that the change will occur. Each refinery of the small refiner no longer eligible for small refiner status must meet the standards in § 80.195 for the next averaging period.

§ 80.235 How does a refiner obtain approval as a small refiner?

(a) A refiner must apply to EPA for small refiner status by June 1, 2002.

(b) Applications for small refiner status must be sent to: U.S. EPA—FED, Gasoline Sulfur Small Refiner Status, 2000 Traverwood, Ann Arbor, MI 48105.

(c) The small refiner status application must contain the following information:

(1) A listing of the name and address of each location where any employee of the refiner worked on January 1, 1999, the total number of employees at each location, and the type of business activities carried out at each location.

(2) A letter signed by the president, chief operating or chief executive officer of the company, or his/her designee, stating that the information contained in the application is true to the best of his/her knowledge.

(3) Name, address, phone number, facsimile number and E-mail address of a corporate contact person.

(d) For joint ventures, the total employee count includes the combined employee count of all corporate entities in the venture.

(e) For government-owned refiners, the total employee count includes all government employees.

(f) Refiners who apply for small refiner status based on the number of employees after January 1, 1999 but before January 1, 2001, as permitted under § 80.225(d), must comply with paragraphs (a) through (c) of this section.

(g) EPA will notify a refiner of approval or disapproval of small refiner status by letter.

(1) If approved, EPA will notify the refiner of each refinery's approved baseline, refinery per-gallon cap, and downstream per-gallon cap standard under § 80.210.

(2) If disapproved, the refiner must comply with the standards in § 80.195.

§ 80.240 What are the small refiner gasoline sulfur standards?

(a) The gasoline sulfur standards for an approved small refiner depend on the refinery baseline sulfur level, and are shown in Table 1 of this section, as follows:

TABLE 1.—GASOLINE SULFUR STANDARDS FOR APPROVED SMALL REFINERS

Refinery baseline sulfur level (ppm)	Refinery annual average and per-gallon ("cap") sulfur standards (ppm) that apply during 2004–2007
0 to 30	Refinery average: 30. Cap: 80.
31 to 80	Refinery average: no requirement. Cap: 80.
81 to 200	Refinery average: baseline level. Cap: Factor of 2 above the baseline.
201 and above.	Refinery average: 200 ppm or 50% of baseline, whichever is higher, but in no event greater than 300 ppm. Cap: Factor of 1.5 above baseline level.

(b) The average standards specified in Table 1 of this section apply to the combined reformulated and conventional gasoline produced at a refinery.

(c) The refinery average sulfur standards specified in Table 1 of this section must be met on an annual calendar year basis for each refinery owned by a small refiner.

(d) The per-gallon cap standards specified in Table 1 of this section for the averaging period beginning January 1, 2004 must be met beginning October 1, 2003.

(e) *Volume limitation.* (1) The refinery average standards specified in Table 1 of this section apply to the volume of gasoline produced by a small refiner's refinery up to the lesser of:

(i) 105% of the baseline gasoline volume; or

(ii) The volume of gasoline produced at that refinery during the average period by processing crude oil.

(2) If a refiner exceeds the volume limitation in paragraph (e)(1) of this section during the calendar year, the annual average sulfur standard is calculated as follows:

$$S_{sr} = \frac{(V_b \times S_b) + (30 \times V_a \times V_b)}{V_a}$$

Where:

S_{sr} = Small refiner annual average sulfur standard.

V_b = Applicable volume under paragraph (e)(1) of this section.

V_a = Averaging period gasoline volume.

S_b = Small refiner sulfur baseline.

(3) The applicable volume from paragraph (e)(1) of this section excludes volumes of gasoline blending stocks used in the small refinery's gasoline

production that were received from external sources, unless such blending stocks are substantially transformed through the refinery's processing operations and have not been included in any other refiner's or importer's compliance determination.

(4) The applicable per-gallon cap standards in Table 1 of this section apply to all gasoline produced by small refiners.

(f) Withdrawal of small refiner status. Refiners that receive notification from EPA under § 80.235(f) of their qualification as small refiners will have that status withdrawn if EPA finds that the refiner provided false or inaccurate information on its application for small refiner status. Such refiners will be subject to the standards in § 80.195 beginning on January 1, 2004.

§ 80.245 How does a small refiner apply for a sulfur baseline?

(a) A refiner seeking small refiner status must establish an individual sulfur baseline for every refinery covered by the small refiner status application by June 1, 2002

(1) If a sulfur baseline was submitted for the refinery under § 80.290, the refiner does not need to resubmit that information.

(2) If no sulfur baseline was previously submitted, the refiner must submit a sulfur baseline for every refinery according to § 80.250.

(b) The sulfur baselines must be submitted to the address specified in § 80.235(b).

§ 80.250 How is the small refiner sulfur baseline determined?

(a) The small refiner sulfur baseline is determined as follows:

$$S_b = \frac{\sum_{i=1}^{n} (V_i \times S_i)}{\sum_{i=1}^{n} V_i}$$

Where:

S_b = Sulfur baseline value.
V_i = Volume of gasoline batch i.
S_i = Sulfur content of batch i.
n = Total number of batches of conventional gasoline produced from January 1, 1997 through December 31, 1998.
i = Individual batch of conventional gasoline produced from January 1, 1997 through December 31, 1998.

(b) Foreign small refiners must also comply with the baseline establishment requirements in § 80.410(b).

(c) An approved small refiner may not aggregate the gasoline volumes and sulfur levels of its refineries for compliance with the applicable standards specified in § 80.240.

(d) If at any time a small refinery baseline is determined to be incorrect, the corrected baseline applies ab initio and the annual average standards and cap standards are deemed to be those applicable under the corrected information.

(e) If a small refiner does not have the data specified in paragraph (a) of this section to generate a sulfur baseline, or if any refineries owned by that refiner were not operating in 1997–1998, EPA will assign each refinery a baseline average sulfur level of 150 ppm sulfur and a baseline CG volume equivalent to the annual gasoline volume capability of the refinery at the time it applies for small refiner status.

§ 80.255 [Reserved].

§ 80.260 What are the procedures and requirements for obtaining a hardship extension?

(a) An approved small refiner may apply to EPA for a hardship extension of the small refiner standards for calendar years 2008 and 2009. The application must be submitted no later than June 30, 2007 to U.S. EPA–FED, Small Refiner Hardship Extension, 2000 Traverwood, Ann Arbor, MI 48105.

(b) The application must provide a detailed discussion regarding the inability of the refinery to produce gasoline meeting the requirements of § 80.195. Such an application must include, at a minimum, the following information:

(1) A detailed analysis of the reasons the refinery is unable to produce gasoline meeting the requirements of § 80.195 in 2008, including costs, specification of equipment still needed, potential equipment suppliers, and efforts already completed to obtain the necessary equipment;

(2) If unavailability of equipment is part of the reason for the inability to comply, a discussion of other options considered, and the reasons these other options are not feasible;

(3) If relevant, a demonstration that a needed or lower cost technology is immediately unavailable, but will be available in the near future, and full information regarding when and from what sources it will be available;

(4) Schematic drawings of the refinery configuration as of January 1, 1997 and as of the date of the hardship extension application, and any planned future additions or changes;

(5) If relevant, a demonstration that a temporary unavailability exists of engineering or construction resources necessary for design or installation of the needed equipment;

(6) If sources of crude oil lower in sulfur than what the refiner is currently using are available, full information regarding the availability of these different crude sources, the sulfur content of those crude sources, the cost of the different crude sources over the past five years, and an estimate of gasoline sulfur levels achievable by your refinery if the lower sulfur crude sources were used;

(7) A discussion of any sulfur reductions that can be achieved from current levels;

(8) The date the refiner anticipates compliance with the standards in § 80.195 can be achieved at its refinery;

(9) An analysis of the economic impact of compliance on the refiner's business (including financial statements from the last 5 years, or for any time period up to 10 years, at EPA's request); and

(10) Any other information regarding other strategies considered, including strategies, or components of strategies, that do not involve installation of equipment, and why meeting the standards in § 80.195 beginning in 2008 is infeasible.

(c) The hardship extension application must contain a letter signed by the president, chief operating or chief executive officer, of the company, or his/her designee, stating that the information contained in the application is true to the best of his/her knowledge.

§ 80.265 How will the EPA approve or disapprove of my hardship extension application?

(a) EPA will evaluate each application for hardship extension on a case-by-case basis. An extension will be granted for a refinery if the small refiner who owns the refinery adequately demonstrates that severe economic hardship would result if compliance with the standards in § 80.195 is required in 2008 and/or 2009.

(b) EPA may request more information, if necessary, for evaluation of the application. If requested information is not submitted within the time specified in EPA's request, or any extensions granted, the application may be denied.

(c) EPA will notify the refiner of approval or disapproval of hardship extension by letter.

(1) If approved, EPA will also notify the refiner of the date that full compliance with the standards specified at § 80.195 must be achieved or what interim sulfur levels or schedules apply, if any.

(2) If disapproved, beginning January 1, 2008, the refinery is subject to the requirements in § 80.195.

§ 80.270–80.275 [Reserved]

Sulfur Averaging, Banking, Trading-General Information

§ 80.280 What is the sulfur Averaging, Banking and Trading (ABT) program?

(a) The sulfur averaging, banking and trading program is a voluntary program which allows eligible, participating refiners and importers to generate, bank, trade and use credits.

(b) Beginning in 2000, refiners and importers may generate credits by producing or importing gasoline with sulfur levels below the applicable baseline as calculated under § 80.295.

(c) Beginning in 2004, sulfur credits may be:

(1) Used by the refiner or importer who generated the credits;

(2) Banked for later use or transfer; or

(3) Traded or sold to another refiner or importer.

(d) This subpart contains specific requirements for the following:

(1) Using, generating, selling and trading credits; and

(2) The duration of the ABT program.

(e) The gasoline sulfur ABT program is summarized in Table 1 of this section as follows:

BILLING CODE 6560–50–P

Table 1. Sulfur ABT Program Summary

2000	2000 - 2003	2004	2005	2006	2007+
Application for Credit Program Baseline due by July 1	Early Credit Generation for Gasoline with ≤150 ppm Sulfur				
		Credit Generation for ≤30 ppm Sulfur			
	Banking and Trading of Credits	Banking & Trading of Credits			
		Corporate Average Standards Apply			
		Compliance with 30 ppm Average Standard at the Refinery and Importer Level			
		Phase-in of Downstream Cap Standards			

BILLING CODE 6560–50–C

§ 80.285 Who may participate in the sulfur ABT program?

(a) Any refiner or importer of gasoline, may participate in the program, except that participation by small refiners is limited under paragraph (d) of this section.

(b) Refiners and importers who choose to generate credits in the ABT program must establish a sulfur baseline under § 80.290.

(c) Oxygenate blenders may not participate in the program.

(d) Small refiners with any refinery subject to the standards specified in § 80.240:

(1) May not use sulfur credits to meet the average standard applicable to the refinery.

(2) May generate early credits under § 80.305 and bank and trade such sulfur credits throughout the duration of the sulfur ABT program.

Sulfur ABT Program—Baseline

§ 80.290 How do I apply for a sulfur baseline?

(a) Each refiner or importer who wishes to generate ABT program credits during 2000–2003 must submit a sulfur baseline notification to EPA by July 1, 2000.

(b) The sulfur baseline notification must be sent to: U.S. EPA–FED, ABT Sulfur Baseline, 2000 Traverwood, Ann Arbor, MI 48105.

(c) The sulfur baseline notification must include the following information:

(1) A listing of the names and addresses of all refineries and/or import facilities owned by the corporation;

(2) The conventional gasoline sulfur baseline value, calculated as specified in § 80.295(a), for each refinery and import facility of the corporation.

(3) The conventional gasoline baseline volume, calculated as specified in § 80.295(c), for each refinery and import facility of the corporation.

(4) A letter signed by the president, chief operating or chief executive officer, of the company, or his/her delegate, stating that the information contained in the sulfur baseline determination is true to the best of his/her knowledge.

(5) Name, address, phone number, facsimile number and E-mail address of a corporate contact person.

(d)(1) A refiner or importer may generate credits as specified in § 80.305, beginning in calendar year 2000, based on the sulfur baseline submitted to EPA according to paragraph (c) of this section.

(2) If at any time the baseline submitted in accordance with the requirements of this section is determined to be incorrect, the corrected baseline applies. Credits

generated, banked, used or traded will be adjusted to reflect the correction.

§ 80.295 How is a refinery or importer sulfur baseline determined?

(a) A refinery's or importer's conventional gasoline sulfur baseline is calculated using the following equation:

$$S_{BCG} = \frac{\sum_{i=1}^{n}(V_i \times S_i)}{\sum_{i=1}^{n} V_i}$$

Where:

S_{BCG} = Conventional gasoline sulfur baseline value.

V_i = Volume of conventional gasoline batch i.

S_i = Sulfur content of conventional gasoline batch i.

n = Total number of batches of conventional gasoline produced or imported during January 1, 1997 through December 31, 1998.

i = Individual batch of conventional gasoline produced or imported during January 1, 1997 through December 31, 1998.

(b) The individual sulfur baseline for summer reformulated gasoline is 150 ppm.

(c) The individual sulfur baseline for winter reformulated gasoline is equivalent to the conventional gasoline sulfur baseline calculated under paragraph (a) of this section.

(d) The baseline volumes are as follows:

(1) The conventional gasoline baseline volume is one half of the total 1997 and 1998 volume of conventional gasoline produced or imported.

(2) There is no baseline volume for either summer or winter RFG produced or imported.

(e) Any refiner or importer who, under § 80.65 or § 80.101(d)(4), included oxygenate blended downstream in conventional gasoline compliance calculations for 1997–1998 must include this oxygenate in the baseline calculations for sulfur content and volume under paragraphs (a) and (d) of this section.

(f) The baseline calculations for sulfur content and volume under paragraphs (a) and (d) of this section for non-oxygenated blendstock, such as natural gasoline or butane, that is blended into gasoline must be calculated using the sulfur content and volume of the blendstock only.

§ 80.300 What if I did not produce or import gasoline during 1997 or 1998?

A refiner or importer who did not produce or import gasoline during 1997 or 1998 is assigned a baseline sulfur level of 150 ppm for conventional gasoline and RFG (winter and summer).

Sulfur ABT Program—Credit Generation

§ 80.305 How are credits generated during the time period 2000 through 2003?

(a) *General.* (1) Sulfur credits may be generated annually during calendar years 2000–2003.

(2) Credits must be calculated separately for Conventional gasoline and RFG. Credits must be calculated by multiplying the volume of gasoline for which credits are generated under paragraphs (b) and (c) of this section by the amount of sulfur reduction in ppm below the refiner's or importer's applicable sulfur baseline. The refiner or importer may include any oxygenates included in its RFG or Conventional gasoline volume under §§ 80.65 and 80.101(d)(4), respectively, for the purpose of generating credits.

(3) A refiner's or importer's total credit generation is the sum of the separate credit calculations for Conventional gasoline and RFG.

(4) Credits under this program are in units of ''ppm-gallons''.

(5) Credits must be identified by the year of creation, the year of transfer (if any), and the year of use (as specified in § 80.315). Records relating to credit generation, use, and transfer, including the applicable years, must be maintained pursuant to § 80.365.

(b) *Calculation of credits for conventional gasoline.* (1) Refiners and importers may generate credits for conventional gasoline produced or imported during an averaging period only if the annual average sulfur level for the conventional gasoline produced during the averaging period is less than 150 ppm.

(2) Refiners and importers whose conventional gasoline volume for the averaging period is less than or equal to 105% of its baseline volume for conventional gasoline, must calculate credits as follows:

$$CR_{CG} = (V_{CG}) \times S_{BCG} - S_{ACG})$$

Where:

CR_{CG} = Credits generated for conventional gasoline.

V_{CG} = Volume of conventional gasoline produced or imported during the averaging period.

S_{BCG} = Sulfur baseline value for conventional gasoline or 150, whichever is greater .

S_{ACG} = Annual average sulfur level for conventional gasoline produced or imported during the averaging period.

(3) Refiners and importers whose conventional gasoline volume for the averaging period is greater than 105% of the baseline volume for conventional gasoline, must calculate credits as follows:

$$CR_{CG} = (V_{BCG} \times 1.05) \times (S_{BCG} - S_{ACG}) + (V_{CG} - (1.05 \times V_{BCG})) \times (150 - S_{ACG})$$

Where:

CR_{CG} = Credits generated for conventional gasoline.

V_{BCG} = Baseline volume of conventional gasoline.

S_{BCG} = Sulfur baseline value for conventional gasoline or 150, whichever is greater.

S_{ACG} = Annual average sulfur level for conventional gasoline produced or imported during the averaging period.

V_{CG} = Volume of conventional gasoline produced or imported during the averaging period.

(c) *Calculation of credits for RFG.* (1) Refiners and importers may generate credits for summer RFG produced or imported during an averaging period only if the average sulfur level for the summer RFG produced or imported during the averaging period is less than 150 ppm. Summer RFG credits are calculated as follows:

$$CR_{SRFG} = (V_{SRFG}) \times (150 - S_{SRFG})$$

Where:

CR_{SRFG} = Credits generated for summer reformulated gasoline.

V_{SRFG} = Volume of summer RFG produced or imported during the averaging period.

S_{SRFG} = Average sulfur level for summer RFG produced or imported during the averaging period.

(2) Refiners and importers may generate credits for winter RFG produced or imported during an averaging period only if the average sulfur level for the winter RFG produced or imported during the averaging period is less than 150 ppm. Winter RFG credits calculated as follows:

$$CR_{WRFG} = (V_{WRFG}) \times (S_{BCG} - S_{WRFG})$$

Where:

CR_{WRFG} = Credits generated for winter reformulated gasoline.

V_{WRFG} = Volume of winter RFG produced or imported during the averaging period.

S_{BCG} = Sulfur baseline value for conventional gasoline or 150, whichever is greater.

S_{WRFG} = Average sulfur level for winter RFG produced or imported during the averaging period.

§ 80.310 How are credits generated beginning in 2004?

(a) A refiner, for any refinery owned by it, or an importer may generate credits for annual average sulfur reductions if the annual average sulfur level for the combined RFG and conventional gasoline produced by any refinery owned by the refiner or imported by the importer for the averaging period is less than 30 ppm.

(b) Credits calculated as follows:

$$CR_A = (V_A) \times (30 - S_A)$$

Where:

CR_A = Credits generated for the averaging period.

V_A = Total annual combined volume of RFG and conventional gasoline produced in a refinery or imported during the averaging period.

S_A = Annual average sulfur level of RFG and conventional gasoline produced in a refinery or imported during the averaging period.

(c) Credits must be identified by the year of creation, the year of transfer (if any), and the year of use (as specified in § 80.315). Records relating to credit generation, use, and transfer, including the applicable years, must be maintained pursuant to § 80.365.

Sulfur ABT Program-Credit Use

§ 80.315 How are credits used?

(a) Credits may be used, beginning with the 2004 averaging period, to meet the applicable annual average sulfur standard of 30 ppm, provided that:

(1) Sulfur credits used were generated pursuant to the requirements of this subpart; and

(2) The requirements of paragraphs (b) and (e) of this section are met.

(b) Credits may not be used to meet the applicable corporate pool average under § 80.195.

(c) *Credit transfers.* (1) Credits obtained from other persons may be used to meet the annual averaged 30 ppm standard specified in § 80.195 if all the following conditions are met:

(i) The credits are generated and reported according to the requirements of this subpart.

(ii) The credits are used in compliance with the limitations regarding the appropriate periods for credit use in this subpart.

(iii) Any credit transfer takes place no later than the last day of February following the calendar year averaging period when the credits are used.

(iv) Only the refiner or importer who generates the credits transfers them, and only a refiner or importer who uses the credits to achieve its compliance with the averaged standards obtains them from the transferor refiner or importer.

(v) The credit transferor must apply any credits necessary to meet the transferor's applicable average standard, including credits generated during 2000, 2001, 2002 and 2003, before transferring credits to any other refiner or importer. No credits may be transferred that would result in the transferor having a negative credit balance.

(vi) The transferor must supply to the transferee records indicating the year(s) the credits were generated.

(2) In the case of credits that have been calculated or created improperly, or are otherwise determined to be invalid in violation of the requirements of this subpart, the following provisions apply:

(i) Invalid credits cannot be used to achieve compliance with the transferee's averaging standard, regardless of the transferee's good faith belief that the credits were valid.

(ii) The refiner or importer who used the credits, and any transferor of the credits, must adjust its sulfur calculations to reflect the proper credits.

(iii) Any properly created credits existing in the transferor's credit balance after correcting the credit balance, and after the transferor applies credits as needed to meet the average standard at the end of the compliance year, must first be applied to correct the invalid transfers before the transferor trades or banks the credits.

(d) *Limitations on credit use.* (1) Credits generated prior to 2004 must be used or transferred no later than 2007.

(2) Credits generated in 2004 or later must be used or transferred within five years of generation.

(3) Credits transferred must be used by the transferee within five years of transfer, or no more than ten years of the year of generation, whichever is less.

(4) A refiner possessing credits must use all credits prior to falling into compliance deficit, as defined under § 80.205(d) (2).

(e) If the recordkeeping requirements of § 80.365(d) are not met, credits used under this subpart are invalid.

§ 80.320 What are the reporting requirements for the sulfur ABT program?

(a) A refiner or importer who generates, uses, or transfers credits under the sulfur ABT program must file an annual report with EPA which must be submitted with the refiner's or importer's annual compliance report under § 80.370.

(b) The report must include the following information:

(1) For credits generated in 2000, 2001, 2002 and 2003, the applicable Conventional gasoline sulfur content baseline, in ppm, and Conventional gasoline baseline;

(2) The actual annual average sulfur content, in ppm, before the application of credits, separately for Conventional gasoline and separately, the average sulfur content, in ppm, for winter RFG and for summer RFG;

(3) For refiners, the annual volume of conventional gasoline produced, and for importers, the annual volume of Non-Certified S-FRGAS imported, in gallons;

(4) The number of credits used in ppm-gallons, in the averaging period;

(5) The number of credits banked, credits transferred and credits acquired, in ppm-gallons;

(6) The identity of the refiners and importers involved in these transactions, including their registration numbers, under § 80.190, and the number of credits in ppm-gallons in each transaction; and

(7) The number of credits, if any, for which the refiner is deficient, as defined under § 80.205 (d), and the use of credits in the following year to cure the deficiency under § 80.205(d)(2).

§ 80.325 [Reserved].

Sampling, Testing and Retention Requirements for Refiners and Importers

§ 80.330 What are the sampling and testing requirements for refiners and importers?

(a) *Sample and test each batch of gasoline.* (1) Refiners and importers of gasoline must collect a representative sample from each batch of gasoline produced or imported and test each sample to determine its sulfur content for compliance with requirements under this subpart prior to the gasoline leaving the refinery or import facility, using the sampling and testing methods provided in this section.

(2) The requirements of this section apply beginning October 1, 2003, or January 1 of the first year of credit generation for refiners and importers generating early credits under § 80.305.

(b) *Sampling methods.* Refiners and importers must sample each batch of gasoline by using one of the following methods:

(1) Manual sampling of tanks and pipelines must be performed according to the applicable procedures specified in one of the two following methods:

(i) American Society for Testing and Materials (ASTM) method D 4057–95, entitled ''Standard Practice for Manual Sampling of Petroleum and Petroleum Products.''

(ii) Samples collected under the applicable procedures in ASTM D 5842–95, entitled ''Standard Practice for Sampling and Handling of Fuels for Volatility Measurement,'' may be used

for measuring sulfur content if you assure that there is no contamination present that could affect the sulfur test result.

(2) Automatic sampling of petroleum products in pipelines must be performed according to the applicable procedures specified in ASTM method D 4177–95, entitled ''Standard Practice for Automatic Sampling of Petroleum and Petroleum Products.''

(c) *Test method for measuring the sulfur content of gasoline.* Refiners and importers must use the method provided in § 80.46(a) to measure the sulfur content of gasoline they produce or import.

(d) *Test method for sulfur in Butane.* The sulfur content of butane must be determined by ASTM D–5623–94, entitled ''Standard Test Method for Sulfur Compounds in Light Petroleum Liquids by Gas Chromatography and Sulfur Selective Detection.''

(e) *Incorporations by reference.* ASTM standard practices D 4057–95, D 4177–95 and D 5842–95, and ASTM standard method D 5623–94 are incorporated by reference. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428. Copies may be inspected at the Air Docket Section (LE–131), room M–1500, U.S. Environmental Protection Agency, Docket No. A–97–03, 401 M Street, SW., Washington, DC 20460, or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

§ 80.335 What gasoline sample retention requirements apply to refiners and importers?

(a) For each batch of gasoline produced or imported, refiners and importers must:

(1) Retain a representative sample of at least 330 ml, collected from the batch and keep the sample for a period not less than 30 days from the date the batch was collected.

(2) Comply with the gasoline sample handling and storage procedures found in the sampling procedures specified in § 80.330 for each sample retained.

(3) Provide the sample retained under paragraph (a) of this section to the Administrator's authorized representative upon request by EPA, and if requested by EPA, ship the sample to EPA within two working days by an overnight shipping service or comparable means, following the procedures specified by EPA when the request is made.

(4) Include with each annual report filed under § 80.370, the following statement, signed and dated by the same person who signs the annual report:

> I certify that I have made inquiries that are sufficient to give me knowledge of the procedures to collect and store gasoline samples, and I further certify that the procedures meet the requirements of the ASTM procedures required under § 80.330.

(b) The requirements of this section apply beginning October 1, 2003, or January 1 of the first year of credit generation for refiners and importers generating early credits under § 80.305.

§ 80.340 What alternative standards, sampling and testing requirements apply to refiners producing gasoline by blending blendstocks into previously certified gasoline (PCG)?

(a) Any refiner who produces gasoline by blending blendstock into PCG must meet the requirement of § 80.330 to sample and test every batch of gasoline as follows:

(1)(i) Sample and test to determine the volume and sulfur content of the PCG prior to blendstock blending;

(ii) Sample and test to determine the volume and sulfur content of the gasoline subsequent to blendstock blending;

(iii) Calculate the volume and sulfur content of the blendstock, which is a batch for purposes of compliance calculations and reporting, by subtracting the volume and sulfur content of the PCG from the volume and sulfur content of the gasoline subsequent to blendstock blending.

(2) In the alternative, and provided every batch of blendstock used at a refinery during an averaging period has a sulfur content that is equal to or less than the applicable per-gallon cap standard under § 80.195, a refiner may sample and test each batch of blendstock when received at the refinery to determine the volume and sulfur content, and treat each blendstock receipt as a separate batch for purposes of compliance calculations for the annual average sulfur standard and for reporting.

(b) Refiners that blend only butane into PCG may meet the sampling and testing requirements by using sulfur test results of the butane supplier, provided that the following requirements are also met:

(1) The sulfur content of the butane received from the butane supplier must not exceed 30 ppm on a per-gallon basis.

(2) The butane supplier must demonstrate that the sulfur content of each load of butane supplied does not exceed the per-gallon sulfur standard of 30 ppm through test results of samples of the butane contained in the storage tank from which the butane blender is supplied.

(i) Testing for the sulfur content of the butane by the supplier must be subsequent to each time butane is supplied to the supplier's storage tank, or the testing must be immediately before transfer of butane to the butane blender.

(ii) The testing must be performed by the method specified in § 80.330(d).

(iii) The butane blender must obtain a copy of the butane supplier's test results, at the time of each transfer of butane to the butane blender, that reflect the sulfur content of each load of butane supplied to the butane blender.

(3) The sulfur content and volume of each batch of gasoline produced must be that of the butane the refiner blends into gasoline for purposes of calculating compliance with the standards in § 80.195.

(4) The refiner must conduct a quality assurance program of sampling and testing for each butane supplier that demonstrates the butane sulfur content does not exceed 30 ppm. The frequency of butane sampling and testing, for each butane supplier, must be one sample for every 500,000 gallons of butane received, or one sample every 3 months, whichever results in more frequent sampling.

(5) If any of the requirements of this section are not met, in whole or in part, for any butane blended into gasoline, that butane is deemed in violation of the gasoline sulfur standards in § 80.195.

§ 80.345 [Reserved]

§ 80.350 What alternative sulfur standards, sampling and testing requirements apply to importers who transport gasoline by truck?

Importers who import gasoline into the United States by truck, as an alternative to the requirements to sample and test every batch of gasoline under § 80.330(a), and the annual sulfur average and per-gallon cap standards otherwise applicable to importers under § 80.195, may instead comply with the following requirements:

(a) *Per-gallon standard.* The imported gasoline must meet a sulfur standard of 30 ppm on a per-gallon basis.

(b) *Terminal testing.* The terminal operator must demonstrate the gasoline does not exceed 30 ppm sulfur on a per-gallon basis, through testing of the gasoline contained in the storage tank from which the trucks used to transport gasoline into the United States are loaded.

(1) This sampling and testing must be performed after each receipt of gasoline into the storage tank, or immediately before each transfer of gasoline to the importer's truck.

(2) The sampling and testing must be performed using the methods specified in § 80.330.

(3) At the time of each transfer of gasoline to the importer's truck, the importer must obtain a copy of the terminal test result that indicates the sulfur content of each truck load of gasoline that is imported into the United States.

(c) *Quality assurance program*. The importer must conduct a quality assurance program, as specified in this paragraph, for each truck loading terminal.

(1) Quality assurance samples must be obtained from the truck-loading terminal and tested by the importer, or by an independent laboratory, and the terminal operator must not know in advance when samples are to be collected.

(2) The sampling and testing must be performed using the methods specified in § 80.330.

(3) The quality assurance test results for sulfur must be within 12 ppm of the terminal's test results.

(4) The frequency of the quality assurance sampling and testing must be at least one sample for each fifty of an importer's trucks that are loaded at a terminal, or one sample per month, whichever is more frequent.

(d) Instead of conducting the quality assurance program specified in paragraph (c) of this section an importer may meet the quality assurance program requirement if the sampling and testing requirements of paragraph (b) of this section are conducted by an independent laboratory that meets the requirements in § 80.65(f)(2)(iii).

(e) The importer must treat each truck load of imported gasoline as a separate batch for purposes of assigning batch numbers and maintaining records under § 80.365, and reporting under § 80.370.

(f) EPA inspectors or auditors, and auditors conducting attest engagements under § 80.415, must be given full and immediate access to the truck-loading terminal and any laboratory at which samples of gasoline collected at the terminal are analyzed, and must be allowed to conduct inspections, review records, collect gasoline samples, and perform audits. These inspections or audits may be either announced or unannounced.

(g) This section does not apply to Certified Sulfur-FRGAS.

(h) If any of the requirements of this section are not met, all gasoline imported by the truck importer during the time any requirements are not met is deemed in violation of the gasoline sulfur average and per-gallon cap standards in § 80.195. In addition, the truck importer may not in the future use the sampling and testing provisions in this section in lieu of the provisions in § 80.330.

§ 80.355 [Reserved]

Recordkeeping and Reporting Requirements

§ 80.360 What are the product transfer document requirements?

(a) On each occasion that any person transfers custody of or title to S–RGAS, as defined in § 80.210, other than when S–RGAS is sold or dispensed for use in motor vehicles at a retail outlet or wholesale purchaser-consumer facility, the product transfer documents must include a statement identifying the gasoline as S–RGAS and the applicable downstream cap under § 80.210(b).

(b) Except for transfers to truck carriers, retailers and wholesale purchaser-consumers, product codes may be used to convey the information required by this section if such codes are clearly understood by each transferee.

§ 80.365 What records must be kept?

(a) *Records that must be kept.* Beginning January 1, 2004, any person who sells, offers for sale, dispenses, distributes, supplies, offers for supply, stores, or transports gasoline, must keep the following records:

(1) The product transfer documents required under §§ 80.106, 80.77 and 80.360;

(2) For any sampling and testing for sulfur content conducted:

(i) The location, date, time and storage tank or truck identification for each sample collected;

(ii) The name and title of the person who collected the sample and the person who performed the testing;

(iii) The results of the tests for sulfur content and the test volume; and

(3) Reasonable business records documenting the actions you took to stop the sale or distribution of any gasoline found not to be in compliance with the sulfur standards specified in this subpart, and the actions you took to identify the cause of any noncompliance and prevent future instances of noncompliance.

(b) *Additional records that refiners and importers must keep.* Beginning October 1, 2003, or January 1 of the first year of early credit generation for refiners and importers generating credits under § 80.305, refiners and importers must keep records that include the following information:

(1) The volume of each batch of gasoline produced or imported;

(2) For credit generation, the information required by paragraph (a)(2) of this section as well as the information required under § 80.305(a)(5) and § 80.310(c);

(3) The batch number assigned to each batch of gasoline under § 80.65(d)(3); however, if composite samples that represent multiple batches of conventional gasoline for anti-dumping purposes are used, a separate batch number must be assigned to each batch for purposes of this subpart;

(4) The date of production or importation of each batch of gasoline produced or imported;

(5) The calculations and records used in making the calculations to determine compliance with the applicable sulfur standard on average, including compliance with the debit provision of this subpart and records regarding the generation, use, transfer, and banking of credits under §§ 80.195, 80.305, 80.310 and 80.315; and

(6) A copy of all reports and other documents submitted to the EPA pursuant to the requirements of this subpart.

(c) *Additional records importers must keep.* Importers must maintain documentation which verifies the source of each batch of certified Sulfur-FRGAS and non-certified Sulfur-FRGAS imported.

(d) *Length of time records must be kept.* The records required in paragraphs (a), (b) and (c) of this section must be maintained for five years from the date they were created, except for the following:

(1) For any person who generates credits, and/or uses the credits so generated, the records required by paragraphs (a), (b) and (c) of this section must be retained for five years from the date the credits were used, and in no case must the records be retained for more than ten years from the year they were generated.

(2) In the case of credits that were transferred between two parties, both parties must retain records of those credits for ten years from the date the credits were generated.

(e) *Make records available to EPA.* The records required in paragraphs (a), (b) and (c) of this section must be made available to the Administrator or the Administrator's authorized representative upon request.

§ 80.370 What are the annual reporting requirements?

Beginning with the 2004 averaging period, or the first year of credit

generation for refiners and importers generating early credits under § 80.305, and continuing for each averaging period thereafter, refiners and importers must submit to the Administrator a report that contains the information required in this section and such other information as EPA may require. A refiner's annual reports for 2004 and 2005 must include the refiner's RFG and conventional gasoline production for all refineries during the averaging period. Beginning in 2006 and thereafter, a refiner must submit a separate annual report for each refinery that produced gasoline during the averaging period. An importer must submit a report for all of the gasoline imported during the averaging period no later than the last day of February following the previous year's averaging period.

(a) *Information required in a refiner's report.* For refiners, the annual sulfur averaging report must include the following information:

(1) The EPA refiner and refinery facility registration numbers;

(2) The total gallons of gasoline (winter reformulated, summer reformulated, and conventional) produced at the refinery or aggregation of refineries;

(3) The annual average sulfur content of the gasoline (winter reformulated, summer reformulated, and conventional) produced at the refinery, or aggregation of refineries, in parts per million;

(4) For each batch of gasoline produced during the averaging period:

(i) The batch number assigned under § 80.65(d)(3); however, if composite samples that represent multiple batches of conventional gasoline are tested for conventional gasoline, a separate batch number must be assigned to each batch, using the batch numbering procedures specified in § 80.65(d)(3);

(ii) The date the batch was produced;

(iii) The volume of the batch;

(iv) The sulfur content of the batch as determined under § 80.330;

(v) The information on individual batches submitted to EPA under § 80.75(a)(2) and 80.105(a)(5) satisfies the requirements of this paragraph (a)(4) unless compositing of samples is used for anti-dumping rule batch reporting under § 80.105(a)(5);

(5) A refiner's annual report for 2004 and 2005 must include the refiner's winter reformulated RFG, summer RFG, and conventional gasoline for all refineries during the averaging period;

(6) Beginning in 2006 and thereafter, a refiner must submit a separate annual report for each of its refineries that produced gasoline during the averaging period.

(b) *Information required in an importer's report.* An importer must submit a report for all the gasoline it imported during the averaging period. The report must include the following information:

(1) The EPA importer registration number;

(2) The total gallons of gasoline (reformulated and conventional) imported during the averaging period, excluding certified Sulfur-FRGAS;

(3) The annual average sulfur content of the gasoline (reformulated and conventional) imported during the averaging period, excluding certified Sulfur-FRGAS, in parts per million;

(4) For gasoline imported during the averaging period from any small foreign refiner who has an EPA approved individual baseline under the small refiner provisions at § 80.410, include the following information:

(i) The EPA refiner and refinery registration numbers of each such small foreign refiner and refinery facility; and

(ii) The total gallons of certified Sulfur-FRGAS and non-certified Sulfur-FRGAS imported from each such small foreign refiner;

(5) The batch information required in paragraph (a)(4) of this section.

(c) *Sulfur credit program activity.* Refiners and importers who generate, bank, transfer, or use sulfur credits must submit to EPA an annual report in accordance with the provisions of § 80.320.

(d) The report must state the debit for the current year, as applicable, and credits applied to the previous compliance year's debit, as applicable.

(e) *Report submission.* Each annual report required under this section must be:

(1) Signed and certified as meeting all of the applicable requirements of this subpart H by the owner or a responsible corporate officer of the refiner or importer; and

(2) Submitted to EPA no later than the last day of February for the prior calendar year averaging period.

(f) *Attest reports.* Attest reports for refiner and importer attest engagements must be submitted to the Administrator by May 30 of each year under § 80.415.

Exemptions

§ 80.375 What requirements apply to California gasoline?

(a) *Definition.* For purposes of this subpart, *California gasoline* is defined under § 80.81(a)(2).

(b) *California gasoline exemptions.* California gasoline is exempt from all requirements of this subpart with the exception of the segregation requirement described in paragraph (c) of this section and the product transfer document requirements described in paragraph (d) of this section.

(c) *Segregation requirement.* California gasoline produced at a refinery located outside of the state of California must be kept segregated from all gasoline that is not California gasoline at all points in the distribution system.

(d) *Product transfer documents.* For California gasoline produced at a refinery located outside the state of California, the transferors and transferees must comply with the product transfer document requirements in § 80.81(g).

(e) *Use of California test methods and off site sampling procedures.* Any refiner of gasoline produced in California or importer of gasoline imported into California whose gasoline is used outside of California may:

(1) Use the sampling and testing methods approved in Title 13 of the California Code of Regulations, as permitted under § 80.81(h)(1) as an alternative to the sampling and testing methods required by § 80.330; and

(2) Determine the sulfur content of gasoline at off site tankage as permitted in § 80.81(h)(2).

§ 80.380 What are the requirements for obtaining an exemption for gasoline used for research, development or testing purposes?

(a) *R&D application.* Any person may request an exemption from the provisions of this subpart for gasoline used for research, development or testing (''R&D'') purposes by submitting an application that includes all the information listed in paragraph (c) of this section to:

Director (6406J), Fuels and Energy Division, U.S. Environmental Protection Agency, 401 M Street SW, Washington, DC 20460; and

Director (2242A), Air Enforcement Division, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460.

(b) *Criteria for an R&D exemption.* For an R&D exemption to be granted, the proposed test program must:

(1) Have a purpose that constitutes an appropriate basis for exemption;

(2) Necessitate the granting of an exemption;

(3) Be reasonable in scope; and

(4) Have a degree of control consistent with the purpose of the program and EPA's monitoring requirements.

(c) *Information required to be submitted.* To demonstrate each of the four elements in paragraphs (b)(1) through (4) of this section, the

application required under paragraph (a) of this section must include the following information:

(1) A concise statement of the purpose of the program demonstrating that the program has an appropriate R&D purpose.

(2) An explanation of why the stated purpose of the program cannot be achieved in a practicable manner without performing one or more of the prohibited acts under § 80.385.

(3) To demonstrate the reasonableness of the scope of the program:

(i) An estimate of the program's duration;

(ii) An estimate of the maximum number of vehicles or engines involved in the program;

(iii) The time or mileage duration of the program;

(iv) The range of sulfur content of the gasoline expected to be used in the program, in ppm; and

(v) The quantity of gasoline which exceeds the applicable sulfur standard that is expected to be used in the program.

(4) With regard to control, a demonstration that the program affords EPA a monitoring capability, including at a minimum:

(i) The technical nature of the program;

(ii) The site(s) of the program (including street address, city, county, State, and zip code);

(iii) The manner in which information on vehicles and engines used in the program will be recorded and made available to the Administrator;

(iv) The manner in which results of the program will be recorded and made available to the Administrator;

(v) The manner in which information on the gasoline used in the program (including quantity, sulfur content, name, address, telephone number and contact person of the supplier, and the date received from the supplier), will be recorded and made available to the Administrator;

(vi) The manner in which distribution pumps will be labeled to insure proper use of the gasoline;

(vii) The name, address, telephone number and title of the person(s) in the organization requesting an exemption from whom further information on the application may be obtained; and

(viii) The name, address, telephone number and title of the person(s) in the organization requesting an exemption who is responsible for recording and making available the information specified in paragraphs (b)(4)(iii), (iv) and (v) of this section, and the location in which such information will be maintained.

(d) *Additional requirements.* (1) The product transfer documents associated with R&D gasoline must identify the gasoline as such, and must state that the gasoline is to be used only for research, development, or testing purposes.

(2) The R&D gasoline must be kept segregated from non-exempt gasoline at all points in distribution of the gasoline.

(3) The R&D gasoline must not be sold, distributed, offered for sale or distribution, dispensed, supplied, offered for supply, transported to or from, or stored by a gasoline retail outlet, or by a wholesale purchaser-consumer facility, unless the wholesale purchaser-consumer facility is associated with the R&D program that uses the gasoline.

(e) *Memorandum of exemption.* The Administrator will grant an R&D exemption upon a demonstration that the requirements of this section have been met. The R&D exemption will be granted in the form of a memorandum of exemption signed by the applicant and the Administrator (or delegate), which will include such terms and conditions as the Administrator determines necessary to monitor the exemption and to carry out the purposes of this section. Any violation of such a term or condition of the exemption or any requirement under this section will cause the exemption to be void *ab initio.*

Violation Provisions

§ 80.385 What acts are prohibited under the gasoline sulfur program?

No person may:

(a) Produce or import gasoline that does not comply with the applicable sulfur average standards at § 80.195 or § 80.240.

(b) Produce, import, sell, offer for sale, dispense, supply, offer for supply, store or transport gasoline that does not comply with the applicable sulfur cap standards at § 80.195, § 80.210 or § 80.240.

(c) Cause another person to commit an act in violation of paragraph (b) of this section.

(d) Cause gasoline that does not comply with an applicable refiner/importer or downstream cap standard under § 80.195, § 80.210 or § 80.240 to be in the gasoline distribution system.

§ 80.390 What evidence may be used to determine compliance with the prohibitions and requirements of this subpart and liability for violations of this subpart?

(a) Compliance with the sulfur standards of this subpart must be determined based on the sulfur level of the gasoline, measured using the methodologies specified in § 80.330. Any evidence or information, including the exclusive use of such evidence or information, may be used to establish the sulfur level of gasoline if the evidence or information is relevant to whether the sulfur level of gasoline would have been in compliance with the standards if the appropriate sampling and testing methodology had been correctly performed. Such evidence may be obtained from any source or location and may include, but is not limited to, test results using methods other than those specified in § 80.330, business records, and commercial documents.

(b) Determination of compliance with the requirements of this subpart other than the sulfur standards, and determination of liability for any violation of this subpart, are based on probative evidence or information obtained from any source or location. Such evidence may include, but is not limited to, business records and commercial documents.

§ 80.395 Who is liable for violations under the gasoline sulfur program?

(a) *Persons liable for violations of prohibited acts.* (1) Any refiner or importer who violates § 80.385(a) is liable for the violation.

(2) Any refiner, importer, distributor, reseller, carrier, retailer or wholesale purchaser-consumer who owned, leased, operated, controlled or supervised a facility where a violation of § 80.385(b) occurred, is deemed in violation of § 80.385(b).

(3) Any refiner, importer, distributor, reseller, retailer, or wholesale purchaser-consumer who produced, imported, sold, offered for sale, dispensed, supplied, offered for supply, stored, transported, or caused the transportation or storage of gasoline that is the subject of a violation of § 80.385(b), is deemed in violation of § 80.385(c).

(4) Any refiner or importer whose corporate, trade, or brand name, or whose marketing subsidiary's corporate, trade, or brand name appeared at a facility where a violation of § 80.385(b) occurred, is deemed in violation of § 80.385(b).

(5) Any carrier who dispensed, supplied, stored, or transported gasoline which is the subject of a violation of § 80.385(b), is deemed in violation of § 80.385(c) provided that EPA demonstrates, by reasonably specific showing by direct or circumstantial evidence, that any such carrier caused the violation.

(6) Any refiner, importer, distributor, reseller, or carrier who owned, leased, operated, controlled or supervised a facility from which gasoline that does

not comply with an applicable refiner/importer or downstream sulfur cap standard at § 80.195, § 80.210 or § 80.240 was released into the distribution system, is deemed in violation of § 80.385(d).

(7) Any person who caused another party to violate § 80.385(a), is liable for causing a violation of § 80.385(a).

(b) *Persons liable for failure to meet other requirements of this subpart.* (1) Any person who failed to meet a requirement of this subpart not addressed in paragraph (a) of this section is liable for a violation of that requirement.

(2) Any person who caused another person to fail to meet a requirement of this subpart not addressed in paragraph (a) of this section is liable for causing a violation of that requirement.

§ 80.400 What defenses apply to persons deemed liable for a violation of a prohibited act?

(a) Any person deemed liable for a violation of a prohibition under § 80.395(a), will not be deemed in violation if the person demonstrates:

(1) That the violation was not caused by the person or the person's employee or agent; and

(2) That the person conducted a quality assurance sampling and testing program, as described in paragraph (d) of this section. A carrier may rely on the quality assurance program carried out by another party, including the party who owns the gasoline in question, provided that the quality assurance program is carried out properly. Retailers and wholesale purchaser-consumers are not required to conduct quality assurance programs.

(b) In the case of a violation found at a facility operating under the corporate, trade or brand name of a refiner or importer, or a refiner's or importer's marketing subsidiary, the refiner or importer must show, in addition to the defense elements required by paragraph (a) of this section, that the violation was caused by:

(1) An act in violation of law (other than the Clean Air Act or this Part 80), or an act of sabotage or vandalism;

(2) The action of any refiner, importer, retailer, distributor, reseller, carrier, retailer or wholesale purchaser-consumer in violation of a contractual agreement between the branded refiner or importer and the person designed to prevent such action, and despite periodic sampling and testing by the branded refiner or importer to ensure compliance with such contractual obligation; or

(3) The action of any carrier or other distributor not subject to a contract with the refiner or importer, but engaged for transportation of gasoline, despite specifications or inspections of procedures and equipment which are reasonably calculated to prevent such action.

(c) Under paragraph (a) of this section, for any person to show that the violation was not caused by it, or under paragraph (b) of this section, to show that the violation was caused by any of the specified actions, the person must demonstrate by reasonably specific showing, by direct or circumstantial evidence, that the violation was caused or must have been caused by another person and that the person asserting the defense did not contribute to that other person's causation.

(d) *Quality assurance program.* To demonstrate an acceptable quality assurance program under paragraph (a)(2) of this section, a person must present evidence of the following:

(1) A periodic sampling and testing program to ensure the gasoline the person sold, dispensed, supplied, stored, or transported, meets the applicable sulfur standard;

(2) On each occasion when gasoline is found not in compliance with the applicable sulfur standard:

(i) The person immediately ceases selling, offering for sale, dispensing, supplying, offering for supply, storing or transporting the non-complying product; and

(ii) The person promptly remedies the violation and the factors that caused the violation (for example, by removing the non-complying product from the distribution system until the applicable standard is achieved and taking steps to prevent future violations of a similar nature from occurring); and

(3) Any carrier who transports gasoline in a tank truck, the quality assurance program required under this paragraph (d) of this section is not required to include periodic sampling and testing of gasoline in the tank truck, but instead of such sampling and testing, the carrier must present evidence of an oversight program relating to the transport or storage of gasoline by tank truck, such as appropriate guidance to drivers regarding compliance with the applicable sulfur standard and product transfer document requirements, and the periodic review of records received in the ordinary course of business concerning gasoline quality and delivery.

§ 80.405 What Penalties Am I Subject To?

(a) Any person liable for a violation under § 80.395, is subject to a civil penalty of not more than $27,500 for every day of each such violation and the amount of economic benefit or savings resulting from each violation.

(b) Any person liable under § 80.395(a) for a violation of the applicable sulfur average standard or causing another party to violate that standard during any averaging period, is subject to a separate day of violation for each and every day in the averaging period. Any person liable under § 80.395(b) for a failure to fulfill any credit creation or transfer requirement, is subject to a separate day of violation for each and every day in the averaging period.

(c)(1) Any person liable under § 80.395(a) for causing gasoline that does not comply with an applicable refiner/importer or downstream sulfur cap standard to be in the gasoline distribution system in violation of § 80.385(d), is subject to a separate day of violation for each and every day that the non-complying gasoline remains any place in the gasoline distribution system.

(2) For purposes of paragraph (c) of this section, the length of time the gasoline in question remained in the gasoline distribution system is deemed to be twenty-five days, unless a person subject to liability or EPA demonstrates by reasonably specific showings, by direct or circumstantial evidence, that the non-complying gasoline remained in the gasoline distribution system for fewer than or more than twenty-five days.

(d) Any person liable under § 80.395(b) for failure to meet, or causing a failure to meet, a requirement of this subpart is liable for a separate day of violation for each and every day such requirement remains unfulfilled.

Provisions for Foreign Refiners With Individual Sulfur Baselines

§ 80.410 What are the additional requirements for gasoline produced at foreign refineries having individual small refiner sulfur baselines?

(a) *Definitions.* (1) A foreign refinery is a refinery that is located outside the United States, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands (collectively referred to in this section as ''the United States'').

(2) A foreign refiner is a person who meets the definition of refiner under § 80.2(i) for foreign refinery.

(3) A small foreign refiner is a refiner that meets the definition of a small refiner under § 80.225.

(4) ''Sulfur-FRGAS'' means gasoline produced at a foreign refinery that has been assigned an individual refinery

sulfur baseline and that is imported into the United States.

(5) ''Non-Sulfur-FRGAS'' means gasoline that is produced at a foreign refinery that has not been assigned an individual refinery sulfur baseline, gasoline produced at a foreign refinery with an individual refinery sulfur baseline that is not imported into the United States, and gasoline produced at a foreign refinery with an individual sulfur baseline during a year when the foreign refiner has opted to not participate in the Sulfur-FRGAS program under paragraph (c)(3) of this section.

(6) ''Certified Sulfur-FRGAS'' means Sulfur-FRGAS the foreign refiner intends to include in the foreign refinery's sulfur compliance calculations under § 80.205, and does include in these compliance calculations when reported to EPA.

(7) ''Non-Certified Sulfur-FRGAS'' means Sulfur-FRGAS that is not Certified Sulfur-FRGAS.

(b) *Baseline establishment.* Any foreign refiner that meets the definition of small under § 80.225, may submit to a petition to the Administrator for an individual refinery sulfur baseline, under § 80.235 by June 1, 2002.

(1) The baseline for a foreign refinery must reflect only the volume and properties of gasoline produced in 1997 and 1998 that was imported into the United States.

(2) In making determinations for foreign refinery baselines EPA will consider all information supplied by a foreign refiner, and in addition may rely on any and all appropriate assumptions necessary to make such a determination.

(3) Where a foreign refiner submits a petition that is incomplete or inadequate to establish an accurate baseline, and the refiner fails to cure this defect after a request for more information, then EPA will not assign an individual refinery sulfur baseline.

(c) *General requirements for foreign refiners with individual refinery sulfur baselines.* A foreign refiner of a refinery that has been assigned an individual sulfur baseline under paragraph (b) of this section must designate all gasoline produced at the foreign refinery that is exported to the United States as either Certified Sulfur-FRGAS or as Non-Certified Sulfur-FRGAS, except as provided in paragraph (c)(3) of this section.

(1) In the case of Certified Sulfur-FRGAS, the foreign refiner must meet all requirements that apply to refiners under this subpart.

(2) In the case of Non-Certified Sulfur-FRGAS, the foreign refiner must meet all the following requirements:

(i) The designation requirements in this section.

(ii) The recordkeeping requirements in §§ 80.360 and 80.365.

(iii) The reporting requirements in § 80.370 and this section.

(iv) The product transfer document requirements in this section.

(v) The prohibitions in this section and § 80.385.

(vi) The independent audit requirements in § 80.415 and paragraph (h) of this section.

(3)(i) Any foreign refiner that has been assigned an individual sulfur baseline for a foreign refinery under paragraph (b) of this section may elect to classify no gasoline imported into the United States as Sulfur-FRGAS, provided the foreign refiner notifies EPA of the election no later than November 1 of the prior calendar year.

(ii) An election under paragraph (c)(3)(i) of this section must:

(A) Be for an entire calendar year averaging period and apply to all gasoline produced during the calendar year at the foreign refinery that is used in the United States; and

(B) Remain in effect for each succeeding calendar year averaging period, unless and until the foreign refiner notifies EPA of a termination of the election. The change in election takes effect at the beginning of the next calendar year.

(d) *Designation, product transfer documents, and foreign refiner certification.* (1) Any foreign refiner of a foreign refinery that has been assigned an individual sulfur baseline must designate each batch of Sulfur-FRGAS as such at the time the gasoline is produced, unless the refiner has elected to classify no gasoline exported to the United States as Sulfur-FRGAS under paragraph (c)(3)(i) of this section.

(2) On each occasion when any person transfers custody or title to any Sulfur-FRGAS prior to its being imported into the United States, they must include the following information as part of the product transfer document information in this section:

(i) Identification of the gasoline as Certified Sulfur-FRGAS or as Non-Certified Sulfur-FRGAS; and

(ii) The name and EPA refinery registration number of the refinery where the Sulfur-FRGAS was produced.

(3) On each occasion when Sulfur-FRGAS is loaded onto a vessel or other transportation mode for transport to the United States, the foreign refiner must prepare a certification for each batch of the Sulfur-FRGAS that meets the following requirements:

(i) The certification must include the report of the independent third party under paragraph (f) of this section, and the following additional information:

(A) The name and EPA registration number of the refinery that produced the Sulfur-FRGAS;

(B) The identification of the gasoline as Certified Sulfur-FRGAS or Non-Certified Sulfur-FRGAS, and for Certified Sulfur-FRGAS the information required by § 80.360;

(C) The volume of Sulfur-FRGAS being transported, in gallons;

(D) A declaration that the Sulfur-FRGAS is being included in the compliance baseline calculations under § 80.250 for the refinery that produced the Sulfur-FRGAS; and

(E) In the case of Certified Sulfur-FRGAS:

(*1*) The sulfur content as determined under paragraph (f) of this section; and

(*2*) A declaration that the Sulfur-FRGAS is being included in the compliance calculations under § 80.205 for the refinery that produced the Sulfur-FRGAS.

(ii) The certification must be made part of the product transfer documents for the Sulfur-FRGAS.

(e) *Transfers of Sulfur-FRGAS to non-United States markets.* The foreign refiner is responsible to ensure that all gasoline classified as Sulfur-FRGAS is imported into the United States. A foreign refiner may remove the Sulfur-FRGAS classification, and the gasoline need not be imported into the United States, but only if:

(1)(i) The foreign refiner excludes:

(A) The volume of gasoline from the refinery's compliance baseline calculations under § 80.250; and

(B) In the case of Certified Sulfur-FRGAS, the volume and sulfur content of the gasoline from the compliance calculations under § 80.205;

(ii) The exclusions under paragraph (e)(1)(i) of this section must be on the basis of the parameter and volumes determined under paragraph (f) of this section; and

(2) The foreign refiner obtains sufficient evidence in the form of documentation that the gasoline was not imported into the United States.

(f) *Load port independent sampling, testing and refinery identification.* (1) On each occasion Sulfur-FRGAS is loaded onto a vessel for transport to the United States a foreign refiner must have an independent third party:

(i) Inspect the vessel prior to loading and determine the volume of any tank bottoms;

(ii) Determine the volume of Sulfur-FRGAS loaded onto the vessel (exclusive of any tank bottoms present before vessel loading);

(iii) Obtain the EPA-assigned registration number of the foreign refinery;

(iv) Determine the name and country of registration of the vessel used to transport the Sulfur-FRGAS to the United States; and

(v) Determine the date and time the vessel departs the port serving the foreign refinery.

(2) On each occasion Certified Sulfur-FRGAS is loaded onto a vessel for transport to the United States a foreign refiner must have an independent third party:

(i) Collect a representative sample of the Certified Sulfur-FRGAS from each vessel compartment subsequent to loading on the vessel and prior to departure of the vessel from the port serving the foreign refinery;

(ii) Prepare a volume-weighted vessel composite sample from the compartment samples, and determine the value for sulfur using the methodology specified in § 80.330 by:

(A) The third party analyzing the sample; or

(B) The third party observing the foreign refiner analyze the sample;

(iii) Review original documents that reflect movement and storage of the certified Sulfur-FRGAS from the refinery to the load port, and from this review determine:

(A) The refinery at which the Sulfur-FRGAS was produced; and

(B) That the Sulfur-FRGAS remained segregated from:

(*1*) Non-Sulfur-FRGAS and Non-Certified Sulfur-FRGAS; and

(*2*) Other Certified Sulfur-FRGAS produced at a different refinery.

(3) The independent third party must submit a report:

(i) To the foreign refiner containing the information required under paragraphs (f)(1) and (2) of this section, to accompany the product transfer documents for the vessel; and

(ii) To the Administrator containing the information required under paragraphs (f)(1) and (2) of this section, within thirty days following the date of the independent third party's inspection. This report must include a description of the method used to determine the identity of the refinery at which the gasoline was produced, assurance that the gasoline remained segregated as specified in paragraph (n)(1) of this section, and a description of the gasoline's movement and storage between production at the source refinery and vessel loading.

(4) The independent third party must:

(i) Be approved in advance by EPA, based on a demonstration of ability to perform the procedures required in this paragraph (f);

(ii) Be independent under the criteria specified in § 80.65(f)(2)(iii); and

(iii) Sign a commitment that contains the provisions specified in paragraph (i) of this section with regard to activities, facilities and documents relevant to compliance with the requirements of this paragraph (f).

(g) *Comparison of load port and port of entry testing.* (1)(i) Any foreign refiner and any United States importer of Certified Sulfur-FRGAS must compare the results from the load port testing under paragraph (f) of this section, with the port of entry testing as reported under paragraph (o) of this section, for the volume of gasoline and the sulfur value; except that

(ii) Where a vessel transporting Certified Sulfur-FRGAS off loads this gasoline at more than one United States port of entry, and the conditions of paragraph (g)(2)(i) of this section are met at the first United States port of entry, the requirements of paragraph (g)(2) of this section do not apply at subsequent ports of entry if the United States importer obtains a certification from the vessel owner, that meets the requirements of paragraph(s) of this section, that the vessel has not loaded any gasoline or blendstock between the first United States port of entry and the subsequent port of entry.

(2)(i) The requirements of this paragraph (g)(2) apply if:

(A) The temperature-corrected volumes determined at the port of entry and at the load port differ by more than one percent; or

(B) The sulfur value determined at the port of entry is higher than the sulfur value determined at the load port, and the amount of this difference is greater than the reproducibility amount specified for the port of entry test result by the American Society of Testing and Materials (ASTM).

(ii) The United States importer and the foreign refiner must treat the gasoline as Non-Certified Sulfur-FRGAS, and the foreign refiner must:

(A) Exclude the gasoline volume and properties from its gasoline sulfur compliance calculations under § 80.205; and

(B) Include the gasoline volume in its compliance baseline calculation under § 80.250.

(h) *Attest requirements.* The following additional procedures must be carried out by any foreign refiner of Sulfur-FRGAS as part of the attest engagement for each foreign refinery under § 80.415:

(1) The inventory reconciliation analysis under § 80.128(b) and the tender analysis under § 80.128(c) must include Non-Sulfur-FRGAS in addition to the gasoline types listed in § 80.128(b) and (c).

(2) Obtain separate listings of all tenders of Certified Sulfur-FRGAS, and of Non-Certified Sulfur-FRGAS. Agree the total volume of tenders from the listings to the gasoline inventory reconciliation analysis in § 80.128(b), and to the volumes determined by the third party under paragraph (f)(1) of this section.

(3) For each tender under paragraph (h)(2) of this section where the gasoline is loaded onto a marine vessel, report as a finding the name and country of registration of each vessel, and the volumes of Sulfur-FRGAS loaded onto each vessel.

(4) Select a sample from the list of vessels identified in paragraph (h)(3) of this section used to transport Certified Sulfur-FRGAS, in accordance with the guidelines in § 80.127, and for each vessel selected perform the following:

(i) Obtain the report of the independent third party, under paragraph (f) of this section, and of the United States importer under paragraph (o) of this section.

(A) Agree the information in these reports with regard to vessel identification, gasoline volumes and test results.

(B) Identify, and report as a finding, each occasion the load port and port of entry parameter and volume results differ by more than the amounts allowed in paragraph (g) of this section, and determine whether the foreign refiner adjusted its refinery calculations as required in paragraph (g) of this section.

(ii) Obtain the documents used by the independent third party to determine transportation and storage of the Certified Sulfur-FRGAS from the refinery to the load port, under paragraph (f) of this section. Obtain tank activity records for any storage tank where the Certified Sulfur-FRGAS is stored, and pipeline activity records for any pipeline used to transport the Certified Sulfur-FRGAS, prior to being loaded onto the vessel. Use these records to determine whether the Certified Sulfur-FRGAS was produced at the refinery that is the subject of the attest engagement, and whether the Certified Sulfur-FRGAS was mixed with any Non-Certified Sulfur-FRGAS, Non-Sulfur-FRGAS, or any Certified Sulfur-FRGAS produced at a different refinery.

(5) Select a sample from the list of vessels identified in paragraph (h)(3) of this section used to transport certified and Non-Certified Sulfur-FRGAS, in accordance with the guidelines in § 80.127, and for each vessel selected perform the following:

(i) Obtain a commercial document of general circulation that lists vessel arrivals and departures, and that includes the port and date of departure of the vessel, and the port of entry and date of arrival of the vessel.

(ii) Agree the vessel's departure and arrival locations and dates from the independent third party and United States importer reports to the information contained in the commercial document.

(6) Obtain separate listings of all tenders of Non-Sulfur-FRGAS, and perform the following:

(i) Agree the total volume of tenders from the listings to the gasoline inventory reconciliation analysis in § 80.128(b).

(ii) Obtain a separate listing of the tenders under this paragraph (h)(6) where the gasoline is loaded onto a marine vessel. Select a sample from this listing in accordance with the guidelines in § 80.127, and obtain a commercial document of general circulation that lists vessel arrivals and departures, and that includes the port and date of departure and the ports and dates where the gasoline was off loaded for the selected vessels. Determine and report as a finding the country where the gasoline was off loaded for each vessel selected.

(7) In order to complete the requirements of this paragraph (h) an auditor must:

(i) Be independent of the foreign refiner;

(ii) Be licensed as a Certified Public Accountant in the United States and a citizen of the United States, or be approved in advance by EPA based on a demonstration of ability to perform the procedures required in § 80.125 through 130 and this paragraph (h); and

(iii) Sign a commitment that contains the provisions specified in paragraph (i) of this section with regard to activities and documents relevant to compliance with the requirements of § 80.125 through 80.130 and this paragraph (h).

(i) *Foreign refiner commitments.* Any foreign refiner must commit to and comply with the provisions contained in this paragraph (i) as a condition to being assigned an individual refinery sulfur baseline.

(1) Any United States Environmental Protection Agency inspector or auditor must be given full, complete and immediate access to conduct inspections and audits of the foreign refinery.

(i) Inspections and audits may be either announced in advance by EPA, or unannounced.

(ii) Access must be provided to any location where:

(A) Gasoline is produced;

(B) Documents related to refinery operations are kept;

(C) Gasoline or blendstock samples are tested or stored; and

(D) Sulfur-FRGAS is stored or transported between the foreign refinery and the United States, including storage tanks, vessels and pipelines.

(iii) Inspections and audits may be by EPA employees or contractors to EPA.

(iv) Any documents requested that are related to matters covered by inspections and audits must be provided to an EPA inspector or auditor on request.

(v) Inspections and audits by EPA may include review and copying of any documents related to:

(A) Refinery baseline establishment, including the volume and sulfur content, and transfers of title or custody, of any gasoline or blendstocks, whether Sulfur-FRGAS or Non-Sulfur-FRGAS, produced at the foreign refinery during the period January 1, 1997 through the date of the refinery baseline petition or through the date of the inspection or audit if a baseline petition has not been approved, and any work papers related to refinery baseline establishment;

(B) The volume and sulfur content of Sulfur-FRGAS;

(C) The proper classification of gasoline as being Sulfur-FRGAS or as not being Sulfur-FRGAS, or as Certified Sulfur-FRGAS or as Non-Certified Sulfur-FRGAS;

(D) Transfers of title or custody to Sulfur-FRGAS;

(E) Sampling and testing of Sulfur-FRGAS;

(F) Worked performed and reports prepared by independent third parties and by independent auditors under the requirements of this section and § 80.415, including work papers; and

(G) Reports prepared for submission to EPA, and any work papers related to such reports.

(vi) Inspections and audits by EPA may include taking samples of gasoline or blendstock, and interviewing employees.

(vii) Any employee of the foreign refiner must be made available for interview by the EPA inspector or auditor, on request, within a reasonable time period.

(viii) English language translations of any documents must be provided to an EPA inspector or auditor, on request, within 10 working days.

(ix) English language interpreters must be provided to accompany EPA inspectors and auditors, on request.

(2) An agent for service of process located in the District of Columbia must be named, and service on this agent constitutes service on the foreign refiner or any employee of the foreign refiner for any action by EPA or otherwise by the United States related to the requirements of this subpart.

(3) The forum for any civil or criminal enforcement action related to the provisions of this section for violations of the Clean Air Act or regulations promulgated thereunder are governed by the Clean Air Act, including the EPA administrative forum where allowed under the Clean Air Act.

(4) United States substantive and procedural laws apply to any civil or criminal enforcement action against the foreign refiner or any employee of the foreign refiner related to the provisions of this section.

(5) Submitting a petition for an individual refinery sulfur baseline, producing and exporting gasoline under an individual refinery sulfur baseline, and all other actions to comply with the requirements of this subpart relating to the establishment and use of an individual refinery sulfur baseline constitute actions or activities that satisfy the provisions of 28 U.S.C. 1605(a)(2), but solely with respect to actions instituted against the foreign refiner, its agents and employees in any court or other tribunal in the United States for conduct that violates the requirements applicable to the foreign refiner under this subpart, including conduct that violates 18 U.S.C. 1001 and Clean Air Act section 113(c)(2).

(6) The foreign refiner, or its agents or employees, must not detain or impose civil or criminal remedies against EPA inspectors or auditors, whether EPA employees or EPA contractors, for actions performed within the scope of EPA employment related to the provisions of this section.

(7) The commitment required by this paragraph (i) must be signed by the owner or president of the foreign refiner business.

(8) In any case where Sulfur-FRGAS produced at a foreign refinery is stored or transported by another company between the refinery and the vessel that transports the Sulfur-FRGAS to the United States, the foreign refiner must obtain from each such other company a commitment that meets the requirements specified in paragraphs (i)(1) through (7) of this section, and these commitments must be included in the foreign refiner's baseline petition.

(j) *Sovereign immunity.* By submitting a petition for an individual foreign refinery baseline under this section, or by producing and exporting gasoline to the United States under an individual refinery sulfur baseline under this section, the foreign refiner, its agents

and employees, without exception, become subject to the full operation of the administrative and judicial enforcement powers and provisions of the United States without limitation based on sovereign immunity, with respect to actions instituted against the foreign refiner, its agents and employees in any court or other tribunal in the United States for conduct that violates the requirements applicable to the foreign refiner under this subpart, including conduct that violates 18 U.S.C. 1001 and Clean Air Act section 113(c)(2).

(k) *Bond posting.* Any foreign refiner must meet the requirements of this paragraph (k) as a condition to being assigned an individual refinery sulfur baseline.

(1) The foreign refiner must post a bond of the amount calculated using the following equation:

$$\text{Bond} = G \times \$0.01$$

Where:

Bond = Amount of the bond in U. S. dollars.

G = The largest volume of gasoline produced at the foreign refinery and exported to the United States, in gallons, during a single calendar year among the most recent of the following calendar years, up to a maximum of five calendar years: the calendar year immediately preceding the date the baseline petition is submitted, the calendar year the baseline petition is submitted, and each succeeding calendar year.

(2) Bonds must be posted by:

(i) Paying the amount of the bond to the Treasurer of the United States;

(ii) Obtaining a bond in the proper amount from a third party surety agent that is payable to satisfy United States administrative or judicial judgments against the foreign refiner, provided EPA agrees in advance as to the third party and the nature of the surety agreement; or

(iii) An alternative commitment that results in assets of an appropriate liquidity and value being readily available to the United States, provided EPA agrees in advance as to the alternative commitment.

(3) If the bond amount for a foreign refinery increases the foreign refiner must increase the bond to cover the shortfall within 90 days of the date the bond amount changes. If the bond amount decreases, the foreign refiner may reduce the amount of the bond beginning 90 days after the date the bond amount changes.

(4) Bonds posted under this paragraph (k) must be used to satisfy any judicial judgment that results from an administrative or judicial enforcement action for conduct in violation of this subpart, including where such conduct violates 18 U.S.C. 1001 and Clean Air Act section 113(c)(2).

(5) On any occasion a foreign refiner bond is used to satisfy any judgment, the foreign refiner must increase the bond to cover the amount used within 90 days of the date the bond is used.

(l) [Reserved]

(m) *English language reports.* Any report or other document submitted to EPA by an foreign refiner must be in English language, or must include an English language translation.

(n) *Prohibitions.* (1) No person may combine Certified Sulfur-FRGAS with any Non-Certified Sulfur-FRGAS or Non-Sulfur-FRGAS, and no person may combine Certified Sulfur-FRGAS with any Certified Sulfur-FRGAS produced at a different refinery, except as provided in paragraph (e) of this section.

(2) No foreign refiner or other person may cause another person to commit an action prohibited in paragraph (n)(1) of this section, or that otherwise violates the requirements of this section.

(o) *United States importer requirements.* Any United States importer must meet the following requirements:

(1) Each batch of imported gasoline must be classified by the importer as being Sulfur-FRGAS or as Non-Sulfur-FRGAS, and each batch classified as Sulfur-FRGAS must be further classified as Certified Sulfur-FRGAS or as Non-certified Sulfur-FRGAS.

(2) Gasoline must be classified as Certified Sulfur-FRGAS or as Non-Certified Sulfur-FRGAS according to the designation by the foreign refiner if this designation is supported by product transfer documents prepared by the foreign refiner as required in paragraph (d) of this section, unless the gasoline is classified as Non-Certified Sulfur-FRGAS under paragraph (g) of this section.

(3) For each gasoline batch classified as Sulfur-FRGAS, any United States importer must perform the following procedures:

(i) In the case of both Certified and Non-Certified Sulfur-FRGAS, have an independent third party:

(A) Determine the volume of gasoline in the vessel;

(B) Use the foreign refiner's Sulfur-FRGAS certification to determine the name and EPA-assigned registration number of the foreign refinery that produced the Sulfur-FRGAS;

(C) Determine the name and country of registration of the vessel used to transport the Sulfur-FRGAS to the United States; and

(D) Determine the date and time the vessel arrives at the United States port of entry.

(ii) In the case of Certified Sulfur-FRGAS, have an independent third party:

(A) Collect a representative sample from each vessel compartment subsequent to the vessel's arrival at the United States port of entry and prior to off loading any gasoline from the vessel;

(B) Prepare a volume-weighted vessel composite sample from the compartment samples; and

(C) Determine the sulfur value using the methodologies specified in § 80.330, by:

(*1*) The third party analyzing the sample; or

(*2*) The third party observing the importer analyze the sample.

(4) Any importer must submit reports within thirty days following the date any vessel transporting Sulfur-FRGAS arrives at the United States port of entry:

(i) To the Administrator containing the information determined under paragraph (o)(3) of this section; and

(ii) To the foreign refiner containing the information determined under paragraph (o)(3)(ii) of this section.

(5) Any United States importer must meet the requirements specified in § 80.195 for any imported gasoline that is not classified as Certified Sulfur-FRGAS under paragraph (o)(2) of this section.

(p) [Reserved]

(q) *Withdrawal or suspension of a foreign refinery's baseline* EPA may withdraw or suspend a baseline that has been assigned to a foreign refinery where:

(1) A foreign refiner fails to meet any requirement of this section;

(2) A foreign government fails to allow EPA inspections as provided in paragraph (i)(1) of this section;

(3) A foreign refiner asserts a claim of, or a right to claim, sovereign immunity in an action to enforce the requirements in this subpart; or

(4) A foreign refiner fails to pay a civil or criminal penalty that is not satisfied using the foreign refiner bond specified in paragraph (k) of this section.

(r) Any refiner whose Sulfur-FRGAS is transported into the United States by truck may petition EPA to use alternative procedures to meet the requirements for certification under paragraph (d)(5) of this section, load port and port of entry sampling and testing under paragraphs (f) and (g) of this section, attest under paragraph (h) of this section and importer testing under paragraph (o)(3) of this section.

These alternative procedures must ensure Certified Sulfur-FRGAS remains segregated from Non-Certified Sulfur-FRGAS and from Non-Sulfur-FRGAS until it is imported into the United States. The petition will be evaluated based on whether it adequately addresses the following:

(1) Provisions for monitoring pipeline shipments, if applicable, from the refinery, that ensure segregation of Certified Sulfur-FRGAS from that refinery from all other gasoline.

(2) Contracts with any terminals and/or pipelines that receive and/or transport Certified Sulfur-FRGAS, that prohibit the commingling of Certified Sulfur-FRGAS with any of the following:

(i) Other Certified Sulfur-FRGAS from other refineries.

(ii) All Non-Certified Sulfur-FRGAS.

(iii) All Non-Sulfur-FRGAS.

(3) Procedures for obtaining and reviewing truck loading records and United States import documents for Certified Sulfur-FRGAS to ensure that such gasoline is only loaded into trucks making deliveries to the United States.

(4) Attest procedures to be conducted annually by an independent third party that review loading records and import documents based on volume reconciliation, or other criteria, to confirm that all Certified Sulfur-FRGAS remains segregated throughout the distribution system and is only loaded into trucks for import into the United States.

(5) The petition required by this section must be submitted to EPA along with the application for small refiner status and individual refinery sulfur baseline and standards under § 80.235 and this section.

(s) *Additional requirements for petitions, reports and certificates.* Any petition for a refinery baseline under paragraph (b) of this section, any alternative procedures under paragraph (r) of this section, any report or other submission required by paragraphs (c), (f)(2), or (i) of this section, and any certification under paragraph (d)(3) of this section must be:

(1) Submitted in accordance with procedures specified by the Administrator, including use of any forms that may specified by the Administrator.

(2) Be signed by the president or owner of the foreign refiner company, or by that person's immediate designee, and must contain the following declaration:

I hereby certify: (1) that I have actual authority to sign on behalf of and to bind [insert name of foreign refiner] with regard to all statements contained herein; (2) that I am aware that the information contained herein is being certified, or submitted to the United States Environmental Protection Agency, under the requirements of 40 CFR Part 80, subpart H and that the information is material for determining compliance under these regulations; and (3) that I have read and understand the information being certified or submitted, and this information is true, complete and correct to the best of my knowledge and belief after I have taken reasonable and appropriate steps to verify the accuracy thereof.

I affirm that I have read and understand the provisions of 40 CFR Part 80, subpart H, including 40 CFR § 80.410 [insert name of foreign refiner]. Pursuant to Clean Air Act section 113(c) and Title 18, United States Code, section 1001, the penalty for furnishing false, incomplete or misleading information in this certification or submission is a fine of up to $10,000, and/or imprisonment for up to five years.

Attest Engagements

§ 80.415 What are the attest engagement requirements for gasoline sulfur compliance?

Refiners and importers, for each annual averaging period, must arrange to have an attest engagement performed of the underlying documentation that forms the basis of any report required under this section. The attest engagement must comply with the procedures and requirements that apply to refiners and importers under §§ 80.125 through 80.130, and must be submitted to the Administrator of EPA by May 30 of each year.

PART 85—CONTROL OF AIR POLLUTION FROM MOBILE SOURCES

5. The authority citation for part 85 continues to read as follows:

Authority: 42 U.S.C. 7521, 7522, 7524, 7525, 7541, 7542, 7601(a).

6. Section 85.1515 is amended by redesignating the existing paragraph (c) as paragraph (c)(1) and adding new paragraphs (c)(2), (c)(3), (c)(4) and (c)(5) to read as follows:

§ 85.1515 Emission standards and test procedures applicable to imported nonconforming motor vehicles and motor vehicle engines.

* * * * *

(c)(1) * * *

(2) The provisions of paragraph (c)(1) of this section notwithstanding, nonconforming light duty vehicles or light light-duty trucks (LDV/LLDTs) modified in model years 2004, 2005 or 2006 must meet the interim FTP exhaust and evaporative emission standards for light duty vehicles and light light-duty trucks specified in 40 CFR 86.1811–04(l) and 86.1811–04(e)(5). Nonconforming LDT3s and LDT4s (HLDTs) modified in model years 2004 through 2008 must meet the interim non-Tier 2 FTP exhaust and evaporative standards for HLDTs specified in 40 CFR 86.1811–04(l) and 86.1811–04(e)(5). Optionally, independent commercial importers may elect to meet the Tier 2 FTP exhaust and evaporative emission standards set forth in 40 CFR 86.1811–04(c) and (e) during those years. ICIs are exempt from the Tier 2 and the interim non-Tier 2 phase-in percentage requirements described in 40 CFR 86.1811–04.

(3) Nonconforming light duty vehicles and light light-duty trucks (LDV/LLDTs) modified in model years 2007 or later must meet the exhaust and evaporative emission requirements set forth for all 2007 and later model year LDV/LLDTs in 40 CFR 86.1811–04.

(4) Nonconforming heavy light-duty trucks (HLDTs) modified in model years 2009 or later must meet the exhaust and evaporative emission requirements set forth for all 2009 and later model year HLDTs in 40 CFR 86.1811–04.

(5) The requirements of 40 CFR 86.1811–04 related to fleet average NO_X standards and requirements to comply with such standards do not apply to vehicles modified under this subpart.

* * * * *

PART 86—CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES

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

Authority: 42 U.S.C. 7401–7671q.

8. Section 86.1 is amended by revising the entry for ''California Regulatory Requirements Applicable to the National Low Emission Vehicle Program, October, 1996'', and by adding an entry in alphabetical order in the table in paragraph (b)(4) to read as follows:

§ 86.1 Reference materials.

* * * * *

(b) * * *

(4) * * *

Document No. and name	40 CFR part 86 reference
* * * * * * *	
California Regulatory Requirements Applicable to the ''LEV II'' Program, including 1. Amendments to California Exhaust and Evaporative Emission Standards and Test Procedures for Passenger Cars, Light-duty Trucks and Medium-duty Vehicles and Amendments to California Motor Vehicle Certification, Assembly-line and In-use Test Requirements ''CAP 2000''. 2. California Zero-Emission and Hybrid Electric Vehicle Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Passenger Cars, Light-duty Trucks and Medium-duty Vehicles. 3. California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-duty Trucks and Medium-duty Vehicles. 4. California Non-Methane Organic Gas Test Procedures. 5. California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles. 6. California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles.	86.1830–01; 86.1806–01; 86.1810–01; 86.1811–04; 86.1844–01.
California Regulatory Requirements Applicable to the National Low Emission Vehicle Program, October 1996.	86.113–004; 86.612–97; 86.1012–97; 86.1702–99; 86.1708–99; 86.1709–99; 86.1717–99; 86.1735–99; 86.1771–99; 86.1775–99; 86.1776–99; 86.1777–99; Appendix XVI; Appendix XVII.

* * * * *

Subpart B—Emission Regulations for 1997 and Later Model Year New Light-duty Vehicles and New Light-duty Trucks; Test Procedures

9. Section 86.113–04 is added to read as follows:

§ 86.113–04 Fuel Specifications.

This section includes text that specifies requirements that differ from § 86.113–94. Where a paragraph in § 86.113–94 is identical and applicable to this section, this will be indicated by specifying the corresponding paragraph and the statement ''[Reserved]. For guidance see § 86.113–94.''

(a) *Gasoline fuel.* (1) Gasoline having the following specifications will be used by the Administrator in exhaust and evaporative emission testing of petroleum-fueled Otto-cycle vehicles. Gasoline having the following specification or substantially equivalent specifications Approved by the Administrator, must be used by the manufacturer in exhaust and evaporative testing except that octane specifications do not apply:

Item	ASTM test method No.	Value
Octane, Research, Min.	D2699	93.
Sensitivity, Min		.7.5
Lead (organic), maximum: g/U.S. gal. (g/liter)	D3237	0.050 (0.013).
Distillation Range	D86	
IBP [1]: deg. F (deg. C)		75–95 (23.9–35).
10 pct. point: deg.F (deg.C)		120–135 (48.9–57.2).
50 pct. point: deg.F. (deg.C)		200–230 (93.3–110).
90 pct. point: deg.F (deg.C)		300–325 (148.9–162.8).
EP, max: deg.F (deg.C)D86		415 (212.8).
Sulfur, weight pct.	D1266	0.003–0.008.
Phosphorous, max. g/U.S. gal (g/liter)	D3231	0.005 (0.0013).
RVP [2 3]	D3231	8.7–9.2 (60.0–63.4).
Hydrocarbon composition	D1319	
Olefins, max. pct.		10.
Aromatics, max, pct.		35.
Saturates		Remainder.

[1] For testing at altitudes above 1,219 m (4000 feet), the specified range is 75–105 deg. F (23.9–40.6 deg. C).
[2] For testing which is unrelated to evaporative emission control, the specified range is 8.0-9.2 psi (55.2–63.4 kPa).
[3] For testing at altitudes above 1,219 m (4000 feet), the specified range is 7.6–8.0 psi (52-55 kPa).

(2) For light-duty vehicles and light-duty trucks certified for 50 state sale, ''California Phase 2'' gasoline having the specifications listed in the table in this section may be used in exhaust emission testing as an option to the specifications in paragraph (a)(1) of this section. If a manufacturer elects to utilize this option, exhaust emission testing must be conducted by the manufacturer with gasoline having the specifications listed in the table in this paragraph (a)(2) and the Administrator must also conduct exhaust emission testing with gasoline having the specifications listed in the table in this paragraph (a)(2), except that the Administrator may use or require the use of test fuel meeting the specifications in paragraph (a)(1) of this section for selective enforcement auditing and in-use testing. All fuel property test methods for this fuel are contained in Chapter 4 of the California

Regulatory Requirements Applicable to the National Low Emission Vehicle Program (October, 1996). These requirements are incorporated by reference (see § 86.1). The table follows:

Fuel property	Limit
Octane, (R+M)/2 (min)	91.
Sensitivity (min)	7.5.
Lead, g/gal (max) (No lead added)	0–0.01.
Distillation Range, °F	
10 pct. point,	130–150.
50 pct. point,	200–210.
90 pct. point,	290–300.
EP, maximum	390.
Residue, vol% (max)	2.0.
Sulfur, ppm by wt.	30–40.
Phosphorous, g/gal (max)	0.005.
RVP, psi	6.7–7.0.
Olefins, vol %	4.0–6.0.
Total Aromatic Hydrocarbons (vol%)	22–25.
Benzene, vol %	0.8–1.0.
Multi-Substituted Alkyl Aromatic Hydrocarbons, vol%	12–14.
MTBE, vol%	10.8–11.2.
Additives	See Chapter 4 of the California Regulatory Requirements Applicable to the National Low Emission Vehicle Program (October, 1996). These procedures are incorporated by reference (see § 86.1).
Copper Corrosion	No. 1.
Gum, Washed, mg/100 ml (max)	3.0.
Oxidation Stability, minutes (min)	1000.
Specific Gravity	No limit; report to purchaser required.
Heat of Combustion	No limit; report to purchaser required.
Carbon, wt%	No limit; report to purchaser required.
Hydrogen, wt%	No limit; report to purchaser required.

(3)(i) Unless otherwise approved by the Administrator, unleaded gasoline representative of commercial gasoline that will be generally available through retail outlets must be used in service accumulation. Unless otherwise approved by the Administrator, where the vehicle is to be used for evaporative emission durability demonstration, such fuel must contain ethanol as required by § 86.1824–01(a)(2)(iii). Leaded gasoline must not be used in service accumulation.

(ii) The octane rating of the gasoline used must be no higher than 1.0 Research octane number above the minimum recommended by the manufacturer and have a minimum sensitivity of 7.5 octane numbers, where sensitivity is defined as the Research octane number minus the Motor octane number.

(iii) The Reid Vapor Pressure of the gasoline used must be characteristic of the motor fuel used during the season in which the service accumulation takes place.

(4) The specification range of the gasoline to be used under paragraph (a) of this section must be reported in accordance with §§ 86.094–21(b)(3) and 86.1844–01.

(b) through (g) ''[Reserved]. For guidance see § 86.113–94.''

6. Section 86.129–00 is amended by adding a new paragraph (f)(1)(ii)(C) to read as follows:

§ 86.129–00 Road load power, test weight, and inertia weight class determination.

* * * * *

(f) * * *

(1) * * *

(ii) * * *

(C) Regardless of other requirements in this section relating to the testing of heavy light duty trucks, for Tier 2 heavy light duty trucks, the test weight basis for FTP and SFTP testing (both US06 and SC03) is the vehicle curb weight plus 300 pounds.

* * * * *

Subpart C—Emission Regulations for 1994 and Later Model Year Gasoline-Fueled New Light-duty Vehicles and New Light-duty Trucks; Cold Temperature Test Procedures

10. Section 86.213–04 is added to read as follows:

§ 86.213–04 Fuel specifications.

Gasoline having the following specifications will be used by the Administrator. Gasoline having the specifications set forth in the table in this section may be used by the manufacturer except that the octane specification does not apply. In lieu of using gasoline having these specifications, the manufacturer may, for certification testing, use gasoline having the specifications specified in § 86.113–04 provided the cold CO emissions are not decreased. Documentation showing that cold CO emissions are not decreased must be maintained by the manufacturer and must be made available to the Administrator upon request. The table listing the cold CO fuel specifications described in the text in this section follows:

TABLE—COLD CO FUEL SPECIFICATIONS

Item	Cold CO low octane value or		Cold CO high octane [1] value or range
	ASTM test	Range	
(RON+MON)/2, min	D2699	87.8<plus-minus>.3	92.3<plus-minus>0.5.
Sensitivity, min	D2699	7.5	7.5.
Distillation range:			
IBP, deg.F	D86	76–96	76–96.
10% point, deg.F	D86	98–118	105–125.
50% point, deg.F	D86	179–214	195–225.
90% point, deg.F	D86	316–346	316–346.
EP, max, deg.F	D86	413	413.
Sulfur, wt. %	D3120	0.003–0.008	0.003–0.008.
Phosphorous, g/U.S gal, max	D3231	0.005	0.005.
Lead, g/gal, max		0.01	0.01.
RVP, psi	D4953	11.5<plus-minus>.3	11.5<plus-minus>.3.
Hydrocarbon composition	D1319		
Olefins, vol. pct		12.5<plus-minus>5.0	10.0<plus-minus>5.0.
Aromatics, vol. pct		26.4<plus-minus>4.0	32.0<plus-minus>4.0.
Saturates		Remainder	Remainder.

[1] Gasoline having these specifications may be used for vehicles which are designed for the use of high-octane premium fuel.

Subpart R—General Provisions for the Voluntary National Low Emission Vehicle Program for Light-duty Vehicles and Light-duty Trucks

11. Section 86.1701–99 is amended by adding paragraph (f) to read as follows:

§ 86.1701–99 General applicability.

* * * * *

(f) The provisions of this subpart are not applicable to 2004 or later model year vehicles, except where specific references to provisions of this subpart are made in conjunction with provisions applicable to such vehicles.

Subpart S—General Compliance Provisions for Control of Air Pollution From New and In-use Light-duty Vehicles and Light-duty Trucks

12. Section 86.1801–01 is amended by revising the first sentence of paragraph (a) and the first sentence of paragraph (e) and adding paragraphs (f) and (g) to read as follows:

§ 86.1801–01 Applicability.

(a) Except as otherwise indicated, the provisions of this subpart apply to new 2001 and later model year Otto-cycle and diesel cycle light duty vehicles and light duty trucks, including alternative fueled, hybrid electric, and zero emission vehicles.* * *

* * * * *

(e) *National Low Emission Vehicle Program for light-duty vehicles and light light-duty trucks.* A manufacturer may elect to certify 2001–2003 model year light duty vehicles and light light-duty trucks (LDV/LLDTs) to the provisions of the National Low Emission Vehicle Program contained in Subpart R of this part. * * *

(f) *''Early'' Tier 2 LDV/Ts.* Any LDV/LLDT which is certified to Tier 2 FTP exhaust standards prior to the 2004 model year, or any HLDT which is certified to the Tier 2 FTP exhaust standards prior to the 2008 model year, to utilize alternate phase-in schedules and/or for purposes of generating and banking NO_X credits, must comply with all the exhaust emission requirements applicable to Tier 2 LDV/Ts under this subpart.

(g) *Interim non-Tier 2 LDV/Ts.* Model year 2004–2008 LDV/Ts, that do not comply with the Tier 2 FTP exhaust emission requirements (interim non-Tier 2 LDV/Ts) as permitted under the phase-in requirements of § 86.1811–04(k) must comply with all interim non-Tier 2 exhaust emission requirements contained in this subpart, including FTP exhaust emission requirements for all interim non-Tier 2 LDV/Ts found at § 86.1811–04(l). Separate emission requirements are provided for interim non-Tier 2 LDV/LLDTs and interim non-Tier 2 HLDTs.

13. Section 86.1803–01 is amended by adding the following definitions in alphabetical order to read as follows:

§ 86.1803–01 Definitions.

* * * * *

Bin or *emission bin* means a set of emission standards applicable to exhaust pollutants measured on the Federal Test Procedure (FTP). A *bin* is equivalent to a horizontal row of FTP standards in the various charts shown in this subpart. Manufacturers are generally free to choose the bin of standards that will apply to a certain test group of vehicles, provided that on a sales weighted average of those bins, all of their vehicles meet a specified fleet average standard for a particular pollutant.

* * * * *

CalLEV II or *California LEV II* refers to California's second phase of its low emission vehicle (LEV) program. This program was adopted at the hearing of the California Air Resources Board held on November 5, 1998.

* * * * *

Fleet average NO_X standard means, for light-duty vehicles and light-duty trucks, a NO_X standard imposed over an individual manufacturer's total U.S. sales (or a fraction of total U.S. sales during phase-in years), as ''U.S. sales'' is defined in this subpart, of light duty vehicles and trucks of a given model year. Manufacturers determine their compliance with such a standard by averaging, on a sales weighted basis, the individual NO_X standards they choose for the fleet of light duty vehicles and trucks they sell of that model year.

* * * * *

Interim non-Tier 2 vehicle or *interim non-Tier 2 LDV/T* or *interim vehicle* means any 2004 or later model year light duty vehicle or light duty truck not certified to Tier 2 FTP exhaust emission standards during the Tier 2 phase-in period.

* * * * *

LDV/T means light duty vehicles and light duty trucks collectively, without regard to category.

* * * * *

Non-methane organic gases (NMOG) means the sum of oxygenated and non-oxygenated hydrocarbons contained in a gas sample as measured in accordance with the California Non-Methane Organic Gas Test Procedures. These

requirements are incorporated by reference (see § 86.1).

* * * * *

Periodically regenerating trap oxidizer system means a trap oxidizer that utilizes, during normal driving conditions, an automated regeneration mode for cleaning the trap, the operation of which can be easily detected.

* * * * *

Point of first sale means the location where the completed light duty vehicle or light duty truck is first purchased. This term is synonymous with final product purchase location. The point of first sale may be a retail customer, dealer, distributor, fleet operator, broker, secondary manufacturer, or any other entity which purchases a vehicle from a manufacturer. In cases where the end user purchases the completed vehicle directly from the manufacturer, the end user is the point of first sale.

* * * * *

Round, rounded or *rounding* means, unless otherwise specified, that numbers will be rounded according to ASTM–E29–93a, which is incorporated by reference in this part pursuant to § 86.1.

* * * * *

Tier 2 standards means those FTP exhaust emission standards applicable to new light-duty vehicles and light light duty trucks and that begin a phase-in in the 2004 model year, and those exhaust emission standards applicable to heavy light duty trucks that begin a phase-in in the 2008 model year. These standards are found in § 86.1811–04.

Tier 2 vehicle or *Tier 2 LDV/T* means any light duty vehicle or light duty truck, including HEVs and ZEVs, of the 2004 or later model year certified to comply with the Tier 2 FTP exhaust standards contained in § 86.1811–04. The term Tier 2 vehicle also includes any light duty vehicle or truck, of any model year, which is certified to Tier 2 FTP exhaust standards for purposes of generating or banking early NO_X credits for averaging under Tier 2 requirements as allowed in this subpart.

* * * * *

U.S. sales means, unless otherwise specified, sales in any state of the United States except for California or a state that has adopted California motor vehicle standards for that model year pursuant to section 177 of the Clean Air Act. This definition applies only to those regulatory requirements addressing Tier 2 and interim non-Tier 2 LDV/Ts.

* * * * *

14. Section 86.1804–01 is amended by adding the following acronyms and abbreviations, in alphabetical order, to read as follows:

§ 86.1804–01 Acronyms and abbreviations.

* * * * *

HCHO—Formaldehyde.

* * * * *

HEV—Hybrid electric vehicle.

* * * * *

HLDT—Heavy light duty truck. Includes only those trucks over 6000 pounds GVWR (LDT3s and LDT4s).

* * * * *

LDV/LLDT—Light duty vehicles and light light-duty trucks. Includes only those trucks rated at 6000 pounds GVWR or less (LDT1s and LDT2s).

LDV/T—Light duty vehicles and light duty trucks. This term is used collectively to include, or to show that a provision applies to, all light duty vehicles and all categories of light duty trucks, i.e.

LDT1, LDT2, LDT3 and LDT4.

LEV—Low Emission Vehicle.

* * * * *

NLEV—Refers to the National Low Emission Vehicle Program. Regulations governing this program are found at subpart R of this part.

* * * * *

NMOG—Non-methane organic gases.

* * * * *

RAF—Reactivity adjustment factor.

* * * * *

SULEV—Super Ultra Low Emission Vehicle.

* * * * *

TLEV—Transitional Low Emission Vehicle.

* * * * *

ULEV—Ultra Low Emission Vehicle.

* * * * *

ZEV—Zero Emission Vehicle.

* * * * *

15. Section 86.1805–04 is added to read as follows:

§ 86.1805–04 Useful life.

(a) Except as required under paragraph (b) of this section or permitted under paragraphs (d) and (e) of this section, the full useful life for all LDVs, LDT1s and LDT2s is a period of use of 10 years or 120,000 miles, whichever occurs first. For all HLDTs, full useful life is a period of 11 years or 120,000 miles, whichever occurs first. This full useful life applies to exhaust, evaporative and refueling emission requirements except for standards which are specified to only be applicable at the time of certification.

(b) Manufacturers may elect to optionally certify a test group to the Tier 2 exhaust emission standards for 150,000 miles to gain additional NO_X credits, as permitted in § 86.1860–04(g). In such cases, useful life is a period of use of 15 years or 150,000 miles, whichever occurs first, for all exhaust, evaporative and refueling emission requirements except for cold CO standards and standards which are applicable only at the time of certification.

(c) Where intermediate useful life exhaust emission standards are applicable, such standards are applicable for five years or 50,000 miles, whichever occurs first.

(d)(1) Manufacturers may petition the Administrator to provide alternative useful life periods for idle CO requirements for light duty trucks when they believe that the useful life period described in this section is significantly unrepresentative for one or more test groups (either too long or too short). This petition must include the full rationale behind the request, together with any supporting data and other evidence. Based on this or other information, the Administrator may assign an alternative useful life period. Any petition should be submitted in a timely manner to allow adequate time for a thorough evaluation.

(2) Where cold CO standards are applicable, the useful life requirement for compliance with the cold CO standard only, is 5 years or 50,000 miles whichever occurs first.

(e) Where LDVs, LDT1s and LDT2s of the 2003 or earlier model years are certified to Tier 2 exhaust emission standards for purposes of generating early NO_X credits, manufacturers may certify those vehicles to full useful lives of 100,000 miles in lieu of the otherwise required 120,000 mile full useful lives, as provided under § 86.1861–04(c)(4).

16. Section 86.1806–01 is amended by adding paragraph (b)(8) to read as follows:

§ 86.1806–01 On-board diagnostics.

* * * * *

(b)* * *

(8) *For Tier 2 and interim non-Tier 2 hybrid electric vehicles (HEVs) only.* Unless added to HEVs in compliance with other requirements of this section, or unless otherwise approved by the Administrator:

(i) The manufacturer must equip each HEV with a maintenance indicator consisting of a light that must activate automatically by illuminating the first time the minimum performance level is observed for each battery system component. Possible battery system components requiring monitoring are: battery water level, temperature control, pressure control, and other parameters critical for determining battery condition.

(ii) The manufacturer must equip ''off-vehicle charge capable HEVs'' with a useful life indicator for the battery

system consisting of a light that must illuminate the first time the battery system is unable to achieve an all-electric operating range (starting from a full state-of-charge) which is at least 75 percent of the range determined for the vehicle in the Urban Driving Schedule portion of the All-Electric Range Test (see the California Zero-Emission and Hybrid Electric Vehicle Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Year Passenger Cars, Light-Duty Trucks and Medium Duty Vehicles. These requirements are incorporated by reference (see § 86.1)

(iii) The manufacturer must equip each HEV with a separate odometer or other device subject to the approval of the Administrator that can accurately measure the mileage accumulation on the engines used in these vehicles.

* * * * *

17. Section 86.1807–01 is amended by revising paragraph (a)(3)(vi) to read as follows:

§ 86.1807–01 Vehicle labeling.

(a) * * *

(3) * * *

(vi) The exhaust emission standards to which the test group is certified, and for test groups having different in-use standards, the corresponding exhaust emission standards that the test group must meet in use. In lieu of this requirement, manufacturers may use the standardized test group name designated by EPA;

* * * * *

18. Section 86.1809–01 is amended by adding paragraph (e) to read as follows:

§ 86.1809–01 Prohibition of defeat devices.

* * * * *

(e) For each test group of Tier 2 and interim non-Tier 2 LDV/Ts, the manufacturer must submit, with the Part II certification application, an engineering evaluation demonstrating to the satisfaction of the Administrator that a discontinuity in emissions of non-methane organic gases, carbon monoxide, oxides of nitrogen and formaldehyde measured on the Federal Test Procedure (subpart B of this part) does not occur in the temperature range of 20 to 86 degrees F. For diesel vehicles, the engineering evaluation must also include particulate emissions.

19. Section 86.1810–01 is amended by adding two new sentences to the end of the introductory text; by adding a new sentence to the end of paragraph (i)(6); and by adding new paragraphs (i)(13), (i)(14), (o) and (p) to read as follows:

§ 86.1810–01 General standards; increase in emissions; unsafe conditions; waivers.

* * * For Tier 2 and interim non-Tier 2 LDV/Ts, this section also applies to hybrid electric vehicles and zero emission vehicles. Unless otherwise specified, requirements and provisions of this subpart applicable to methanol fueled vehicles are also applicable to Tier 2 and interim non-Tier 2 ethanol fueled LDV/Ts.

* * * * *

(i) * * *

(6) * * * For Tier 2 and interim non-Tier 2 LDV/Ts, this provision does not apply to enrichment that occurs upon cold start, warm-up conditions and rapid-throttle motion conditions (''tip-in'' or ''tip-out'' conditions).

* * * * *

(13) *A/C-on specific calibrations.* (i) For Tier 2 and interim non-Tier 2 LDV/Ts, A/C-on specific calibrations (e.g. air to fuel ratio, spark timing, and exhaust gas recirculation), may be used which differ from A/C-off calibrations for given engine operating conditions (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters).

(ii) Such calibrations must not unnecessarily reduce the NMHC+NO_X emission control effectiveness during A/C-on operation when the vehicle is operated under conditions which may reasonably be expected to be encountered during normal operation and use.

(iii) If reductions in control system NMHC+NO_X effectiveness do occur as a result of such calibrations, the manufacturer must, in the Application for Certification, specify the circumstances under which such reductions do occur, and the reason for the use of such calibrations resulting in such reductions in control system effectiveness.

(iv) A/C-on specific ''open-loop'' or ''commanded enrichment'' air-fuel enrichment strategies (as defined below), which differ from A/C-off ''open-loop'' or ''commanded enrichment'' air-fuel enrichment strategies, may not be used, with the following exceptions: Cold-start and warm-up conditions, or, subject to Administrator approval, conditions requiring the protection of the vehicle, occupants, engine, or emission control hardware. Other than these exceptions, such strategies which are invoked based on manifold pressure, engine speed, throttle position, or other engine parameters must use the same engine parameter criteria for the invoking of this air-fuel enrichment strategy and the same degree of enrichment regardless of whether the A/C is on or off. ''Open-loop'' or ''commanded'' air-fuel enrichment strategy is defined as enrichment of the air to fuel ratio beyond stoichiometry for the purposes of increasing engine power output and the protection of engine or emissions control hardware. However, ''closed-loop biasing,'' defined as small changes in the air-fuel ratio for the purposes of optimizing vehicle emissions or driveability, must not be considered an ''open-loop'' or ''commanded'' air-fuel enrichment strategy. In addition, ''transient'' air-fuel enrichment strategy (or ''tip-in'' and ''tip-out'' enrichment), defined as the temporary use of an air-fuel ratio rich of stoichiometry at the beginning or duration of rapid throttle motion, must not be considered an ''open-loop'' or ''commanded'' air-fuel enrichment strategy.

(14) ''*Lean-on-cruise*'' calibration strategies. (i) For Tier 2 and interim non-Tier 2 LDV/Ts, the manufacturer must state in the Application for Certification whether any ''lean-on-cruise'' strategies are incorporated into the vehicle design. A ''lean-on-cruise'' air-fuel calibration strategy is defined as the use of an air-fuel ratio significantly greater than stoichiometry, during non-deceleration conditions at speeds above 40 mph. ''Lean-on-cruise'' air-fuel calibration strategies must not be employed during vehicle operation in normal driving conditions, including A/C usage, unless at least one of the following conditions is met:

(A) Such strategies are substantially employed during the FTP or SFTP;

(B) Such strategies are demonstrated not to significantly reduce vehicle NMHC+NO_X emission control effectiveness over the operating conditions in which they are employed; or

(C) Such strategies are demonstrated to be necessary to protect the vehicle occupants, engine, or emission control hardware.

(ii) If the manufacturer proposes to use a ''lean-on-cruise'' calibration strategy, the manufacturer must specify the circumstances under which such a calibration would be used, and the reason or reasons for the proposed use of such a calibration.

* * * * *

(o) Unless otherwise approved by the Administrator, manufacturers must measure NMOG emissions in accordance with the California Non-Methane Organic Gas Test Procedures. These procedures are incorporated by reference (see § 86.1).

(p) For diesel vehicles, manufacturers may measure non-methane hydrocarbons in lieu of NMOG.

20. Section 86.1811–01 is amended by adding a sentence to the end of the introductory text to read as follows:

§ 86.1811–01 Emission standards for light-duty vehicles.

* * * This section does not apply to 2004 and later model year vehicles, except as specifically referenced by § 86.1811–04.

* * * * *

21. Section 86.1811–04 is added to read as follows:

§ 86.1811–04 Emission standards for light duty vehicles and light duty trucks.

(a) *Applicability.* (1) This section contains regulations implementing emission standards for all light duty vehicles and light duty trucks (LDV/Ts). This section applies to 2004 and later model year LDV/Ts fueled by gasoline, diesel, methanol, ethanol, natural gas and liquefied petroleum gas fuels, except as noted. Additionally, this section contains provisions applicable to hybrid electric vehicles (HEVs) and zero emission vehicles (ZEVs). Multi-fueled vehicles must comply with all requirements established for each consumed fuel.

(2)(i) This section also applies to LDV/LLDTs of model years prior to 2004, when manufacturers certify such vehicles to Tier 2 exhaust emission requirements to utilize alternate phase-in schedules, as allowed under paragraph (k)(6) of this section, and/or to earn NO_X credits for use in complying with the Tier 2 fleet average NO_X standard which takes effect in the 2004 model year for LDV/LLDTs.

(ii) This section also applies to HLDTs of model years prior to 2004, when manufacturers certify such vehicles to Tier 2 exhaust emission requirements to utilize alternate phase-in schedules as allowed under paragraph (k)(6) of this section.

(3) Except where otherwise specified, this section applies instead of §§ 86.1811–01, 86.1812–01, 86.1813–01, 86.1814–01, 86.1814–02, 86.1815–01, and 86.1815–02.

(4) Except where otherwise specified, the provisions of this section apply equally to LDVs and all categories of LDTs, as reflected by the use of the term LDV/T.

(5) The exhaust emission standards and evaporative emission standards of this section apply equally to certification and in-use LDV/Ts unless otherwise specified.

(b) *Test weight.* (1) Except as required in paragraph (b)(2) of this section, emission testing of all LDV/Ts to determine compliance with any exhaust or evaporative emission standard set forth in this part must be on a loaded vehicle weight (LVW) basis, as that term is defined in this subpart.

(2) Interim non-Tier 2 HLDTs tested to Tier 1 SFTP standards, must be tested on an adjusted loaded vehicle weight (ALVW) basis, as that term is defined in this subpart, during the SC03 element of the SFTP.

(c) *Tier 2 FTP exhaust emission standards.* Exhaust emissions from Tier 2 LDV/Ts must not exceed the standards in Table S04–1 of this section at full useful life when tested over the Federal Test Procedure (FTP) described in subpart B of this part. Exhaust emissions from Tier 2 LDV/Ts must not exceed the standards in Table S04–2 of this section at intermediate useful life, if applicable, when tested over the FTP. Manufacturers of LDV/Ts must meet these standards according to the phase-in schedules shown in Tables S04–6 and S04–7 of this section.

(1) For a given test group a manufacturer desires to certify to operate only on one fuel, the manufacturer must select a set of standards from the same bin (line or row) in Table S04–1 of this section for non-methane organic gases (NMOG), carbon monoxide (CO), oxides of nitrogen (NO_X), formaldehyde (HCHO) and particulate matter (PM). The manufacturer must certify the test group to meet those standards, subject to all the applicable provisions of this subpart. The manufacturer must also certify the test group to meet the intermediate useful life standards (if any) in Table S04–2 of this section having the same EPA bin reference number as the chosen full useful life standards.

(2) For a given test group of flexible-fueled, bi-fuel or dual fuel vehicles when operated on the alcohol or gaseous fuel they are designed to use, manufacturers must select a bin of standards from Table S04–1 of this section and the corresponding bin in Table S04–2, if any. When these flexible-fueled, bi-fuel or dual fuel vehicles are certified to operate on gasoline or diesel fuel, the manufacturer may choose to comply with the next numerically higher NMOG standard above the bin which contains the standards selected for certification on the gaseous or alcohol fuel.

(3) The bin 7 NMOG value may be used by alternative fueled vehicles when operated on gasoline or diesel fuel when such vehicles are certified to bin 6 standards on the gaseous or alcohol fuel on which they are designed to operate.

(4) In addition to the bins shown in Tables S04–1 and 2 of this section, manufacturers may also use the applicable interim non-Tier 2 bins for Tier 2 vehicles. These bins are shown in Tables S04–8 and 9 of this section for LDV/LLDTs and Tables S04–10 and 11 of this section for HLDTs. These bins may only be used through the last model year of the duration of the applicable interim program, i.e. 2006 for LDV/LLDTs and 2008 for HLDTs. In a given model year, an individual vehicle may not be included in both the Tier 2 program and an interim program.

(5) Tables S04–1 and S04–2 follow:

TABLE S04–1.—TIER 2 LIGHT DUTY FULL USEFUL LIFE EXHAUST MASS EMISSION STANDARDS

[Grams per mile]

EPA bin No.	NMOG	CO	HCHO	NO_X	PM
7	[a] 0.156	.....	.....	.....	.....
7	0.125	4.2	.018	0.20	0.02
6	0.090	4.2	0.018	0.15	0.02
5	0.090	4.2	0.018	0.07	0.01
4	0.055	2.1	0.011	0.07	0.01
3	0.070	2.1	0.011	0.04	0.01
2	0.010	2.1	0.004	0.02	0.01
1	0.000	0.0	0.000	0.00	0.0

[a] Applicable only to flexible-fueled and dual-fuel bin 7 vehicles when certifying for operation on gasoline.

TABLE S04–2.—TIER 2 LIGHT DUTY INTERMEDIATE USEFUL LIFE EXHAUST MASS EMISSION STANDARDS

[Grams per mile]

EPA bin No.	NMOG	CO	HCHO	NO_X	PM [b]
7	[a] 0.125				
7	0.100	3.4	0.015	0.14	
6	0.075	3.4	0.015	0.11	
5	0.075	3.4	0.015	0.05	
4	0.040	1.7	0.008	0.05	

[a] Applicable only to flexible-fueled and dual-fuel bin 7 vehicles when certifying for operation on gasoline.
[b] The full useful life PM standards from Table S04–1 also apply at intermediate useful life.

(d) *Fleet average NO_X* Standards. (1) For a given individual model year's sales of Tier 2 LDV/Ts, including model years during the phase-in years of the Tier 2 standards, manufacturers must comply with a fleet average oxides of nitrogen (NO_X) standard of 0.07 grams per mile. The manufacturer must calculate its fleet average NO_X emission level(s) as described in § 86.1860–04. Up through and including model year 2008, manufacturers must calculate separate fleet average NO_X emission levels for LDV/LLDTs and HLDTs as described in § 86.1860–04.

(2) *For Early Tier 2 LDV/LLDTs.* For model years prior to 2004, where the manufacturer desires to bank early Tier 2 NO_X credits as permitted under § 86.1861(c), the manufacturer must comply with a fleet average standard of 0.07 grams per mile for its Tier 2 LDV/LLDTs. Manufacturers must determine compliance with the NO_X fleet average standard according to regulations in § 86.1860–04.

(3) *For Early Tier 2 HLDTs.* For model years prior to 2008, where the manufacturer desires to bank early Tier 2 NO_X credits as permitted under § 86.1861(c), the manufacturer must comply with a fleet average standard of 0.07 grams per mile for its Tier 2 HLDTs. Manufacturers must determine compliance with the NO_X fleet average standard according to regulations in § 86.1860–04.

(e) *Evaporative emission standards.* Consistent with the phase-in requirements in paragraph (k) of this section, evaporative emissions from gasoline-fueled, natural gas-fueled, liquefied petroleum gas-fueled, ethanol-fueled and methanol-fueled LDV/Ts must not exceed the standards in this paragraph. The standards apply equally to certification and in-use LDV/Ts, except that the spitback standard applies only to newly assembled LDV/Ts.

(1) *Diurnal-plus-hot soak evaporative hydrocarbon standards.* Hydrocarbons for LDV/Ts must not exceed the diurnal plus hot soak standards shown in Table S04–3 for the full three diurnal test sequence and for the supplemental two diurnal test sequence. Table S04–3 follows:

TABLE S04–3.—LIGHT-DUTY DIURNAL PLUS HOT SOAK EVAPORATIVE EMISSION STANDARDS

[Grams per test]

Vehicle category	3 day diurnal + hot Soak	Supplemental 2 day diurnal + hot soak
LDVs, LDT1s and LDT2s	0.95	1.2
LDT3s and LDT4s	1.2	1.5

(2) *Running loss standard.* Hydrocarbons for LDV/Ts measured on the running loss test must not exceed 0.05 grams per mile.

(3) *Refueling emission standards.* Refueling emissions must not exceed the following standards:

(i) For gasoline-fueled, diesel-fueled and methanol-fueled LDV/Ts: 0.20 grams hydrocarbon per gallon (0.053 grams per liter) of fuel dispensed.

(ii) For liquefied petroleum gas-fueled LDV/Ts: 0.15 grams hydrocarbon per gallon (0.04 grams per liter) of fuel dispensed.

(iii) Refueling standards for LDT3s and LDT4s are subject to the phase-in requirements found in § 86.1810–01(k).

(4) *Spitback standards.* For gasoline and methanol fueled LDV/Ts, hydrocarbons measured on the fuel dispensing spitback test must not exceed 1.0 grams hydrocarbon (carbon if methanol-fueled) per test.

(5) Vehicles not certified to meet the evaporative emission standards in this paragraph (e) as permitted under the phase-in schedule of paragraph (k) of this section, must meet applicable evaporative emission standards in §§ 86.1811–01, 86.1812–01, 86.1813–01, 86.1814–02 or 86.1815–02 except that all LDV/Ts must meet the refueling emission standards in paragraph (e)(3) of this section.

(f) *Supplemental exhaust emission standards for LDV/Ts.* (1) Supplemental exhaust emissions from gasoline-fueled and diesel fueled LDV/Ts must not exceed the standards in Table S04–4 at full useful life. Supplemental exhaust emission standards are not applicable to alternative fueled LDV/Ts, or flexible fueled LDV/Ts when operated on a fuel other than gasoline or diesel. Table S04–4 follows:

TABLE S04–4.— FULL USEFUL LIFE SUPPLEMENTAL EMISSION STANDARDS (SFTP STANDARDS) FOR LDV/TS

[Grams/mile]

Vehicle category	USO6 NMHC+NO_X	USO6 CO	SCO3 NMHC+NO_X	SCO3 CO
LDV/LDT1	0.20	11.1	0.26	4.2
LDT2	0.37	14.6	0.39	5.5
LDT3	0.53	16.9	0.44	6.4
LDT4	0.78	19.3	0.62	7.3

(2) Gasoline-fueled LDV/Ts, diesel-fueled LDV/Ts and flexible fueled LDV/Ts when operated on gasoline or diesel fuel, and subject to intermediate useful life FTP standards, must not exceed the intermediate useful life supplemental emission standards in Table S04–5, as follows:

TABLE S04–5.—INTERMEDIATE USEFUL LIFE SUPPLEMENTAL EMISSION STANDARDS (SFTP STANDARDS) FOR LDV/TS

[Grams/mile]

Vehicle category	USO6 NMHC+NO_X	USO6 CO	SCO3 NMHC+NO_X	SCO3 CO
LDV/LDT1	0.16	9.0	0.22	3.0
LDT2	0.30	11.6	0.32	3.9
LDT3	0.45	11.6	0.36	3.9
LDT4	0.67	13.2	0.51	4.4

(3) For interim non-Tier 2 gasoline, diesel and flexible-fueled LDT3s and LDT4s, manufacturers may, at their option, meet the gasoline SFTP standards found in §§ 86.1814–02 and 86.1815–02, respectively.

(4) Interim non-Tier 2 gasoline, diesel and flexible-fueled LDV/LLDTs certified to bin 5 FTP exhaust emission standards from Table S04–8 in this section may meet the gasoline Tier 1 SFTP requirements found at § 86.1811–01(b).

(g) *Cold temperature exhaust emission standards for LDV/Ts.* These standards are applicable only to gasoline fueled LDV/Ts. For cold temperature exhaust emission standards, a useful life of 50,000 miles applies.

(1) For LDVs and LDT1s, the standard is 10.0 grams per mile CO.

(2) For LDT2s, LDT3s and LDT4s, the standard is 12.5 grams per mile CO.

(h) *Certification short test exhaust emission standards for LDV/Ts.* Certification short test emissions from all gasoline-fueled otto cycle LDV/Ts must not exceed the following standards:

(1) Hydrocarbons: 100 ppm as hexane, for certification and SEA testing; 220 ppm as hexane, for in-use testing.

(2) Carbon monoxide: 0.5% for certification and SEA testing; 1.2% for in-use testing.

(i) *Idle exhaust emission standards for light duty trucks.* Exhaust emissions of carbon monoxide from gasoline, methanol, natural gas, and liquefied petroleum gas-fueled light duty trucks must not exceed 0.5% of exhaust gas flow at curb idle for the useful life of the trucks as defined in this part. This standard does not apply to light duty vehicles.

(j) *Highway NO_X exhaust emission standard for LDV/Ts.* The maximum projected NO_X emissions measured on the federal Highway Fuel Economy Test in 40 CFR part 600, subpart B, must not be greater than 1.33 times the applicable FTP NO_X standard to which the manufacturer certifies the test group. Both the projected emissions and the product of the NO_X standard and 1.33 must be rounded to the nearest 0.01 g/mi before being compared.

(k) *Phase-in of the Tier 2 FTP exhaust and evaporative requirements; small volume manufacturer flexibilities.* (1) Manufacturers must comply with the phase-in requirements in Tables S04–6 and S04–7 of this section for the Tier 2 FTP exhaust emission requirements specified in paragraph (c) of this section. Separate phase-in schedules are provided for LDV/LLDTs and HLDTs. These requirements specify the minimum percentage of the manufacturer's LDV/LLDT and HLDT U.S. sales, by model year, that must meet the Tier 2 requirements for their full useful lives. Tables S04–6 and S04–7 follow:

TABLE S04–6.—PHASE-IN PERCENTAGES FOR LDV/LLDT TIER 2 REQUIREMENTS

Model year	Percentage of LDV/LLDTs that must meet tier 2 requirements
2004	25
2005	50
2006	75
2007 and subsequent	100

TABLE S04–7.—PHASE-IN PERCENTAGES FOR HLDT TIER 2 REQUIREMENTS

Model year	Percentage of HLDTs that must meet tier 2 requirements
2008	50
2009 and subsequent	100

(2) Manufacturers must also comply with the phase-in requirements in Tables S04–6 and S04–7 of this section for the evaporative emission requirements contained in paragraph (e) of this section.

(3) Manufacturers may opt to use different LDV/LLDTs and HLDTs to meet the phase-in requirements for evaporative emissions and FTP exhaust emissions, provided that the manufacturer meets the minimum phase-in requirements in Table S04–6 and Table S04–7 of this section for both FTP exhaust and evaporative emissions. A LDV or LDT counted toward compliance with any phase-in requirement for FTP exhaust or evaporative standards, must comply with all applicable Tier 2 exhaust requirements or all evaporative requirements, as applicable, described in this section.

(4) LDVs and LDTs not certified to meet the Tier 2 FTP exhaust requirements during model years 2004–2008, as allowed under this subpart, are subject to the provisions of paragraph (l) of this section. LDVs and LDTs not certified to meet the evaporative requirements in paragraph (e) of this section during model years 2004–2008, as allowed under this subpart, must meet all evaporative requirements found in §§ 86.1811–01, 86.1812–01, 86.1813–01, 86.1814–02 and 86.1815–02 as applicable, and the refueling requirements found in paragraph (e)(3) of this section.

(5)(i) Small volume manufacturers, as defined in this part, are exempt from the LDV/LLDT phase-in requirements for model years 2004, 2005 and 2006 in Table S04–6, but must comply with the 100% requirement for the 2007 and later model years.

(ii) Small volume manufacturers, as defined in this part, are exempt from the HLDT phase-in requirement for model year 2008 in Table S04–7 of this section and the interim fleet average NO_X standard and the phase-in of the HLDT interim non-Tier 2 FTP exhaust standards for the 2004, 2005 and 2006 model years.

(iii) Small volume manufacturers must comply with the interim non-Tier 2 FTP exhaust emission standards of bin 5 or lower from Tables S04–10 and 11 of this section for HLDTs of model years 2004, 2005 and 2006; the interim non-Tier 2 FTP exhaust standards from Tables S04–10 and 11 and the 0.20 g/mi fleet average NO_X standard for the 2007 and 2008 model year; and the Tier 2 FTP exhaust standards, evaporative standards, and the 0.07 g/mi fleet average NO_X standard for the 2009 and later model years.

(6)(i) A manufacturer may elect an alternate phase-in schedule that results in 100% phase-in for LDV/LLDTs by 2007 . Alternate phase-in schedules must produce a sum of at least 250% when the percentages of LDV/LLDTs certified to Tier 2 requirements for each model year from 2001 through 2007 are summed. As an example, a 10/25/50/65/100 percent phase-in that began in 2003 would have a sum of 250 percent would be acceptable. However, a 10/25/40/70/100 percent phase-in that began the same year would have a sum of 245 percent and would not be acceptable.

(ii) A manufacturer electing this option for LDV/LLDTs may calculate its compliance with the evaporative standards in paragraph (e)(1) of this section separately from its compliance with Tier 2 exhaust standards, provided that the phase-in schedules for each separately produce a sum of at least 250 percent when calculated as described in paragraph (k)(6)(i) of this section. A vehicle counted towards compliance with any phase-in requirement for the Tier 2 exhaust standards or the evaporative standards in paragraph (e)(1) of this section, must comply with all applicable Tier 2 exhaust standards or all evaporative standards, as applicable, described in this section.

(iii) In addition to the requirements of paragraph (k)(6)(i) and (ii) of this section, a manufacturer of LDV/LLDTs electing to use an alternate phase-in schedule for compliance with the Tier 2 exhaust standards or the evaporative standards in paragraph (e)(1) of this section must ensure that the sum of the percentages of vehicles from model years 2001 through 2004, meeting such exhaust or evaporative standards, as applicable, is at least 25%.

(iv) A manufacturer may elect an alternate phase-in schedule that results in 100% phase-in for HLDTs by 2009. The requirements of paragraph (k)(6)(i) through (k)(6)(iii) of this section apply, except that for HLDTs, the calculation described in paragraph (k)(6)(i) of this section may cover model years 2001 through 2009 and must produce a sum of at least 150%.

(7)(i) Sales percentages for the purpose of determining compliance with the phase-in of the Tier 2 requirements and the phase-in of the evaporative standards in paragraph (e)(1) of this section, must be based upon projected U.S. sales of LDV/LLDTs and HLDTs of the applicable model year by the manufacturer to the point of first sale. Such sales percentages must be rounded to the nearest one tenth of a percent, and must not include vehicles and trucks projected to be sold to points of first sale in California or a state that has adopted California requirements for that model year as permitted under section 177 of the Act.

(ii) Alternatively, the manufacturer may petition the Administrator to allow actual volume produced for U.S. sales to be used in lieu of projected U.S. sales for purposes of determining compliance with the phase-in percentage requirements under this section. The manufacturer must submit its petition within 30 days of the end of the model year to the Vehicle Programs and Compliance Division. For EPA to approve the use of actual volume produced for U.S. sales, the manufacturer must establish to the satisfaction of the Administrator, that actual production volume is functionally equivalent to actual sales volume of LDV/LLDTs and HLDTs sold in states other than California and states that have adopted California standards.

(iii) Manufacturers must submit information showing compliance with all phase-in requirements of this section with its Part I application as required by § 86.1844(d)(13).

(l) *FTP exhaust standards for interim non-Tier 2 LDV/LLDTs and HLDTs. (1) FTP exhaust emission standards for interim non-Tier 2 LDV/LLDTs.* (i) LDV/LLDTs that are not certified to meet Tier 2 FTP exhaust emission requirements during the Tier 2 phase-in period (model years 2004–2006) must comply with the full useful life FTP exhaust emission standards listed in Table S04–8 of this section and, the corresponding intermediate useful life standards, if any, in Table S04–9 of this section. Manufacturers may choose the bin of full useful life standards to which they certify a test group of vehicles, subject to the requirements in paragraph (l)(3)(i) of this section. In addition to the bins shown in Tables S04–8 and S04–9 of this section, manufacturers may also use the Tier 2 bins shown in Tables S04–1 and S04–2 of this section. Manufacturers may include LDV/LLDTs in the interim program that are not used to meet the Tier 2 corporate average NO_X standard or the phase-in percentage requirements in the Tier 2 program or to generate Tier 2 NO_X credits. More simply, a manufacturer may use the Tier 2 bins for interim non-Tier 2 vehicles; but, in a given model year, an individual vehicle may not be included in both the Tier 2 program and an interim program. Tables S04–8 and S04–9 follow:

TABLE S04–8.—FULL USEFUL LIFE INTERIM EXHAUST MASS EMISSION STANDARDS FOR LDV/LLDTS

[Grams per mile]

EPA Bin No.	NMOG	CO	NO_X	HCHO	PM
5	0.156	4.2	0.60	0.018	0.06
4	0.090	4.2	0.30	0.018	0.06
3	0.055	2.1	0.30	0.011	0.04
2	0.090	4.2	0.07	0.018	0.01
1	0.000	0.0	0.00	0.000	0.0

TABLE S04–9.—INTERMEDIATE USEFUL LIFE INTERIM EXHAUST MASS EMISSION STANDARDS FOR LDV/LLDTS

[Grams per mile]

EPA Bin No.	NMOG	CO	NO_X	HCHO	PM
5	0.125	3.4	0.40	0.015	
4	0.075	3.4	0.20	0.015	
3	0.040	1.7	0.20	0.008	
2	0.075	3.4	0.05	0.015	

(ii) Manufacturers must select a set of standards from the same bin in Table S04–8 of this section and the corresponding bin in Table S04–9, if any, for a given test group of flexible-fueled, dual fuel or multi-fuel LDV/LLDTs, when operated

on the alcohol or gaseous fuel they are designed to use. When these flexible-fueled, dual fuel or multi fuel LDV/Ts are certified to operate on gasoline, the manufacturer may choose to comply with the next numerically higher NMOG standard (if there is one) above the bin which contains the standards selected for certification on the gaseous or alcohol fuel.

(2) *FTP exhaust emission standards for interim non-Tier 2 HLDTs.* (i) HLDTs of model years 2004–2008 that are not certified to meet the Tier 2 FTP exhaust standards in paragraph (c) of this section must comply with the interim non-Tier 2 FTP exhaust emission standards in Tables S04–10 and S04–11 of this section.

(ii) HLDTs of model years 2004–2008 that are not certified to meet the Tier 2 FTP exhaust standards in paragraph (c) of this section must also comply with the fleet average NO_X standard described in paragraph (l)(3)(ii) of this section subject to the phase-in schedule in paragraph (l)(2)(iv) of this section, i.e. 25 percent of the HLDTs must meet the fleet average standard of 0.20 g/mi in 2004, 50 percent in 2005, and so on.

(iii) Manufacturers may choose the bin of full useful life standards to which they certify a test group of HLDTs, subject to the requirements in paragraph (l)(3)(ii) of this section. In addition to the bins shown in Tables S04–10 and S04–11 of this section, manufacturers may also use the Tier 2 bins shown in Tables S04–1 and S04–2 of this section. Therefore, manufacturers may include HLDTs in the interim program that are not used to meet the Tier 2 corporate average NO_X standard or the phase-in percentage requirements in the Tier 2 program or to generate Tier 2 NO_X credits. More simply, a manufacturer may use the Tier 2 bins for interim non-Tier 2 vehicles; but, in a given model year, an individual vehicle may not be included in both the Tier 2 program and an interim program. Tables S04–10 and S04–11 follow:

TABLE S04–10.—FULL USEFUL LIFE INTERIM EXHAUST MASS EMISSION STANDARDS FOR HLDTS

[Grams/mile]

EPA Bin No.	NMOG	CO	NO_X	HCHO	PM
5	0.230	4.2	0.60	0.018	0.06
4	0.180	4.2	0.30	0.018	0.06
3	0.156	4.2	0.20	0.018	0.02
2	0.090	4.2	0.07	0.018	0.01
1	0.000	0.0	0.00	0.000	0.0

TABLE S04–11.—INTERMEDIATE USEFUL LIFE INTERIM EXHAUST MASS EMISSION STANDARDS FOR HLDTS

[Grams per mile]

EPA Bin No.	NMOG	CO	NO_X	HCHO	PM
5	0.160	3.4	0.40	0.015	.....
4	0.140	3.4	0.20	0.015	.....
3	0.125	3.4	0.14	0.015	.....
2	0.075	3.4	0.05	0.015	.....

(iv) *Phase-in schedule for interim non-Tier 2 HLDT standards.* Table S04–12 of this section specifies the minimum percentage of the manufacturer's non-Tier 2 HLDT U.S. sales, by model year, that must comply with the fleet average NO_X standard described in paragraph (l)(3(ii) of this section. Table S04–12 follows:

TABLE S04–12.—PHASE-IN PERCENTAGES FOR INTERIM NON-TIER 2 FLEET AVERAGE NO_X Standard for HLDTS

Model year	Percentage of non-tier 2 HLDTs that must meet interim non-tier 2 fleet average NO_X standard
2004	25
2005	50
2006	75
2007 and 2008	100

(v) A manufacturer may elect an alternate phase-in schedule, beginning as early as the 2001 model year, that results in 100% compliance by 2007 with the fleet average NO_X standard for HLDTs described in paragraph (1)(3)(ii) of this section. The requirements of paragraph (k)(6)(i) of this section apply to the selection of an alternate phase-in schedule.

(vi) Manufacturers must select a set of standards from the same bin in Table S04–10 of this section and the corresponding bin in Table S04–11, if any (or Tables S04–1 and S04–2 of this section), for a given test group of flexible-fueled, dual fuel or multi-fuel HLDTs, when operated on the alcohol or gaseous fuel they are designed to use. When these flexible-fueled, dual fuel or multi fuel HLDTs are certified to operate on gasoline, the manufacturer may choose to comply with the next numerically higher NMOG standard (if there is one) above the bin which contains the standards selected for certification on the gaseous or alcohol fuel.

(3) *Fleet average NO_X standards for interim non-Tier 2 LDV/Ts.* (i) Manufacturers must comply with a fleet average full useful life NO_X standard for their interim non-Tier 2 LDV/LLDTs, on an annual basis, of 0.30 grams per mile.

(ii) Manufacturers must comply with a fleet average full useful life NO_X standard for their interim non-Tier 2 HLDTs, excluding those HLDTs not yet covered by the phase-in requirement described in paragraph (l)(2)(ii) of this section, on an annual basis, of 0.20 grams per mile.

(iii) Manufacturers must determine their compliance with these interim fleet average NO_X standards for each model year by separately computing the sales weighted average NO_X level of all interim non-Tier 2 LDV/LLDTs and all interim non-Tier 2 HLDTs (excluding those not yet phased in as described in paragraph (l)(2)(ii) of this section), using the methodology in § 86.1860.

(iv) Manufacturers may generate, bank, average, trade and use interim non-Tier 2 NO_X credits based on their NO_X fleet average as determined under paragraph (l)(3)(iii) of this section. Unless waived or modified by the Administrator, the provisions of § 86.1861 apply to the generation, banking, averaging, trading and use of credits generated by interim non-Tier 2 LDV/Ts. NO_X credits generated by interim non-Tier 2 LDV/Ts are not subject to any discount.

(m) *NMOG standards for diesel, flexible fueled and dual-fueled LDV/Ts.* (1) For diesel fueled LDV/Ts, the term ''NMOG'' in both the Tier 2 and interim non-Tier 2 standards means non-methane hydrocarbons.

(2) Flexible-fueled and dual-fuel Tier 2 LDV/Ts and interim non-Tier 2 LDV/Ts must be certified to NMOG exhaust emission standards both for operation on gasoline and on any alternate fuel they are designed to use.

(n) *Hybrid electric vehicle (HEV) and Zero Emission Vehicle (ZEV) requirements.* For FTP and SFTP exhaust emissions, and unless otherwise approved by the Administrator, manufacturers must measure emissions from all HEVs and ZEVs according to the requirements and test procedures found in the document entitled California Zero-Emission and Hybrid Electric Vehicle Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Passenger Cars, Light-duty Trucks and Medium-duty Vehicles. This document is incorporated by reference (see § 86.1) . Requirements and procedures in this document that are relevant only to complying with the California ZEV mandate, computing partial and full ZEV allowance credits, or generating and using ZEV credits, are not relevant to the federal program and may be disregarded. Discussion in that document relevant to fleet average NMOG standards and NMOG credits may also be disregarded.

(o) *NMOG measurement.* (1) Manufacturers must measure NMOG emissions in accordance with Part G of the California Non-Methane Organic Gas Test Procedures. These requirements are incorporated by reference (see § 86.1).

(2) Manufacturers must not apply reactivity adjustment factors (RAFs) to NMOG measurements. See § 86.1841.

(p) *In-use standards for Tier 2 LDV/Ts.* (1) Table S04–13 of this section contains in-use emission standards applicable only to Tier 2 LDV/Ts certified to the bins shown in the table. These standards apply to in-use testing performed by the manufacturer pursuant to regulations at §§ 1845–01, 1845–04 and 1846–01 and to in-use testing performed by EPA. These standards do not apply to certification or Selective Enforcement Auditing.

(2) These standards apply only to Tier 2 LDV/LLDTs produced up through the 2008 model year, and Tier 2 HLDTs produced up through the 2010 model year. These standards are subject to other limitations described in paragraph (p)(3) of this section.

(3) For the first model year and also for the next model year after that, in which a test group of Tier 2 vehicles is certified to a bin of standards to which it has not previously been certified, the standards in Table S04–13 of this section apply for purposes of in-use testing only. The standards apply equally to Tier 2 LDV/Ts produced before, during and after the applicable Tier 2 phase-in period, subject to the model year limitation in paragraph (p)(2) of this section. Table S04–13 follows:

TABLE S04–13.—IN-USE COMPLIANCE STANDARDS FOR TIER 2 VEHICLES (G/MI)

[Certification standards shown for reference purposes]

Bin No.	Durability period (miles)	NO_X in-use	NO_X certification	NMOG in-use	NMOG certification
5,4	50,000	0.07	0.05	n/a	0.075, 0.04
5,4	120,000	0.10	0.07	n/a	0.090, 0.055
3	120,000	0.06	0.04	n/a	0.070
2	120,000	0.03	0.02	0.02	0.010

22. Section 86.1812–01 is amended by adding the following sentence to the end of the introductory text to read as follows:

§ 86.1812–01 Emission standards for light-duty trucks 1.

* * * This section does not apply to 2004 and later model year vehicles, except as specifically referenced by § 86.1811–04.

* * * * *

23. Section 86.1813–01 is amended by adding the following sentence to the end of the introductory text to read as follows:

§ 86.1813–01 Emission standards for light-duty trucks 2.

* * * This section does not apply to 2004 and later model year vehicles, except as specifically referenced by § 86.1811–04.

* * * * *

24. Section 86.1814–02 is amended by adding the following sentence to the end of the introductory text to read as follows:

§ 86.1814–02 Emission standards for light-duty trucks 3.

* * * This section does not apply to 2004 and later model year vehicles, except as specifically referenced by § 86.1811–04.

* * * * *

§ 86.1814–04 [Removed]

25. Section 86.1814–04 is removed.

26. Section 86.1815–02 is amended by adding the following sentence to the end of the introductory text to read as follows:

§ 86.1815–02 Emission standards for light-duty trucks 4.

* * * This section does not apply to 2004 and later model year vehicles, except as specifically referenced by § 86.1811–04.

* * * * *

§ 86.1815–04 [Removed]

27. Section 86.1815–04 is removed.

28. Section 86.1824–01 is amended by adding paragraphs (a)(2)(iii) and (a)(2)(iv) to read as follows:

§ 86.1824–01 Durability demonstration procedures for evaporative emissions.

* * * * *

(a) * * *

(2) * * *

(iii) For gasoline fueled LDV/Ts certified to meet the evaporative emission standards set forth in § 86.1811–04(e)(1), any service accumulation method for evaporative emissions must employ gasoline fuel for the entire service accumulation period which contains ethanol in, at least, the highest concentration permissible in gasoline under federal law and that is

commercially available in any state in the United States. Unless otherwise approved by the Administrator, the manufacturer must determine the appropriate ethanol concentration by selecting the highest legal concentration commercially available during the calendar year before the one in which the manufacturer begins its service accumulation. The manufacturer must also provide information acceptable to the Administrator to indicate that the service accumulation method is of sufficient design, duration and severity to stabilize the permeability of all non-metallic fuel and evaporative system components to the service accumulation fuel constituents.

(iv) For flexible-fueled, dual-fueled, multi-fueled, ethanol-fueled and methanol-fueled LDV/Ts certified to meet the evaporative emission standards set forth in § 86.1811–04(e)(1), any service accumulation method must employ fuel for the entire service accumulation period which the vehicle is designed to use and which the Administrator determines will have the greatest impact upon the permeability of evaporative and fuel system components. The manufacturer must also provide information acceptable to the Administrator to indicate that the service accumulation method is of sufficient design, duration and severity to stabilize the permeability of all non-metallic fuel and evaporative system components to service accumulation fuel constituents.

* * * * *

29. Section 86.1827–01 is amended by adding paragraph (e) to read as follows:

§ 86.1827–01 Test group determination.

* * * * *

(e) Unless otherwise approved by the Administrator, a manufacturer of hybrid electric vehicles must create separate test groups based on both the type of battery technology employed by the HEV and upon features most related to their exhaust emission characteristics.

30. Section 86.1829–01 is amended by adding paragraph (d) to read as follows:

§ 86.1829–01 Durability and emission testing requirements; waivers.

* * * * *

(d)(1) Beginning in the 2004 model year, the exhaust emissions must be measured from all exhaust emission data vehicles tested in accordance with the federal Highway Fuel Economy Test (HWFET; 40 CFR part 600, subpart B). The oxides of nitrogen emissions measured during such tests must be multiplied by the oxides of nitrogen deterioration factor computed in accordance with § 86.1824–01 and subsequent model year provisions, and then rounded and compared with the applicable emission standard in § 86.1811–04. All data obtained from the testing required under this paragraph (d) must be reported in accordance with the procedures for reporting other exhaust emission data required under this subpart.

(2) In the event that one or more emission data vehicles fail the applicable HWFET standard in § 86.1811–04, the manufacturer may submit to the Administrator engineering data or other evidence showing that the system is capable of complying with the standard. If the Administrator finds, on the basis of an engineering evaluation, that the system can comply with the HWFET standard, he or she may accept the information supplied by the manufacturer in lieu of the test data.

31. Section 86.1837–01 is amended by designating the existing text as paragraph (a) and by adding paragraph (b) to read as follows:

§ 86.1837–01 Rounding of emission measurements.

* * * * *

(b) Fleet average NO_X value calculations, where applicable, must be rounded to one more decimal place than that of the applicable fleet average standard before comparing with the applicable fleet average NO_X standard to determine credit generation or credit needs.

32. Section 86.1838–01 is amended by revising paragraph (c)(2)(iii) to read as follows:

§ 86.1838–01 Small volume manufacturer certification procedures.

* * * * *

(c) * * *

(2) * * *

(iii) The provisions of § 86.1845–01(c)(2) and § 86.1845–04(c)(2) that require one vehicle of each test group during high mileage in-use verification testing to have a minimum odometer mileage of 75 percent of the full useful life mileage for Tier 1 and NLEV LDV/Ts, or 90,000 (or 105,000) miles for Tier 2 and interim non-Tier 2 LDV/Ts, do not apply.

* * * * *

33. Section 86.1840–01 is amended by adding paragraph (c) to read as follows:

§ 86.1840–01 Special test procedures.

* * * * *

(c) Manufacturers of LDV/Ts equipped with periodically regenerating trap oxidizer systems must propose a procedure for testing and certifying such LDV/Ts including SFTP testing for the review and approval of the Administrator. The manufacturer must submit its proposal before it begins any service accumulation or emission testing. The manufacturer must provide with its submittal, sufficient documentation and data for the Administrator to fully evaluate the operation of the trap oxidizer system and the proposed certification and testing procedure.

34. Section 86.1841–01 is amended by revising paragraph (a)(1)(iii) and adding paragraph (e) to read as follows:

§ 86.1841–01 Compliance with emission standards for the purpose of certification.

(a) * * *

(1) * * *

(iii) For the SFTP composite standard of NMHC+NO_X, the measured results of NMHC and NO_X must each be adjusted by their corresponding deterioration factors before the composite NMHC+NO_X certification level is calculated. Where the applicable FTP exhaust hydrocarbon emission standard is an NMOG standard, the applicable NMOG deterioration factor must be used in place of the NMHC deterioration factor, unless otherwise approved by the Administrator.

* * * * *

(e) Unless otherwise approved by the Administrator, manufacturers must not use Reactivity Adjustment Factors (RAFs) in their calculation of the certification levels of any pollutant, regardless of the fuel used in the test vehicle.

35. Section 86.1844–01 is amended by adding a new paragraph (d)(15), a new paragraph (e)(6) and a new paragraph (i) to read as follows:

§ 86.1844–01 Information requirements: Application for certification and submittal of information upon request.

* * * * *

(d) * * *

(15) For HEVs, unless otherwise approved by the Administrator, the information required by the ''California Zero-Emission and Hybrid Electric Vehicle Standards and Test Procedures for 2003 and Subsequent Model Year Passenger Cars, Light-Duty Trucks and Medium-duty Vehicles'' must be supplied. These procedures are incorporated by reference (see § 86.1).

(e) * * *

(6) The NMOG/NMHC and formaldehyde to NMHC ratios established according to § 86.1845–04.

* * * * *

(i) For exhaust emission testing for Tier 2 and interim non-Tier 2 LDV/Ts, if approved by the Administrator in advance, manufacturers may submit exhaust emission test data generated

under California test procedures to comply with any certification and in-use testing requirements under this subpart. The Administrator may require supporting information to establish that differences between California and Federal exhaust testing procedures and fuels will not produce significant differences in emission results. The Administrator may require that in-use testing be performed using Federal test fuels as specified in § 86.113–04(a)(1).

36. Section 86.1845–04 is amended by redesignating the text of paragraph (a) after the paragraph heading as paragraph (a)(1), adding paragraph (a)(2), revising paragraph (c)(2) and adding paragraph (f) to read as follows:

§ 86.1845–04 Manufacturer in-use verification testing requirements.

(a) *General requirements.* (1) * * *

(2) Unless otherwise approved by the Administrator, no emission measurements made under the requirements of this section may be adjusted by Reactivity Adjustment Factors (RAFs).

* * * * *

(c) * * *

(2) Vehicle mileage:

(i) All test vehicles must have a minimum odometer mileage of 50,000 miles. At least one vehicle of each test group must have a minimum odometer mileage of 75 percent of the full useful life mileage. See § 86.1838–01(c)(2) for small volume manufacturer mileage requirements; or

(ii) For engine families certified for a useful life of 150,000 miles, at least one vehicle must have a minimum odometer mileage of 105,000 miles. See § 86.1838–01(c)(2) for small volume manufacturer mileage requirements.

* * * * *

(f)(1) As an alternative to measuring the NMOG content, the Administrator may approve, upon submission of supporting data by a manufacturer, the use of NMOG to NMHC ratios. To request the use of NMOG to NMHC ratios, a manufacturer must establish during certification testing the ratio of measured NMOG exhaust emissions to measured NMHC exhaust emissions for each emission data vehicle for the applicable test group. The results must be submitted to the Administrator in the Part II application for certification. A manufacturer may conduct in-use testing on the test group by measuring NMHC exhaust emissions rather than NMOG exhaust emissions. After approval by the Administrator, the measured NMHC exhaust emissions must be multiplied by the NMOG to NMHC ratio submitted in the application for certification for the test group to determine the equivalent NMOG exhaust emission values for the test vehicle. The equivalent NMOG exhaust emission value must be used in place of the measured NMOG exhaust emission value in determining the exhaust NMOG results. The equivalent NMOG exhaust emission values must be compared to the NMOG exhaust emission standard from the emission bin to which the test group was certified.

(2) For flexible-fueled LDV/Ts certified to NMOG standards, the manufacturer may request from the Administrator the use of a methanol (M85) or ethanol (E85) NMOG exhaust emission to gasoline NMHC exhaust emission ratio which must be established during certification for each emission data vehicle for the applicable test group. The results must be submitted to the Administrator in the Part II application for certification. After approval by the Administrator, the measured gasoline NMHC exhaust emissions must be multiplied by the M85 or E85 NMOG to gasoline NMHC ratio submitted in the application for certification for the test group to determine the equivalent NMOG exhaust emission values for the test vehicle. The equivalent NMOG exhaust emission value must be used in place of the measured NMOG exhaust emission value in determining the exhaust NMOG results. The equivalent NMOG exhaust emission values must be compared to the NMOG exhaust emission standard from the vehicle emission standard bin to which the test group was certified.

(3) As an alternative to measuring the HCHO content, the Administrator may approve, upon submission of supporting data by a manufacturer, the use of HCHO to NMHC ratios. To request the use of HCHO to NMHC ratios, the manufacturer must establish during certification testing the ratio of measured HCHO exhaust emissions to measured NMHC exhaust emissions for each emission data vehicle for the applicable test group. The results must be submitted to the Administrator with the Part II application for certification. Following approval of the application for certification, the manufacturer may conduct in-use testing on the test group by measuring NMHC exhaust emissions rather than HCHO exhaust emissions. The measured NMHC exhaust emissions must be multiplied by the HCHO to NMHC ratio submitted in the application for certification for the test group to determine the equivalent HCHO exhaust emission values for the test vehicle. The equivalent HCHO exhaust emission values must be compared to the HCHO exhaust emission standard applicable to the test group.

37. Section 86.1846–01 is amended by redesignating paragraph (a) as paragraph (a)(1) and adding paragraph (a)(2) to read as follows:

§ 86.1846–01 Manufacturer in-use confirmatory testing requirements.

(a)(1) * * *

(2) Except for vehicles certified under the NLEV provisions of subpart R of this part or unless otherwise approved by the Administrator, no emission measurements made under the requirements of this section may be adjusted by Reactivity Adjustment Factors (RAFs).

* * * * *

38. Section 86.1848–01 is amended by adding paragraph (c)(7) to read as follows:

§ 86.1848–01 Certification.

* * * * *

(c) * * *

(7) For Tier 2 LDV/Ts and interim non-Tier 2 LDV/Ts, all certificates of conformity issued are conditional upon compliance with all provisions of §§ 86.1811–04, 86.1860–04, 86.1861–04 and 86.1862–04 both during and after model year production.

(i) Failure to meet the fleet average NO_X requirements of 0.07g/mi, 0.30 g/mi or 0.20 g/mi, as applicable, will be considered to be a failure to satisfy the terms and conditions upon which the certificate(s) was (were) issued and the LDV/Ts sold in violation of the fleet average NO_X standard will not be covered by the certificate(s).

(ii) Failure to comply fully with the prohibition against selling credits that it has not generated or that are not available, as specified in § 86.1861–04, will be considered to be a failure to satisfy the terms and conditions upon which the certificate(s) was (were) issued and the LDV/Ts sold in violation of this prohibition will not be covered by the certificate(s).

(iii) Failure to comply fully with the phase-in requirements of § 86.1811–04, will be considered to be a failure to satisfy the terms and conditions upon which the certificate(s) was (were) issued and the LDV/Ts sold which do not comply with Tier 2 or interim non-Tier 2 requirements, up to the number needed to comply, will not be covered by the certificate(s).

(iv) For paragraphs (c)(7) (i) through (iii) of this section:

(A) The manufacturer must bear the burden of establishing to the satisfaction of the Administrator that the terms and conditions upon which the certificate(s) was (were) issued were satisfied.

(B) For recall and warranty purposes, LDV/Ts not covered by a certificate of conformity will continue to be held to the standards stated or referenced in the certificate that otherwise would have applied to the LDV/Ts

* * * * *

§§ 86.1854 through 86.1859 [Reserved]

39. Sections 86.1854 through 86.1859 are added and reserved.

40. Section 86.1860–04 is added to read as follows:

§ 86.1860–04 How to comply with the Tier 2 and interim non-Tier 2 fleet average NO_X standards.

(a) The fleet average standards referred to in this section are the corporate fleet average standards for FTP exhaust NO_X emissions set forth in: § 86.1811–04(d) for Tier 2 LDV/Ts (0.07 g/mi); § 86.1811–04(l)(3) for interim non-Tier 2 LDV/LLDTs (0.30 g/mi); and, § 86.1811–04(l)(3) for interim non-Tier 2 HLDTs (0.20 g/mi). Unless otherwise indicated in this section, the provisions of this section apply to all three corporate fleet average standards, except that the interim non-Tier 2 fleet average NO_X standards do not apply to a manufacturer whose U.S. LDV/T sales are 100% Tier 2 LDV/Ts.

(b) Each manufacturer must comply with the applicable fleet average NO_X standard, or standards, on a sales weighted average basis, at the end of each model year, using the procedure described in this section.

(c)(1)(i) Each manufacturer must separately compute the sales weighted averages of the individual NO_X emission standards to which it certified all its Tier 2 LDV/Ts, interim non-Tier 2 LDV/LLDTs, and interim non-Tier 2 HLDTs of a given model year as described in § 86.1804(l)(2). The averages must be rounded to the same number of decimal places as those of the standard plus one additional decimal place.

(ii) For model years up to and including 2008, manufacturers must compute separate NO_X fleet averages for Tier 2 LDV/LLDTs and Tier 2 HLDTs.

(2)(i) For model years up to and including 2008, if a manufacturer certifies its entire U.S. sales of Tier 2 or interim non-Tier 2 LDV/LLDTs or interim non-Tier 2 HLDTs, to full useful life bins having NO_X standards at or below the applicable fleet average NO_X standard, that manufacturer may elect not to compute a fleet average NO_X level for that category of vehicles. A manufacturer making such an election must not generate NO_X credits for that category of vehicles for that model year.

(ii) For model years after 2008, if a manufacturer certifies its entire U.S. sales of Tier 2 vehicles to full useful life bins having NO_X standards at or below 0.07 gpm, that manufacturer may elect not to compute a fleet average NO_X level for its Tier 2 vehicles. A manufacturer making such an election must not generate NO_X credits for that model year.

(d) The sales weighted NO_X fleet averages determined pursuant to paragraph (c) of this section must be compared with the applicable fleet average standard; 0.07 g/mi for NO_X for Tier 2 LDV/Ts, 0.30 g/mi for NO_X for interim non-Tier 2 LDV/LLDTs, and 0.20 g/mi for NO_X for interim non-Tier 2 HLDTs. Each manufacturer must comply on an annual basis with the fleet average standards by:

(1) showing that its sales weighted average NO_X emissions of its LDV/LLDTs, HLDTs or LDV/Ts, as applicable, are at or below the applicable fleet average standard; or

(2) if the sales weighted average is not at or below the applicable fleet average standard, obtaining and applying sufficient Tier 2 NO_X credits, interim non-Tier 2 LDV/LLDT NO_X credits or interim non-Tier 2 HLDT NO_X credits as permitted under § 86.1861–04 of this part. Manufacturers may not use NMOG credits generated under the NLEV program in subpart R of this part to meet any Tier 2 or interim non-Tier 2 NO_X fleet average standard. Tier 2 NO_X credits may not be used to meet any fleet average interim non-Tier 2 NO_X standard. Interim non-Tier 2 NO_X credits may not be used to meet the Tier 2 corporate average NO_X standard. Interim non-Tier 2 NO_X credits from HLDTs may not be used to meet the fleet average NO_X standard for interim non-Tier 2 LDV/LLDTs, and interim non-Tier 2 credits from LDV/LLDTs may not be used to meet the fleet average NO_X standard for interim non-Tier 2 HLDTs.

(e) Manufacturers that can not meet the requirements of paragraph (d) of this section, may carry forward a credit deficit for one model year, but may not carry a deficit forward in two consecutive model years, except that manufacturers may carry forward a credit deficit for interim non-Tier 2 LDV/LLDTs or interim non-Tier 2 HLDTs for more than one year but must cover the LDV/LLDT credit deficit with interim non-Tier 2 LDV/LLDT NO_X credits by the end of model year 2006, and any interim non-Tier 2 HLDT deficit with interim non-Tier 2 HLDT NO_X credits by the end of model year 2008. No deficit from interim non-Tier 2 LDV/LLDTs of any model year may be carried forward into the 2007 model year. No deficit from interim non-Tier 2 HLDTs may be carried forward into the 2009 model year.

(f) *Computing fleet average NO_X emissions.* (1) Manufacturers must separately compute these fleet NO_X averages using the equation contained in paragraph (f)(2) of this section:

(i) Their Tier 2 LDV/LLDT and Tier 2 HLDT fleet average NO_X emissions for each model year through 2008;

(ii) Their Tier 2 LDV/T fleet average NO_X emissions for each model year after 2008;

(iii) Their interim non-Tier 2 LDV/LDT fleet average NO_X emissions for each model year through 2006; and

(iv) Their interim non-Tier 2 HLDT fleet average NO_X emissions for each model year through 2008.

(2) The equation for computing fleet average NO_X emissions is as follows:

$$\frac{\sum\left(N \times NO_X \text{ emission standard}\right)}{\text{Total number of LDV/Ts sold including HEVs and ZEVs}}$$

Where:

N = The number of LDV/Ts sold in the applicable category that were certified for each corresponding NO_X emission bin. N must be based on LDV/Ts counted to the point of first sale.

Emission standard = The individual full useful life NO_X emission standard for each bin for which the manufacturer had sales.

(3) The results of the calculation in paragraph (f)(2) of this section must be rounded to one more decimal place than the number of decimal places of the fleet average NO_X standard.

(4) When approved in advance by the Administrator, the numerator in the equation in paragraph (f)(2) of this section may be adjusted downward by the product of the number of HEVs from each NO_X emission bin times a HEV NO_X contribution factor determined through mathematical estimation of the reduction in NO_X emissions over the

test procedure used to certify the HEVs. The reduction in NO_X emissions must be determined using good engineering judgement and reflect the relation in actual full useful life NO_X emissions to the full useful life NO_X standards for the certification bin applicable to the LDV/Ts. The Administrator may require that calculation of the HEV NO_X contribution factor include vehicle parameters such as vehicle weight, portion of time during the test procedure that the HEV operates with zero exhaust emissions, zero emission range, NO_X emissions from fuel-fired heaters and NO_X emissions from electricity production and storage.

(g) Additional credits for LDV/Ts certified to 150,000 mile useful lives. A manufacturer may certify any Tier 2 test group to an optional useful life of 150,000 miles. For any test group certified to the optional 150,000 mile useful life, the manufacturer, when calculating its fleet average by the procedure in paragraph (f) of this section, may substitute an adjusted NO_X standard for the applicable NO_X standards from the full useful life certification bin. The adjusted standard must be equal to the applicable full useful life NO_X standard multiplied by 0.85 and rounded to the same number of decimal places as the applicable full useful life NO_X standard.

41. Section 86.1861–04 is added to read as follows:

§ 86.1861–04 How do the Tier 2 and interim non-Tier 2 NO_X averaging, banking and trading programs work?

(a) *General provisions for Tier 2 credits and debits.* (1) A manufacturer whose Tier 2 fleet average NO_X emissions exceeds the 0.07 g/mile standard must complete the calculation at paragraph (b) of this section to determine the size of its NO_X credit deficit. A manufacturer whose Tier 2 fleet average NO_X emissions is less than or equal to the 0.07 g/mile standard must complete the calculation in paragraph (b) of this section if it desires to generate NO_X credits. In either case, the number of credits or debits determined in the calculation at paragraph (b) of this section must be rounded to the nearest whole number.

(2) Credits generated according to the calculation in paragraph (b)(1) of this section may be banked for future use or traded to another manufacturer.

(3) NO_X credits are not subject to any discount or expiration date.

(4) If a manufacturer calculates that it has negative credits (debits or a credit deficit) for a given model year, it must obtain sufficient credits from LDV/Ts produced by itself or another manufacturer in a model year no later than the one following the model year for which it calculated the credit deficit. (*Example:* if a manufacturer calculates that it has a NO_X credit deficit for the 2008 model year, it must obtain sufficient NO_X credits to offset that deficit from its own production or that of other manufacturers' 2009 or earlier model year LDV/Ts.)

(5) A manufacturer must not have a NO_X credit deficit for any two consecutive model years. (*Example:* A manufacturer that has a NO_X credit deficit at the end of the 2008 model year from its 2008 production that it can not offset with NO_X credits from 2008 or earlier model year LDV/Ts as allowed under this subpart, must not also have a NO_X credit deficit at the end of the 2009 model year.)

(6) Manufacturers may not use NO_X credits generated in the Tier 2 program to comply with the NLEV requirements of subpart R of this part. Manufacturers may not use NMOG credits generated by vehicles certified to the NLEV requirements of subpart R of this part to comply with any NO_X requirements of this subpart. Manufacturers may not use NO_X credits generated by interim non-Tier 2 LDV/Ts to comply with the corporate average NO_X standard for Tier 2 LDV/Ts. Manufacturers may not use NO_X credits generated by Tier 2 LDV/Ts to comply with any corporate average NO_X standard for interim non-Tier 2 LDV/Ts. Manufacturers may not use NO_X credits generated by interim non-Tier 2 LDV/LLDTs to comply with the corporate average NO_X standard for interim non-Tier 2 HLDTs. Manufacturers may not use NO_X credits generated by interim non-Tier 2 HLDTs to comply with the corporate average NO_X standard for interim non-Tier 2 LDV/LLDTs.

(7) Manufacturers may bank Tier 2 NO_X credits for later use to meet the Tier 2 corporate average NO_X standard or trade them to another manufacturer. Credits are earned on the last day of the model year. Before trading or carrying over credits to the next model year, a manufacturer must apply available credits to offset any credit deficit, where the deadline to offset that credit deficit has not yet passed.

(8) There are no property rights associated with NO_X credits generated under this subpart. Credits are a limited authorization to emit the designated amount of emissions. Nothing in this part or any other provision of law should be construed to limit EPA's authority to terminate or limit this authorization through a rulemaking.

(b) *Calculating Tier 2 credits and debits.* (1) Manufacturers that achieve fleet average NO_X values from the calculation in § 86.1860–04(f), lower than the applicable fleet average NO_X standard, may generate credits for a given model year, in units of vehicle-g/mi NO_X, determined in this equation:

[(Fleet Average NO_X Standard) − (Manufacturer's Fleet Average NO_X Value)] × (Total number of Tier 2 LDV/Ts Sold, Including ZEVs and HEVs)

Where: The number of Tier 2 LDV/Ts sold is based on the point of first sale and does not include vehicles sold in California or a state that adopts, and has in effect for that model year, California emission requirements.

(2) Where the result of the calculation in paragraph (b)(1) of this section is a negative number, the manufacturer must generate negative NO_X credits (debits).

(c) *Early banking.* (1)(i) Manufacturers may certify LDV/LLDTs to the Tier 2 FTP exhaust standards in § 86.1811–04 for model years 2001–2003 in order to bank credits for use in the 2004 and later model years. Such vehicles must also meet SFTP exhaust emission standards specified in § 86.1811–04.

(ii) Manufacturers may certify HLDTs to the Tier 2 FTP exhaust standards in § 86.1811–04 for model years 2004–2007 in order to bank credits for use in the 2008 and later model years. Such vehicles must also meet SFTP exhaust emission standards specified in § 86.1811–04.

(iii) This process is referred to as ''early banking'' and the resultant credits are referred to as ''early credits''. In order to bank early credits, a manufacturer must comply with all exhaust emission standards and requirements applicable to Tier 2 LDV/LLDTs and/or HLDTs, as applicable, except as allowed under paragraph (c)(4) of this section.

(2) To generate early credits, a manufacturer must separately compute the sales weighted NO_X average of the LDV/LLDTs and HLDTs it certifies to the Tier 2 exhaust requirements and separately compute credits using the calculations in this section and in § 86.1860–04.

(3) Early HLDT credits may not be applied to LDV/LLDTs before the 2009 model year. Early LDV/LLDT credits may not be applied to HLDTs before the 2009 model year.

(4) Manufacturers may generate early Tier 2 credits from LDVs, LDT1s and LDT2s that are certified to a full useful life of 100,000 miles, provided that the credits are prorated by a multiplicative factor of 0.833 (the quotient of 100,000/120,000). Where a manufacturer has

both 100,000 and 120,000 mile full useful life vehicles for which it desires to bank early credits, it must compute the credits from each group of vehicles separately and then add them together.

(5) Manufacturers may bank early credits for later use to meet the Tier 2 corporate average NO_X standard or trade them to another manufacturer subject to the restriction in paragraph (c)(3) of this section.

(6) Early credits may not be used to comply with the corporate average NO_X standards for interim non-Tier 2 LDV/Ts.

(d) *Reporting and recordkeeping for Tier 2 NO_X* credits including early credits. Each manufacturer must comply with the reporting and recordkeeping requirements of § 86.1862–04.

(e) *Fleet average NO_X debits.* (1) Manufacturers must offset any debits for a given model year by the fleet average NO_X reporting deadline for the model year following the model year in which the debits were generated. Manufacturers may offset debits by generating credits or acquiring credits generated by another manufacturer.

(2)(i) Failure to meet the requirements of paragraphs (a) through (d) of this section within the required timeframe for offsetting debits will be considered to be a failure to satisfy the conditions upon which the certificate(s) was issued and the individual noncomplying LDV/Ts not covered by the certificate must be determined according to this section.

(ii) If debits are not offset within the specified time period, the number of LDV/Ts not meeting the fleet average NO_X standards and not covered by the certificate must be calculated by dividing the total amount of debits for the model year by the fleet average NO_X standard applicable for the model year in which the debits were first incurred.

(iii) EPA will determine the LDV/Ts for which the condition on the certificate was not satisfied by designating LDV/Ts in those engine families with the highest certification NO_X emission values first and continuing until a number of LDV/Ts equal to the calculated number of noncomplying LDV/Ts as determined above is reached. If this calculation determines that only a portion of LDV/Ts in an engine family contribute to the debit situation, then EPA will designate actual LDV/Ts in that engine family as not covered by the certificate, starting with the last vehicle produced and counting backwards.

(3) If a manufacturer ceases production of LDV/Ts or is purchased by, merges with or otherwise combines with another manufacturer, the manufacturer continues to be responsible for offsetting any debits outstanding within the required time period. Any failure to offset the debits will be considered to be a violation of paragraph (e)(1) of this section and may subject the manufacturer to an enforcement action for sale of LDV/Ts not covered by a certificate, pursuant to paragraph (e)(2) of this section.

(4) For purposes of calculating the statute of limitations, a violation of the requirements of paragraph (e)(1) of this section, a failure to satisfy the conditions upon which a certificate(s) was issued and hence a sale of LDV/Ts not covered by the certificate, all occur upon the expiration of the deadline for offsetting debits specified in paragraph (e)(1) of this section.

(f) *NO_X* credit transfers. (1) EPA may reject NO_X credit transfers if the involved manufacturers fail to submit the credit transfer notification in the annual report.

(2) A manufacturer may not sell credits that are not available for sale pursuant to the provisions in paragraphs (a)(2) and (a)(7) of this section.

(3) In the event of a negative credit balance resulting from a transaction, both the buyer and seller are liable, except in cases involving fraud. EPA may void *ab initio* the certificates of conformity of all engine families participating in such a trade.

(4)(i) If a manufacturer transfers a credit that it has not generated pursuant to paragraph (b) of this section or acquired from another party, the manufacturer will be considered to have generated a debit in the model year that the manufacturer transferred the credit. The manufacturer must offset such debits by the deadline for the annual report for that same model year.

(ii) Failure to offset the debits within the required time period will be considered a failure to satisfy the conditions upon which the certificate(s) was issued and will be addressed pursuant to paragraph (e) of this section.

(g) *Interim non-Tier 2 NO_X* credits and debits; Interim non-Tier 2 averaging, banking and trading. Interim non-Tier 2 NO_X credits must be generated, calculated, tracked, averaged, banked, traded, accounted for and reported upon separately from Tier 2 credits. The provisions of this section applicable to Tier 2 NO_X credits and debits and Tier 2 averaging banking and trading are applicable to interim non-Tier 2 LDV/Ts with the following exceptions:

(1) Provisions for early banking under paragraph (c) of this section do not apply.

(2) The fleet average NO_X standard used for calculating credits is 0.30 grams per mile for interim non-Tier 2 LDV/LLDTs and 0.20 g/mi for interim non-Tier 2 HLDTs. (The interim non-Tier 2 NO_X standard of 0.30 (or 0.20) g/mi replaces 0.07 in the text and calculation in this section.)

(3) Interim non-Tier 2 NO_X credit deficits may be carried forward for more than one year, except that all credit deficits must be reduced to zero for interim non-Tier 2 LDV/LLDTs by the end of the 2006 model year, and by the end of the 2008 model year for interim non-Tier 2 HLDTs.

42. Section 86.1862–04 is added to read as follows:

§ 86.1862–04 Maintenance of records and submittal of information relevant to compliance with fleet average NO_X standards.

(a) *Maintenance of records.* (1) The manufacturer producing any light-duty vehicles and/or light-duty trucks subject to the provisions in this subpart must establish, maintain, and retain the following information in adequately organized and indexed records for each model year:

(i) Model year;

(ii) Applicable fleet average NO_X standard: 0.07g/mi for Tier 2 LDV/Ts; 0.30 g/mi for interim non-Tier 2 LDV/LLDTs; or 0.20 g/mi for interim non-Tier 2 HLDTs;

(iii) Fleet average NO_X value achieved; and

(iv) All values used in calculating the fleet average NO_X value achieved.

(2) The manufacturer producing any LDV/Ts subject to the provisions in this subpart must establish, maintain, and retain the following information in adequately organized and indexed records for each LDV/T subject to this subpart:

(i) Model year;

(ii) Applicable fleet average NO_X standard;

(iii) EPA test group;

(iv) Assembly plant;

(v) Vehicle identification number;

(vi) NO_X standard to which the LDV/T is certified; and

(vii) Information on the point of first sale, including the purchaser, city, and state.

(3) The manufacturer must retain all records required to be maintained under this section for a period of eight years from the due date for the annual report. Records may be retained as hard copy or reduced to microfilm, ADP diskettes, and so forth, depending on the manufacturer's record retention procedure; provided, that in every case all information contained in the hard copy is retained.

(4) Nothing in this section limits the Administrator's discretion to require the

manufacturer to retain additional records or submit information not specifically required by this section.

(5) Pursuant to a request made by the Administrator, the manufacturer must submit to the Administrator the information that the manufacturer is required to retain.

(6) EPA may void *ab initio* a certificate of conformity for a LDV/T certified to emission standards as set forth or otherwise referenced in this subpart for which the manufacturer fails to retain the records required in this section or to provide such information to the Administrator upon request.

(b) *Reporting.* (1) Each covered manufacturer must submit an annual report. Except as provided in paragraph (b)(2) of this section, the annual report must contain, for each applicable fleet average NO_X standard, the fleet average NO_X value achieved, all values required to calculate the NO_X value, the number of credits generated or debits incurred, and all the values required to calculate the credits or debits. The annual report must contain the resulting balance of credits or debits.

(2) When a manufacturer calculates compliance with the fleet average NO_X standard using the provisions in § 86.1860–04(c)(2), then the annual report must state that the manufacturer has elected to use such provision and must contain the fleet average NO_X standard as the fleet average NO_X value for that model year.

(3) For each applicable fleet average NO_X standard, the annual report must also include documentation on all credit transactions the manufacturer has engaged in since those included in the last report. Information for each transaction must include:

(i) Name of credit provider;

(ii) Name of credit recipient;

(iii) Date the transfer occurred;

(iv) Quantity of credits transferred; and

(v) Model year in which the credits were earned.

(4) Unless a manufacturer reports the data required by this section in the annual production report required under § 86.1844–01(e) and subsequent model year provisions, a manufacturer must submit an annual report for each model year after production ends for all affected vehicles and trucks produced by the manufacturer subject to the provisions of this subpart and no later than May 1 of the calendar year following the given model year. Annual reports must be submitted to: Director, Vehicle Programs and Compliance Division, U.S. Environmental Protection Agency, 2000 Traverwood, Ann Arbor, Michigan 48105.

(5) Failure by a manufacturer to submit the annual report in the specified time period for all vehicles and trucks subject to the provisions in this section is a violation of section 203(a)(1) of the Clean Air Act for each subject vehicle and truck produced by that manufacturer.

(6) If EPA or the manufacturer determines that a reporting error occurred on an annual report previously submitted to EPA, the manufacturer's credit or debit calculations will be recalculated. EPA may void erroneous credits, unless transferred, and must adjust erroneous debits. In the case of transferred erroneous credits, EPA must adjust the manufacturer's credit or debit balance to reflect the sale of such credits and any resulting generation of debits.

(c) *Notice of opportunity for hearing.* Any voiding of the certificate under paragraph (a)(6) of this section will be made only after EPA has offered the manufacturer concerned an opportunity for a hearing conducted in accordance with § 86.614 for light-duty vehicles or § 86.1014 for light-duty trucks and, if a manufacturer requests such a hearing, will be made only after an initial decision by the Presiding Officer.

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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 80 and 86

[AMS–FRL–6337–4]

RIN 2060–AI32

Control of Diesel Fuel Quality

AGENCY: Environmental Protection Agency.

ACTION: Advance notice of proposed rulemaking.

SUMMARY: Diesel engines used in motor vehicles and nonroad equipment are a major source of nitrogen oxides and particulate matter, both of which contribute to serious health problems in the United States. We are considering setting new quality requirements for fuel used in diesel engines, in order to bring about large environmental benefits through the enabling of a new generation of diesel emission control technologies.

Because the pursuit of diesel fuel quality changes would be a major undertaking for the Agency and affected industries, and because of the many unresolved issues involved, we are publishing this advance notice to summarize the issues, with the goal of helping you to better inform us as we consider how to proceed. To aid this process, we have grouped key questions under issue topic headings that are numbered sequentially throughout this notice.

Although this advance notice solicits comment on all potentially beneficial diesel fuel quality changes, we believe that the most promising change would be fuel desulfurization for the purpose of enabling new engine and aftertreatment technologies that, although highly effective, are sensitive to sulfur.

DATES: You should submit written comments on this advance notice by June 28, 1999.

ADDRESSES: You may submit written comments in paper form and/or by E-mail. To ensure their consideration, all comments must be submitted to us by the date indicated under **DATES** above. Paper copies of comments should be submitted (in duplicate if possible) to Public Docket No. A–99–06 at the following address: U.S. Environmental Protection Agency, Air Docket Section, Room M–1500, 401 M Street, SW, Washington, DC 20460. We request that you also send a separate copy to the contact person listed below. Those submitting a paper copy of their comments are also encouraged to submit an electronic copy (in ASCII format) by E-mail to ''A-and-R-Docket@epa.gov'', or on a 3.5 inch diskette. You may also submit comments by E-mail to the docket at the address listed above (with a copy to the contact person listed below) without the submission of a paper copy. However, we encourage you to send a paper copy as well to ensure the clarity of your submission.

Materials related to this rulemaking are available for review at EPA's Air Docket at the above address (on the ground floor in Waterside Mall) from 8:00 a.m. to 5:30 p.m., Monday through Friday, except on government holidays. The telephone number for EPA's Air Docket is (202) 260–7548, and the facsimile number is (202) 260–4400. A reasonable fee may be charged by EPA for copying docket materials, as provided in 40 CFR part 2.

FOR FURTHER INFORMATION CONTACT: Carol Connell, U.S. EPA, National Vehicle and Fuels Emission Laboratory, 2000 Traverwood, Ann Arbor, MI 48105; Telephone (734) 214–4349, FAX (734) 214–4050, E-mail connell.carol@epa.gov.

SUPPLEMENTARY INFORMATION:

I. Why Is EPA Considering Diesel Fuel Changes?

II. Diesel Engines and Air Quality