The Administrator signed the following rule on February 9, 2007, and we are submitting it for publication in the *Federal Register*. While we've taken steps to ensure the accuracy of this Internet version of the rule, it's not the official version of the rule for purposes of compliance. Please refer to the official version in a forthcoming *Federal Register* publication or on GPO's Web Site. You can access the *Federal Register* at: www.gpoaccess.gov/fr/index.html. When using this site, note that "text" files may be incomplete because they don't include graphics. Instead, select "Adobe Portable Document File" (PDF) files.

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Parts 59, 80, 85 and 86**

**[EPA-HQ-OAR-2005-0036; FRL-]**

**RIN 2060-AK70**

# Control of Hazardous Air Pollutants from Mobile Sources

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** EPA is adopting controls on gasoline, passenger vehicles, and portable fuel containers (primarily gas cans) that will significantly reduce emissions of benzene and other hazardous air pollutants ("mobile source air toxics"). Benzene is a

known human carcinogen, and mobile sources are responsible for the majority of benzene emissions. The other mobile source air toxics are known or suspected to cause cancer or other serious health effects. We are limiting the benzene content of gasoline to an annual refinery average of 0.62% by volume, beginning in 2011. In addition for gasoline, we are establishing a maximum average standard for refineries of 1.3% by volume beginning on July 1, 2012, which acts as an upper limit on gasoline benzene content when credits are used to meet the 0.62 volume % standard. We are also limiting exhaust emissions of hydrocarbons from passenger vehicles when they are operated at cold temperatures. This standard will be phased in from 2010 to 2015. For passenger vehicles we are also adopting evaporative emissions standards that are equivalent to those currently in effect in California. Finally, we are adopting a hydrocarbon emissions standard for portable fuel containers beginning in 2009, which will reduce evaporation and spillage of gasoline from these containers. These controls will significantly reduce emissions of benzene and other mobile source air toxics such as 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, and naphthalene. There will be additional substantial benefits to public health and welfare because of significant reductions in emissions of particulate matter from passenger vehicles.

**DATES:** This rule is effective on [insert date], 60 days after publication in the FEDERAL REGISTER.

**ADDRESSES:** EPA has established a docket for this action under Docket ID No. **EPA-HQ-2005-0036.** All documents in the docket are listed on the www.regulations.gov web

site. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through www.regulations.gov or in hard copy at the Air Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air Docket is (202) 566-1742.

**FOR FURTHER INFORMATION CONTACT:** Mr. Chris Lieske, U.S. EPA, Office of Transportation and Air Quality, Assessment and Standards Division **(**ASD), Environmental Protection Agency, 2000 Traverwood Drive, Ann Arbor, MI 48105; telephone number: (734) 214-4584; fax number: (734)214-4816; email address: lieske.christopher@epa.gov, or Assessment and Standards Division Hotline; telephone number: (734) 214-4636; e-mail address: asdinfo@epa.gov.

**SUPPLEMENTARY INFORMATION:**

**Does this Action Apply to Me?**

Entities potentially affected by this action are those that produce new motor vehicles, alter individual imported motor vehicles to address U.S. regulation, or convert

motor vehicles to use alternative fuels. It will also affect you if you produce gasoline motor fuel or manufacture portable gasoline containers. Regulated categories include:

| Category | NAICS Codes[a] | SIC Codes[b] | Examples of potentially affected entities |
|---|---|---|---|
| Industry…….. | 336111 | 3711 | Motor vehicle manufacturers |
| Industry…….. | 335312 | 3621 | Alternative fuel vehicle converters |
| | 424720 | 5172 | |
| | 811198 | 7539 | |
| | | 7549 | |
| Industry…….. | 811111 | 7538 | Independent commercial importers |
| | 811112 | 7533 | |
| | 811198 | 7549 | |
| Industry…….. | 324110 | 2911 | Gasoline fuel refiners |
| Industry…….. | 326199 | 3089 | Portable fuel container |
| | 332431 | 3411 | manufacturers |

[a]North American Industry Classification System (NAICS).

[b]Standard Industrial Classification (SIC) system code.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of

entities not listed in the table could also be regulated. To determine whether your activities are regulated by this action, you should carefully examine the applicability criteria in 40 CFR parts 59, 80, 85, and 86. If you have any questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

**Outline of This Preamble**


I. Summary

II. Overview of Final Rule

A. Light-Duty Vehicle Emission Standards

B. Gasoline Fuel Standards

C. Portable Fuel Container (PFC) Controls

III. Why Is EPA Taking This Action?

A. Statutory Requirements

1. Clean Air Act Section 202(l)

2. Clean Air Act Section 183(e)

3. Energy Policy Act

B. Public Health Impacts of Mobile Source Air Toxics (MSATs)

1. What Are MSATs?

2. Health Risk Associated With MSATs

a. National Cancer Risk

b. National Risk of Noncancer Health Effects

c. Exposure Near Roads

d. Exposure From Attached Garages

3. What Are the Health Effects of Air Toxics?

a. Overview of Potential Cancer and Noncancer Health Effects

b. Health Effects of Key MSATs

i. Benzene

ii. 1,3-Butadiene

iii. Formaldehyde

iv. Acetaldehyde

v. Acrolein

vi. Polycyclic Organic Matter (POM)

vii. Naphthalene

viii. Diesel Exhaust

c. Gasoline PM

d. Near-Roadway Health Effects

C. Ozone

1. Background

2. Health Effects of Ozone

3. Plant and Ecosystem Effects of Ozone

4. Current and Projected 8-hour Ozone Levels

D. Particulate Matter

1. Background

2. Health Effects of PM

3. Welfare Effects of PM

a. Visibility

i. Background

ii Current Visibility Impairment

iii. Future Visibility Impairment

b. Atmospheric Deposition

c. Materials Damage and Soiling

4. Current and Projected $PM_{2.5}$ Levels

5. Current $PM_{10}$ Levels

IV. What Are the Emissions, Air Quality, and Public Health Impacts of This Rule?

A. Emissions Impacts of All Rule Provisions Combined

1. How Will MSAT Emissions Be Reduced?

2. How Will VOC Emissions Be Reduced?

3. How Will PM Emissions Be Reduced?

B. Emission Impacts By Provision

1. Vehicle Controls

a. Volatile Organic Compounds (VOC)

b. Toxics

c. $PM_{2.5}$

2. Fuel Benzene Standard

3. PFC Standards

a. VOC

b. Toxics

C. What Are the Air Quality, Exposure, and Public Health Impacts of This Rule?

1. Mobile Source Air Toxics

2. Ozone

3. PM

D. What Other Mobile Source Emissions Control Programs Reduce MSATs?

1. Fuels Programs

a. Gasoline Sulfur

b. Gasoline Volatility

c. Diesel Fuel

d. Phase-Out of Lead in Gasoline

2. Highway Vehicle and Engine Programs

3. Nonroad Engine Programs

4. Voluntary Programs

5. Additional Programs Under Development That Will Reduce MSATs

a. On-Board Diagnostics for Heavy-Duty Vehicles Over 14,000 Pounds

b. Standards for Small Nonroad Spark-Ignition Engines

c. Standards for Locomotive and Marine Diesel Engines

E. How Do These Mobile Source Programs Satisfy the Requirements of Clean Air Act Section 202(l)?

V. New Light-duty Vehicle Standards

A. Introduction

B. What Cold Temperature Requirements Are We Adopting?

1. Why Are We Adopting a New Cold Temperature NMHC Standard?

2. What are the New NMHC Exhaust Emissions Standards?

3. Feasibility of the Cold Temperature NMHC Standards

a. Currently Available Emission Control Technologies

b. Feasibility Considering Current Certification Levels, Deterioration and Compliance Margin

c. Feasibility and Test Programs

4. Standards Timing and Phase-In

a. Phase-In Schedule

b. Alternative Phase-In Schedules

5. Certification Levels

6. Credit Program

a. How Credits Are Calculated

b. Credits Earned Prior to Primary Phase-In Schedule

c. How Credits Can Be Used

d. Discounting and Unlimited Life

e. Deficits Can Be Carried Forward

f. Voluntary Heavy-Duty Vehicle Credit Program

7. Additional Vehicle Cold Temperature Standard Provisions

a. Applicability

b. Useful Life

c. High Altitude

d. In-Use Standards for Vehicles Produced During Phase-In

8. Monitoring and Enforcement

C. What Evaporative Emissions Standards Are We Finalizing?

1. Current Controls and Feasibility of the New Standards

2. Evaporative Standards Timing

3. Timing for Flex Fuel Vehicles

4. In-Use Evaporative Emission Standards

5. Existing Differences Between California and Federal Evaporative Emission Test Procedures

D. Additional Exhaust Control Under Normal Conditions

E. Vehicle Provisions for Small Volume Manufacturers

1. Lead Time Transition Provisions

2. Hardship Provisions

3. Special Provisions for Independent Commercial Importers (ICIs)

VI. Gasoline Benzene Control Program

A. Description of and Rationale for the Gasoline Benzene Control Program

1. Gasoline Benzene Content Standard

a. Description of the Average Benzene Content Standard

b. Why Are We Finalizing a Benzene Content Standard?

i. Standards That Would Include Toxics Other Than Benzene

ii. Control of Gasoline Sulfur and/or Volatility for MSAT Reduction

iii. Diesel Fuel Changes

c. Why Are We Finalizing a Level of 0.62 vol% for the Average Benzene Standard?

i. General Technological Feasibility of Benzene Control

ii. Appropriateness of the 0.62 vol% Average Benzene Content Standard

iii. Timing of the Average Standard

d. Upper Limit Benzene Standard

2. Description of the Averaging, Banking, and Trading (ABT) Program

a. Overview

b. Credit Generation

i. Eligibility

ii. Early Credit Generation

iii. Standard Credit Generation

c. Credit Use

i. Early Credit Life

ii. Standard Credit Life

iii. Consideration of Unlimited Credit Life

iv. Credit Trading Provisions

3. Provisions for Small Refiners and Refiners Facing Hardship Situations

a. Provisions for Small Refiners

i. Definition of Small Refiner for Purposes of the MSAT2 Small Refiner Provisions

ii. Small Refiner Status Application Requirements

iii. Small Refiner Provisions

iv. The Effect of Financial and Other Transactions on Small Refiner Status and Small Refiner Relief Provisions

b. Provisions for Refiners Facing Hardship Situations

i. Temporary Waivers Based on Extreme Hardship Circumstances

ii. Temporary Waivers Based on Unforeseen Circumstances

c. Option for Early Compliance in Certain Circumstances

B. How will the Gasoline Benzene Standard Be Implemented?

1. General Provisions

2. Small Refiner Status Application Requirements

3. Administrative and Enforcement Provisions

a. Sampling/Testing

b. Recordkeeping/Reporting

C. How Will the Program Relate to Other Fuel-Related Toxics Programs?

D. How Does This Program Satisfy the Statutory Requirements of Clean Air Act Section 202(l)(2)?

VII. Portable Fuel Containers

A. What Are the New HC Emissions Standards For PFCs?

1. Description of Emissions Standard

2. Determination of Best Available Control

3. Diesel, Kerosene and Utility Containers

4. Automatic Shut-Off

B. Timing of Standard

C. What Test Procedures Would Be Used?

1. Diurnal Test

2. Preconditioning to Ensure Durable In-Use Control

a. Durability cycles

b. Preconditioning Fuel Soak

c. Spout Actuation

D. What Certification and In-Use Compliance Provisions Is EPA Adopting?

1. Certification

2. Emissions Warranty and In-Use Compliance

3. Labeling

E. How Would State Programs Be Affected By EPA Standards?

F. Provisions for Small PFC Manufacturers

1. First Type of Hardship Provision

2. Second Type of Hardship Provision

VIII. What Are the Estimated Impacts of the Rule?

A. Refinery Costs of Gasoline Benzene Reduction

1. Methodology

a. Overview of the Benzene Program Cost Methodology

b. Changes to the Cost Estimation Methodology Used in the Proposed Rule

c. Linear Programming Cost Model

d. Refinery-by-Refinery Cost Model

e. Price of Chemical Grade Benzene

2. Summary of Costs

a. Nationwide Costs of the Final Benzene Control Program

b. Regional Costs

c. Refining Industry Cost Study

B. What Are the Vehicle Cost Impacts?

C. What Are The PFC Cost Impacts?

D. Cost Per Ton of Emissions Reduced

E. Benefits

1. Unquantified Health and Environmental Benefits

2. Quantified Human Health and Environmental Effects of the Final Cold Temperature Vehicle Standard

3. Monetized Benefits

4. What Are the Significant Limitations of the Benefit Analysis?

5. How Do the Benefits Compare to the Costs of The Final Standards?

F. Economic Impact Analysis

1. What Is an Economic Impact Analysis?

2. What Is the Economic Impact Model?

3. What Economic Sectors Are Included in this Economic Impact Analysis?

4. What Are the Key Features of the Economic Impact Model?

5. What Are the Key Model Inputs?

6. What Are the Results of the Economic Impact Modeling?

IX. Public Participation

X. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

B. Paperwork Reduction Act

C. Regulatory Flexibility Act (RFA), as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 USC 601 et seq.

1. Overview

2. The Need For and Objectives of This Rule

3. Summary of the Significant Issues Raised By the Public Comments

4. Summary of Regulated Small Entities

a. Highway Light-Duty Vehicles

b. Gasoline Refiners

c. Portable Fuel Container Manufacturers

5. Description of the Reporting, Recordkeeping, and Other Compliance Requirements of the Rule

6. Relevant Federal Rules

7. Steps Taken to Minimize the Significant Economic Impact on Small Entities

a. Significant Panel Findings

b. Outreach With Small Entities (and the Panel Process)

c. Small Business Flexibilities

i. Highway Light-Duty Vehicles

ii. Gasoline Refiners

iii. Portable Fuel Containers

D. Unfunded Mandates Reform Act

E. Executive Order 13132: Federalism

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

G. Executive Order 13045: Protection of Children from Environmental Health and Safety Risks

H. Executive Order 13211: Actions that Significantly Affect Energy Supply, Distribution, or Use

I. National Technology Transfer Advancement Act

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

K. Congressional Review Act

XI. Statutory Provisions and Legal Authority

## I. Summary

Mobile sources emit air toxics (also known as "hazardous air pollutants") that can cause cancer and other serious health effects. Mobile sources contribute significantly to the nationwide risk from breathing outdoor sources of air toxics. Mobile sources were responsible for about 44% of outdoor toxic emissions, almost 50% of the cancer risk, and 74% of the noncancer risk according to EPA's National-Scale Air Toxics Assessment (NATA) for 1999. In addition, people who live or work near major roads or live in homes with attached garages are likely to have higher exposures and risk, which are not reflected in NATA.

According to NATA for 1999, there are a few mobile source air toxics that pose the greatest risk based on current information about ambient levels and exposure. These include benzene, 1,3-butadiene, formaldehyde, acrolein, naphthalene, and polycyclic organic matter (POM). All of these compounds are gas-phase hydrocarbons except POM, which appears in the gas and particle phases. Benzene is the most significant contributor to cancer risk from all outdoor air toxics, according to NATA for 1999. NATA does not include a quantitative estimate of cancer risk for diesel exhaust, but it concludes that diesel exhaust is a mixture of pollutants that collectively poses one of the greatest relative cancer risks when compared with the other individual pollutants assessed. Although we expect significant reductions in mobile source air toxics in the future, cancer and noncancer health risks will remain a public health concern, and exposure to benzene will remain the largest contributor to this risk.

In this rule, we are finalizing standards for passenger vehicles, gasoline, and portable fuel containers (typically gas cans). Specifically, we are finalizing standards for:

- exhaust hydrocarbon emissions from passenger vehicles during cold temperature operation;
- evaporative hydrocarbon emissions from passenger vehicles;
- the benzene content of gasoline; and
- hydrocarbon emissions from portable fuel containers that would reduce evaporation, permeation, and spillage from these containers.

These standards will significantly reduce emissions of the many air toxics that are hydrocarbons, including benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, and naphthalene. The fuel benzene standards and hydrocarbon standards for vehicles and portable fuel containers will together reduce total emissions of air toxics by 330,000 tons in 2030, including 61,000 tons of benzene. As a result of this final rule, in 2030 passenger vehicles will emit 45% less benzene, gas cans will emit almost 80% less benzene, and gasoline will have 38% less benzene overall. Mobile sources were responsible for over 70% of benzene emissions in 1999.

The reductions in mobile source air toxics emissions will reduce exposure and predicted risk of cancer and noncancer health effects, including in environments where exposure and risk may be highest, such as near roads, in vehicles, and in homes with attached garages. Nationwide, the cancer risk attributable to total MSATs emitted by all mobile sources will be reduced by 30%, and the risk from mobile source benzene will be reduced by 37%. At 2030 exposure levels, the highway vehicle contribution to MSAT cancer risk will be reduced on average 36% across the U.S., and the highway vehicle contribution to benzene cancer risk will be reduced on average by 43% across the U.S. Nationwide, the mobile source contribution to the respiratory hazard index will be reduced by 23%. In addition, the hydrocarbon reductions from the vehicle and gas can standards will reduce VOC emissions (which are precursors to ozone and $PM_{2.5}$) by over 1.1 million tons in 2030. The vehicle standards will reduce direct $PM_{2.5}$ emissions by over 19,000 tons in 2030 and will also reduce secondary formation of $PM_{2.5}$. Although

ozone and $PM_{2.5}$ are considered criteria pollutants rather than "air toxics," reductions in ozone and $PM_{2.5}$ are nevertheless important co-benefits of this proposal.

Section I.B.2 of this preamble provides more discussion of the public health and environmental impacts of mobile source air toxics, ozone, and PM. Details on health effects, emissions, exposure, and cancer risks are also located in Chapters 1-3 of the Regulatory Impact Analysis (RIA) for this rule.

We estimate that the benefits of this rule will be about $6 billion in 2030, based on the direct $PM_{2.5}$ reductions from the vehicle standards, plus unquantified benefits from reductions in mobile source air toxics and VOC. We estimate that the annual net social costs of this rule will be about $400 million in 2030 (expressed in 2003 dollars). These net social costs include the value of fuel savings from the proposed gas can standards, which will be worth about $92 million in 2030.

The rule will have an average cost of 0.27 cents per gallon of gasoline, less than $1 per vehicle, and less than $2 per gas can. The reduced evaporation from gas cans will result in fuel savings that will more than offset the increased cost for the gas can. In 2030, the long-term cost per ton of the standards (in combination, and including fuel savings) will be $1,100 per ton of total mobile source air toxics reduced; $5,900 per ton of benzene reduced; and no cost for the hydrocarbon and PM reductions (because we expect the vehicle standards will have no cost in 2020 and beyond). Section VIII of the preamble and Chapters 8-13 of the RIA provide more details on the costs, benefits, and

economic impacts of the standards. The impacts on small entities and the flexibilities we are finalizing are discussed in section X of this preamble and Chapter 14 of the RIA.

## II. Overview of Final Rule

### A. Light-Duty Vehicle Emission Standards

As described in more detail in section V, we are adopting new standards for both exhaust and evaporative emissions from passenger vehicles. The new exhaust emissions standards will significantly reduce non-methane hydrocarbon (NMHC) emissions from passenger vehicles at cold temperatures. These hydrocarbons include many mobile source air toxics (including benzene), as well as VOC.

As we discussed in the proposal, current vehicle emission standards are based on testing of NMHC that is generally performed at 75˚ F. Recent research and analysis indicates that these standards are not resulting in robust control of NMHC at lower temperatures. We believe that cold temperature NMHC control can be substantially improved using the same technological approaches that are generally already being used in the Tier 2 vehicle fleet to meet the stringent standards at 75˚ F. These cold-temperature NMHC controls will also result in lower direct PM emissions at cold temperatures.

Accordingly, consistent with the proposal, we are adopting a new NMHC exhaust emissions standard at 20˚ F for light-duty vehicles, light-duty trucks, and medium-duty

passenger vehicles. Vehicles at or below 6,000 pounds gross vehicle weight rating (GVWR) will be subject to a sales-weighted fleet average NMHC level of 0.3 grams/mile. Vehicles between 6,000 and 8,500 pounds GVWR and medium-duty passenger vehicles will be subject to a sales-weighted fleet average NMHC level of 0.5 grams/mile. For lighter vehicles, the standard will phase in between 2010 and 2013. For heavier vehicles, the new standards will phase in between 2012 and 2015. The standards include a credit program and other provisions designed to provide flexibility to manufacturers, especially during the phase-in periods. These provisions are designed to allow the earliest possible phase-in of standards and help minimize costs and ease the transition to new standards. These standards in combination are expected to lead to emissions control over a wide range of in-use temperatures, and not just at 20°F and 75°F.

We are also establishing, as proposed, a set of nominally more stringent evaporative emission standards for all light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles. The standards are equivalent to California's Low Emission Vehicle II (LEV II) standards, and they reflect the evaporative emissions levels that are already being achieved nationwide. The standards codify the approach that most manufacturers are already taking for 50-state evaporative systems, and thus prevent backsliding in the future. The evaporative emission standards will take effect in 2009 for lighter vehicles and in 2010 for the heavier vehicles.

Section V of this preamble provides details on the exhaust and evaporative

vehicle standards.

B. Gasoline Fuel Standards

As we proposed, we are limiting the benzene content of all gasoline, both reformulated and conventional. Beginning January 1, 2011, refiners must meet a refinery average gasoline benzene content standard of 0.62% by volume on all their gasoline. The program is described in more detail in section VI of this preamble. The standard does not apply to gasoline produced and/or sold for use in California because such gasoline is already covered under California's Phase 3 Reformulated Gasoline (Ca3RFG) program.

The benzene content standard, in combination with the existing gasoline sulfur standard, will result in air toxics emissions reductions that are greater than required under all existing gasoline toxics programs. As a result, upon full implementation in 2011, the regulatory provisions for the benzene control program will become the regulatory mechanism used to implement the reformulated gasoline (RFG) and Anti-dumping annual average toxics performance and benzene content requirements. The current RFG and Anti-dumping annual average provisions thus will be replaced by this benzene control program. This benzene control program will also replace the requirements of the 2001 MSAT rule ("MSAT1"). In addition, the program will satisfy certain fuel MSAT conditions of the Energy Policy Act of 2005 and obviate the need to revise toxics baselines for reformulated gasoline otherwise required by that Act. In all of these ways, the existing national fuel-related MSAT regulatory program will be significantly

consolidated and simplified.

We are finalizing a nationwide ABT program that allows refiners and importers to choose the most economical compliance strategy (investment in technology, credits, or both) for meeting the 0.62 vol% annual average standard. From 2007-2010, refiners can generate "early credits" by making qualifying benzene reductions earlier than required. Beginning in 2011 and continuing indefinitely, refiners and importers can generate "standard credits" by producing/importing gasoline with benzene levels below 0.62 volume percent (vol%) on an annual average basis. Credits may be used interchangeably towards company compliance with the 0.62 vol% standard, "banked" for future use, and/or transferred nationwide to other refiners/importers subject to the standard. In addition to the 0.62 vol% standard, refiners and importers must also meet a 1.3 vol% maximum average benzene standard beginning July 1, 2012. To comply with the maximum average standard, gasoline produced by a refinery or imported by an importer may not exceed 1.3 vol% benzene on an annual average basis.

The ABT program allows us to set a numerically more stringent benzene standard than would otherwise be achievable (within the meaning of Clean Air Act section 202(l)(2)). The ABT program also allows implementation to occur earlier. Under this benzene content standard and ABT program, gasoline in all areas of the country will have lower benzene levels than they have today. Overall benzene levels will be 38% lower. This will reduce benzene emissions and exposure nationwide.

The program includes special provisions for refiners facing hardship. Refiners approved as “small refiners” are eligible for certain temporary relief provisions. In addition, any refiner facing extreme unforeseen circumstances or extreme hardship circumstances can apply for similar temporary relief.

C. Portable Fuel Container (PFC) Controls

Portable fuel containers, such as gas cans and diesel and kerosene containers, are consumer products used to refuel a wide variety of equipment, including lawn and garden equipment, recreational equipment, and passenger vehicles that have run out of gas. As described in section VII, we are adopting standards for these containers that would reduce hydrocarbon emissions from evaporation, permeation, and spillage. The program we are finalizing is consistent with the proposal, except that instead of applying only to gasoline containers, it will also apply to diesel and kerosene containers. These standards will significantly reduce emissions of benzene and other gaseous toxics, as well as VOC. VOC is an ozone precursor, and certain aromatic species are believed to contribute to secondary organic $PM_{2.5}$.

We are finalizing a performance-based standard of 0.3 grams per gallon per day of hydrocarbons, determined based on the emissions from the can over a diurnal test cycle specified in the rule. The standard applies to containers manufactured on or after January 1, 2009. We are also establishing test procedures and a certification and compliance program, in order to ensure that containers meet the emission standard over a

range of in-use conditions. The standards are based on the performance of best available control technologies, such as durable permeation barriers, automatically closing spouts, and cans that are well-sealed, and the standards will result in the use of these control technologies.

California implemented an emissions control program for gas cans in 2001, and since then, several other states have adopted the program. Last year, California adopted a revised program, which will take effect July 1, 2007. The revised California program is very similar to the program we are finalizing. Although a few aspects of the programs are different, we believe manufacturers will be able to meet both EPA and California requirements with the same container designs, resulting in equivalent emission reductions.

## III. Why Is EPA Taking This Action?

People experience elevated risk of cancer and other noncancer health effects from exposure to air toxics. Mobile sources are responsible for a significant portion of this risk. For example, benzene is the most significant contributor to cancer risk from all outdoor air toxics[1], and most of the nation's benzene emissions come from mobile sources. These risks vary depending on where people live and work and the kinds of activities in which they engage. People who live or work near major roads, people that spend a large amount of time in vehicles or work with motorized equipment, and people

[1]Based on quantitative estimates of risk, which do not include risks associated with diesel particulate matter and diesel exhaust organic gases.

living in homes with attached garages are likely to have higher exposures and higher risks. Although we expect significant reductions in mobile source air toxics in the future, predicted cancer and noncancer health risks are likely to remain a public health concern. Benzene will likely remain the largest contributor to this risk. In addition, some mobile source air toxics contribute to the formation of ozone and $PM_{2.5}$, which contribute to serious public health problems. Section III.B of this preamble discusses the risks posed by outdoor toxics now and in the future. Sections III.C and III.D discuss the health and welfare effects of ozone and PM, respectively. The controls in this rule will significantly reduce exposure to emissions of mobile source air toxics (and reduce exposure to ozone and $PM_{2.5}$ as well), thus reducing these public health concerns.

## A. Statutory Requirements

### 1. Clean Air Act Section 202(l)

Section 202(l)(2) of the Clean Air Act requires EPA to set standards to control hazardous air pollutants ("air toxics") from motor vehicles[2], motor vehicle fuels, or both. These standards must reflect the greatest degree of emission reduction achievable through the application of technology which will be available, taking into consideration the motor vehicle standards established under section 202(a) of the Act, the availability and cost of the technology, and noise, energy and safety factors, and lead time. The standards are to be set under Clean Air Act sections 202(a)(1) or 211(c)(1), and they are to apply, at a

[2] "Motor vehicles" is a term of art, defined in Clean Air Act section 216(2) as "any self-propelled vehicle designed for transporting persons or property on a street or highway."

minimum, to benzene and formaldehyde emissions.

Section 202(a)(1) of the Clean Air Act directs EPA to set standards for new motor vehicles or new motor vehicle engines which EPA judges to cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare. We are issuing the vehicle emissions standards under this authority in conjunction with section 202(l)(2).

Section 211(c)(1)(A) of the Clean Air Act authorizes EPA (among other things) to control the manufacture of fuel if any emission product of such fuel causes or contributes to air pollution which may reasonably be anticipated to endanger public health or welfare. We are issuing the benzene standard for gasoline under this authority in conjunction with section 202(l)(2).

Clean Air Act section 202(l)(2) also requires EPA to revise its regulations controlling hazardous air pollutants from motor vehicles and fuels, "from time to time." EPA's first rule under Clean Air Act section 202(l) was published on March 29, 2001, entitled, "Control of Emissions of Hazardous Air Pollutants from Mobile Sources" (66 FR 17230). That rule committed to additional rulemaking that would evaluate the need for and feasibility of additional controls. Today's final rule fulfills that commitment.

2. Clean Air Act Section 183(e)

Clean Air Act section 183(e)(3) requires EPA to list categories of consumer or commercial products that the Administrator determines, based on an EPA study of VOC emissions from such products, contribute at least 80 percent of the VOC emissions from such products in areas violating the national ambient air quality standard for ozone. EPA promulgated this list at 60 FR 15264 (March 23, 1995), but it did not consider or list portable fuel containers. After analyzing these containers' emissions inventory impacts, we recently published a Federal Register notice that added portable fuel containers to the list of consumer products to be regulated.[3] EPA is required to develop rules reflecting "best available controls" to reduce VOC emissions from the listed products. "Best available controls" are defined in section 183(e)(1)(A) as follows:

> The term "best available controls" means the degree of emissions reduction that the Administrator determines, on the basis of technological and economic feasibility, health, environmental, and energy impacts, is achievable through the application of the most effective equipment, measures, processes, methods, systems, or techniques, including chemical reformulation, product or feedstock substitution, repackaging, and directions for use, consumption, storage, or disposal.

Section 183(e)(4) also allows these standards to be implemented by means of "any system or systems of regulation as the Administrator may deem appropriate, including requirements for registration and labeling, self-monitoring and reporting…concerning the manufacture, processing, distribution, use, consumption, or disposal of the product." We

[3] 71 FR 28320, May 16, 2006, "Consumer and Commercial Products: Schedule for Regulation"

are issuing a hydrocarbon standard for portable fuel containers under the authority of section 183(e).

### 3. Energy Policy Act

Section 1504(b) of the Energy Policy Act of 2005 requires EPA to adjust the toxics emissions baselines for individual refineries for reformulated gasoline to reflect 2001-2002 fuel qualities. However, the Act provides that this action becomes unnecessary if EPA takes action which results in greater overall reductions of toxics emissions from vehicles in areas with reformulated gasoline. As described in section VI of this preamble, we believe the benzene content standard we are finalizing today will in fact result in greater overall reductions than would be achieved by adjusting the individual baselines under the Energy Policy Act. Accordingly, under the provisions of the Energy Policy Act, this rule obviates the need for readjusting emissions baselines for reformulated gasoline.

## B. Public Health Impacts of Mobile Source Air Toxics (MSATs)

### 1. What Are MSATs?

Section 202(l) refers to “hazardous air pollutants from motor vehicles and motor vehicle fuels.” We use the term “mobile source air toxics (MSATs)” to refer to compounds that are emitted by mobile sources and have the potential for serious adverse

health effects. Some MSATs are known or suspected to cause cancer. Some of these pollutants are also known to have adverse health effects on people's respiratory, cardiovascular, neurological, immune, reproductive, or other organ systems, and they may also have developmental effects. Some may pose particular hazards to more susceptible and sensitive populations, such as pregnant women, children, the elderly, or people with pre-existing illnesses.

Some MSATs of particular concern include benzene, 1,3-butadiene, formaldehyde, acrolein, naphthalene, polycyclic organic matter, and diesel particulate matter and diesel exhaust organic gases. These are compounds that EPA's National-Scale Air Toxics Assessment (NATA) for 1999[4] identifies as the most significant contributors to cancer and noncancer health risk from breathing outdoor air toxics, and that have a significant contribution from mobile sources. Our understanding of what compounds pose the greatest risk will evolve over time, based on our understanding of the ambient levels and health effects associated with the compounds.

EPA has compiled a Master List of Compounds Emitted by Mobile Sources, based on an extensive review of the literature on exhaust and evaporative emissions from onroad and nonroad equipment. The list currently includes approximately 1,000 compounds, and it is available in the public docket for this rule and on the web (www.epa.gov/otaq/toxics.htm). Chapter 1 of the RIA provides a detailed discussion of information sources for identifying those compounds that have the potential for serious adverse health effects (i.e., could be considered "MSATs"). This discussion includes a

[4] http://www.epa.gov/ttn/atw/nata1999/

list of those compounds that are emitted by mobile sources and listed in EPA's Integrated Risk Information System (IRIS).

MSATs are emitted by motor vehicles, nonroad engines (such as lawn and garden equipment, farming and construction equipment, locomotives, and ships), aircraft, and their fuels. MSATs are emitted as a result of various processes. Some MSATs are present in fuel or fuel additives and are emitted to the air when the fuel evaporates or passes through the engine. Some MSATs are formed through engine combustion processes. Some compounds, like formaldehyde and acetaldehyde, are also formed through a secondary process when other mobile source pollutants undergo chemical reactions in the atmosphere. Finally, some air toxics, such as metals, result from engine wear or from impurities in oil or fuel.

There are other sources of air toxics, including stationary sources such as power plants, factories, oil refineries, dry cleaners, gas stations, and small manufacturers. They can also be produced by combustion of wood and other organic materials. There are also indoor sources of air toxics, such as solvent evaporation and outgassing from furniture and building materials.

2. Health Risk Associated With MSATs

EPA's National-Scale Air Toxics Assessment (NATA) for 1999 provides some perspective on the average risk of cancer and noncancer health effects associated with

breathing air toxics from outdoor sources, and the contribution of mobile sources to these risks.[5,6] NATA assessed 177 pollutants. It is worth noting that NATA does not include indoor sources of air toxics. Also, it assumes uniform outdoor concentrations within a census tract, and therefore does not reflect elevated concentrations and exposures near roadways or other sources within a census tract. Additional limitations and uncertainties associated with NATA are discussed in Section 3.2.1.3 of the RIA. Nevertheless, its findings are useful in providing a perspective on the magnitude of risks posed by outdoor sources of air toxics generally, and in identifying what pollutants and sources are important contributors to these health risks. Some of NATA's findings are discussed in the paragraphs below.

For this rule, EPA also performed a national-scale assessment for 1999 and future years using the same modeling tools and approach as the 1999 NATA, but with updated emissions inventories and an updated exposure model. The exposure model accounts for higher toxics concentrations near roads. This updated national-scale analysis examined only those toxics that are emitted by mobile sources (i.e., a subset of the 177 pollutants included in NATA). However, the analysis includes all sources of those pollutants, including mobile, stationary, and area sources. The analysis is discussed in detail in Chapter 3 of the RIA, and some highlights of the findings are discussed immediately below.

[5] http://www.epa.gov/ttn/atw/nata1999/

[6] NATA does not include a quantitative estimate of cancer risk for diesel particulate matter and diesel exhaust organic gases. EPA has concluded that while diesel exhaust is likely to be a human carcinogen, available data are not sufficient to develop a confident estimate of cancer unit risk.

In addition to national-scale analysis, we have also evaluated more refined local-scale modeling, measured ambient concentrations, personal exposure measurements, and other data. This information is discussed in detail in Chapter 3 of the RIA. These data collectively show that while levels of air toxics are decreasing, potential public health risks remain a concern, and ambient levels and personal exposure vary significantly. These data indicate that concentrations of benzene and other air toxics can be higher near high-traffic roads, inside vehicles, and in homes with attached garages.

a. National Cancer Risk

According to NATA, the average national cancer risk in 1999 from all outdoor sources of air toxics was estimated to be 42 in a million. That is, 42 out of one million people would be expected to contract cancer from a lifetime of breathing air toxics at 1999 levels. Mobile sources were responsible for 44% of outdoor toxic emissions and almost 50% of the cancer risk. Benzene is the largest contributor to cancer risk of all 133 pollutants quantitatively assessed in the 1999 NATA, and mobile sources are the single largest source of ambient benzene.

According to the national-scale analysis performed for this rule, the national average cancer risk in 1999 from breathing outdoor sources of MSATs was about 25 in a million.[7] Over 224 million people in 1999 were exposed to a risk level above 10 in a million due to chronic inhalation exposure to MSATs. About 130 million people in 1999 were exposed to a risk level above 10 in a million due to chronic inhalation exposure to

[7] This includes emissions from mobile and stationary sources of these pollutants.

benzene alone. Mobile sources were responsible for over 70% of benzene emissions in 1999.

Although air toxics emissions are projected to decline in the future as a result of standards EPA has previously adopted, cancer risk will continue to be a public health concern. Without additional controls, the predicted national average cancer risk from MSATs in 2030 is predicted to be above 20 in a million. In fact, in 2030 there will be more people exposed to levels of MSATs that result in the highest levels of risk. For instance, the number of Americans above the 10 in a million cancer risk level from exposure to MSATs is projected to increase from 223 million in 1999 to 272 million in 2030. Mobile sources will continue to be a significant contributor to risk in the future, accounting for 43% of total air toxic emissions in 2020, and 55% of benzene emissions.

b. National Risk of Noncancer Health Effects

According to national-scale modeling for 1999 done for this rule, nearly the entire U.S. population was exposed to an average level of air toxics that has the potential for adverse respiratory health effects (noncancer).[8] We estimated this will continue to be the case in 2030, even though toxics levels will be lower.

Mobile sources were responsible for 74% of the noncancer (respiratory) risk from outdoor air toxics in the 1999 NATA. The majority of this risk was from acrolein, and

[8] That is, the respiratory hazard index exceeded 1. See section III.B.3.a for more information.

formaldehyde also contributed to the risk of respiratory health effects.[9]

Although not included in NATA's estimates of noncancer risk, PM from gasoline and diesel mobile sources contributes significantly to the health effects associated with ambient PM, for which EPA has established National Ambient Air Quality Standards. There are extensive human data showing a wide spectrum of adverse health effects associated with exposure to ambient PM[10].

c. Exposure Near Roads

A substantial number of modeling assessment and air quality monitoring studies show elevated concentrations of multiple MSATs in close proximity to major roads. Exposure studies also indicate that populations spending time near major roadways likely experience elevated personal exposures to motor vehicle-related pollutants. In addition, these populations may experience exposures to differing physical and chemical compositions of certain air toxic pollutants depending on the amount of time spent in close proximity to motor vehicle emissions. Chapter 3.1 of the RIA provides a detailed discussion of air quality monitoring, personal exposure monitoring, and modeling assessments near major roadways.

[9] Acrolein was assigned an overall confidence level of "lower" based on consideration of the combined uncertainties from the modeling estimates. In contrast, formaldehyde was assigned an overall confidence level of "medium."

[10] U.S. Environmental Protection Agency (2004) Air Quality Criteria for Particulate Matter. Research Triangle Park, NC: National Center for Environmental Assessment – RTP Office; Report No. EPA/600/P-99/002aF, p. 8-318.

As part of the analyses underlying the final rule, we employed a new version of the Hazardous Air Pollutant Exposure Model (HAPEM), the exposure model used in NATA. HAPEM6 explicitly accounts for the gradient in outdoor concentrations that occurs near major roads, and the fraction of the population living near major roads.[11] The HAPEM6 analysis highlights the fact that residence near a major road is a substantial contributor to overall differences in exposure to directly-emitted MSATs. As an example, while the average of within-tract median annual census tract exposure concentrations nationally is 1.4 ug/m3, the average 90$^{th}$ percentile of within-tract exposure concentration nationally is over 2 ug/m3.

The potential population exposed to elevated concentrations near major roadways is large. A study of the populations nationally indicated that more than half of the population lives within 200 meters of a major road.[12] It should be noted that this analysis relied on the Census Bureau definition of a major road, which is not based on traffic volume. Thus, some of the roads designated as "major" may carry a low volume of traffic. This estimate is consistent with other studies that have examined the proximity of population to major roads. These studies are discussed in Section 3.5 of the RIA. In addition, analysis of data from the Census Bureau's American Housing Survey suggests that approximately 37 million people live within 300 feet (~100 meters) of a 4-or more

[11] U.S. EPA. 2007. The HAPEM6 User's Guide. Prepared for Ted Palma, Office of Air Quality Planning and Standards, Research Triangle Park, NC, by Arlene Rosenbaum and Michael Huang, ICF International, January 2007.. This document is available in Docket EPA-HQ-OAR-2005-0036. http://www.epa.gov/ttn/fera/human_hapem.html

[12] Major roads are defined as those roads defined by the U.S. Census as one of the following: "limited access highway," "highway," "major road (primary, secondary and connecting roads )," or "ramp."

lane highway, railroad, or airport.[13] American Housing Survey statistics, as well as epidemiology studies, indicate that those houses located near major transportation sources are more likely to be lower in income or have minority residents than houses not located near major transportation sources. These data are also discussed in detail in Section 3.5 of the RIA.

Other population studies also indicate that a significant fraction of the population resides in locations near major roads. At present, the available studies use different indicators of "major road" and of "proximity," but the estimates range from 12.4% of student enrollment in California attending schools within 150 meters of roads with 25,000 vehicles per day or more, to 13% of Massachusetts veterans living within 50 meters of a road with at least 10,000 vehicles per day.[14,15] Using a more general definition of a "major road," between 22% and 51% of different study populations live near such roads.

d. Exposure From Attached Garages

People living in homes with attached garages are potentially exposed to substantially higher overall concentrations of benzene, toluene, and other VOCs from mobile source-related emissions. EPA has conducted a modeling analysis to examine the

[13] United States Census Bureau. (2004) American Housing Survey web page. [Online at http://www.census.gov/hhes/www/housing/ahs/ahs03/ahs03.html ] Table IA-6.

[14] Green, R.S.; Smorodinsky, S.; Kim, J.J.; McLaughlin, R.; Ostro, B. (2004) Proximity of California public schools to busy roads. *Environ. Health Perspect.* 112: 61-66.

[15] Garshick, E.; Laden, F.; Hart, J.E.; Caron, A. (2003) Residence near a major road and respiratory symptoms in U.S. veterans. *Epidemiol.* 14: 728-736.

influence of attached garages on personal exposure to benzene (see Appendix 3A of RIA). Compared to national average exposure concentrations modeled in 1999 NATA, which does not account for emissions originating in attached garages, average exposure concentrations for people with attached garages could more than double. Other recent studies also emphasize the substantial role of attached garages in exposure to MSATs. Chapter 3 of the RIA discusses measurements of concentrations and exposure associated with attached garages and EPA's modeling analysis.

### 3. What Are the Health Effects of Air Toxics?

#### a. Overview of Potential Cancer and Noncancer Health Effects

Air toxics can cause of variety of cancer and noncancer health effects. Inhalation cancer risks are usually estimated by EPA as "unit risks," which represent the excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 $\mu g/m^3$ in air. Some air toxics are known to be carcinogenic in animals but lack data in humans. Many of these have been assumed to be human carcinogens. Also, in the absence of evidence of a nonlinear dose-response curve, EPA assumes these relationships between exposure and probability of cancer are linear. These unit risks are typically upper bound estimates. Upper bound estimates are more likely to overestimate than underestimate risk. Where there are strong epidemiological data, a maximum likelihood (MLE) estimate may be developed. An MLE is a best scientific estimate of risk. The benzene unit risk is an MLE. A discussion of the confidence in a quantitative

cancer risk estimate is provided in the IRIS file for each compound. The discussion of the confidence in the cancer risk estimate includes an assessment of the source of the data (human or animal), uncertainties in dose estimates, choice of the model used to fit the exposure and response data and how uncertainties and potential confounders are handled.

Potential noncancer chronic inhalation health risks are quantified using reference concentrations (RfCs) and noncancer chronic ingestion and dermal health risks are quantified using reference doses (RfDs). The RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a lifetime. Sources of uncertainty in the development of the RfCs and RfDs include interspecies extrapolation (animal to human) and intraspecies extrapolation (average human to sensitive human). Additional sources of uncertainty can include the use of a lowest observed adverse effect level in place of a no observed adverse effect level, and other data deficiencies. A statement regarding the confidence in the RfC and/or RfD is developed to reflect the confidence in the principal study or studies on which the RfC or RfD are based and the confidence in the underlying database. Factors that affect the confidence in the principal study include how well the study was designed, conducted and reported. Factors that affect the confidence in the database include an assessment of the availability of information regarding identification of the critical effect, potentially susceptible populations and exposure scenarios relevant to assessment of risk.

The RfC may be used to estimate a hazard quotient, which is the environmental

exposure to a substance divided by its RfC. A hazard quotient greater than one indicates adverse health effects are possible. The hazard quotient cannot be translated to a probability that adverse health effects will occur, and is unlikely to be proportional to risk. It is especially important to note that a hazard quotient exceeding one does not necessarily mean that adverse health effects will occur. In NATA, hazard quotients for different respiratory irritants were also combined into a hazard index (HI). A hazard index is the sum of hazard quotients for substances that affect the same target organ or organ system. Because different pollutants may cause similar adverse health effects, it is often appropriate to combine hazard quotients associated with different substances. However, the HI is only an approximation of a combined effect because substances may affect a target organ in different ways.

b. Health Effects of Key MSATs

i. Benzene

The EPA's IRIS database lists benzene, an aromatic hydrocarbon, as a known human carcinogen (causing leukemia) by all routes of exposure.[16] A number of adverse noncancer health effects including blood disorders and immunotoxicity have also been associated with long-term occupational exposure to benzene.[17]

[16]U.S. EPA (2000). Integrated Risk Information System File for Benzene. This material is available electronically at http://www.epa.gov/iris/subst/0276.htm.

[17] U. S. EPA. (2002). Toxicological Review of Benzene (Noncancer Effects). National Center for Environmental Assessment, Washington, DC. Report No. EPA/635/R-02/001F. http://www.epa.gov/iris/toxreviews/0276-tr.pdf.

Inhalation is the major source of human exposure to benzene in occupational and non-occupational settings. Long-term occupational inhalation exposure to benzene has been shown to cause cancers of the hematopoetic (blood cell) system in adults.[18] Among these are acute nonlymphocytic leukemia[19] and chronic lymphocytic leukemia.[20, 21] Leukemias, lymphomas, and other tumor types have been observed in experimental animals exposed to benzene by inhalation or oral administration. Exposure to benzene and/or its metabolites has also been linked with chromosomal changes in humans and animals[22,23] and increased proliferation of mouse bone marrow cells.[24,25]

---

[18] U.S. EPA (1998) Carcinogenic Effects of Benzene: An Update, National Center for Environmental Assessment, Washington, DC. EPA600-P-97-001F. Enter report number at the following search page, http://yosemite.epa.gov/ncepihom/nsCatalog.nsf//SearchPubs?Openform.

[19]Leukemia is a blood disease in which the white blood cells are abnormal in type or number. Leukemia may be divided into nonlymphocytic (granulocytic) leukemias and lymphocytic leukemias. Nonlymphocytic leukemia generally involves the types of white blood cells (leukocytes) that are involved in engulfing, killing, and digesting bacteria and other parasites (phagocytosis) as well as releasing chemicals involved in allergic and immune responses. This type of leukemia may also involve erythroblastic cell types (immature red blood cells). Lymphocytic leukemia involves the lymphocyte type of white blood cell that is responsible for antibody and cell-mediated immune responses. Both nonlymphocytic and lymphocytic leukemia may, in turn, be separated into acute (rapid and fatal) and chronic (lingering, lasting) forms. For example in acute myeloid leukemia there is diminished production of normal red blood cells (erythrocytes), granulocytes, and platelets (control clotting), which leads to death by anemia, infection, or hemorrhage. These events can be rapid. In chronic myeloid leukemia (CML) the leukemic cells retain the ability to differentiate (i.e., be responsive to stimulatory factors) and perform function; later there is a loss of the ability to respond.

[20]U.S. EPA (1985) Environmental Protection Agency, Interim quantitative cancer unit risk estimates due to inhalation of benzene, prepared by the Office of Health and Environmental Assessment, Carcinogen Assessment Group, Washington, DC. for the Office of Air Quality Planning and Standards, Washington, DC., 1985.

[21]U.S. EPA. (1993) Motor Vehicle-Related Air Toxics Study. Office of Mobile Sources, Ann Arbor, MI. http://www.epa.gov/otaq/regs/toxics/tox_archive.htm.

[12]International Agency for Research on Cancer (IARC) (1982) IARC monographs on the evaluation of carcinogenic risk of chemicals to humans, Volume 29, Some industrial chemicals and dyestuffs, International Agency for Research on Cancer, World Health Organization, Lyon, France, p. 345-389.

[23] U.S. EPA (1998) Carcinogenic Effects of Benzene: An Update, National Center for Environmental Assessment, Washington, DC. EPA600-P-97-001F. Enter report number at the following search page, http://yosemite.epa.gov/ncepihom/nsCatalog.nsf//SearchPubs?Openform.

[24]Irons, R.D., W.S. Stillman, D.B. Colagiovanni, and V.A. Henry (1992) Synergistic action of the benzene metabolite hydroquinone on myelopoietic stimulating activity of granulocyte/macrophage colony-stimulating factor in vitro, *Proc. Natl. Acad. Sci.* 89:3691-3695.

[25] U.S. EPA (1998) Carcinogenic Effects of Benzene: An Update, National Center for Environmental Assessment, Washington, DC. EPA600-P-97-001F. Enter report number at the following search page, http://yosemite.epa.gov/ncepihom/nsCatalog.nsf//SearchPubs?Openform.

The latest assessment by EPA estimates the excess risk of developing leukemia from inhalation exposure to benzene at $2.2 \times 10^{-6}$ to $7.8 \times 10^{-6}$ per $\mu g/m^3$. In other words, there is an estimated risk of about two to eight excess leukemia cases in one million people exposed to 1 $\mu g/m^3$ of benzene over a lifetime.[26] This range of unit risks reflects the MLEs calculated from different exposure assumptions and dose-response models that are linear at low doses. At present, the true cancer risk from exposure to benzene cannot be ascertained, even though dose-response data are used in the quantitative cancer risk analysis, because of uncertainties in the low-dose exposure scenarios and lack of clear understanding of the mode of action. A range of estimates of risk is recommended, each having equal scientific plausibility. There are confidence intervals associated with the MLE range that reflect variation of the observed data used to develop dose-response values. For the upper end of the MLE range, the 5$^{th}$ and 95$^{th}$ percentile values are about a factor of 5 lower and higher than the best fit value. The upper end of the MLE range was used in NATA.

It should be noted that not enough information is known to determine the slope of the dose-response curve at environmental levels of exposure and to provide a sound scientific basis to choose any particular extrapolation/exposure model to estimate human cancer risk at low doses. EPA risk assessment guidelines suggest using an assumption of linearity of dose response when (1) there is an absence of sufficient information on modes of action or (2) the mode of action information indicates that the dose-response

[26]U.S. EPA (1998) Carcinogenic Effects of Benzene: An Update, National Center for Environmental Assessment, Washington, DC. EPA600-P-97-001F. Enter report number at the following search page, http://yosemite.epa.gov/ncepihom/nsCatalog.nsf//SearchPubs?Openform.

curve at low dose is or is expected to be linear.[27] Since the mode of action for benzene carcinogenicity is unknown, the current cancer unit risk estimate assumes linearity of the low-dose response. Data that were considered by EPA in its carcinogenic update suggested that the dose-response relationship at doses below those examined in the studies reviewed in EPA's most recent benzene assessment may be supralinear. Such a relationship could support the inference that cancer risks are as high or are higher than the estimates provided in the existing EPA assessment.[28] Data discussed in the EPA IRIS assessment suggest that genetic abnormalities occur at low exposure in humans, and the formation of toxic metabolites plateaus above 25 ppm (80,000 $\mu g/m^3$).[29] More recent data on benzene adducts in humans, published after the most recent IRIS assessment, suggest that the enzymes involved in benzene metabolism start to saturate at exposure levels as low as 1 ppm.[30,31,32] These data highlight the importance of ambient exposure levels and their contribution to benzene-related adducts. Because there is a transition from linear to saturable metabolism below 1 ppm, the assumption of low-dose linearity extrapolated from much higher exposures could lead to substantial underestimation of leukemia risks. This is consistent with recent epidemiological data which also suggest a supralinear exposure-response relationship and which "[extend] evidence for

---

[27] U. S. EPA (2005) Guidelines for Carcinogen Risk Assessment. Report No. EPA/630/P-03/001F. http://cfpub.epa.gov/ncea/raf/recordisplay.cfm?deid=116283.

[28] U.S. EPA (1998) Carcinogenic Effects of Benzene: An Update. EPA/600/P-97/001F.

[29] Rothman, N; Li, GL; Dosemeci, M; et al. (1996) Hematotoxicity among Chinese workers heavily exposed to benzene. *Am. J. Indust. Med.* 29:236-246.

[30] Rappaport, S.M.; Waidyanatha, S.; Qu, Q.; Shore, R.; Jin, X.; Cohen, B.; Chen, L.; Melikian, A.; Li, G.; Yin, S.; Yan, H.; Xu, B.; Mu, R.; Li, Y.; Zhang, X.; and Li, K. (2002) Albumin adducts of benzene oxide and 1,4-benzoquinone as measures of human benzene metabolism. *Cancer Research* 62:1330-1337.

[31] Rappaport, S.M.; Waidyanatha, S.; Qu, Q.; Yeowell-O'Connell, K.; Rothman, N.; Smith M.T.; Zhang, L.; Qu, Q.; Shore, R.; Li, G.; Yin, S. (2005) Protein adducts as biomarkers of human enzene metabolism. *Chem Biol Interact*. 153-154:103-109.

[32] Lin, Y-S., Vermeulen, R., Tsai, C.H., Suramya, W., Lan, Q., Rothman, N., Smith, M.T., Zhang, L., Shen, M., Songnian, Y., Kim, S., Rappaport, S.M. (2006) Albumin adducts of electrophilic benzene metabolitesin benzene-exposed and control workers. Environ Health Perspec.

hematopoietic cancer risks to levels substantially lower than had previously been established."[33,34,35] These data are from the largest cohort studies done to date with individual worker exposure estimates. However, these data have not yet been formally evaluated by EPA as part of the IRIS review process, and it is not clear how they might influence low-dose risk estimates. A better understanding of the biological mechanism of benzene-induced leukemia is needed.

Children may represent a subpopulation at increased risk from benzene exposure, due to factors that could increase their susceptibility. Children may have a higher unit body weight exposure because of their heightened activity patterns which can increase their exposures, as well as different ventilation tidal volumes and frequencies, factors that influence uptake. This could entail a greater lifetime risk of leukemia and other toxic effects from exposures occurring during childhood, if children are exposed to benzene at similar levels as adults. There is limited information from two studies regarding an increased risk to children whose parents have been occupationally exposed to benzene.[36,37] Data from animal studies have shown benzene exposures result in damage to the hematopoietic (blood cell formation) system during development.[38, 39, 40] Also, key

---

[33] Hayes, R.B.; Yin, S.; Dosemeci, M.; Li, G.; Wacholder, S.; Travis, L.B.; Li, C.; Rothman, N.; Hoover, R.N.; and Linet, M.S. (1997) Benzene and the dose-related incidence of hematologic neoplasms in China. *J. Nat. Cancer Inst.* 89:1065-1071.

[34] Hayes, R.B.; Songnian, Y.; Dosemeci, M.; and Linet, M. (2001) Benzene and lymphohematopoietic malignancies in humans. *Am. J. Indust. Med.* 40:117-126.

[35] Lan, Q.;, Zhang, L., Li, G., Vermeulen, R., et al. (2004). Hematotoxicicity in Workers Exposed to Low Levels of Benzene. Science 306: 1774-1776.

[36] Shu, X.O,; Gao, Y.T.; Brinton, L.A.; et al. (1988) A population-based case-control study of childhood leukemia in Shanghai. *Cancer* 62:635-644.

[37] McKinney P.A.; Alexander, F.E.; Cartwright, R.A.; et al. (1991) Parental occupations of children with leukemia in west Cumbria, north Humberside, and Gateshead, *Br. Med. J.* 302:681-686.

[38] Keller, KA; Snyder, CA. (1986) Mice exposed in utero to low concentrations of benzene exhibit enduring changes in their colony forming hematopoietic cells. *Toxicology* 42:171-181.

changes related to the development of childhood leukemia occur in the developing fetus.[41] Several studies have reported that genetic changes related to eventual leukemia development occur before birth. For example, there is one study of genetic changes in twins who developed T cell leukemia at 9 years of age.[42] An association between traffic volume, residential proximity to busy roads and occurrence of childhood leukemia has also been identified in some studies, although some studies show no association.

A number of adverse noncancer health effects, including blood disorders such as preleukemia and aplastic anemia, have also been associated with long-term exposure to benzene.[43, 44] People with long-term occupational exposure to benzene have experienced harmful effects on the blood-forming tissues, especially in the bone marrow. These effects can disrupt normal blood production and suppress the production of important blood components, such as red and white blood cells and blood platelets, leading to anemia (a reduction in the number of red blood cells), leukopenia (a reduction in the number of white blood cells), or thrombocytopenia (a reduction in the number of blood platelets, thus reducing the ability of blood to clot). Chronic inhalation exposure to

---

[39] Keller, KA; Snyder, CA. (1988) Mice exposed in utero to 20 ppm benzene exhibit altered numbers of recognizable hematopoietic cells up to seven weeks after exposure. *Fundam. Appl. Toxicol.* 10:224-232.

[40] Corti, M; Snyder, CA. (1996) Influences of gender, development, pregnancy and ethanol consumption on the hematotoxicity of inhaled 10 ppm benzene. *Arch. Toxicol.* 70:209-217.

[41] U. S. EPA. (2002). Toxicological Review of Benzene (Noncancer Effects). National Center for Environmental Assessment, Washington, DC. Report No. EPA/635/R-02/001F. http://www.epa.gov/iris/toxreviews/0276-tr.pdf.

[42] Ford, AM; Pombo-de-Oliveira, MS; McCarthy, KP; MacLean, JM; Carrico, KC; Vincent, RF; Greaves, M. (1997) Monoclonal origin of concordant T-cell malignancy in identical twins. *Blood* 89:281-285.

[43] Aksoy, M. (1989) Hematotoxicity and carcinogenicity of benzene. *Environ. Health Perspect.* 82: 193-197.

[44] Goldstein, B.D. (1988) Benzene toxicity. *Occupational medicine. State of the Art Reviews* 3: 541-554.

benzene in humans and animals results in pancytopenia,[45] a condition characterized by decreased numbers of circulating erythrocytes (red blood cells), leukocytes (white blood cells), and thrombocytes (blood platelets).[46, 47] Individuals that develop pancytopenia and have continued exposure to benzene may develop aplastic anemia, whereas others exhibit both pancytopenia and bone marrow hyperplasia (excessive cell formation), a condition that may indicate a preleukemic state.[48, 49] The most sensitive noncancer effect observed in humans, based on current data, is the depression of the absolute lymphocyte count in blood.[50, 51]

EPA's inhalation reference concentration (RfC) for benzene is 30 $\mu g/m^3$, based on suppressed absolute lymphocyte counts as seen in humans under occupational exposure conditions. The overall confidence in this RfC is medium. Since development of this RfC, human reports of benzene's hematotoxic effects have been published in the literature that provides data suggesting a wide range of hematological endpoints that are

---

[45]Pancytopenia is the reduction in the number of all three major types of blood cells (erythrocytes, or red blood cells, thrombocytes, or platelets, and leukocytes, or white blood cells). In adults, all three major types of blood cells are produced in the bone marrow of the skeletal system. The bone marrow contains immature cells, known as multipotent myeloid stem cells, that later differentiate into the various mature blood cells. Pancytopenia results from a reduction in the ability of the red bone marrow to produce adequate numbers of these mature blood cells.

[46]Aksoy, M. (1991) Hematotoxicity, leukemogenicity and carcinogenicity of chronic exposure to benzene. In: Arinc, E.; Schenkman, J.B.; Hodgson, E., Eds. Molecular Aspects of Monooxygenases and Bioactivation of Toxic Compounds. New York: Plenum Press, pp. 415-434.

[47]Goldstein, B.D. (1988) Benzene toxicity. *Occupational medicine. State of the Art Reviews* 3: 541-554.

[48]Aksoy, M., S. Erdem, and G. Dincol. (1974) Leukemia in shoe-workers exposed chronically to benzene. *Blood* 44:837.

[49]Aksoy, M. and K. Erdem. (1978) A follow-up study on the mortality and the development of leukemia in 44 pancytopenic patients associated with long-term exposure to benzene. *Blood* 52: 285-292.

[50]Rothman, N., G.L. Li, M. Dosemeci, W.E. Bechtold, G.E. Marti, Y.Z. Wang, M. Linet, L.Q. Xi, W. Lu, M.T. Smith, N. Titenko-Holland, L.P. Zhang, W. Blot, S.N. Yin, and R.B. Hayes (1996) Hematotoxicity among Chinese workers heavily exposed to benzene. *Am. J. Ind. Med*. 29: 236-246.

[51] EPA 2005 "Full IRIS Summary for Benzene (CASRN 71-43-2)" Environmental Protection Agency, Integrated Risk Information System (IRIS), Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH http://www.epa.gov/iris/subst/0276.htm.

affected at occupational exposures of less than 5 ppm (about 16 mg/m$^3$)[52] and at air levels of 1 ppm (about 3 mg/m$^3$) or less among genetically susceptible populations.[53] One recent study found benzene metabolites in mouse liver and bone marrow at environmental doses, indicating that even concentrations in urban air can elicit a biochemical response in rodents that indicates toxicity.[54] EPA has not formally evaluated these recent studies as part of the IRIS review process to determine whether or not they will lead to a change in the current RfC. EPA does not currently have an acute reference concentration for benzene. The Agency for Toxic Substances and Disease Registry Minimal Risk Level for acute exposure to benzene is 160 µg/m$^3$ for 1-14 days exposure.

ii. 1,3-Butadiene

EPA has characterized 1,3-butadiene, a hydrocarbon, as a leukemogen, carcinogenic to humans by inhalation.[55, 56] The specific mechanisms of 1,3-butadiene-induced carcinogenesis are unknown; however, it is virtually certain that the carcinogenic effects are mediated by genotoxic metabolites of 1,3-butadiene. Animal data suggest that females may be more sensitive than males for cancer effects; nevertheless, there are insufficient data in humans from which to draw any conclusions on potentially sensitive

[52]Qu, Q., R. Shore, G. Li, X. Jin, L.C. Chen, B. Cohen, et al. (2002). Hematological changes among Chinese workers with a broad range of benzene exposures. *Am. J. Industr. Med*. 42: 275-285.

[53]Lan, Q.; Zhang, L., Li, G., Vermeulen, R., et al. (2004). Hematotoxicity in Workers Exposed to Low Levels of Benzene. *Science* 306: 1774-1776.

[54]Turtletaub, K.W. and Mani, C. (2003). Benzene metabolism in rodents at doses relevant to human exposure from Urban Air. *Res Rep Health Effect Inst* 113.

[55]U.S. EPA. (2002). Health Assessment of 1,3-Butadiene. Office of Research and Development, National Center for Environmental Assessment, Washington Office, Washington, DC. Report No. EPA600-P-98-001F. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=54499.

[56]EPA 2005 "Full IRIS Summary for 1,3-butadiene (CASRN 106-99-0)" Environmental Protection Agency, Integrated Risk Information System (IRIS), Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH http://www.epa.gov/iris/subst/0139.htm.

subpopulations. The upper bound cancer unit risk estimate is 0.08 per ppm or $3x10^{-5}$ per $\mu g/m^3$ (based primarily on linear modeling and extrapolation of human data). In other words, it is estimated that approximately 30 persons in one million exposed to 1 $\mu g/m^3$ of 1,3-butadiene continuously for their lifetime would develop cancer as a result of this exposure. The human incremental lifetime unit cancer risk estimate is based on extrapolation from leukemias observed in an occupational epidemiologic study.[57,58] This estimate includes a two-fold adjustment to the epidemiologic-based unit cancer risk applied to reflect evidence from the rodent bioassays suggesting that the epidemiologic-based estimate (from males) may underestimate total cancer risk from 1,3-butadiene exposure in the general population, particularly for breast cancer in females. A recent study extended the investigation of 1,3-butadiene exposure and leukemia among synthetic rubber industry workers.[59] The results of this study strengthen the evidence for the relationship between 1,3-butadiene exposure and lymphohematopoietic cancer. This relationship was found to persist after controlling for exposure to other toxics in this work environment.

1,3-Butadiene also causes a variety of reproductive and developmental effects in mice; no human data on these effects are available. The most sensitive effect was ovarian

---

[57]Delzell, E, N. Sathiakumar, M. Macaluso, et al. (1995). A follow-up study of synthetic rubber workers. Submitted to the International Institute of Synthetic Rubber Producers. University of Alabama at Birmingham. October 2, 1995.

[58] EPA 2005 "Full IRIS Summary for 1,3-butadiene (CASRN 106-99-0)" Environmental Protection Agency, Integrated Risk Information System (IRIS), Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH http://www.epa.gov/iris/subst/0139.htm.

[59] Delzell, E., Sathiakumar, N., Graff, J., Macaluso, M., Maldonado, G., Matthews, R. (2006) An updated study of mortality among North American synthetic rubber industry workers. Health Effects Institute Report Number 132.

atrophy observed in a lifetime bioassay of female mice.[60] Based on this critical effect and the benchmark concentration methodology, an RfC was calculated. This RfC for chronic health effects is 0.9 ppb, or about 2 $\mu g/m^3$. Confidence in the inhalation RfC is medium.

iii. Formaldehyde

Since 1987, EPA has classified formaldehyde, a hydrocarbon, as a probable human carcinogen based on evidence in humans and in rats, mice, hamsters, and monkeys.[61] EPA's current IRIS summary provides an upper bound cancer unit risk estimate of $1.3 \times 10^{-5}$ per $\mu g/m^3$.[62] In other words, there is an estimated risk of about thirteen excess leukemia cases in one million people exposed to 1 $\mu g/m^3$ of formaldehyde over a lifetime.

EPA is currently reviewing recently published epidemiological data. For instance, research conducted by the National Cancer Institute (NCI) found an increased risk of nasopharyngeal cancer and lymphohematopoietic malignancies such as leukemia among workers exposed to formaldehyde.[63, 64] NCI is currently performing an update of these studies. A recent National Institute of Occupational Safety and Health (NIOSH)

---

[60]Bevan, C.; Stadler, J.C.; Elliot, G.S.; et al. (1996) Subchronic toxicity of 4-vinylcyclohexene in rats and mice by inhalation. *Fundam. Appl. Toxicol.* 32:1-10.

[61]U.S. EPA (1987). Assessment of Health Risks to Garment Workers and Certain Home Residents from Exposure to Formaldehyde, Office of Pesticides and Toxic Substances, April 1987.

[62] U.S. EPA (1989). Integrated Risk Information System File for Formaldehyde. This material is available electronically at http://www.epa.gov/iris/subst/0419.htm.

[63]Hauptmann, M..; Lubin, J. H.; Stewart, P. A.; Hayes, R. B.; Blair, A. 2003. Mortality from lymphohematopoetic malignancies among workers in formaldehyde industries. *Journal of the National Cancer Institute* 95: 1615-1623.

[64]Hauptmann, M..; Lubin, J. H.; Stewart, P. A.; Hayes, R. B.; Blair, A. 2004. Mortality from solid cancers among workers in formaldehyde industries. *American Journal of Epidemiology* 159: 1117-1130.

study of garment workers also found increased risk of death due to leukemia among workers exposed to formaldehyde.[65] Extended follow-up of a cohort of British chemical workers did not find evidence of an increase in nasopharyngeal or lymphohematopoeitic cancers, but a continuing statistically significant excess in lung cancers was reported.[66]

Based on the developments of the last decade, in 2004, the working group of the International Agency for Research on Cancer concluded that formaldehyde is carcinogenic to humans (Group 1 classification) on the basis of sufficient evidence in humans and sufficient evidence in experimental animals—a higher classification than previous IARC evaluations. In addition, the National Institute of Environmental Health Sciences recently nominated formaldehyde for reconsideration as a known human carcinogen under the National Toxicology Program. Since 1981 it has been listed as a "reasonably anticipated human carcinogen." Recently the German Federal Institute for Risk Assessment determined that formaldehyde is a known human carcinogen.[67]

In the past 15 years there has been substantial research on the inhalation dosimetry for formaldehyde in rodents and primates by the CIIT Centers for Health Research, with a focus on use of rodent data for refinement of the quantitative cancer

---

[65]Pinkerton, L. E. 2004. Mortality among a cohort of garment workers exposed to formaldehyde: an update. *Occup. Environ. Med.* 61: 193-200.

[66] Coggon, D, EC Harris, J Poole, KT Palmer. 2003. Extended follow-up of a cohort of British chemical workers exposed to formaldehyde. J National Cancer Inst. 95:1608-1615.

[67] Bundesinstitut für Risikobewertung (BfR) Toxicological Assessment of Formaldehyde. Opinion of BfR No. 023/2006 of 30 March 2006. www.bfr.bund.de/cm/290/toxicological_assessment_of_formaldehyde.pdf.

dose-response assessment.[68,69,70] CIIT's risk assessment of formaldehyde incorporated mechanistic and dosimetric information on formaldehyde. The risk assessment analyzed carcinogenic risk from inhaled formaldehyde using approaches that were consistent with EPA's draft guidelines for carcinogenic risk assessment. In 2001, Environment Canada relied on this cancer dose-response assessment in their assessment of formaldehyde.[71] In 2004, EPA also relied on this cancer unit risk estimate during the development of the plywood and composite wood products national emissions standards for hazardous air pollutants (NESHAPs).[72] In these rules, EPA concluded that the CIIT work represented the best available application of the available mechanistic and dosimetric science on the dose-response for portal of entry cancers due to formaldehyde exposures. EPA is reviewing the recent work cited above from the NCI and NIOSH, as well as the analysis by the CIIT Centers for Health Research and other studies, as part of a reassessment of the human hazard and dose-response associated with formaldehyde.

Noncancer effects of formaldehyde have been observed in humans and several animal species and include irritation to eye, nose and throat tissues in conjunction with increased mucous secretions.

---

[68]Conolly, RB, JS Kimbell, D Janszen, PM Schlosser, D Kalisak, J Preston, and FJ Miller. 2003. Biologically motivated computational modeling of formaldehyde carcinogenicity in the F344 rat. *Tox. Sci.* 75: 432-447.

[69]Conolly, RB, JS Kimbell, D Janszen, PM Schlosser, D Kalisak, J Preston, and FJ Miller. 2004. Human respiratory tract cancer risks of inhaled formaldehyde: Dose-response predictions derived from biologically-motivated computational modeling of a combined rodent and human dataset. *Tox. Sci.* 82: 279-296.

[70]Chemical Industry Institute of Toxicology (CIIT).1999. Formaldehyde: Hazard characterization and dose-response assessment for carcinogenicity by the route of inhalation. CIIT, September 28, 1999. Research Triangle Park, NC.

[71]Health Canada. 2001. Priority Substances List Assessment Report. Formaldehyde. Environment Canada, Health Canada, February 2001.

[72]U. S. EPA. 2004. National Emission Standards for Hazardous Air Pollutants for Plywood and Composite Wood Products Manufacture: Final Rule. (69 FR 45943, 7/30/04)

iv. Acetaldehyde

Acetaldehyde, a hydrocarbon, is classified in EPA's IRIS database as a probable human carcinogen and is considered toxic by inhalation.[73] Based on nasal tumors in rodents, the upper confidence limit estimate of a lifetime extra cancer risk from continuous acetaldehyde exposure is about $2.2 \times 10^{-6}$ per $\mu g/m^3$. In other words, it is estimated that about 2 persons in one million exposed to 1 $\mu g/m^3$ acetaldehyde continuously for their lifetime (70 years) would develop cancer as a result of their exposure, although the risk could be as low as zero. In short-term (4 week) rat studies, compound-related histopathological changes were observed only in the respiratory system at various concentration levels of exposure.[74, 75] Data from these studies showing degeneration of the olfactory epithelium were found to be sufficient for EPA to develop an RfC for acetaldehyde of 9 $\mu g/m^3$. Confidence in the principal study is medium and confidence in the database is low, due to the lack of chronic data establishing a no observed adverse effect level and due to the lack of reproductive and developmental toxicity data. Therefore, there is low confidence in the RfC. The agency is currently conducting a reassessment of risk from inhalation exposure to acetaldehyde.

The primary acute effect of exposure to acetaldehyde vapors is irritation of the

[73]U.S. EPA. 1988. Integrated Risk Information System File of Acetaldehyde. This material is available electronically at http://www.epa.gov/iris/subst/0290.htm.

[74]Appleman, L. M., R. A. Woutersen, V. J. Feron, R. N. Hooftman, and W. R. F. Notten. (1986). Effects of the variable versus fixed exposure levels on the toxicity of acetaldehyde in rats. *J. Appl. Toxicol.* 6: 331-336.

[75]Appleman, L.M., R.A. Woutersen, and V.J. Feron. (1982). Inhalation toxicity of acetaldehyde in rats. I. Acute and subacute studies. *Toxicology*. 23: 293-297.

eyes, skin, and respiratory tract.[76] Some asthmatics have been shown to be a sensitive subpopulation to decrements in functional expiratory volume (FEV1 test) and bronchoconstriction upon acetaldehyde inhalation.[77]

v. Acrolein

Acrolein, a hydrocarbon, is intensely irritating to humans when inhaled, with acute exposure resulting in upper respiratory tract irritation and congestion. The Agency has developed an RfC for acrolein of 0.02 $\mu g/m^3$.[78] The overall confidence in the RfC assessment is judged to be medium. The Agency is also currently in the process of conducting an assessment of acute health effects for acrolein. EPA determined in 2003 using the 1999 draft cancer guidelines that the human carcinogenic potential of acrolein could not be determined because the available data were inadequate. No information was available on the carcinogenic effects of acrolein in humans and the animal data provided inadequate evidence of carcinogenicity.

vi. Polycyclic Organic Matter (POM)

POM is generally defined as a large class of organic compounds which have multiple benzene rings and a boiling point greater than 100 degrees Celsius. Many of the

---

[76]U.S. EPA (1988). Integrated Risk Information System File of Acetaldehyde. This material is available electronically at http://www.epa.gov/iris/subst/0290.htm.

[77]Myou, S.; Fujimura, M.; Nishi K.; Ohka, T.; and Matsuda, T. (1993) Aerosolized acetaldehyde induces histamine-mediated bronchoconstriction in asthmatics. *Am. Rev. Respir.Dis.*148(4 Pt 1): 940-3.

[78]U.S. Environmental Protection Agency (2003) Integrated Risk Information System (IRIS) on Acrolein. National Center for Environmental Assessment, Office of Research and Development, Washington, D.C. 2003. This material is available electronically at http://www.epa.gov/iris/subst/0364.htm.

compounds included in the class of compounds known as POM are classified by EPA as probable human carcinogens based on animal data. One of these compounds, naphthalene, is discussed separately below.

Polycyclic aromatic hydrocarbons (PAHs) are a chemical subset of POM. In particular, EPA frequently obtains data on 16 of these POM compounds. Recent studies have found that maternal exposures to PAHs in a population of pregnant women were associated with several adverse birth outcomes, including low birth weight and reduced length at birth, as well as impaired cognitive development at age three.[79,80] These studies are discussed in the Regulatory Impact Analysis.

vii. Naphthalene

Naphthalene is a PAH compound consisting of two benzene rings fused together with two adjacent carbon atoms common to both rings. In 2004, EPA released an external review draft of a reassessment of the inhalation carcinogenicity of naphthalene.[81] The draft reassessment, External Review Draft, IRIS Reassessment of the Inhalation Carcinogenicity of Naphthalene, U. S. EPA, completed external peer review in 2004 by

[79] Perera, F.P.; Rauh, V.; Tsai, W-Y.; et al. (2002) Effect of transplacental exposure to environmental pollutants on birth outcomes in a multiethnic population. *Environ Health Perspect.* 111: 201-205.

[80] Perera, F.P.; Rauh, V.; Whyatt, R.M.; Tsai, W.Y.; Tang, D.; Diaz, D.; Hoepner, L.; Barr, D.; Tu, Y.H.; Camann, D.; Kinney, P. (2006) Effect of prenatal exposure to airborne polycyclic aromatic hydrocarbons on neurodevelopment in the first 3 years of life among inner-city children. Environ Health Perspect 114: 1287-1292.

[81] U.S. EPA (1998) Integrated Risk Information System (IRIS) summary on Naphthalene. National Center for Environmental Assessment, Office of Research and Development, Washington, D.C. 2003. This material is available electronically at http://www.epa.gov/iris/subst/0436.htm.

Oak Ridge Institute for Science and Education.[82] Based on external comments, additional analyses are being considered. California EPA has released a new risk assessment for naphthalene with a cancer unit risk estimate of $3x10^{-5}$ per $\mu g/m^3$.[83] The California EPA value was used in the 1999 NATA and in the analyses done for this rule. In addition, IARC has reevaluated naphthalene and re-classified it as Group 2B: possibly carcinogenic to humans.[84] Current risk estimates for naphthalene are based on extrapolations from rodent studies conducted at higher doses. At present, human data are inadequate for developing estimates.

The current EPA IRIS assessment includes noncancer data on hyperplasia and metaplasia in nasal tissue that form the basis of an inhalation RfC of 3 $\mu g/m^3$.[85] The principal study was given medium confidence because adequate numbers of animals were used, and the severity of nasal effects increased at the higher exposure concentration. However, the study produced high mortality and hematological evaluation was not conducted beyond 14 days. The database was given a low-to-medium confidence rating because there are no chronic or subchronic inhalation studies in other animal species, and there are no reproductive or developmental studies for inhalation exposure. In the absence of human or primate toxicity data, the assumption is made that nasal responses in

---

[82]Oak Ridge Institute for Science and Education. (2004) External Peer Review for the IRIS Reassessment of the Inhalation Carcinogenicity of Naphthalene. August 2004. http://cfpub2.epa.gov/ncea/cfm/recordisplay.cfm?deid=86019.

[83]California EPA. (2004) Long Term Health Effects of Exposure to Naphthalene. Office of Environmental Health Hazard Assessment. http://www.oehha.ca.gov/air/toxic_contaminants/draftnaphth.html.

[84]International Agency for Research on Cancer (IARC). (2002) Monographs on the Evaluation of the Carcinogenic Risk of Chemicals for Humans. Vol. 82. Lyon, France.

[85] EPA 2005 "Full IRIS Summary for Naphthalene (CASRN 91-20-3)" Environmental Protection Agency, Integrated Risk Information System (IRIS), Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH http://www.epa.gov/iris/subst/0436.htm.

mice to inhaled naphthalene are relevant to humans; however, it cannot be said with certainty that this RfC for naphthalene based on nasal effects will be protective for hemolytic anemia and cataracts, the more well-known human effects from naphthalene exposure. As a result, we have medium confidence in the RfC.

viii. Diesel Exhaust

In EPA's Diesel Health Assessment Document (HAD),[86] diesel exhaust was classified as likely to be carcinogenic to humans by inhalation at environmental exposures, in accordance with the revised draft 1996/1999 EPA cancer guidelines. A number of other agencies (National Institute for Occupational Safety and Health, the International Agency for Research on Cancer, the World Health Organization, California EPA, and the U.S. Department of Health and Human Services) have made similar classifications. EPA concluded in the Diesel HAD that it is not possible currently to calculate a cancer unit risk for diesel exhaust due to a variety of factors that limit the current studies, such as limited quantitative exposure histories in occupational groups investigated for lung cancer.

However, in the absence of a cancer unit risk, the EPA Diesel HAD sought to provide additional insight into the significance of the cancer hazard by estimating possible ranges of risk that might be present in the population. An exploratory analysis was used to characterize a possible risk range by comparing a typical environmental

[86]U.S. EPA (2002) Health Assessment Document for Diesel Engine Exhaust. EPA/600/8-90/057F Office of Research and Development, Washington DC. This document is available electronically at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=29060.

exposure level for highway diesel sources to a selected range of occupational exposure levels. The occupationally observed risks were then proportionally scaled according to the exposure ratios to obtain an estimate of the possible environmental risk. A number of calculations are needed to accomplish this, and these can be seen in the EPA Diesel HAD. The outcome was that environmental risks from diesel exhaust exposure could range from a low of $10^{-4}$ to $10^{-5}$ to as high as $10^{-3}$, reflecting the range of occupational exposures that could be associated with the relative and absolute risk levels observed in the occupational studies. Because of uncertainties, the analysis acknowledged that the risks could be lower than $10^{-4}$ or $10^{-5}$, and a zero risk from diesel exhaust exposure was not ruled out.

Noncancer health effects of acute and chronic exposure to diesel exhaust emissions are also of concern to the Agency. EPA derived an RfC from consideration of four well-conducted chronic rat inhalation studies showing adverse pulmonary effects.[87,88,89,90] The RfC is 5 $\mu g/m^3$ for diesel exhaust as measured by diesel PM. This RfC does not consider allergenic effects such as those associated with asthma or immunologic effects. There is growing evidence, discussed in the Diesel HAD, that diesel exhaust can exacerbate these effects, but the exposure-response data are presently

[87]Ishinishi, N; Kuwabara, N; Takaki, Y; et al. (1988) Long-term inhalation experiments on diesel exhaust. In: Diesel exhaust and health risks. Results of the HERP studies. Ibaraki, Japan: Research Committee for HERP Studies; pp. 11-84.

[88]Heinrich, U; Fuhst, R; Rittinghausen, S; et al. (1995) Chronic inhalation exposure of Wistar rats and two different strains of mice to diesel engine exhaust, carbon black, and titanium dioxide. *Inhal. Toxicol.* 7:553-556.

[89]Mauderly, JL; Jones, RK; Griffith, WC; et al. (1987) Diesel exhaust is a pulmonary carcinogen in rats exposed chronically by inhalation. *Fundam. Appl. Toxicol.* 9:208-221.

[90]Nikula, KJ; Snipes, MB; Barr, EB; et al. (1995) Comparative pulmonary toxicities and carcinogenicities of chronically inhaled diesel exhaust and carbon black in F344 rats. *Fundam. Appl. Toxicol.* 25:80-94.

lacking to derive an RfC. The EPA Diesel HAD states, "With DPM [diesel particulate matter] being a ubiquitous component of ambient PM, there is an uncertainty about the adequacy of the existing DE [diesel exhaust] noncancer database to identify all of the pertinent DE-caused noncancer health hazards" (p. 9-19).

The Diesel HAD also briefly summarizes health effects associated with ambient PM and discusses the EPA's annual National Ambient Air Quality Standard (NAAQS) of 15 $\mu g/m^3$. There is a much more extensive body of human data showing a wide spectrum of adverse health effects associated with exposure to ambient PM, of which diesel exhaust is an important component. The $PM_{2.5}$ NAAQS is designed to provide protection from the noncancer and premature mortality effects of $PM_{2.5}$ as a whole, of which diesel PM is a constituent.

c. Gasoline PM

Beyond the specific areas of quantifiable risk discussed above in section III.C, EPA is also currently investigating gasoline PM. Gasoline exhaust is a complex mixture that has not been evaluated in EPA's IRIS. Gasoline exhaust is a ubiquitous source of particulate matter, contributing to the health effects observed for ambient PM which is discussed extensively in the EPA Particulate Matter Criteria Document.[91] The PM Criteria Document notes that the PM components of gasoline and diesel engine exhaust

[91] U.S. EPA (2004) Air Quality Criteria for Particulate Matter: Volume 1. Research Triangle Park, NC: National Center for Environmental Assessment – RTP Office; Report No. EPA/600/P-99/002aF. Enter report number at the following search page, http://yosemite.epa.gov/ncepihom/nsCatalog.nsf//SearchPubs?Openform.

are hypothesized, important contributors to the observed increases in lung cancer incidence and mortality associated with ambient $PM_{2.5}$.[92] Gasoline PM is also a component of near-roadway emissions that may be contributing to the health effects observed in people who live near roadways (see section III.F). There is also emerging evidence for the mutagenicity and cytotoxicity of gasoline exhaust and gasoline PM. Seagrave et al. investigated the combined particulate and semivolatile organic fractions of gasoline engine emissions in various animal and bioassay tests.[93] The authors suggest that emissions from gasoline engines are mutagenic and can induce inflammation and have cytotoxic effects.

EPA is working to improve the understanding of PM emissions from gasoline engines, including the potential range of emissions and factors that influence emissions. EPA led a cooperative test program that recently completed testing approximately 500 randomly procured vehicles in the Kansas City metropolitan area. The purpose of this study was to determine the distribution of gasoline PM emissions from the in-use light-duty fleet. Results from this study are expected to be available shortly. Preliminary results from this work show the influence of high emitters on overall gasoline PM emissions and, also, that gasoline PM emissions increase at lower ambient temperatures in the in-use fleet. Some source apportionment studies show gasoline and diesel PM can

---

[92]U.S. EPA (2004) Air Quality Criteria for Particulate Matter: Volume 1. Research Triangle Park, NC: National Center for Environmental Assessment – RTP Office; Report No. EPA/600/P-99/002aF, p. 8-318. Enter report number at the following search page, http://yosemite.epa.gov/ncepihom/nsCatalog.nsf//SearchPubs?Openform.

[93] Seagrave, J.; McDonald, J.D.; Gigliotti, A.P.; Nikula, K.J.; Seilkop, S.K.; Gurevich, M. and Mauderly, J.L. (2002) Mutagenicity and in Vivo Toxicity of Combined Particulate and Semivolatile Organic Fractions of Gasoline and Diesel Engine Emissions. *Toxicological Sciences* 70:212-226.

result in larger contributions to ambient PM than predicted by EPA emission inventories.[94, 95] These source apportionment studies were one impetus behind conducting the Kansas City study.

Another issue related to gasoline PM is the effect of gasoline vehicles and engines on ambient PM, especially secondary PM. Ambient PM is composed of primary PM emitted directly into the atmosphere and secondary PM that is formed from chemical reactions in the atmosphere. The issue of secondary organic aerosol formation from aromatic precursors such as toluene is an important one to which EPA and others are paying significant attention. This is discussed in more detail in section 1.4.1 of the RIA.

d. Near-Roadway Health Effects

Another approach to investigating the collective health effects of mobile source contaminants is to examine associations between living near major roads and different adverse health endpoints. These studies generally examine people living near heavily-trafficked roadways, typically within several hundred meters, where fresh emissions from motor vehicles are not yet fully diluted with background air.

Several studies have measured elevated concentrations of pollutants emitted directly by motor vehicles near roadways as compared to overall urban background

[94] Fujita, E.; Watson, M.J.; Chow, M.C.; et al. (1998) Northern Front Range Air Quality Study, Volume C: Source apportionment and simulation methods and evaluation. Prepared for Colorado State University, Cooperative Institute for Research in the Atmosphere, by Desert Research Institute, Reno, NV.

[95] Schauer, J.J.; Rogge, W.F.; Hildemann, L.M.; et al. (1996) Source apportionment of airborne particulate matter using organic compounds as tracers. *Atmos. Environ.* 30(22):3837-3855.

levels. These elevated concentrations generally occur within approximately 200 meters of the road, although the distance may vary depending on traffic and environmental conditions. Pollutants measured with elevated concentrations include benzene, polycyclic aromatic hydrocarbons, carbon monoxide, nitrogen dioxide, black carbon, and coarse, fine, and ultrafine particulate matter. In addition, concentrations of road dust, and wear particles from tire and brake use also show concentration increases in proximity of major roadways.

The near-roadway health studies provide stronger evidence for some health endpoints than others. Evidence of adverse responses to traffic-related pollution is strongest for non-allergic respiratory symptoms, cardiovascular effects, premature adult mortality, and adverse birth outcomes, including low birth weight and size. Some evidence for new onset asthma is available, but not all studies have significant correlations. Lastly, among studies of childhood cancer, in particular childhood leukemia, evidence is inconsistent. Several small studies report positive associations, though such effects have not been observed in two larger studies. As described above, benzene and 1,3-butadiene are both known human leukemogens in adults. As previously mentioned, there is evidence of increased risk of leukemia among children whose parents have been occupationally exposed to benzene. Though the near-roadway studies are equivocal, taken together with the laboratory studies and other exposure environments, the data suggest a potentially serious children's health concern could exist. Additional research is needed to determine the significance of this potential concern.

Significant scientific uncertainties remain in our understanding of the relationship between adverse health effects and near-road exposure, including the exposures of greatest concern, the importance of chronic versus acute exposures, the role of fuel type (e.g. diesel or gasoline) and composition (e.g., % aromatics), relevant traffic patterns, the role of co-stressors including noise and socioeconomic status, and the role of differential susceptibility within the "exposed" populations. For a more detailed discussion, see Chapter 3 of the Regulatory Impact Analysis.

These studies provide qualitative evidence that reducing emissions from on-road mobile sources will provide public health benefits beyond those that can be quantified using currently available information.

## C. Ozone

Many MSATs are part of a larger category of mobile source emissions known as volatile organic compounds (VOCs), which contribute to the formation of ozone. Mobile sources contribute significantly to national emissions of VOCs. In addition, PFCs are a source of VOCs. The vehicle and PFC standards in this final rule will help reduce emissions of VOCs.

### 1. Background

Ground-level ozone pollution is formed by the reaction of VOCs and nitrogen oxides (NOx) in the lower atmosphere in the presence of heat and sunlight. These pollutants, often referred to as ozone precursors, are emitted by many types of pollution sources, such as highway and nonroad motor vehicles and engines, power plants, chemical plants, refineries, makers of consumer and commercial products, industrial facilities, and smaller area sources. The PFC controls being finalized in this action will help reduce VOC emissions by reducing evaporation, permeation and spillage from PFCs. The vehicle controls being finalized will also reduce VOC emissions; however, because these reductions will occur at cold temperatures the ozone benefits will be limited.

The science of ozone formation, transport, and accumulation is complex.[96] Ground-level ozone is produced and destroyed in a cyclical set of chemical reactions, many of which are sensitive to temperature and sunlight. When ambient temperatures and sunlight levels remain high for several days and the air is relatively stagnant, ozone and its precursors can build up and result in more ozone than typically would occur on a single high-temperature day. Ozone also can be transported into an area from pollution sources found hundreds of miles upwind, resulting in elevated ozone levels even in areas with low VOC or NOx emissions.

[96]U.S. EPA. Air Quality Criteria for Ozone and Related Photochemical Oxidants (Final). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-05/004aF-cF, 2006. This document is available in Docket EPA-HQ-OAR-2005-0036.

The current ozone National Ambient Air Quality Standards (NAAQS) established by EPA in 1997 has an 8-hour averaging time.[97] The 8-hour ozone NAAQS is based on well-documented science demonstrating that more people were experiencing adverse health effects at lower levels of exertion, over longer periods, and at lower ozone concentrations than addressed by the previous one-hour ozone NAAQS. The current ozone NAAQS addresses ozone exposures of concern for the general population and populations most at risk, including children active outdoors, outdoor workers, and individuals with pre-existing respiratory disease, such as asthma. The 8-hour ozone NAAQS is met at an ambient air quality monitoring site when the average of the annual fourth-highest daily maximum 8-hour average ozone concentration over three years is less than or equal to 0.084 ppm.

2. Health Effects of Ozone

The health and welfare effects of ozone are well documented and are assessed in the EPA's 2006 ozone Air Quality Criteria Document (ozone AQCD) and EPA staff papers.[98,99] Ozone can irritate the respiratory system, causing coughing, throat irritation, and/or uncomfortable sensation in the chest. Ozone can reduce lung function and make it more difficult to breathe deeply, and breathing may become more rapid and shallow than

[97] EPA's review of the ozone NAAQS is underway and a proposal is scheduled for June 2007 with a final rule scheduled for March 2008.

[98] U.S. EPA. Air Quality Criteria for Ozone and Related Photochemical Oxidants (Final). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-05/004aF-cF, 2006. This document is available in Docket EPA-HQ-OAR-2005-0036.

[99] U.S. EPA (2007) Review of National Ambient Air Quality Standards for Ozone, Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA-452/R-07-003. This document is available in Docket EPA-HQ-OAR-2005-0036.

normal, thereby limiting a person's activity. Ozone can also aggravate asthma, leading to more asthma attacks that require a doctor's attention and/or the use of additional medication. Animal toxicologic evidence indicates that with repeated exposure, ozone can inflame and damage the lining of the lungs, which may lead to permanent changes in lung tissue and irreversible reductions in lung function. People who are more susceptible to effects associated with exposure to ozone include children, the elderly, and individuals with respiratory disease such as asthma. There is also suggestive evidence that certain people may have greater genetic susceptibility. Those with greater exposures to ozone, for instance due to time spent outdoors (e.g., outdoor workers), are also of concern.

The recent ozone AQCD also examined relevant new scientific information which has emerged in the past decade, including the impact of ozone exposure on such health effects as changes in lung structure and biochemistry, inflammation of the lungs, exacerbation and causation of asthma, respiratory illness-related school absence, hospital admissions and premature mortality. Animal toxicologic studies have suggested potential interactions between ozone and PM with increased responses observed to mixtures of the two pollutants compared to either ozone or PM alone. The respiratory morbidity observed in animal studies along with the evidence from epidemiologic studies supports a causal relationship between acute ambient ozone exposures and increased respiratory-related emergency room visits and hospitalizations in the warm season. In addition, there is suggestive evidence of a contribution of ozone to cardiovascular-related morbidity and non-accidental and cardiopulmonary mortality.

### 3. Plant and Ecosystem Effects of Ozone

Ozone contributes to many environmental effects, with impacts to plants and ecosystems being of most concern. Ozone can produce both acute and chronic injury in sensitive species depending on the concentration level and the duration of the exposure. Ozone effects also tend to accumulate over the growing season of the plant, so that even lower concentrations experienced for a longer duration have the potential to create chronic stress on vegetation. Ozone damage to plants includes visible injury to leaves and a reduction in food production through impaired photosynthesis, both of which can lead to reduced crop yields, forestry production, and use of sensitive ornamentals in landscaping. In addition, the reduced food production in plants and subsequent reduced root growth and storage below ground, can result in other, more subtle plant and ecosystems impacts. These include increased susceptibility of plants to insect attack, disease, harsh weather, interspecies competition and overall decreased plant vigor. The adverse effects of ozone on forest and other natural vegetation can potentially lead to species shifts and loss from the affected ecosystems, resulting in a loss or reduction in associated ecosystem goods and services. Lastly, visible ozone injury to leaves can result in a loss of aesthetic value in areas of special scenic significance like national parks and wilderness areas. The final 2006 ozone AQCD presents more detailed information on ozone effects on vegetation and ecosystems.

### 4. Current and Projected 8-hour Ozone Levels

Currently, ozone concentrations exceeding the level of the 8-hour ozone NAAQS occur over wide geographic areas, including most of the nation's major population centers.[100] As of October 2006 approximately 157 million people live in the 116 areas that are currently designated as not in attainment with the 8-hour ozone NAAQS. There are 461 full or partial counties that make up the 116 8-hour ozone nonattainment areas.

EPA has already adopted many emission control programs that are expected to reduce ambient ozone levels. These control programs include the Clean Air Interstate Rule (70 FR 25162, May 12, 2005), as well as many mobile source rules (many of which are described in section V.D). As a result of these programs, the number of areas that fail to meet the 8-hour ozone NAAQS is expected to decrease.

Based on the recent ozone modeling performed for the CAIR analysis[101], barring additional local ozone precursor controls, we estimate 37 Eastern counties (where 24 million people are projected to live) will exceed the 8-hour ozone NAAQS in 2010. An additional 148 Eastern counties (where 61 million people are projected to live) are expected to be within 10 percent of violating the 8-hour ozone NAAQS in 2010.

States with 8-hour ozone nonattainment areas will be required to take action to bring these areas into compliance in the future. Based on the final rule designating and classifying 8-hour ozone nonattainment areas (69 FR 23951, April 30, 2004), most 8-

[100]A map of the 8-hour ozone nonattainment areas is included in the RIA for this rule.

[101]Technical Support Document for the Final Clean Air Interstate Rule Air Quality Modeling. This document is available in Docket EPA-HQ-OAR-2005-0036.

hour ozone nonattainment areas will be required to attain the 8-hour ozone NAAQS in the 2007 to 2013 time frame and then be required to maintain the 8-hour ozone NAAQS thereafter.[102] The expected ozone inventory reductions from the standards being finalized in this action may be useful to states in attaining or maintaining the 8-hour ozone NAAQS.

EPA's review of the ozone NAAQS is currently underway and a proposed decision in this review is scheduled for June 2007 with a final rule scheduled for March 2008. If the ozone NAAQS is revised then new nonattainment areas could be designated. While EPA is not relying on it for purposes of justifying this rule, the emission reductions from this rulemaking would also be helpful to states if there is an ozone NAAQS revision.

D. Particulate Matter

The cold temperature vehicle controls being finalized here will result in reductions of primary PM being emitted by vehicles. In addition, both the vehicle controls and the PFC controls will reduce VOCs that react in the atmosphere to form secondary $PM_{2.5}$, namely organic carbonaceous $PM_{2.5}$.

1. Background

[102]The Los Angeles South Coast Air Basin 8-hour ozone nonattainment area will have to attain before June 15, 2021.

Particulate matter (PM) represents a broad class of chemically and physically diverse substances. It can be principally characterized as discrete particles that exist in the condensed (liquid or solid) phase spanning several orders of magnitude in size. PM is further described by breaking it down into size fractions. $PM_{10}$ refers to particles generally less than or equal to 10 micrometers (µm) in diameter. $PM_{2.5}$ refers to fine particles, those particles generally less than or equal to 2.5 µm in diameter. Inhalable (or "thoracic") coarse particles refer to those particles generally greater than 2.5 µm but less than or equal to 10 µm in diameter. Ultrafine PM refers to particles with diameters generally less than 100 nanometers (0.1 µm). Larger particles (>10 µm) tend to be removed by the respiratory clearance mechanisms, whereas smaller particles are deposited deeper in the lungs.

Fine particles are produced primarily by combustion processes and by transformations of gaseous emissions (e.g., SOx, NOx and VOCs) in the atmosphere. The chemical and physical properties of $PM_{2.5}$ may vary greatly with time, region, meteorology and source category. Thus, $PM_{2.5}$, may include a complex mixture of different pollutants including sulfates, nitrates, organic compounds, elemental carbon and metal compounds. These particles can remain in the atmosphere for days to weeks and travel through the atmosphere hundreds to thousands of kilometers.

EPA has recently amended the PM NAAQS (71 FR 61144, October 17, 2006). The final rule, signed on September 21, 2006 and published on October 17, 2006, addressed revisions to the primary and secondary NAAQS for PM to provide increased

protection of public health and welfare, respectively. The primary $PM_{2.5}$ NAAQS include a short-term (24-hour) and a long-term (annual) standard. The level of the 24-hour $PM_{2.5}$ NAAQS has been revised from 65μg/m$^3$ to 35 μg/m$^3$ to provide increased protection against health effects associated with short-term exposures to fine particles. The current form of the 24-hour $PM_{2.5}$ standard was retained (e.g., based on the 98$^{th}$ percentile concentration averaged over three years). The level of the annual $PM_{2.5}$ NAAQS was retained at 15μg/m$^{3,}$ continuing protection against health effects associated with long-term exposures. The current form of the annual $PM_{2.5}$ standard was retained as an annual arithmetic mean averaged over three years, however, the following two aspects of the spatial averaging criteria were narrowed: (1) the annual mean concentration at each site shall be within 10 percent of the spatially averaged annual mean, and (2) the daily values for each monitoring site pair shall yield a correlation coefficient of at least 0.9 for each calendar quarter. With regard to the primary $PM_{10}$ standards, the 24-hour $PM_{10}$ NAAQS was retained at a level of 150 μg/m$^3$ not to be exceeded more than once per year on average over a three-year period. Given that the available evidence does not suggest an association between long-term exposure to coarse particles at current ambient levels and health effects, EPA has revoked the annual $PM_{10}$ standard.

With regard to the secondary PM standards, EPA has revised these standards to be identical in all respects to the revised primary standards. Specifically, EPA has revised the current 24-hour $PM_{2.5}$ secondary standard by making it identical to the revised 24-hour $PM_{2.5}$ primary standard, retained the annual $PM_{2.5}$ and 24-hour $PM_{10}$ secondary standards, and revoked the annual $PM_{10}$ secondary standards. This suite of secondary

PM standards is intended to provide protection against PM-related public welfare effects, including visibility impairment, effects on vegetation and ecosystems, and material damage and soiling.

2. Health Effects of PM

Scientific studies show ambient PM is associated with a series of adverse health effects. These health effects are discussed in detail in the 2004 Particulate Matter Air Quality Criteria Document (PM AQCD) as well as the 2005 PM Staff Paper.[103,104] Further discussion of health effects associated with PM can also be found in the RIA for this final rule.

Health effects associated with short-term exposures (e.g. hours to days) in ambient $PM_{2.5}$ include premature mortality, increased hospital admissions, heart and lung diseases, increased cough, adverse lower-respiratory symptoms, decrements in lung function and changes in heart rate rhythm and other cardiac effects. Studies examining populations exposed to different levels of air pollution over a number of years, including the Harvard Six Cities Study and the American Cancer Society Study, show associations between long-term exposure to ambient $PM_{2.5}$ and both total and cardiorespiratory

[103]U.S. EPA (2004) Air Quality Criteria for Particulate Matter (Oct 2004), Volume I Document No. EPA600/P-99/002aF and Volume II Document No. EPA600/P-99/002bF. This document is available in Docket EPA-HQ-OAR-2005-0036.

[104]U.S. EPA (2005) Review of the National Ambient Air Quality Standard for Particulate Matter: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper. EPA-452/R-05-005. This document is available in Docket EPA-HQ-OAR-2005-0036.

mortality. In addition, the reanalysis of the American Cancer Society cohort shows an association between fine particle and sulfate concentrations and lung cancer mortality.

Recently, several studies have highlighted the adverse effects of PM specifically from mobile sources.[105,106] Studies have also focused on health effects due to PM exposures on or near roadways.[107] Although these studies include all air pollution sources, including both spark-ignition (gasoline) and diesel powered vehicles, they indicate that exposure to PM emissions near roadways, thus dominated by mobile sources, are associated with health effects. Additional information on near-roadway health effects can be found in section III.B.2.d of this preamble.

3. Welfare Effects of PM

a. Visibility

i. Background

[105]Laden, F.; Neas, L.M.; Dockery, D.W.; Schwartz, J. (2000) Association of Fine Particulate Matter from Different Sources with Daily Mortality in Six U.S. Cities. *Environmental Health Perspectives* 108: 941-947.

[106]Janssen, N.A.H.; Schwartz, J.; Zanobetti, A.; Suh, H.H. (2002) Air Conditioning and Source-Specific Particles as Modifiers of the Effect of $PM_{10}$ on Hospital Admissions for Heart and Lung Disease. *Environmental Health Perspectives* 110: 43-49.

[107]Riediker, M.; Cascio, W.E.; Griggs, T.R..; Herbst, M.C.; Bromberg, P.A.; Neas, L.; Williams, R.W.; Devlin, R.B. (2003) Particulate Matter Exposures in Cars is Associated with Cardiovascular Effects in Healthy Young Men. *Am. J. Respir. Crit. Care Med.* 169: 934-940.

Visibility can be defined as the degree to which the atmosphere is transparent to visible light.[108] Visibility impairment manifests in two principal ways: as local visibility impairment and as regional haze.[109] Local visibility impairment may take the form of a localized plume, a band or layer of discoloration appearing well above the terrain as a result from complex local meteorological conditions. Alternatively, local visibility impairment may manifest as an urban haze, sometimes referred to as a "brown cloud." This urban haze is largely caused by emissions from multiple sources in the urban areas and is not typically attributable to only one nearby source or to long-range transport. The second type of visibility impairment, regional haze, usually results from multiple pollution sources spread over a large geographic region. Regional haze can impair visibility over large regions and across states.

Visibility is important because it has direct significance to people's enjoyment of daily activities in all parts of the country. Individuals value good visibility for the well-being it provides them directly, where they live and work, and in places where they enjoy recreational opportunities. Visibility is also highly valued in significant natural areas such as national parks and wilderness areas, and special emphasis is given to protecting

[108]National Research Council, 1993. Protecting Visibility in National Parks and Wilderness Areas. National Academy of Sciences Committee on Haze in National Parks and Wilderness Areas. National Academy Press, Washington, DC. This document is available in Docket EPA-HQ-OAR-2005-0036. This book can be viewed on the National Academy Press Website at http://www.nap.edu/books/0309048443/html/.

[109] See discussion in U.S. EPA , National Ambient Air Quality Standards for Particulate Matter; Proposed Rule; January 17, 2006, Vol71 p 2676. This information is available electronically at http://epa.gov/fedrgstr/EPA-AIR/2006/January/Day-17/a177.pdf.

visibility in these areas. For more information on visibility see the 2004 PM AQCD as well as the 2005 PM Staff Paper.[110,111]

Fine particles are the major cause of reduced visibility in parts of the United States. To address the welfare effects of PM on visibility, EPA set secondary $PM_{2.5}$ standards which would act in conjunction with the establishment of a regional haze program. In setting this secondary standard, EPA concluded that $PM_{2.5}$ causes adverse effects on visibility in various locations, depending on PM concentrations and factors such as chemical composition and average relative humidity. The secondary (welfare-based) $PM_{2.5}$ NAAQS was established as equal to the suite of primary (health-based) NAAQS. Furthermore, section 169 of the Act provides additional authorities to remedy existing visibility impairment and prevent future visibility impairment in the 156 national parks, forests and wilderness areas categorized as mandatory class I Federal areas (62 FR 38680-81, July 18, 1997).[112] In July 1999 the regional haze rule (64 FR 35714) was put in place to protect the visibility in mandatory class I federal areas. Visibility can be said to be impaired in both $PM_{2.5}$ nonattainment areas and mandatory class I federal areas.

ii Current Visibility Impairment

[110] U.S. EPA (2004) Air Quality Criteria for Particulate Matter (Oct 2004), Volume I Document No. EPA600/P-99/002aF and Volume II Document No. EPA600/P-99/002bF. This document is available in Docket EPA-HQ-OAR-2005-0036.

[111] U.S. EPA (2005) Review of the National Ambient Air Quality Standard for Particulate Matter: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper. EPA-452/R-05-005. This document is available in Docket EPA-HQ-OAR-2005-0036.

[112] These areas are defined in section 162 of the Act as those national parks exceeding 6,000 acres, wilderness areas and memorial parks exceeding 5,000 acres, and all international parks which were in existence on August 7, 1977.

Recently designated $PM_{2.5}$ nonattainment areas indicate that, as of October 2006, almost 90 million people live in nonattainment areas for the 1997 $PM_{2.5}$ NAAQS. Thus, at least these populations would likely be experiencing visibility impairment, as well as many thousands of individuals who travel to these areas. In addition, while visibility trends have improved in mandatory class I federal areas, the most recent data show that these areas continue to suffer from visibility impairment.[113] In summary, visibility impairment is experienced throughout the U.S., in multi-state regions, urban areas, and remote mandatory class I federal areas.[114,115] The mandatory class I federal areas are listed in Chapter 3 of the RIA for this action. The areas that have design values above the 1997 $PM_{2.5}$ NAAQS are also listed in Chapter 3 of the RIA for this action.

iii. Future Visibility Impairment

Recent modeling for the Clean Air Interstate Rule (CAIR) was used to project visibility conditions in mandatory class I federal areas across the country in 2015. The results for the mandatory class I federal areas suggest that these areas are predicted to continue to have annual average deciview levels above background in the future.[116] Modeling done for the PM NAAQS also projected $PM_{2.5}$ levels in 2015. These

[113]US EPA, Regulatory Impact Analysis for the Final Clean Air Interstate Rule. This document is available in Docket EPA-HQ-OAR-2005-0036.

[114]US EPA, Air Quality Designations and Classifications for the Fine Particles (PM2.5) National Ambient Air Quality Standards, December 17, 2004. (70 FR 943, Jan 5. 2005) This document is also available on the web at: http://www.epa.gov/pmdesignations/.

[115]US EPA. Regional Haze Regulations, July 1, 1999. (64 FR 35714, July 1, 1999)

[116]The deciview metric describes perceived visual changes in a linear fashion over its entire range, analogous to the decibel scale for sound. A deciview of 0 represents pristine conditions. The higher the deciview value, the worse the visibility, and an improvement in visibility is a decrease in deciview value.

projections include all sources of $PM_{2.5}$, including the engines covered in this rule, and suggest that $PM_{2.5}$ levels above the NAAQS will persist into the future.

The vehicles that will be subject to the standards contribute to visibility concerns in these areas through both their primary PM emissions and their VOC emissions, which contribute to the formation of secondary $PM_{2.5}$. The PFCs that will be subject to the standards also contribute to visibility concerns through their VOC emissions. Reductions in these direct PM and VOC emissions will help to improve visibility across the nation, including mandatory class I federal areas.

b. Atmospheric Deposition

Wet and dry deposition of ambient particulate matter delivers a complex mixture of metals (e.g., mercury, zinc, lead, nickel, aluminum, cadmium), organic compounds (e.g., POM, dioxins, furans) and inorganic compounds (e.g., nitrate, sulfate) to terrestrial and aquatic ecosystems. EPA's Great Waters Program has identified 15 pollutants whose deposition to water bodies has contributed to the overall contamination loadings to these Great Waters. These 15 compounds include several heavy metals and a group known as polycyclic organic matter (POM). Within POM are the polycyclic aromatic hydrocarbons (PAHs). PAHs in the environment may be present in the gas or particle phase, although the bulk will be adsorbed onto airborne particulate matter. In most cases, human-made sources of PAHs account for the majority of PAHs released to the environment. The PAHs are usually the POMs of concern as many PAHs are probable

human carcinogens.[117] For some watersheds, atmospheric deposition represents a significant input to the total surface water PAH burden.[118,119] Emissions from mobile sources have been found to account for a percentage of the atmospheric deposition of PAHs. For instance, recent studies have reported gasoline and diesel vehicles as major contributors in the atmospheric deposition of PAHs to Chesapeake Bay, Massachusetts Bay and Casco Bay.[120,121] The vehicle controls being finalized may help to reduce deposition of heavy metals and POM.

c. Materials Damage and Soiling

The deposition of airborne particles can also reduce the aesthetic appeal of buildings and culturally important articles through soiling, and can contribute directly (or in conjunction with other pollutants) to structural damage by means of corrosion or erosion.[122] Particles affect materials principally by promoting and accelerating the corrosion of metals, by degrading paints, and by deteriorating building materials such as

---

[117]Deposition of Air Pollutants to the Great Waters-Third Report to Congress, Office of Air Quality Planning and Standards, June 2000, EPA453-R-00-005. This document is available in Docket EPA-HQ-OAR-2005-0036.

[118]Simcik, M.F.; Eisenrich, S.J.; Golden, K.A.; Liu, S.; Lipiatou, E.; Swackhamer, D.L.; and Long, D.T. (1996) Atmospheric Loading of Polycyclic Aromatic Hydrocarbons to Lake Michigan as Recorded in the Sediments. *Environ. Sci. Technol.* 30:3039-3046.

[119]Simcik, M.F.; Eisenrich, S.J.; and Lioy, P.J. (1999) Source Apportionment and Source/Sink Relationships of PAHs in the Coastal Atmosphere of Chicago and Lake Michigan. *Atmospheric Environment* 33: 5071-5079.

[120]Dickhut, R.M.; Canuel, E.A.; Gustafson, K.E.; Liu, K.; Arzayus, K.M.; Walker, S.E.; Edgecombe, G.; Gaylor, M.O.; and McDonald, E.H. (2000) Automotive Sources of Carcinogenic Polycyclic Aromatic Hydrocarbons Associated with Particulate Matter in the Chesapeake Bay Region. *Environ. Sci. Technol.* 34: 4635-4640.

[121]Golomb, D.; Barry, E.; Fisher, G.; Varanusupakul, P.; Koleda, M.; amd Rooney, T. (2001) Atmospheric Deposition of Polycyclic Aromatic Hydrocarbons near New England Coastal Waters. *Atmospheric Environment* 35: 6245-6258.

[122]U.S EPA (2005) Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper. This document is available in Docket EPA-HQ-OAR-2005-0036.

concrete and limestone. Particles contribute to these effects because of their electrolytic, hygroscopic, and acidic properties, and their ability to sorb corrosive gases (principally sulfur dioxide). The rate of metal corrosion depends on a number of factors, including the deposition rate and nature of the pollutant; the influence of the metal protective corrosion film; the amount of moisture present; variability in the electrochemical reactions; the presence and concentration of other surface electrolytes; and the orientation of the metal surface.

### 4. Current and Projected $PM_{2.5}$ Levels

In 2005 EPA designated 39 nonattainment areas for the 1997 $PM_{2.5}$ NAAQS based on air quality design values (using 2001-2003 or 2002-2004 measurements) and a number of other factors.[123] (See 70 FR 943, January 5, 2005; 70 FR 19844, April 14, 2005.) These areas are comprised of 208 full or partial counties with a total population exceeding 88 million. As mentioned in section III.D.1, the 1997 $PM_{2.5}$ NAAQS was recently revised and the 2006 $PM_{2.5}$ NAAQS became effective on December 18, 2006. Table III.D-1 presents the number of counties in areas currently designated as nonattainment for the 1997 $PM_{2.5}$ NAAQS as well as the number of additional counties which have monitored data that is violating the 2006 $PM_{2.5}$ NAAQS. Nonattainment areas will be designated with respect to the new 2006 $PM_{2.5}$ NAAQS in early 2010.

[123] The full details involved in calculating a $PM_{2.5}$ design value are given in Appendix N of 40 CFR Part 50.

Table III.D-1. $PM_{2.5}$ Standards: Current Nonattainment Areas and Other Violating Counties

| | Number of Counties | Population[1] |
|---|---|---|
| 1997 $PM_{2.5}$ Standards: 39 areas currently designated | 208 | 88,394,000 |
| 2006 $PM_{2.5}$ Standards: Counties with violating monitors[2] | 49 | 18,198,676 |
| Total | 257 | 106,592,676 |

[1] Population numbers are from 2000 census data.

[2] This table provides an estimate of the counties violating the 2006 $PM_{2.5}$ NAAQS based on 2003-05 air quality data. The areas designated as nonattainment for the 2006 $PM_{2.5}$ NAAQS will be based on 3 years of air quality data from later years. Also, the county numbers in the summary table include only the counties with monitors violating the 2006 $PM_{2.5}$ NAAQS. The monitored county violations may be an underestimate of the number of counties and populations that will eventually be included in areas with multiple counties designated nonattainment.

Based on modeling performed for the PM NAAQS analysis, we estimate that 52 counties (where 53 million people are projected to live) will exceed the 2006 $PM_{2.5}$ standard in 2015.[124,125] In addition, 54 counties (where 27 million people are projected to live) are expected to be within 10 percent of violating the 2006 $PM_{2.5}$ NAAQS in 2015.

Areas designated as not attaining the 1997 $PM_{2.5}$ NAAQS will need to attain these standards in the 2010 to 2015 time frame, and then be required to maintain the NAAQS

[124] Note that this analysis identifies only counties projected to have a violating monitor; when designated in the future, some areas may include additional contributing counties. Thus, the total number of counties designated in the future and the associated population would likely exceed these estimates.

[125] Regulatory Impact Analysis for the final PM NAAQS rule. This document is available in Docket EPA-HQ-OAR-2005-0036.

thereafter. The attainment dates associated with the potential nonattainment areas based on the 2006 $PM_{2.5}$ NAAQS would likely be in the 2015 to 2020 timeframe. The emissions standards being finalized in this action would become effective between 2009 and 2015, making the expected PM and VOC inventory reductions useful to states in attaining or maintaining the $PM_{2.5}$ NAAQS.

5. Current $PM_{10}$ Levels

Air quality monitoring data indicates that as of October 2006 approximately 28.5 million people live in 46 designated $PM_{10}$ nonattainment areas, which include all or part of 46 counties. The RIA for this rule lists the $PM_{10}$ nonattainment areas and their populations, as of October 2006. The expected PM and VOC inventory reductions from the standards being finalized in this action could be useful to states in maintaining the $PM_{10}$ NAAQS.

## IV. What Are the Emissions, Air Quality, and Public Health Impacts of This Rule?

### A. Emissions Impacts of All Rule Provisions Combined

The emissions analysis presented in section IV.A of this preamble is described in more detail in Chapter 2.2.2. of the RIA. The emissions analysis has been updated since the proposal, largely to include the effects of the recently proposed Renewable Fuels

Standard, which was required by the Energy Policy Act. The emissions analysis examines the 0.62 vol% standard but does not include the 1.3% maximum average, because of the lead time necessary to conduct inventory modeling. Thus, the emission reductions from highway vehicles and other sources attributable to the fuel benzene standard are underestimated in many areas of the country, particularly in areas where fuel benzene levels were highest without control, such as the Northwest. This issue is discussed in more detail in the RIA.

### 1. How Will MSAT Emissions Be Reduced?

Figure IV.A-1 depicts the estimated reduction in total air toxic emissions emitted by mobile sources between 1990 and 2030, with and without the standards being finalized in this rule. These estimates do not include diesel PM. Trends in diesel PM emissions are discussed in the regulatory impact analysis for this rule. Without standards being finalized in this rule, emissions of air toxics from mobile sources will be reduced by about 70% percent between 1990 and 2030, from about 3.3 million tons to 1.3 million tons. This will occur despite a projected increase in vehicle miles traveled of over 100 percent, and a projected 150% increase in nonroad activity, based on units of work called horsepower hours. Without additional controls, air toxic emissions from mobile sources would begin to increase after 2015. Similar trends are observed for benzene (see Figure IV.A-2), with a reduction in emissions from about 380,000 tons in 1990 to less than

170,000 tons in 2030, but emissions from mobile sources begin to increase again after 2015.

Figure IV.A-1. Estimated Reduction in Air Toxic Emissions Emitted by Mobile Sources, 1990 to 2030, With and Without Standards Being Finalized in this Rule

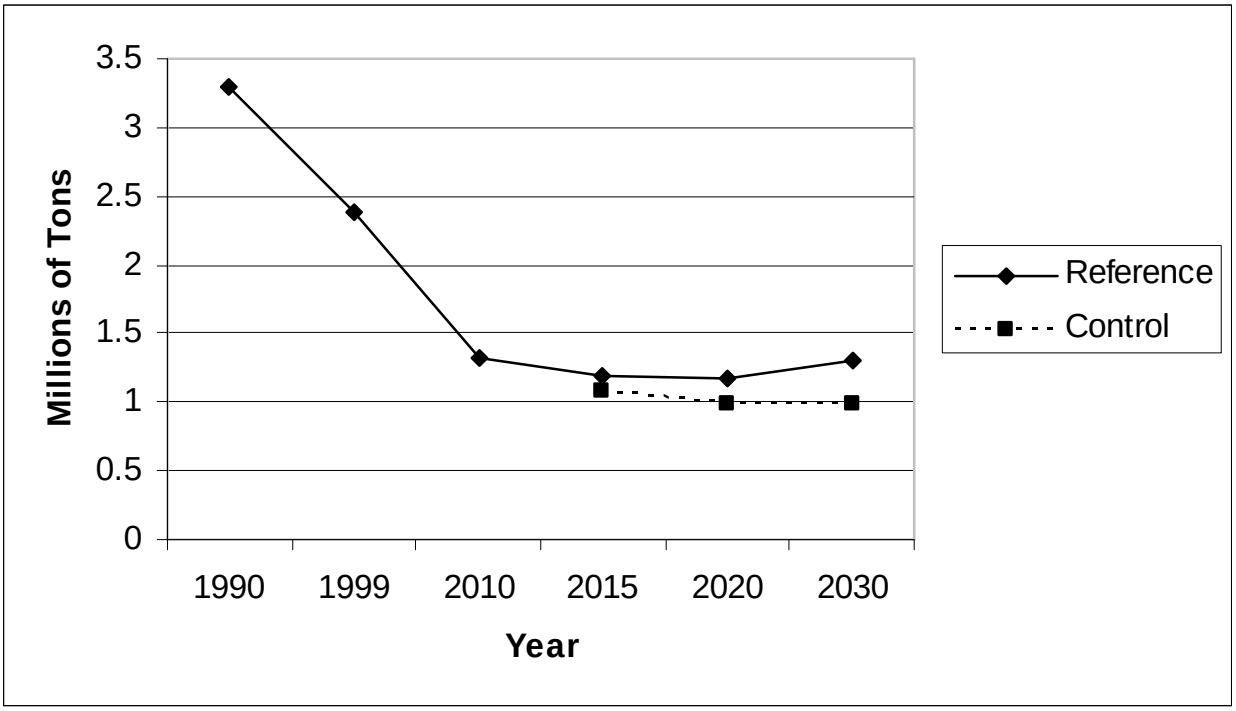
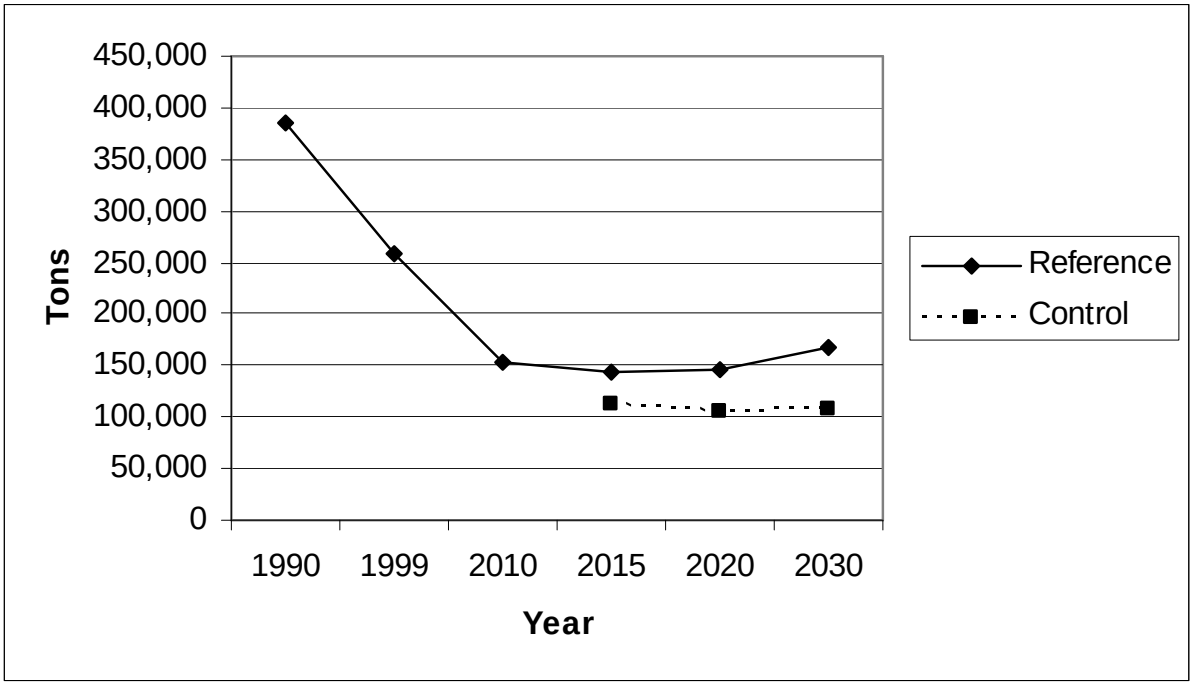


Figure IV.A-2. Estimated Reduction in Benzene Emissions Emitted by Mobile Sources, 1990 to 2030, With and Without Standards Being Finalized in this Rule



Total emissions of MSATs from mobile and stationary sources in 2030 will be 330,000 tons less than they would have been without this rule (Figure IV.A-3). Of these 330,000 tons of reductions, 310,000 will be from mobile sources, with the rest from portable fuel containers (PFCs) and gasoline distribution.[126] Table IV.A-1 summarizes MSAT reductions by source sector in 2015, 2020, and 2030. In addition, total benzene emissions from mobile and stationary sources will be 61,000 tons less than they would have been without this rule (Figure IV.A-4). Table IV.A-2 depicts reductions in benzene by source sector from this rule.

In 2030, annual benzene emissions from gasoline on-road mobile sources will be 45% lower as a result of this rule (Figure IV.A-5), and over 60% lower than they were in 1999. In addition, benzene emissions from gasoline nonroad equipment will be 14% lower in 2030, and over 45% lower than they were in 1999. Benzene emissions from PFCs will be reduced by almost 80% in 2030 (Figure IV.A-6), and benzene emissions from gasoline distribution by over 30% in 2030. For total MSAT emissions from on-road mobile sources, there will be a 38% reduction in MSAT emissions in 2030 (Figure IV.A-7), and a 65% reduction from 1999 levels.

Table IV.A-3 provides estimated reductions in emissions from individual MSATs in 2015, 2020 and 2030, from gasoline vehicles, gasoline nonroad engines, and PFCs as a result of the controls being finalized in this rule.

[126] Reduction in fuel benzene will reduce emissions through the whole distribution chain.

Figure IV.A-3. Reductions in Total MSAT Emissions from All Sources Due to Standards Being Finalized in this Rule

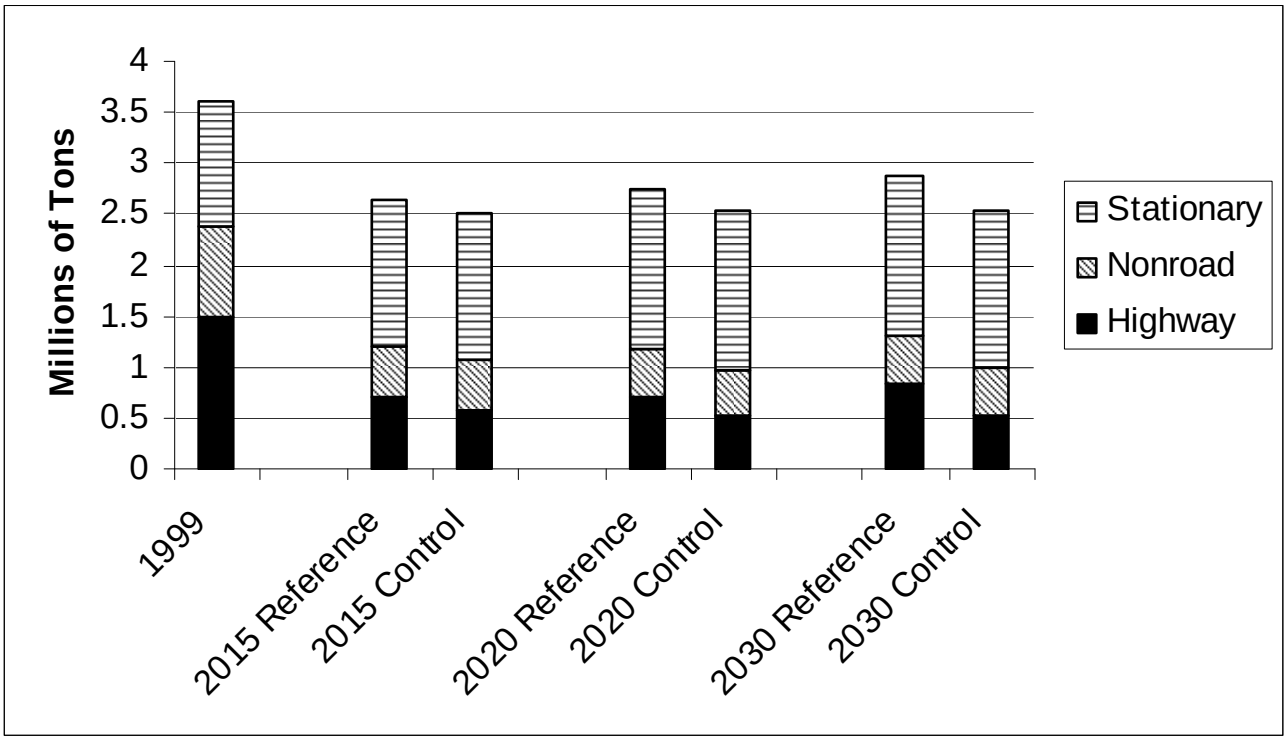


Figure IV.A-4. Reductions in Benzene Emissions from All Sources Due to Standards Being Finalized in this Rule

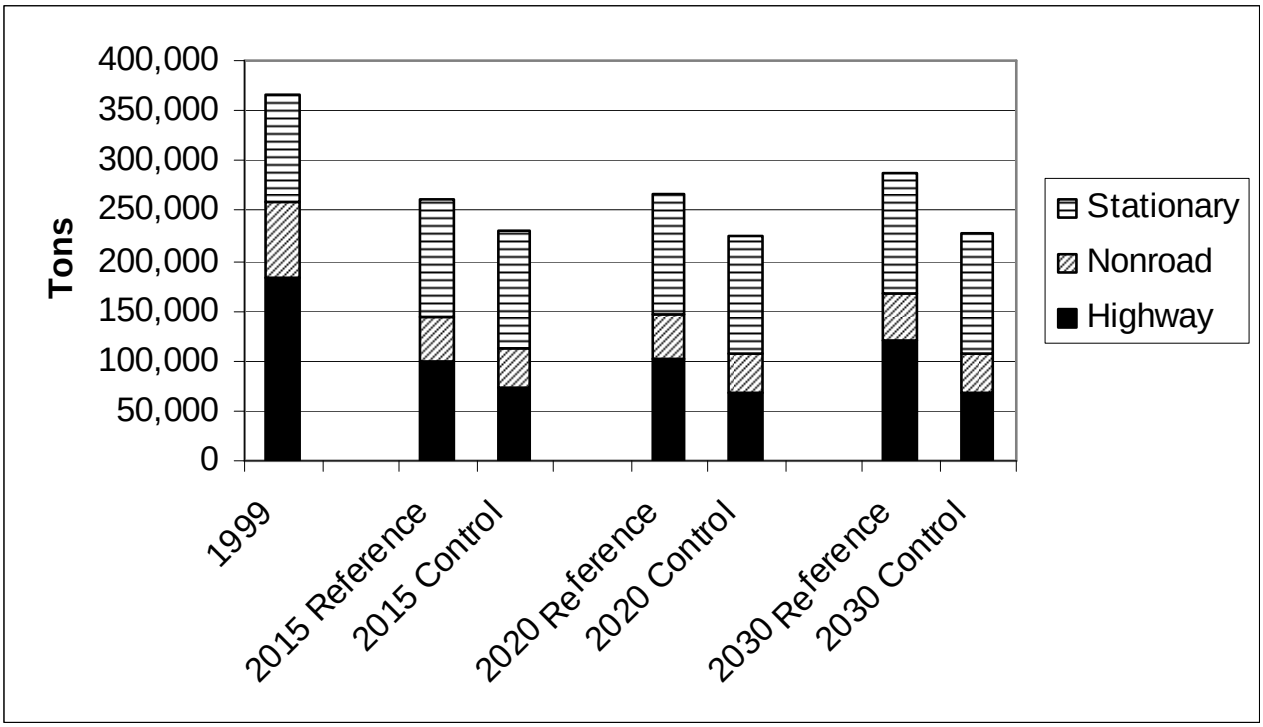


**Table IV.A-1. Estimated Reductions in MSAT Emissions from All Control Measures by Sector, 2015 to 2030**

| MSAT | 1999 | 2015 | | | 2020 | | | 2030 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Without Rule (tons) | With Rule (tons) | Reduction (tons) | Without Rule (tons) | With Rule (tons) | Reduction (tons) | Without Rule (tons) | With Rule (tons) | Reduction (tons) |
| **Gasoline Onroad Mobile Sources** | 1,452,739 | 675,781 | 558,666 | 117,115 | 693,189 | 507,782 | 185,408 | 808,141 | 505,074 | 303,067 |
| **Gasoline Nonroad Mobile Sources** | 806,725 | 449,422 | 443,973 | 5,449 | 406,196 | 400,816 | 5,380 | 412,617 | 406,856 | 5,761 |
| **PFCs** | 37,166 | 27,355 | 9,893 | 17,462 | 29,338 | 10,672 | 18,666 | 33,430 | 12,264 | 21,166 |
| **Gasoline Distribution** | 57,765 | 62,870 | 62,059 | 811 | 64,942 | 64,092 | 850 | 64,942 | 64,092 | 850 |
| **Total** | 2,354,395 | 1,215,428 | 1,074,591 | 140,837 | 1,193,665 | 983,362 | 210,303 | 1,319,130 | 988,286 | 330,844 |

**Table IV.A-2. Estimated Reductions in Benzene Emissions from All Control Measures by Sector, 2015 to 2030**

| Benzene | 1999 | 2015 | | | 2020 | | | 2030 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Without Rule (tons) | With Rule (tons) | Reduction (tons) | Without Rule (tons) | With Rule (tons) | Reduction (tons) | Without Rule (tons) | With Rule (tons) | Reduction (tons) |
| **Gasoline Onroad Mobile Sources** | 183,660 | 97,789 | 71,688 | 26,101 | 101,514 | 65,878 | 35,636 | 119,016 | 65,601 | 53,415 |
| **Gasoline Nonroad Mobile Sources** | 68,589 | 41,343 | 35,825 | 5,518 | 40,161 | 34,717 | 5,444 | 42,994 | 37,167 | 5,827 |
| **PFCs** | 853 | 992 | 215 | 777 | 1,063 | 232 | 831 | 1,210 | 267 | 944 |
| **Gasoline Distribution** | 1,984 | 2,445 | 1,635 | 810 | 2,621 | 1,772 | 849 | 2,621 | 1,772 | 849 |
| **Total** | 255,086 | 142,569 | 109,363 | 33,206 | 145,359 | 102,599 | 42,760 | 165,841 | 104,807 | 61,035 |

Figure IV.A-5. Benzene Emission Reductions from Gasoline Onroad Mobile Sources with All Controls in Place

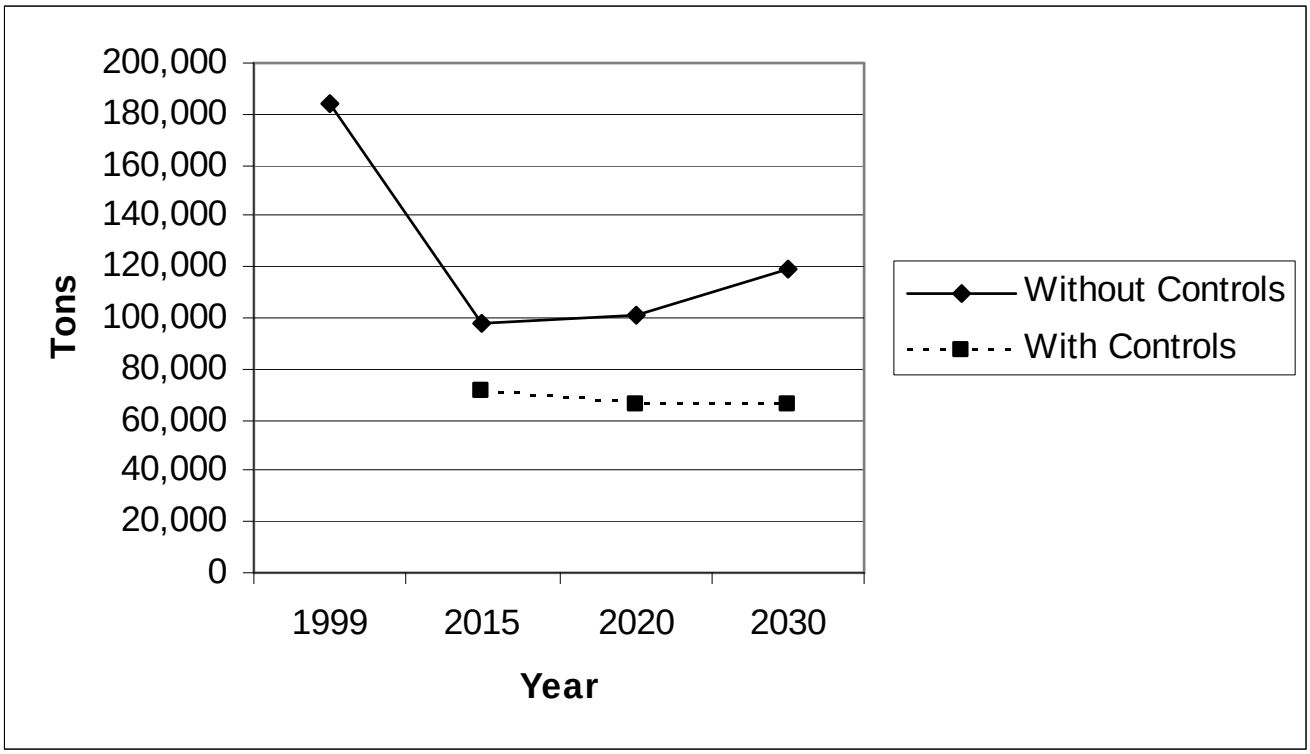


Figure IV.A-6. Benzene Emission Reductions from Portable Fuel Containers with All Controls in Place

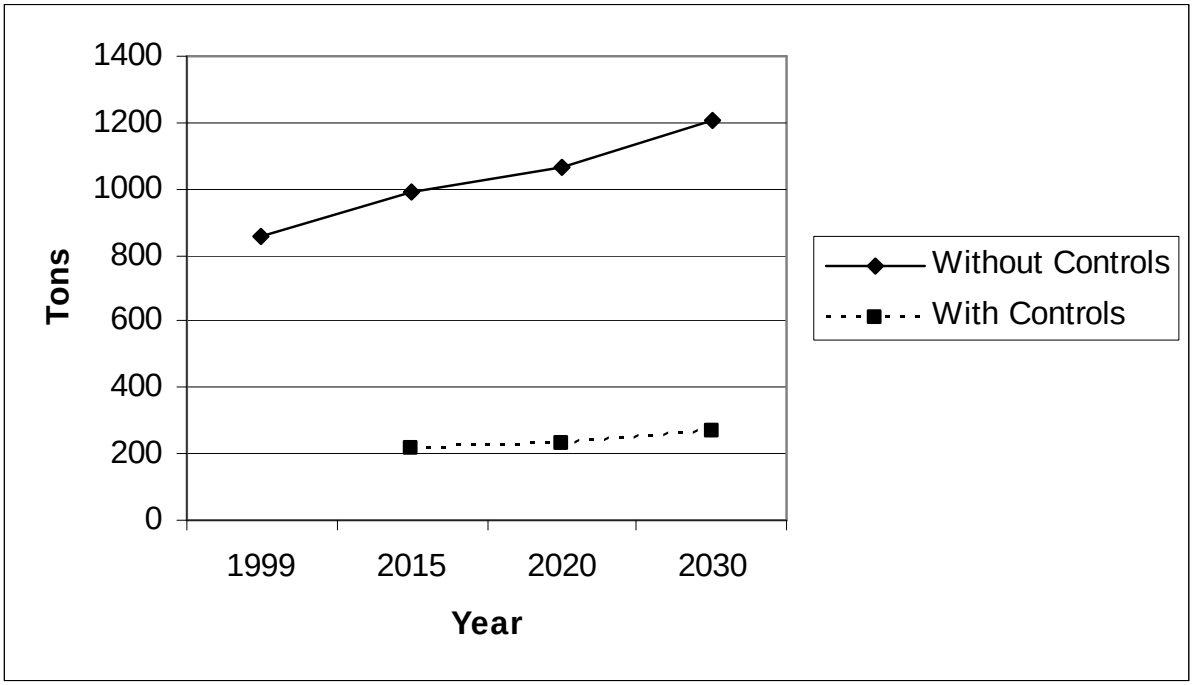


Figure IV.A-7. Total MSAT Emission Reductions from Gasoline Onroad Mobile Sources with All Controls in Place

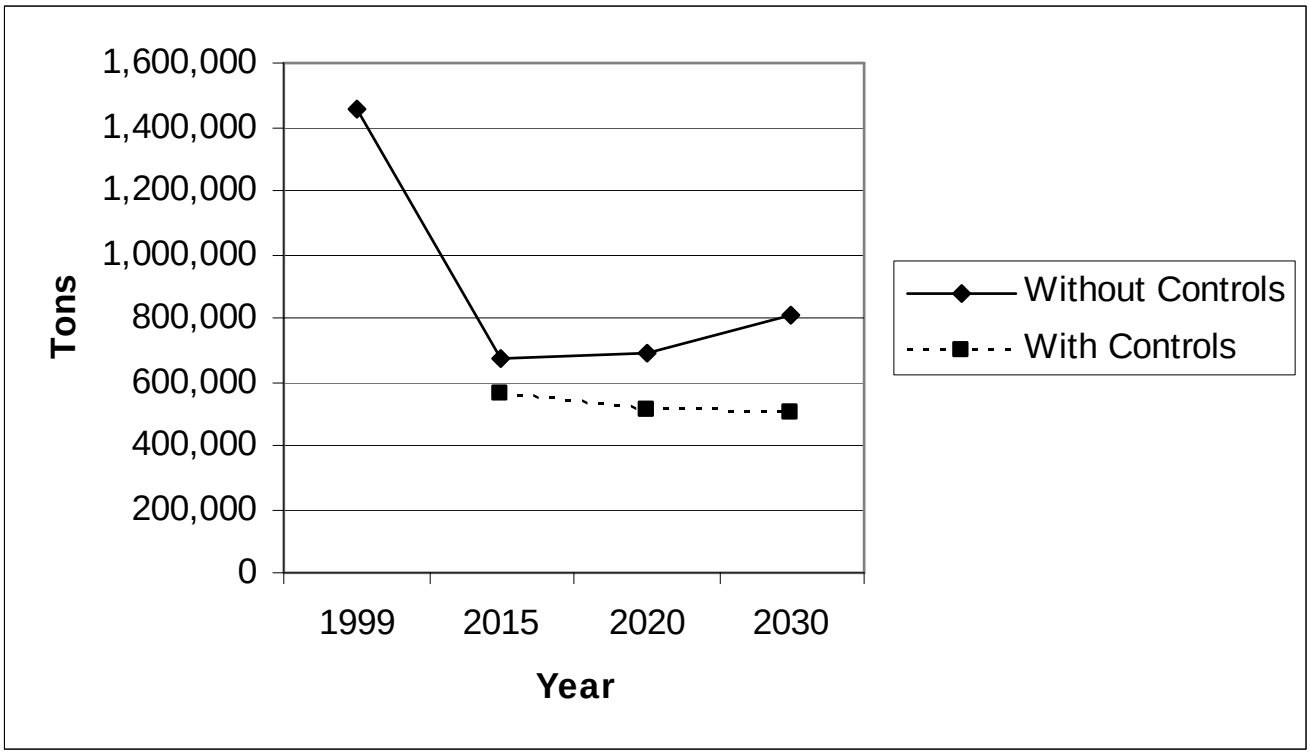


Table IV.A-3. Estimated Reductions in Emissions from Individual MSATs in 2015, 2020 and 2030, from Gasoline Vehicles, Gasoline Nonroad Engines, and Portable Fuel Containers, Resulting from the Cumulative Impacts of the Controls in this Rule[127]

| MSAT | 1999 | 2015 | | | 2020 | | | 2030 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (tons) | Without Rule (tons) | With Rule (tons) | Reductions (tons) | Without Rule (tons) | With Rule (tons) | Reductions (tons) | Without Rule (tons) | With Rule (tons) | Reductions (tons) |
| 1,3-Butadiene | 31,234 | 14,771 | 13,259 | 1,512 | 15,037 | 12,535 | 2,501 | 17,054 | 12,834 | 4,220 |
| 2,2,4-Trimethylpentane | 296,310 | 166,270 | 149,178 | 17,091 | 159,892 | 133,578 | 26,314 | 174,824 | 132,763 | 42,061 |
| Acetaldehyde | 27,800 | 21,223 | 18,154 | 3,069 | 22,156 | 17,011 | 5,145 | 25,754 | 17,213 | 8,541 |
| Acrolein | 3,835 | 1,650 | 1,457 | 193 | 1,665 | 1,347 | 317 | 1,889 | 1,360 | 529 |
| Benzene | 250,227 | 140,124 | 107,728 | 32,396 | 142,737 | 100,827 | 41,911 | 163,221 | 103,035 | 60,186 |
| Ethyl Benzene | 120,150 | 61,300 | 54,805 | 6,495 | 59,963 | 49,968 | 9,995 | 66,823 | 50,830 | 15,992 |
| Formaldehyde | 74,053 | 32,341 | 28,096 | 4,245 | 33,350 | 26,371 | 6,979 | 38,472 | 26,946 | 11,526 |
| Hexane | 106,464 | 57,852 | 52,042 | 5,810 | 54,673 | 46,926 | 7,747 | 59,152 | 48,029 | 11,124 |
| MTBE | 143,350 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Propionaldehyde | 4,142 | 2,195 | 1,965 | 231 | 2,249 | 1,869 | 380 | 2,565 | 1,932 | 633 |
| Styrene | 16,352 | 8,212 | 6,985 | 1,227 | 8,423 | 6,405 | 2,018 | 9,731 | 6,365 | 3,366 |

[127] Napthalene reductions from controls in this rule are not quantified, due to limitations in modeling tools.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Toluene | 729,908 | 390,688 | 347,363 | 43,325 | 380,420 | 312,542 | 67,878 | 420,534 | 310,654 | 109,880 |
| Xylenes | 487,768 | 252,993 | 228,561 | 24,432 | 245,180 | 206,913 | 38,267 | 270,775 | 208,839 | 61,936 |
| **TOTAL MSATs** | **2,291,593** | **1,149,618** | **1,009,592** | **140,026** | **1,125,744** | **916,291** | **209,453** | **1,250,794** | **920,800** | **329,994** |

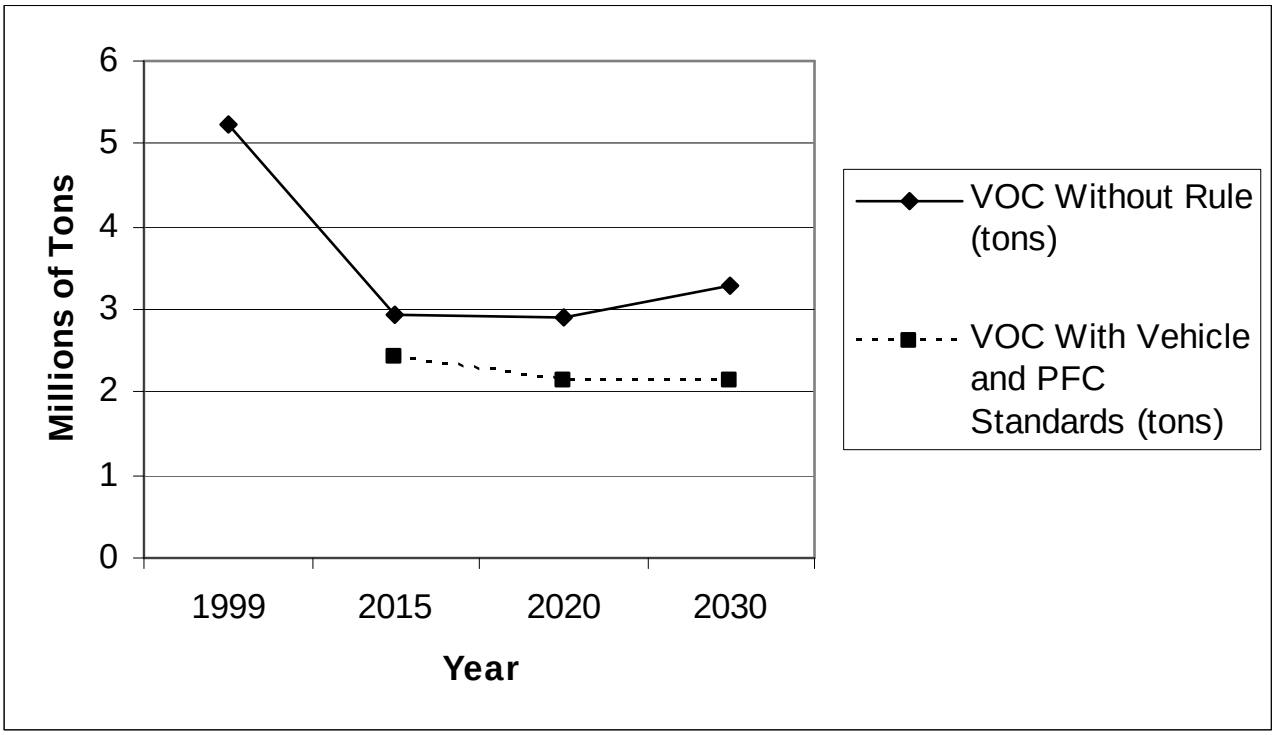
2. How Will VOC Emissions Be Reduced?

VOC emissions will be reduced by the hydrocarbon emission standards for both light-duty vehicles and PFCs. As seen in the table and accompanying figure below Table IV.A-4 and Figure IV.A-8, annual VOC emission reductions from both of these sources will be 34% lower in 2030 because of this rule, and 59% lower than in 1999.

Table IV.A-4. Estimated Reductions in VOC Emissions from Light-Duty Gasoline Vehicles and PFCs, 1999 to 2030

| | **1999** | **2015** | **2020** | **2030** |
|---|---|---|---|---|
| VOC Without Rule (tons) | 5,224,921 | 2,944,491 | 2,892,134 | 3,281,752 |
| VOC With Vehicle and PFC Standards (tons) | | 2,420,860 | 2,146,476 | 2,153,735 |
| VOC Reduction (tons) | | 523,631 | 745,658 | 1,128,017 |

Figure IV.A-8. Estimated Reductions in VOC Emissions from Light-Duty Gasoline Vehicles and PFCs, 1999 to 2030



3. How Will PM Emissions Be Reduced?

EPA expects that the cold-temperature vehicle standards will reduce exhaust emissions of direct $PM_{2.5}$ by over 19,000 tons in 2030 nationwide (see Table IV.A-5 below). Our analysis of the data from vehicles meeting Tier 2 emission standards indicate that PM emissions follow a monotonic relationship with temperature, with lower temperatures corresponding to higher vehicle emissions. Additionally, the analysis shows the ratio of PM to total non-methane hydrocarbons (NMHC) to be independent of temperature.[128] Our testing indicates that strategies which reduce NMHC start emissions at cold temperatures also reduce direct PM emissions. Based on these findings, direct PM emissions at cold temperatures were estimated using a constant PM to NMHC ratio. PM emission reductions were estimated by assuming that NMHC reductions will result in proportional reductions in PM. This assumption is supported by test data. For more detail, see Chapter 2.1 of the RIA.

Table IV.A-5. Estimated National Reductions in Direct $PM_{2.5}$ Exhaust Emissions from Light-Duty Gasoline Vehicles and Trucks, 2015 to 2030

| | **2015** | **2020** | **2030** |
|---|---|---|---|

[128] U. S. EPA. 2005. Cold-temperature exhaust particulate matter emissions. Memorandum from Chad Bailey to docket EPA-HQ-OAR-2005-0036.

| | | | |
|---|---|---|---|
| $PM_{2.5}$ Reductions from Vehicle Standards (tons) | 7,068 | 11,646 | 19,421 |

B. Emission Impacts By Provision

1. Vehicle Controls

We are finalizing a hydrocarbon standard for gasoline passenger vehicles at cold temperatures. This standard will reduce VOC at temperatures below 75˚F, including air toxics such as benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and acrolein, and will also reduce emissions of direct and secondary PM. We are also finalizing new evaporative emissions standards for Tier 2 vehicles starting in 2009. These new evaporative standards reflect the emissions levels already being achieved by manufacturers.

a. Volatile Organic Compounds (VOC)

Table IV.B-1 shows the VOC exhaust emission reductions from light-duty gasoline vehicles and trucks that will result from the cold temperature hydrocarbon standard alone. The standards will reduce VOC emissions from these vehicles in 2030 by 31%. Overall VOC emissions from these vehicles will be reduced by 82% between 1999

and 2030 (including the effects of these standards as well as other standards in place, such as Tier 2).

Table IV.B-1. Estimated National Reductions in Exhaust VOC Emissions from Light-Duty Gasoline Vehicles and Trucks, 1999 to 2030.

| | **1999** | **2010** | **2015** | **2020** | **2030** |
|---|---|---|---|---|---|
| VOC Without Rule (tons) | 4,899,891 | 2,990,760 | 2,614,987 | 2,538,664 | 2,878,836 |
| VOC With Proposed Vehicle Standards (tons) | | 2,839,012 | 2,293,703 | 2,009,301 | 1,996,074 |
| VOC Reductions from Vehicle Standards (tons) | | 151,748 | 321,284 | 529,363 | 882,762 |
| Percentage Reduction | | 5% | 12% | 21% | 31% |

b. Toxics

In 2030, we estimate that the vehicle standards will result in a 38% reduction in total emissions of the MSATs and a 39% reduction in benzene emissions from light-duty vehicles and trucks (see Tables IV.B-1 and IV.B-2). Between 1999 and 2030, total MSATs from light-duty gasoline vehicles and trucks will be reduced by 64%, and benzene by 59%.

Table IV.B-1. Estimated National Reductions in Exhaust MSAT Emissions from Light-Duty Gasoline Vehicles and Trucks, 1999 to 2030

| | **1999** | **2010** | **2015** | **2020** | **2030** |
|---|---|---|---|---|---|
| MSATs Without Rule (tons) | 1,376,002 | 695,408 | 650,012 | 669,707 | 783,648 |
| MSATs With Vehicle Standards (tons) | | 644,312 | 542,281 | 492,700 | 488,824 |
| MSAT Reductions from Vehicle Standards (tons) | | 51,987 | 107,731 | 177,007 | 294,824 |
| Percentage Reduction | | 7% | 17% | 26% | 38% |

Table IV.B-2. Estimated National Reductions in Benzene Exhaust Emissions from Light-Duty Gasoline Vehicles and Trucks, 1999 to 2030.

| | **1999** | **2010** | **2015** | **2020** | **2030** |
|---|---|---|---|---|---|
| Benzene Without Rule (tons) | 173,474 | 99,559 | 95,234 | 99,225 | 116,742 |
| Benzene With Vehicle Standards (tons) | | 91,621 | 78,664 | 72,128 | 71,704 |
| Benzene Reductions from Vehicle Standards (tons) | | 7,939 | 16,570 | 27,097 | 45,037 |
| Percentage Reduction | | 8% | 17% | 27% | 39% |

c. $PM_{2.5}$

As discussed in Section IV.A.3, EPA expects that the cold-temperature vehicle standards will reduce exhaust emissions of direct $PM_{2.5}$ by over 19,000 tons in 2030 nationwide (see Table IV.A-5).

2. Fuel Benzene Standard

The fuel benzene standard will reduce benzene exhaust and evaporative emissions from both on-road and nonroad mobile sources that are fueled by gasoline. In addition, the fuel benzene standard will reduce evaporative emissions from gasoline distribution and PFCs. Impacts on 1,3-butadiene, formaldehyde, and acetaldehyde emissions are not significant, but are presented in Chapter 2 of the RIA. We do not expect the fuel benzene standard to have quantifiable impacts on any other air toxics, total VOCs, or direct PM.

Table IV.B-3 shows national estimates of total benzene emissions from these source sectors with and without the fuel benzene standard in 2015. These estimates do not include effects of the vehicle or PFC standards (see section IV.A.1 for the combined effects of the controls). They also assume that the fuel program is fully phased in, which is a simplification of the actual phase-in. The fuel benzene standard will reduce total benzene emissions from on-road and nonroad gasoline mobile sources, PFCs, and gasoline distribution by 12% in 2015.

Table IV.B-3. Estimated Reductions in Benzene Emissions from Gasoline Standard by Sector in 2015

| | **Gasoline On-road Mobile Sources** | **Gasoline Nonroad Mobile Sources** | **PFCs** | **Gasoline Distribution** | **Total** |
|---|---|---|---|---|---|
| Benzene Without Rule (tons) | 97,789 | 41,343 | 992 | 2,445 | 142,569 |
| Benzene With Gasoline Standard (tons) | 86,875 | 35,825 | 619 | 1,635 | 124,954 |
| Benzene Reductions from Gasoline Standard (tons) | 10,914 | 5,518 | 373 | 810 | 17,615 |
| Percentage Reduction | 11% | 13% | 38% | 33% | 12% |

3. PFC Standards

a. VOC

Table IV.B-4 shows the reductions in VOC emissions that we expect from the PFC standard. In 2015, VOC emissions from PFCs will be reduced by 61% because of reduced permeation, spillage, and evaporative losses.

Table IV.B-4. Estimated National Reductions in VOC Emissions from PFCs, 1999 to 2030

| | **1999** | **2010** | **2015** | **2020** | **2030** |
|---|---|---|---|---|---|
| VOC Without Rule (tons) | 325,030 | 316,756 | 329,504 | 353,470 | 402,916 |
| VOC With PFC Standard (tons) | | 256,175 | 127,157 | 137,175 | 216,294 |
| VOC Reductions from PFC Standard (tons) | | 60,580 | 202,347 | 216,294 | 245,255 |
| Percentage Reduction | | 19% | 61% | 61% | 61% |

b. Toxics

The PFC standard will reduce emissions of benzene, toluene, xylenes, ethylbenzene, n-hexane, 2,2,4-trimethylpentane, and MTBE. We estimate that benzene emissions from PFCs will be reduced by 68% (see Table IV.B-5) and, more broadly, air toxic emissions by 63% (see Table IV.B-6) in year 2015. These reductions do not include effects of the fuel benzene standard (see section IV.A-1 for the combined effects

of the controls). Chapter 2 of the RIA provides details on the emission reductions of the other toxics.

Table IV.B-5. Estimated National Reductions in Benzene Emissions from PFCs, 1999 to 2030

| | **1999** | **2010** | **2015** | **2020** | **2030** |
|---|---|---|---|---|---|
| Benzene Without Rule (tons) | 853 | 943 | 992 | 1063 | 1210 |
| Benzene With PFC Standard (tons) | | 743 | 320 | 345 | 396 |
| Benzene Reductions from PFC Standard (tons) | | 200 | 672 | 718 | 814 |
| Percentage Reduction | | 21% | 68% | 68% | 67% |

Table IV.B-6. Estimated National Reductions in Total MSAT Emissions from PFCs, 1999 to 2030

| | **1999** | **2010** | **2015** | **2020** | **2030** |
|---|---|---|---|---|---|
| MSATs Without Rule (tons) | 37,167 | 26,189 | 27,355 | 29,338 | 33,430 |

| | | | | | |
|---|---|---|---|---|---|
| MSATs With PFC Standard (tons) | | 21,010 | 9,998 | 10,785 | 12,394 |
| MSAT Reductions from PFC Standard (tons) | | 5,179 | 17,357 | 18,553 | 21,036 |
| Percentage Reduction | | 20% | 63% | 63% | 63% |

C. What Are the Air Quality, Exposure, and Public Health Impacts of This Rule?

1. Mobile Source Air Toxics

The controls being finalized in this rule will reduce both evaporative and exhaust emissions from motor vehicles and nonroad equipment. They will also reduce emissions from PFCs and stationary source emissions associated with gasoline distribution. Therefore, they will reduce exposure to mobile source air toxics for the general population, and also for people near roadways, in vehicles, in homes with attached garages, operating nonroad equipment, and living or working near sources of gasoline distribution emissions (such as bulk terminals, bulk plants, tankers, marine vessels, and service stations). Section III.B of this preamble and Chapter 3 of the RIA provide more details on these types of exposures.

We performed national-scale air quality, exposure, and risk modeling in order to quantitatively assess the impacts of the standards being finalized. The exposure modeling for the final rule accounted for the spatial variability of outdoor concentrations of air toxics due to higher concentrations near roadways. This is a significant improvement over exposure modeling done for the proposal, and is discussed in more detail in Chapter 3 of the RIA. However, in addition to the limitations of the national-scale modeling tools (discussed in Chapter 3 of the RIA), this modeling did not account for the impacts of the recently proposed renewable fuel standard, as this standard was proposed subsequent to the development of inventories for air quality modeling. In addition, while the model includes the 0.62 vol% fuel benzene standard, it does not include the 1.3% maximum average.

The standards being finalized in this rule will reduce both the number of people above the 1 in 100,000 cancer risk level, and the average population cancer risk, by reducing exposures to mobile source air toxics. The number of people above the 1 in 100,000 cancer risk level due to exposure to all mobile source air toxics from all sources will decrease by over 11 million in 2020 and by almost 17 million in 2030. The number of people above the 1 in 100,000 cancer risk level from exposure to benzene from all sources will decrease by about 30 million in 2020 and 46 million in 2030. It should be noted that if it were possible to estimate impacts of the standard on "background" concentrations[129], the estimated overall risk reductions would be even larger. The standards will also reduce the number of people with a respiratory hazard index (HI)

[129] "Background represents the contribution to ambient levels of air toxics from sources further away than 50 kilometers, as well as the contribution from uninventoried sources.

greater than one by about 10 million in 2020, and 17 million in 2030. As previously discussed, a value of the HI greater than 1.0 can be best described as indicating that a potential may exist for adverse health effects.

Figure IV.C -1 depicts the impact on the mobile source contribution to nationwide average population cancer risk from total MSATs and benzene in 2030. Nationwide, the cancer risk attributable to total MSATs will be reduced by 30%, and the risk from mobile source benzene will be reduced by 37%. In 2030, the highway vehicle contribution to MSAT cancer risk will be reduced on average 36% across the U.S., and the highway vehicle contribution to benzene cancer risk will be reduced on average by 43% across the U.S. The methods and assumptions used to model the impact of the controls are described in more detail in Chapter 3 of the RIA.

Figure IV.C-2 depicts the impact on the mobile source contribution to nationwide average respiratory hazard index (HI) in 2030. Nationwide, the mobile source contribution to the respiratory hazard index will be reduced by 23%.

Figure IV.C-1. Impact of Controls Being Finalized in this Rule on the Mobile Source Contribution to Nationwide Average Population Lifetime Cancer Risk in 2030.

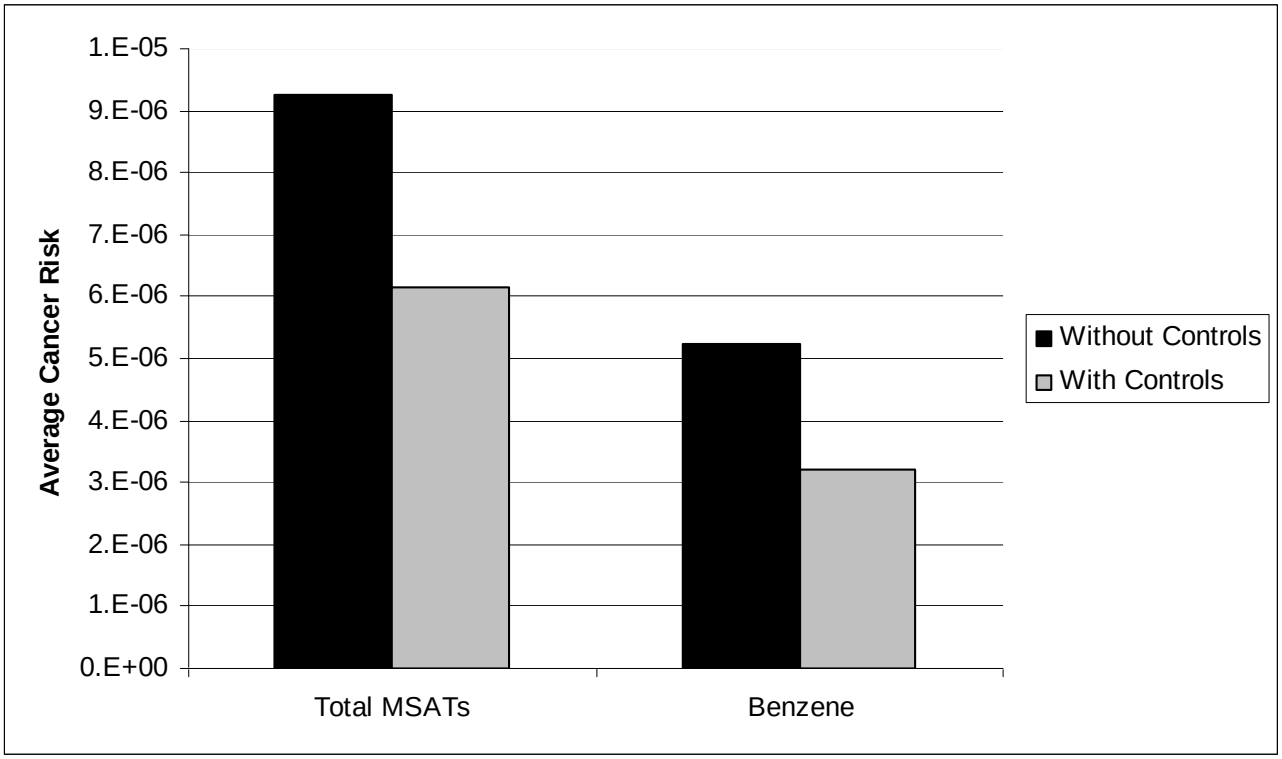


Figure IV.C-2. Impact of Controls Being Finalized in this Rule on the Mobile Source Contribution to Nationwide Average Respiratory Hazard Index in 2030.

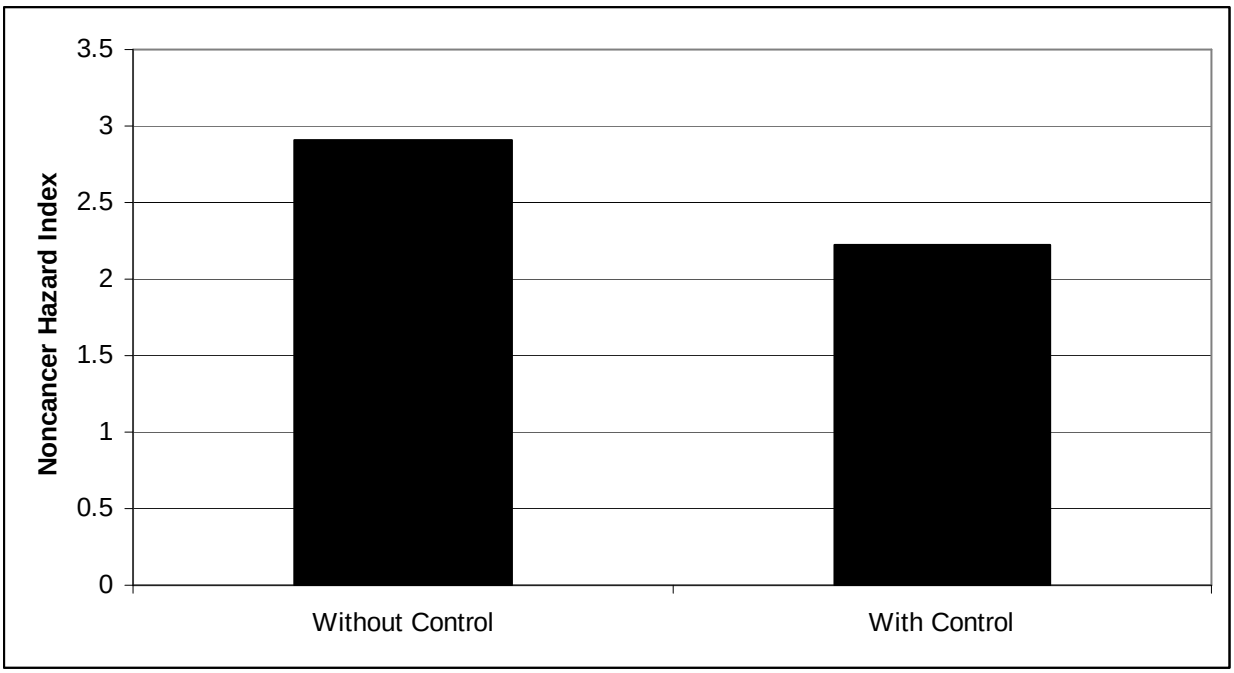


Table IV.C-1 summarizes the change in median and 95th percentile inhalation cancer risks from benzene and all MSATs attributable to all outdoor sources in 2015, 2020, and 2030, with the controls being finalized in this rule. The reductions in risk would be larger if the modeling fully accounted for a number of factors, including exposure to benzene emissions from vehicles, equipment, and PFCs in attached garages and the impacts of the control program on "background" levels attributable to transport. Reductions are significantly larger for individuals in the 95th percentile than in the 50th percentile. Thus, this rule is providing bigger benefits to individuals experiencing the highest levels of risk.

Table IV.C-1. Change in Median and 95th Percentile Inhalation Cancer Risk from Benzene and all MSATs Attributable to Outdoor Sources in 2015, 2020, and 2030 with the Controls Being Finalized in this Rule.

| | 2015 | | 2020 | | 2030 | |
|---|---|---|---|---|---|---|
| | Median | 95th | median | 95th | median | 95th |
| All MSATs | | | | | | |
| Without Controls | $1.50 \times 10^{-5}$ | $4.75 \times 10^{-5}$ | $1.53 \times 10^{-5}$ | $4.93 \times 10^{-5}$ | $1.61 \times 10^{-5}$ | $5.28 \times 10^{-5}$ |
| With Controls | $1.41 \times 10^{-5}$ | $4.37 \times 10^{-5}$ | $1.40 \times 10^{-5}$ | $4.40 \times 10^{-5}$ | $1.42 \times 10^{-5}$ | $4.49 \times 10^{-5}$ |

| | | | | | | |
|---|---|---|---|---|---|---|
| Percent Change | 6 | 8 | 8 | 11 | 12 | 15 |
| Benzene | | | | | | |
| Without Controls | $6.86x10^{-6}$ | $1.82x10^{-5}$ | $6.93x10^{-6}$ | $1.86x10^{-5}$ | $7.37x10^{-6}$ | $2.06x10^{-5}$ |
| With Controls | $6.17x10^{-6}$ | $1.53x10^{-5}$ | $6.02x10^{-6}$ | $1.47x10^{-5}$ | $6.06x10^{-6}$ | $1.49x10^{-5}$ |
| Percent Change | 10 | 16 | 13 | 21 | 18 | 28 |

2. Ozone

The vehicle and PFC standards will also reduce VOC emissions, which are a precursor to ozone. We have modeled the ozone impacts of the PFC standards. As described in more detail in Chapter 3.3 of the RIA, a metamodeling tool developed at EPA, the ozone response surface metamodel, was used to estimate the effects of the emission reductions. The ozone response surface metamodel was created using multiple runs of the Comprehensive Air Quality Model with Extensions (CAMx). Base and control CAMx metamodeling was completed for two future years (2020, 2030) over a modeling domain that includes all or part of 37 Eastern U.S. states. For more information on the response surface metamodel, please see the RIA for this final rule or the Air Quality Modeling Technical Support Document (TSD).

We have made estimates using the ozone response surface metamodel to illustrate the types of change in future ozone levels that we would expect to result from this rule, as described in Chapter 3 of the RIA. The PFC controls are projected to result in a very small net improvement in future ozone, after weighting for population. Although the net future ozone improvement is small, some VOC-limited areas in the Eastern U.S. are projected to have non-negligible improvements in projected 8-hour ozone design values due to the PFC controls. We view these improvements as useful in meeting the 8-hour ozone NAAQS. These net ozone improvements are in addition to reductions in levels of benzene, a toxic ozone precursor, due to the PFC controls.

3. PM

As described in section IV.A, the vehicle standards will reduce emissions of direct PM. The PM health benefits that would be associated with these reductions in PM emissions and exposure are discussed in section VIII.E of this preamble. The vehicle and PFC standards will also reduce VOC emissions, which contribute to the secondary formation of PM. In this rule we have not quantified the impact of the VOC emission reductions on ambient PM or associated health effects.

D. What Other Mobile Source Emissions Control Programs Reduce MSATs?

As described in section IV.A, existing mobile source control programs in

combination with this rule will reduce MSAT emissions (not including diesel PM) by 45% between 1999 and 2030. The existing mobile source programs include controls on fuels, highway vehicles, and nonroad engines and equipment. These programs are also reducing hydrocarbons and PM more generally, as well as oxides of nitrogen. The sections immediately below provide general descriptions of these programs that will be providing MSAT emission reductions, as well as voluntary programs such as the National Clean Diesel Campaign and Best Workplaces for Commuters. We also discuss some programs that are currently being developed. A more detailed description of mobile source programs is provided in Chapter 2 of the RIA.

1. Fuels Programs

As described in section VI of this preamble, this rule would supersede the 2001 MSAT rule and certain provisions of the reformulated gasoline program and anti-dumping programs. These programs are described in Chapter 2 of the RIA.

a. Gasoline Sulfur

EPA's gasoline sulfur program[130] requires, beginning in 2006, that sulfur levels in gasoline could be no higher than 80 ppm as a per-gallon cap, and must average 30 ppm annually. When fully effective, gasoline will have 90 percent less sulfur than before the program. Reduced sulfur levels are necessary to ensure that vehicle emission control systems are not impaired. These systems effectively reduce non-methane organic gas

[130] 65 FR 6822 (February 10, 2000)

(NMOG) emissions, of which some are air toxics, as well as emissions of NOx. With lower sulfur levels, emission control technologies can work longer and more efficiently. Both new and older vehicles benefit from reduced gasoline sulfur levels.

b. Gasoline Volatility

A fuel's volatility defines its evaporation characteristics. A gasoline's volatility is commonly referred to as its Reid vapor pressure, or RVP. Gasoline summertime RVP ranges from about 6-9 psi, and wintertime RVP ranges from about 9-14 psi, when additional volatility is required for starting in cold temperatures. Gasoline vapors contain a subset of the liquid gasoline components, and thus can contain toxics compounds such as benzene. Since 1989, EPA has controlled summertime gasoline RVP primarily as a VOC and ozone precursor control, resulting in additional toxics pollutant reductions.

c. Diesel Fuel

In early 2001, EPA issued rules requiring that diesel fuel for use in highway vehicles contain no more than 15 ppm sulfur beginning June 1, 2006.[131] This program contains averaging, banking and trading provisions during the transition to the 15 ppm level, as well as other compliance flexibilities. In June 2004, EPA issued rules governing the sulfur content of diesel fuel used in nonroad diesel engines.[132] In the nonroad rule, sulfur levels are limited to a maximum of 500 ppm sulfur beginning in 2007 (current

[131] 66 FR 5002, January 18, 2001. See http://www.epa.gov/otaq/highway-diesel/index.htm
[132] 69 FR 38958, June 29, 2004.

levels are approximately 3000 ppm). In 2010, nonroad diesel sulfur levels must not exceed 15 ppm.

EPA's diesel fuel requirements are part of a comprehensive program to combine engine and fuel controls to achieve the greatest emission reductions. The diesel fuel provisions enable the use of advanced emission-control technologies on diesel vehicles and engines. The diesel fuel requirements will also provide immediate public health benefits by reducing PM emissions from current diesel vehicles and engines.

d. Phase-Out of Lead in Gasoline

One of the first programs to control toxic emissions from motor vehicles was the removal of lead from gasoline. Beginning in the mid-1970s, unleaded gasoline was phased in to replace leaded gasoline. The phase-out of leaded gasoline was completed January 1, 1996, when lead was banned from motor vehicle gasoline. The removal of lead from gasoline has essentially eliminated on-highway mobile source emissions of this highly toxic substance.

2. Highway Vehicle and Engine Programs

The 1990 Clean Air Act Amendments set specific emission standards for hydrocarbons and for PM. Air toxics are present in both of these pollutant categories. As vehicle manufacturers develop technologies to comply with the hydrocarbon (HC) and

particulate standards (e.g., more efficient catalytic converters), air toxics are reduced as well. Since 1990, we have developed a number of programs to address exhaust and evaporative hydrocarbon emissions and PM emissions.

Two of our recent initiatives to control emissions from motor vehicles and their fuels are the Tier 2 control program for light-duty vehicles and the 2007 heavy-duty engine rule. Together these two initiatives define a set of comprehensive standards for light-duty and heavy-duty motor vehicles and their fuels. In both of these initiatives, we treat vehicles and fuels as a system. The Tier 2 control program establishes stringent tailpipe and evaporative emission standards for light-duty vehicles and a reduction in sulfur levels in gasoline fuel beginning in 2004.[133] The 2007 heavy-duty engine rule establishes stringent exhaust emission standards for new heavy-duty engines and vehicles for the 2007 model year as well as reductions in diesel fuel sulfur levels starting in 2006.[134] Both of these programs will provide substantial emissions reductions through the application of advanced technologies. We expect 90% reductions in PM from new diesel engines compared to engines under current standards.

Some of the key earlier programs controlling highway vehicle and engine emissions are the Tier 1 and NLEV standards for light-duty vehicles and trucks; enhanced evaporative emissions standards; the supplemental federal test procedures (SFTP); urban bus standards; and heavy-duty diesel and gasoline standards for the 2004/2005 time frame.

---

[133] 65 FR 6697, February 10, 2000.
[134] 66 FR 5001, January 18, 2001.

### 3. Nonroad Engine Programs

There are various categories of nonroad engines, including land-based diesel engines (e.g., farm and construction equipment), small land-based spark-ignition (SI) engines (e.g., lawn and garden equipment, string trimmers), large land-based SI engines (e.g., forklifts, airport ground service equipment), marine engines (including diesel and SI, propulsion and auxiliary, commercial and recreational), locomotives, aircraft, and recreational vehicles (off-road motorcycles, “all terrain” vehicles and snowmobiles). Chapter 2 of the RIA provides more information about these programs.

As with highway vehicles, the VOC standards we have established for nonroad engines will also significantly reduce VOC-based toxics from nonroad engines. In addition, the standards for diesel engines (in combination with the stringent sulfur controls on nonroad diesel fuel) will significantly reduce diesel PM and exhaust organic gases, which are mobile source air toxics.

In addition to the engine-based emission control programs described below, fuel controls will also reduce emissions of air toxics from nonroad engines. For example, restrictions on gasoline formulation (the removal of lead, limits on gasoline volatility and RFG) are projected to reduce nonroad MSAT emissions because most gasoline-fueled nonroad vehicles are fueled with the same gasoline used in on-highway vehicles. An exception to this is lead in aviation gasoline. Aviation gasoline, used in general (as

opposed to commercial) aviation, is a high octane fuel used in a relatively small number of aircraft (those with piston engines). Such aircraft are generally used for personal transportation, sightseeing, crop dusting, and similar activities.

4. Voluntary Programs

In addition to the fuel and engine control programs described above, we are actively promoting several voluntary programs to reduce emissions from mobile sources, such as the National Clean Diesel Campaign, anti-idling measures, and Best Workplaces for Commuters[SM]. While the stringent emissions standards described above apply to new highway and nonroad diesel engines, it is also important to reduce emissions from the existing fleet of about 11 million diesel engines. EPA has launched a comprehensive initiative called the National Clean Diesel Campaign, one component of which is to promote the reduction of emissions in the existing fleet of engines through a variety of cost-effective and innovative strategies. The goal of the Campaign is to reduce emissions from the 11 million existing engines by 2014. Emission reduction strategies include switching to cleaner fuels, retrofitting engines through the addition of emission control devices and engine replacement. For example, installing a diesel particulate filter achieves diesel particulate matter reductions of approximately 90 percent (when combined with the use of ultra low sulfur diesel fuel). The Energy Policy Act of 2005 includes grant authorizations and other incentives to help facilitate voluntary clean diesel actions nationwide.

The National Clean Diesel Campaign is focused on leveraging local, state, and federal resources to retrofit or replace diesel engines, adopt best practices and track and report results. The Campaign targets five key sectors: school buses, ports, construction, freight and agriculture. Almost 300 clean diesel projects have been initiated through the Campaign. These projects will reduce more than 20,000 PM lifetime tons. PM and NOx reductions from these programs will provide nearly $5 billion in health benefits.

Reducing vehicle idling provides important environmental benefits. As a part of their daily routine, truck drivers often keep their vehicles running at idle during stops to provide power, heat and air conditioning. EPA's SmartWay$^{SM}$ Transport Partnership is helping the freight industry to adopt innovative idle reduction technologies and to take advantage of proven systems that provide drivers with basic necessities without idling the main engine. To date, there are 80 mobile and stationary idle-reduction projects throughout the country. Emission reductions, on an annual basis, from these programs are in excess of 157,000 tons of $CO_2$, 2,000 tons of $NO_X$ and 60 tons of PM; over 14 million gallons of fuel are being saved annually. The SmartWay Transport Partnership also works with the freight industry by promoting a wide range of new technologies such as advanced aerodynamics, single-wide tires, weight reduction, speed control and intermodal shipping.

Daily commuting represents another significant source of emissions from motor vehicles. EPA's Best Workplaces for Commuters$^{SM}$ program is working with employers across the country to reverse the trend of longer, single-occupancy vehicle commuting.

OTAQ recognizes employers that have met the *National Standard of Excellence for Commuter Benefits* by adding them to the List of Best Workplaces for Commuters. These companies offer superior commuter benefits such as transit subsidies for rail, bus, and vanpools and promote flexi-place and telework. Emergency Ride Home programs provide a safety net for participants. More than 1,600 employers representing 3.5 million U.S. workers have been designated Best Workplaces for Commuters.

Much of the growth in the Best Workplaces for Commuters program has been through metro area-wide campaigns. Since 2002, EPA has worked with coalitions in over 14 major metropolitan areas to increase the penetration of commuter benefits in the marketplace and the visibility of the companies that have received this distinguished designation. Another significant path by which the program has grown is through Commuter Districts including corporate and industrial business parks, shopping malls, business improvement districts and downtown commercial areas. To date EPA has granted the Best Workplaces for Commuters "District" designation to over twenty locations across the country including sites in downtown Denver, Houston, Minneapolis, Tampa and Boulder.

5. Additional Programs Under Development That Will Reduce MSATs

a. On-Board Diagnostics for Heavy-Duty Vehicles Over 14,000 Pounds

The Agency has proposed on-board diagnostics (OBD) requirements for heavy-

duty vehicles over 14,000 pounds.[135] In general, OBD systems monitor the operation of key emissions controls to detect any failure that would lead to emissions above the standards during the life of the vehicle. Given the nature of the heavy-duty trucking industry, 50-state harmonization of emissions requirement is an important consideration. Initially, the Agency signed a Memorandum of Agreement in 2004 with the California Air Resources Board which expressed both agencies' interest in working towards a single, nationwide program for heavy-duty OBD. Since that time, California has established their heavy-duty OBD program, which will begin implementation in 2010. EPA's program will also begin in 2010. These requirements will help ensure that the emission reductions we projected in the 2007 rulemaking for heavy-duty engines occur in-use.

b. Standards for Small Nonroad Spark-Ignition Engines

We are developing a proposal for small nonroad spark-ignition engines, those typically used in lawn and garden equipment and in spark-ignition marine engines. This proposal is being developed in response to Section 428 of the Omnibus Appropriations Bill for 2004, which requires EPA to propose regulations under Clean Air Act section 213 for new nonroad spark-ignition engines under 50 horsepower. We plan to propose standards that would further reduce engine and equipment emissions for these nonroad categories. We anticipate that any new standards would provide significant additional reductions in exhaust and evaporative HC (and VOC-based toxics) emissions.

c. Standards for Locomotive and Marine Diesel Engines

[135] http://epa.gov/obd/regtech/heavy.htm

We are planning to propose more stringent standards for large diesel engines used in locomotive and marine applications, as discussed in a recent Advance Notice of Proposed Rulemaking.[136] New standards for marine diesel engines would apply to engines less than 30 liters per cylinder in displacement (all engine except for Category 3). We are considering standards modeled after our Tier 4 nonroad diesel engine program, which achieve substantial reductions in PM, HC, and NOx emissions. These standards would be based on the use of high efficiency catalyst aftertreatment and would also require fuel sulfur control.

E. How Do These Mobile Source Programs Satisfy the Requirements of Clean Air Act Section 202(l)?

The benzene and hydrocarbon standards in this action will reduce benzene, 1,3-butadiene, formaldehyde, acrolein, polycyclic organic matter, and naphthalene, as well as many other hydrocarbon compounds that are emitted by motor vehicles, including those that are discussed in more detail in Chapter 1 of the RIA. The emission reductions expected from today's controls are set out in section IV.A and B of this preamble and Chapter 2 of the RIA.

EPA believes that the emission reductions from the standards finalized today for motor vehicles and their fuels, combined with the standards currently in place, represent the maximum achievable reductions of emissions from motor vehicles through the

[136] 69 FR 39276, June 29, 2004

application of technology that will be available, considering costs and the other factors listed in section 202(l)(2). This conclusion applies whether one considers just the compounds listed in Table 1.1-1 of the RIA, or consider all of the compounds on the Master List of emissions, given the breadth of EPA's current control programs and the broad groups of emissions that many of the control technologies reduce. For example, EPA has already taken significant steps to reduce diesel emissions from motor vehicles (as well as other mobile sources). As explained above, we have adopted stringent standards for on-highway diesel trucks and buses and these standards control the air toxics emitted by these motor vehicles to the extent feasible.

Emissions from motor vehicles can be chemically categorized as hydrocarbons, trace elements (including metals) and a few additional compounds containing carbon, nitrogen and/or halogens (e.g., chlorine). For the hydrocarbons, which are the vast majority of these compounds, we believe that with the controls finalized today, we will control the emissions of these compounds from motor vehicles to the maximum amount currently feasible or currently identifiable with available information. Section V of this preamble provides more details about why the standards represent maximum achievable reduction of hydrocarbons from motor vehicles. Motor vehicle controls do not reduce individual hydrocarbons selectively; instead, the maximum emission reductions are achieved by controls on hydrocarbons as a group. There are fuel controls that could selectively reduce individual air toxics (e.g., formaldehyde, acetaldehyde, 1,3-butadiene), as well as controls that reduce hydrocarbons more generally. Section VI of this preamble describes why the standards we are finalizing today represent the maximum emission

reductions achievable through fuel controls, after considering the factors enumerated in section 202(l)(2) of the Clean Air Act.

Motor vehicle emissions also contain trace elements, including metals, which originate primarily from engine wear and impurities in engine oil and gasoline or diesel fuel. EPA does not have authority to regulate engine oil, and there are no feasible motor vehicle controls to directly prevent engine wear. Nevertheless, oil consumption and engine wear have decreased over the years, decreasing emission of metals from these sources. Metals associated with particulate matter will be captured in emission control systems employing a particulate matter trap, such as will be used in heavy-duty vehicles meeting the 2007 standards. We believe that currently, particulate matter traps, in combination with engine-out control, represent the maximum feasible reduction of both motor vehicle particulate matter and toxic metals present as a component of the particulate matter.

The mobile source contribution to the national inventory for metal compounds is generally small. In fact, the emission rate for most metals from motor vehicles is small enough that quantitative measurement requires state-of-the art analytical techniques that are only recently being applied to this source category. We have efforts underway to gather information regarding trace metal emissions, including mercury emissions, from motor vehicles (see Chapter 1 of the RIA for more details).

A few metals and other elements are used as fuel additives. These additives are designed to reduce the emission of regulated pollutants either in combination with or without an emission control device (e.g., a passive particulate matter trap). Clean Air Act section 211 (a) and (b) provide EPA with various authorities to require the registration of fuel additives by their manufacturers before their introduction into commerce. Registration involves certain data requirements that enable EPA to identify products whose emissions may pose an unreasonable risk to public health. In addition, this section provides EPA with authority to require health effects testing to fill any gaps in the data that would prevent a determination regarding the potential for risk to the public. It is under the section 211 registration program that EPA is currently generating the information needed to update an assessment of the potential human health risks related to having manganese in the national fuel supply. Clean Air Act section 211(c) provides the primary mechanism by which EPA would take actions necessary to minimize exposure to emissions of metals or other additives to diesel and gasoline.

Existing regulations limit sulfur in gasoline and diesel fuel to the maximum amount feasible and will reduce emissions of all sulfur-containing compounds (e.g., hydrogen sulfide, carbon disulfide) to the greatest degree achievable.[137, 138,139] For the remaining compounds (e.g., chlorinated compounds), we currently have very little information regarding emission rates and conditions that impact emissions. This

[137] 65 FR 6697, February 10, 2000.

[138] 66 FR 5001, January 18, 2001.

[139] 69 FR 38958, June 29, 2004 (standards for non-road diesel engines and fuels). Although non-road vehicles are not "motor vehicles," and so are not subject to section 202(l)(2), EPA nevertheless has adopted standards resulting in the greatest feasible reductions of mobile source air toxics from these engines.

information would be necessary in order to evaluate potential controls under section 202(l). Emissions of hydrocarbons containing chlorine (e.g., dioxins/furans) would likely be reduced with control measures that reduce total hydrocarbons, just as these emissions were reduced with the use of catalytic controls that lowered exhaust hydrocarbons.

## V. New Light-duty Vehicle Standards

### A. Introduction

The program we are establishing for vehicles will achieve the same significant toxics reductions that we projected for the proposed rule (see generally 71 FR 15845-48). The program is very similar to that proposed except for a few minor changes made in response to comments we received. These changes will improve the implementation of the program without significantly changing the program's overall emission reductions and environmental benefits. As described in this section, we are adopting stringent new nonmethane hydrocarbon standards for vehicles to reduce hydrocarbon (HC) emissions during vehicle cold temperature operation. As discussed in the proposal, the current HC emissions standards are measured within a range of specified warm temperatures, and the test procedure does not include cold temperatures. Data indicate that cold HC emissions currently are very high for many vehicles compared to emissions at normal test temperatures. The new cold temperature standards and program requirements will be phased in starting in 2010. When fully phased in, the new standards will further reduce overall vehicle HC emissions by about 31%, or by about 883,000 tons in 2030.

By reducing overall HC emissions from vehicles, we will be significantly reducing several gaseous toxics including benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. We also project that the cold temperature standard will provide concurrent reductions in direct PM emissions from vehicles, since the strategies manufacturers are expected to employ to reduce cold HC will reduce PM as well. Although Clean Air Act section 202(l) deals with control of air toxics, and not criteria pollutants like PM, this co-benefit of cold temperature control is significant.

We are finalizing the new cold temperature standards and implementation schedule essentially as proposed. We are also adopting several other related provisions and requirements largely as proposed. Many of these provisions will help the manufacturers smoothly transition to the new standards in the shortest lead time possible. They include corporate average emissions standards, emissions credits, options for alternative phase-in schedules, and special provisions for small businesses. The program also includes certification and compliance provisions.

We are also adopting new evaporative emissions standards, beginning in model year 2009. The new standards are essentially the same as those contained in the California LEVII program. Manufacturers have been selling 50-state evaporative systems that meet both the Tier 2 and LEVII requirements. Today's final rule will ensure that industry continues this practice.

Sections V.B. and V.C. provide the details of the new cold temperature and evaporative emissions standards, respectively, and briefly discuss some of the comments we received on the proposed vehicles program. We have seriously considered all of the input from stakeholders in developing the final vehicles program and believe that the final rule appropriately addresses the concerns of all stakeholders. We provide a full discussion of the comments we received on vehicles in Chapter 3 of the Summary and Analysis of Comments for this rule.

## B. What Cold Temperature Requirements Are We Adopting?

### 1. Why Are We Adopting a New Cold Temperature NMHC Standard?

As emissions standards have become more stringent, manufacturers have concentrated primarily on controlling emissions performance just after the start of the engine in order to further reduce emissions. To comply with stringent hydrocarbon emission standards at 75° F, manufacturers developed new emission control strategies and practices that resulted in significant emissions reductions at that start temperature. We expected that proportional reductions in hydrocarbon emissions would occur at other colder start temperatures as a result of the more stringent standards. We believe that there is no engineering reason why proportional control should not be occurring on a widespread basis.

In some cases, certification data for recent model year light-duty vehicles indicate that individual vehicles did demonstrate proportional improvements in hydrocarbon emission results at 20° F relative to their 75° F results, confirming our belief that proportional control is feasible and indeed is practiced at least occasionally. One manufacturer's certification results reflected proportional improvements across almost its entire vehicle lines, further supporting that proportional control is feasible. However, for most vehicles, certification reports show a sharp rise in hydrocarbon[140] emissions at 20° F when compared to the reported 75° F hydrocarbon emission levels. Any rise in hydrocarbon emissions, specifically nonmethane hydrocarbons (NMHC), will result in proportional rise in VOC-based air toxics.[141] While some increase in NMHC emissions can be expected simply due to combustion limitations of gasoline engines at colder temperatures, the reported levels of hydrocarbon emissions seem to indicate a significantly diminished use of hydrocarbon emissions controls occurring at colder temperatures. Thus, although all vehicle manufacturers have been highly successful at reducing emissions at the test start temperature range, in general, they do not appear to be capitalizing on NMHC emission control strategies and technologies at lower temperatures. This is likely because compliance with hydrocarbon standards is not required at 20 degree F temperatures. (see 71 FR at 15845.) Today's rule remedies this by requiring such compliance.

2. What are the New NMHC Exhaust Emissions Standards?

[140] Most certification 20° F hydrocarbon levels are reported as total hydrocarbon (THC), but NMHC accounts for approximately 95% of THC as seen in results with both THC and NMHC levels reported. This relationship also is confirmed in EPA test programs supporting this rulemaking.

[141] "VOC/PM Cold Temperature Characterization and Interior Climate Control Emissions/Fuel Economy Impact," Volume I and II, October 2005.

We are finalizing a set of standards that will achieve proportional NMHC control from the 75° F Tier 2 standards to the 20° F test point. We expect that by fully utilizing available Tier 2 hardware and software control strategies, manufacturers will be able to achieve this standard without major changes to Tier 2 vehicle designs or the use of additional technology. Table V.B-1 contains the final standards.

Table V.B-1. – 20° F FTP Exhaust Emission Standards

| Vehicle GVWR and Category | NMHC Sales-Weighted Fleet Average Standard (grams/mile) |
|---|---|
| ≤ 6000 lbs:<br>Light-duty vehicles (LDV) & Light light-duty trucks (LLDT) | 0.3 |
| > 6000 lbs:<br>Heavy light-duty trucks (HLDT) up to 8,500 lbs & Medium-duty passenger vehicles (MDPV) up to 10,000 lbs | 0.5 |

As shown in the table, we are finalizing, as proposed, two separate sales-weighted fleet average NMHC standards: 0.3 grams/mile for vehicles at or below 6,000 pounds (lbs) GVWR and 0.5 grams/mile for vehicles over 6,000 lbs, including MDPVs.[142] NMHC emissions will be measured during the Cold Federal Test Procedure (FTP) test, which already requires hydrocarbon measurement.[143] The new standard does not require additional certification testing beyond what is required today with "worst case" model selection of a durability test group.[144]

The separate fleet average standards we are finalizing account for challenges related to vehicle weight. We examined certification data from Tier 2 and interim non-Tier 2 vehicles (i.e., vehicles not yet phased into the final Tier 2 program, but meeting interim standards established by Tier 2), and saw a general trend of increased hydrocarbon levels with heavier GVWR vehicles. Some comments suggested that the standard for HLDT/MDPVs should be the same standard as applies to LDVs or contain a second future phase that reduces emissions to those levels. At this time, we continue to believe that heavier vehicles have application-specific design limitations. Heavier vehicles generally produce higher emissions for several reasons. First, added weight requires additional work to accelerate the vehicle mass, generally resulting in higher

[142] Tier 2 created the medium-duty passenger vehicle (MDPV) category to include larger complete passenger vehicles, such as SUVs and vans, with a GVWR of 8,501-10,000 pounds GVWR. Large pick-ups above 8,500 pounds are not included in the MDPV category but are included in the heavy-duty vehicle category.

[143] 40 CFR Subpart C, §86.244-94 requires the measurement of all pollutants measured over the FTP except NOx.

[144] The existing cold FTP test procedures are specified in 40 CFR Subpart C. In the final rule for fuel economy labeling, (71 FR 77872, December 27, 2006), EPA revised the cold FTP test protocol to require manufacturers to run the heater and/or defroster while conducting the cold FTP test. This had previously been an optional provision. We do not believe this requirement will have a significant impact on emissions.

emissions, particularly soon after engine start-up. Second, the design of these emission control systems may incorporate designs for specific duty cycles (i.e., trailer towing) that can negatively affect emissions, particularly during 20° F cold starts. For example, since the catalyst may be located further away from the engine for protection from high exhaust temperatures during design-specific duty cycles, warm-up of the catalyst is typically delayed, especially at colder temperatures. Therefore, we believe the 0.3 g/mile fleet average standard for vehicles below 6,000 lbs GVWR is not technically feasible at this time for heavier vehicles. We are thus finalizing a 0.5 g/mile standard for vehicles over 6000 lbs GVWR, including both HLDTs (6000 lbs to 8500 lbs) and MDPVs.

We are finalizing the sales-weighted fleet average approach as proposed, as the way to achieve the greatest degree of emission control for Tier 2 vehicles. At the same time, this approach allows manufacturers sufficient lead time and flexibility to certify different vehicle groups to different levels, thus lowering the costs of the program. A fleet average provides manufacturers with flexibility to balance challenging vehicle families with ones that more easily achieve the standards. We believe this approach is appropriate because the base Tier 2 program is also based on emissions averaging, and will result in a mix of emissions control strategies across the fleet that have varying cold temperature capabilities. While the Tier 2 program continues to phase in, manufacturers are concurrently developing emissions control packages. The capabilities of each Tier 2 package will not be fully understood until manufacturers are able to evaluate the potential of the individual designs to control cold temperature emissions.

We received several comments from state and environmental groups supporting the new cold temperature standards. Manufacturers indicated their support of the Agency's initiative to seek reductions in MSATs, and one manufacturer commented that cold temperature hydrocarbon control is both effective and logical. Manufacturers commented that the new standards would be very challenging, but that the flexibilities incorporated into the final rule will significantly help manufacturers achieve the new standards. One manufacturer with a product line limited to vehicles below 6,000 lbs GVWR suggested that the 0.3 g/mile standard was too stringent and unreasonable based on an assessment of their current vehicle emission levels. The manufacturer's comments did not provide data or further technical analysis to substantiate this claim. We know of no engineering basis for the standards not being technically achievable. Moreover, there are about nine other manufacturers with similar product lines exclusively below 6,000 lbs GVWR, and they did not provide similar comments. We continue to believe that with careful examination of existing emission control opportunities at colder temperatures on Tier 2 compliant vehicles, especially given the lead time provided, manufacturers will identify strategies to comply with the new standards across their product lines.

We are establishing a Family Emissions Limit (FEL) structure in which manufacturers will determine individual FELs for each group of vehicles certified. These FELs are the standard for each individual group, and are averaged on a sales-weighted basis to demonstrate overall compliance with the fleet average standards. We are using the FEL-based approach for the new cold temperature NMHC standards because we believe it results in the same level of environmental benefit but adds flexibility and leads

to cost-effective compliance strategies. The FEL approach is discussed further in section V.B.4 below.

We are applying the new cold temperature NMHC standards to light-duty gasoline-fueled vehicles. However, diesel vehicles, alternative-fueled vehicles, and heavy-duty vehicles will not be subject to these standards, since we lack data on which to base standards. Section V.B.6.a provides a detailed discussion of applicability and comments received.

### 3. Feasibility of the Cold Temperature NMHC Standards

We believe the new standards will be challenging but are attainable and provide the greatest emission reductions using technology that will be available. The feasibility assessment described below is based on our analysis of the standard's stringency given current emission levels at certification (considering deterioration, compliance margin, and vehicle weight), available emission control techniques, and our own feasibility testing. In addition, sections V.B.3-6 describe the lead time and flexibility within the program structure, which also contribute to the achievability of the standards. There are a number of technologies discussed below that can be utilized to achieve these standards. We expect that manufacturers will employ these technologies in various combinations, which will likely vary from vehicle to vehicle depending on a vehicle's base emission control package developed for Tier 2 compliance. Moreover, as discussed in section V.D,

due to current Tier 2 phase-in schedules, we are not yet in a position to evaluate fully the achievability of standards based on new technologies that may result when Tier 2 is fully phased in in model year 2009. Thus, we are not considering more stringent cold temperature NMHC standards that would require the application of new technology to Tier 2 vehicles.

Chapter 8 of the RIA contains vehicle and nationwide cost estimates, including capital and development costs. We believe the estimated costs are reasonable and the rule is cost-effective, as shown in section XIII, below. Given the emission control strategies currently available, we expect manufacturers to implement these technologies successfully without a significant impact on vehicle noise, energy consumption, or safety factors. Although new emissions control strategies are necessary at cold temperatures, we do not expect fundamental Tier 2 vehicle hardware to change.

Manufacturers commented that the standards will be extremely challenging because the standards are based on full useful life performance and manufacturers must account for fuel quality in the field to ensure adequate performance. Manufacturers also noted that they must account for a host of requirements in addition to the new cold temperature standards, including Tier 2 and SFTP standards. In response, we understand the challenges involved in complying with the new cold temperature standards and we are providing the essential lead time for manufacturers to identify and resolve any related issues as part of overall vehicle development. We are also including several other provisions discussed below, including an averaging program, phase-in, emissions credits,

deficit carry-forward, and in-use standards that provide manufacturers with flexibility in transitioning to the new standards.

a. Currently Available Emission Control Technologies

We believe that the cold temperature NMHC standards for gasoline-fueled vehicles being finalized today are challenging but attainable with Tier 2 **(i.e., existing)** level emission control technologies. Our determination of feasibility is based on the emission control hardware and calibration strategies used today on Tier 2 vehicles. These emission control technologies are utilized to meet the stringent Tier 2 standards for HC at the FTP temperature range of 68° F to 86° F, but are not generally used or activated at colder temperatures. As discussed in section V.D, the standards we are finalizing today will not force changes to Tier 2 compliance strategies. Many current engine families already achieve emissions levels at or below the emission standards being adopted (see RIA Chapter 5) and accomplish this through software and calibration control technologies. However, a significant number of engine families emit more than twice the level of the new standards most likely because they fail to use the Tier 2 control technologies at colder temperatures. We believe the new standards can be met by the application of calibration and software approaches similar to those currently used at 75° F. Although manufacturers could use additional hardware to facilitate compliance with the new standard, we are not projecting that they would choose to do so because the standards can be achieved through lower-cost calibration and software strategies. As described in section V.B.2.c, our own feasibility testing of a vehicle over 6000 lbs

GVWR achieved NMHC reductions consistent with the standard through calibration approaches alone.

In 2002, the European Union (EU) finalized a -7°C (20°F) cold HC requirement.[145] While the European standard is based on a different drive cycle, manufacturers have developed individual strategies to comply with this standard. When the EU implemented the new cold HC standard in conjunction with a new 75° F standard (Euro4), many manufacturers responded by employing National Low Emission Vehicle (NLEV)[146] level hardware and supplementing it with advanced cold start emission control strategies. The EU similarly determined that heavier weight vehicles may have duty-cycle based design limitations and also adopted a separate unique emission standard for these vehicles. Many manufacturers offer common vehicle models in both European and US markets. Such manufacturers can leverage European models to transfer emission control technologies successfully used for 20° F hydrocarbon control in Europe to their US model counterparts.

There are several strategies used in the vehicles that are achieving proportional improvements in NMHC emissions at 20° F FTP. Calibration and software strategies that can be used include lean limit fuel strategies, fuel injection timing,[147] elevated idle speeds, retarded spark timing, redundant spark timing, and accelerated closed loop times.

---

[145] European Union (EU) Type VI Test (-7° C) required for new vehicle models certified as of 1/1/2002.

[146] NLEV voluntary program introduced California low emission cars and light-duty trucks (0-6000 lbs. GVW) into other states beginning in 1999.

[147] Meyer, Robert and John B. Heywood, "Liquid Fuel Transport Mechanisms into the Cylinder of a Firing Port-Injected SI Engine During Start-up," SAE 970865, 1997

These strategies are consistently and successfully used at 75° F to meet stringent Tier 2 standards. We expect that software and/or calibration changes will perform as well or better than added hardware. This is because some hardware such as the improved catalyst system may not be usable immediately following the cold start because it must warm-up to operate efficiently. Calibration and software strategies that minimize emissions produced by the engine during this period while simultaneously accelerating usage of the catalyst will be more effective than most new hardware options. See RIA Chapter 5 for further discussion.

In addition to calibration strategies, some manufacturers may comply with the new standards by extending the use of existing Tier 2 hardware to 20° F. An example of this is secondary air systems. Several European models sold in the US market demonstrate excellent cold HC performance and utilize secondary air systems from 75° F to 20° F start temperatures. The secondary air systems reduce emissions by injecting ambient air into the exhaust, thus supplying oxygen for more complete combustion. This also supplies supplemental heat to the catalyst. These systems have been used extensively to reduce hydrocarbon emissions at 75° F starts. Currently, auto makers are equipping a portion of the Tier 2 fleet with secondary air systems for compliance with Tier 2 standards.

Some manufacturers with vehicles containing secondary air systems claimed that they are not utilizing them at temperatures below freezing simply because of past engineering issues. Those successfully using secondary air at 20° F (mainly European

companies) indicated that these challenges have been addressed through design changes. The robustness of these systems below freezing has also been confirmed with the manufacturers and with the suppliers of the secondary air components.[148] While alternative technologies are available and produce comparable results, vehicles equipped with secondary air technology should meet the new 20° F standard by utilizing it at colder temperatures.

b. Feasibility Considering Current Certification Levels, Deterioration and Compliance Margin

The standards we are finalizing will have a full useful life of 120,000 miles, consistent with Tier 2 standards. We believe the 0.3 g/mile FEL standard leaves adequate flexibility for compliance margins and any emissions deterioration concerns. Of the vehicles certified to Tier 2 with available cold temperature certification data, approximately 20% of vehicles below 6,000 lbs GVWR had HC levels in the range of 0.18 to 0.27 g/mile, which is two to three times the 75° F Tier 2 bin 5 full useful life standard. These reported HC levels are from Cold CO test results for certification test vehicles with typically only 4,000 mile aged systems, without full useful life deterioration applied. Rapid advances in emission control hardware technology have lowered deterioration factors used by manufacturers to demonstrate full useful life compliance, usually indicating little or no deterioration over a vehicle's lifetime. These deterioration factors are common across all required test cycles including cold temperature testing.

[148] Memo to docket "Discussions Regarding Secondary Air System Usage at 20° F with European Automotive Manufacturers and Suppliers of Secondary Air Systems," December 2005

Additionally, manufacturers typically incorporate a 20% to 30% compliance margin to account for in-use issues that may cause emissions variability. See RIA Chapter 5 for further discussion and details regarding current certification levels.

c. Feasibility and Test Programs

While a few of the heavier vehicles achieved emission levels below the 0.5 g/mile level, there are only limited 20° F certification results for Tier 2 compliant vehicles over 6000 lbs GVWR because the Tier 2 standards are still phasing in for these vehicles. Prior to proposal, we conducted a feasibility study in 20° F conditions for Tier 2 vehicles over 6000 lbs GVWR. The test program further investigated the feasibility of compliance for heavier vehicles and assessed their capabilities with typical Tier 2 hardware. For one vehicle with models above and below 6,000 lbs GVWR, we reduced HC emissions by 60-70%, depending on the control strategy. This vehicle had a baseline level of about 1.0 g/mile. The results are well within the 0.5 g/mile standard including compliance margin, and within a 0.3 g/mile level on some tests. We achieved these reductions through recalibration without the use of new hardware.

Comments from the auto industry suggested that the original single vehicle feasibility test program and the approach used to reduce emission levels on the feasibility vehicle were too simplistic and did not fully account for competing requirements. The commenter stated that that Tier 2 FTP and SFTP requirements have affected hardware decisions, such as catalyst location, and make it more difficult to simultaneously obtain

optimal performance at colder temperatures. For the final rule, we completed a second feasibility program to help address the comments regarding the first feasibility program. For the second feasibility test program, we tested a vehicle with some of the specific challenges listed by the auto industry which represented a worst case vehicle from the perspective of cold temperature emissions control including catalyst location and a large displacement engine. The second feasibility program utilized emission control methods already practiced in the production European version of the vehicle tested, helping to demonstrate that significant emission controls through calibration are available to manufacturers today. Simply utilizing the European emission controls resulted in a 32% reduction in NMHC emissions. The findings from both studies are provided in detail in the RIA.

While the auto industry did not question the feasibility of the standards, they expressed concerns that EPA was not conveying the complexity of effort required for full product line manufacturers to meet the new standards. We believe that the feasibility program demonstrated that Tier 2 vehicles, including higher weight vehicles, currently have existing emission control capabilities to achieve the new standards. The extensive emission data from certification tests detailed in RIA Chapter 5 provides substantial support to the assessment that Tier 2 vehicles generally possess the necessary technology to achieve the new standards. In most cases, the technologies need to be activated and optimized at colder temperatures through calibration strategies. However, we recognize that manufacturers, particularly full line manufacturers, will have to do significant development work to bring their expansive Tier 2 product line into compliance with the

new standards over the vehicles' full useful life. This is why we have included a phase-in of the standards over 6 model years.

4. Standards Timing and Phase-In

a. Phase-In Schedule

As proposed, we will begin implementing the standard in the 2010 model year (MY) for LDV/LLDTs and 2012 MY for HLDT/MDPVs. The implementation schedule, in Table V.B-2, begins three model years after the Tier 2 phase-in is complete for each vehicle class. Manufacturers will demonstrate compliance with phase-in requirements through sales projections, similar to Tier 2, as discussed below in Section V.B.7.

Table V.B-2. – Phase-in Schedule for 20°F NMHC Standard by Model Year

| Vehicle GVWR (Category) | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| ≤ 6000 lbs (LDV/LLDT) | 25% | 50% | 75% | 100% | | |
| > 6000lbs HLDT and MDPV | | | 25% | 50% | 75% | 100% |

We requested comments on the proposed start date and duration of the phase-in schedule. Generally, manufacturers supported the phase-in schedule. Commenters indicated that the stringency of the standards will increase the development workload and facility demands, but that the proposed rule recognized these cost issues and provided sufficient mechanisms for phase-in flexibility to help manufacturers transition to the new program. One manufacturer with only LDVs and LLDTs vehicles in their product line commented that the required phase-in percentage affects a larger portion of their products compared with other manufacturers with heavier vehicles, and therefore the phase-in should be extended to accommodate construction of new facilities. Conversely, a non-profit organization commented that EPA should begin the program earlier than we proposed. The organization cited our assessment that manufacturers could utilize primarily calibration and software changes, and not hardware changes, to achieve compliance. However, as discussed below, we believe that the finalized start date and phase-in schedule will achieve the greatest amount of emissions reductions in the shortest feasible amount of time.

EPA must consider lead time in determining the greatest degree of emission reduction achievable under section 202(l) of the Clean Air Act. Also, for vehicles above 6,000 GVWR, section 202(a) of the Act requires that four years of lead time be provided to manufacturers. We believe that lead time and phase-in schedule is needed to allow manufacturers to develop compliant vehicles without significant disruptions in their product development cycles. The three-year period between completion of the Tier 2 phase-in and the start of the new cold NMHC standard should provide vehicle

manufacturers sufficient lead time to design their compliance strategies and to determine the product development plans necessary to meet the new standards.

We recognize that the new cold temperature standards we are finalizing could represent a significant new challenge for many manufacturers and development time will be needed. The issue of NMHC control at cold temperatures was not anticipated by many entities, and research and development to address the issue is consequently at a rudimentary stage for some manufacturers. Lead time is therefore necessary before compliance can be demonstrated. While certification will only require one vehicle model of a durability group to be tested, manufacturers must do development on all vehicle combinations to ensure full compliance within the durability test group. A phase-in is needed because manufacturers must develop control strategies for several vehicle lines. Since manufacturers cannot be expected to implement the standard over their entire product line in 2010, we believe a phase-in allows the program to begin sooner than would otherwise be feasible.

As noted at proposal, the lead time and phase-in are also needed to address test facility availability issues (see 71 FR 15849). Prior to proposal, manufacturers raised concerns that a rapid phase-in schedule would lead to a significant increase in the demand for their cold testing facilities, which could necessitate substantial capital investment in new cold test facilities to meet development needs. This is because manufacturers would need to use their cold testing facilities not only for certification but also for vehicle development. Durability test groups may be large and diverse and therefore require

significant development effort and cold test facility usage for each model. If vehicle development is compressed into too narrow a time window, significant numbers of new facilities would be needed. Manufacturers were also concerned that investment in new test facilities would be stranded at the completion of the initial development and phase-in period.

We took these concerns into consideration when drafting our proposed rule and are finalizing the start date and phase-in as proposed because we continue to believe they address these issues adequately. Our finalized phase-in period accommodates test facilities and work load concerns by distributing these fleet phase-in percentage requirements over a four-year period for each vehicle weight category (six years total). The staggered start dates for the phase-in schedule between the two weight categories should further alleviate manufacturers' burden regarding construction of new test facilities. We recognize that some manufacturers may still determine that upgrades to their current cold facility are needed to handle increased workload, or that additional shifts must be added to their facility work schedules that are not in place today. The lead time provided and the four-year phase-in period provides needed time for vehicle manufacturers to develop a compliance schedule that does not significantly interfere with their future product plans. Manufacturers commented in support of the lead time and phase in provided, commenting that these program elements are needed to avoid high test facility costs.

b. Alternative Phase-In Schedules

We are finalizing provisions, as proposed, that allow manufacturers to introduce vehicles earlier than required in exchange for flexibility to make offsetting adjustments, on a one-for-one basis, to the phase-in percentages in later years. Alternative phase-in schedules essentially credit the manufacturer for its early or accelerated efforts and allow the manufacturer greater flexibility in subsequent years during the phase-in. Under these alternative schedules, manufacturers would have to introduce vehicles that meet or surpass the NHMC average standards before they are required to do so, or else introduce vehicles that meet or surpass the standard in greater quantities than required.

As proposed, we are finalizing provisions allowing manufacturers to apply for an alternative phase-in schedule that would still result in 100% phase-in by 2013 and 2015, respectively, for the lighter and heavier weight categories. As with the primary phase-in, manufacturers would base an alternative phase-in on their projected sales estimates. An alternate phase-in schedule submitted by a manufacturer would be subject to EPA approval and would need to provide the same emissions reductions as the primary phase-in schedule. The alternative phase-in cannot be used to delay full implementation past the last year of the primary phase-in schedule (2013 for LDVs/LDTs and 2015 for HLDTs/MDPVs).

As proposed, this alternative phase-in schedule will be acceptable if it passes a specific mathematical test (see 71 FR 15849). We have designed the test to provide manufacturers a benefit from certifying to the standards early, while ensuring that

significant numbers of vehicles are introduced during each year of the alternative phase-in schedule. Manufacturers will multiply their percent phase-in by the number of years the vehicles are phased in prior to the second full phase-in year. The sum of the calculation will need to be greater than or equal to 500, which is the sum from the primary phase-in schedule (4×25 + 3×50 + 2×75 + 1×100=500). For example, the equation for LDVs/LLDTs will be as follows:

$(6\times API_{2008}) + (5\times API_{2009}) + (4\times API_{2010}) + (3\times API_{2011}) + (2\times API_{2012}) + (1\times API_{2013}) \geq$ 500%, where "API" is the anticipated phase-in percentage for the referenced model year.

As described above, the final sum of percentages for LDVs/LDTs must equal or exceed 500 – the sum that results from a 25/50/75/100 percent phase-in. For example, a 10/25/50/55/100 percent phase-in for LDVs/LDTs that begins in 2009 will have a sum of 510 percent and is acceptable. A 10/20/40/70/100 percent phase-in that begins the same year has a sum of 490 percent and is not acceptable.

To ensure that significant numbers of compliant LDVs/LDTs are introduced in the 2010 time frame (2012 for HLDT/MDPVs), manufacturers would not be allowed to use alternative phase-in schedules that delay the implementation of the requirements, even if the sum of the phase-in percentages ultimately meets or exceeds 500. Such a situation could occur if a manufacturer delayed implementation of its compliant production until 2011 and began an 80/85/100 percent phase-in that year for LDVs/LDTs. To protect against this possibility, we are finalizing, as proposed, that for

any alternative phase-in schedule, the manufacturer's API×year factors for LDV/LLDTs from the 2010 and earlier model years (2012 and earlier for HLDT/MDPVs) sum to at least 100. The early phase-in also encourages the early introduction of vehicles meeting the new standard or the introduction of such vehicles in greater quantity than required, achieving early emissions reductions.

One commenter recommended that EPA carefully consider the added complexity of allowing alternative phase-in schedules before including these provisions in the final rule. In response, we allowed manufacturers the option of using similar alternative phase-ins for Tier 2 and these provisions have not proven to be detrimental in the implementation of the Tier 2 program. We believe the added flexibility provided to manufacturers helps them to meet the new requirements as soon as possible while also helping to minimize disruptions to their product plans. These benefits offset the complexity added by the alternative phase-in option.

Manufacturers commented that EPA should remove the requirement for 2010 to have a sum of 100 because it limits flexibility and could cause manufacturers to run a deficit early in the program. We are retaining this requirement as proposed, except for the option discussed in the next paragraph. In general, this requirement ensures that manufacturers introduce complying vehicles early in the phase-in. The alternative phase-in is not intended to postpone introduction of compliant vehicles; instead, it is to allow an accelerated introduction of vehicles and to allow manufacturers the flexibility of aligning compliance with production schedules. The commenter's suggestion of removing the

sum of 100 provision for MY 2010 and earlier vehicles would essentially amount to delaying the program by one year. Since all manufacturers make LDV/LDTs, the sum of 100 provision ensures that environmental benefits are achieved as soon as possible, while the alternative phase-in provision as a whole provides additional flexibility to manufacturers.

As stated described above, we proposed an early-year requirement for alternative phase-in schedules for HLDTs/MDPVs (see 71 FR 15850). Similar to the LDV/LDT requirement, we proposed that the API×year factors from the 2012 and earlier model years sum to at least 100. We are finalizing the option of electing an HLDT/MDPV alternative phase-in that meets the 500% criteria, including the 100% criteria for model years 2012 and earlier, as proposed. However, based upon comments received, we are revising this provision to allow additional flexibilities. The comments pointed out that such a requirement would pose significant hardship for limited-line manufacturers who produce only a narrow range of HLDTs/MDPVs. For example, a manufacturer who only sells one configuration in the HLDT/MDPV category would not have the option of certifying only 25% of these vehicles in 2012. To meet our proposed criteria, that manufacturer would have to ensure that the model is fully compliant in 2012 (i.e., 100% of their HLDTs/MDPVs), eliminating any flexibility for these manufacturers. To address this concern, we are allowing HLDT/MDPV manufacturers the additional option of employing a phase-in not meeting the early year requirement (sum of 100 in 2012) as long as their full phase-in is accelerated. Under this option, we are requiring only that the full alternative phase-in equation may meet or exceed 600% for HLDTs/MDPVs. We

believe this will still yield environmental benefits as quickly as possible, while not putting an unreasonable burden on limited-line manufacturers of HLDTs/MDPVs. Manufacturers with limited HLDT/MDPV product offerings will still achieve 100 percent phase-in of the HLDTs/MDPVs before the end of the phase-in schedule in 2015. For example, a manufacturer that only has one HLDT/MDPV family and achieves 100% phase-in in 2013 would have a sum of 600% in the equation:

$(6\times0) + (5\times0) + (4\times0) + (3\times100\%) + (2\times100\%) + (1\times100\%) = 600\%$

As noted above, phase-in schedules, in general, add little flexibility for manufacturers with limited product offerings because a manufacturer with only one or two test groups cannot take full advantage of a 25/50/75/100 percent or similar phase-in. Therefore, consistent with our proposal which reflected the recommendations of the Small Advocacy Review Panel (SBAR Panel), which we discuss in more detail later in section V.E, manufacturers meeting EPA's definition of "small volume manufacturer" will be exempt from the phase-in schedules and will be required simply to comply with the final 100% compliance requirement. This provision will only apply to small volume manufacturers and not to small test groups of larger manufacturers.

5. Certification Levels

Manufacturers typically certify groupings of vehicles called durability groups and test groups, and they have some discretion on what vehicle models are placed in each group. A durability group is the basic classification used by manufacturers to group

vehicles to demonstrate durability and to predict deterioration. A test group is a basic classification within a durability group used to demonstrate compliance with FTP 75° F standards.[149] For Cold CO, manufacturers certify on a durability group basis, whereas for 75° F FTP testing, manufacturers certify on a test group basis. In keeping with the current cold CO standards, we are requiring testing on a durability group basis for the cold temperature NMHC standard, as proposed (see 71 FR 15850). Manufacturers will have the option of certifying on the smaller test group basis, as is allowed under current cold CO standards. Testing on a test group basis will require more tests to be run by manufacturers but may provide them with more flexibility within the averaging program. In either case, the worst-case vehicle within the group from an NMHC emissions standpoint must be tested for certification.

For the new standard (and consistent with certification for most section 202 standards), manufacturers will declare a family emission limit (FEL) for each group either at, above, or below the fleet averaging standard. The FEL must be based on the certification NMHC level, including deterioration factor, plus the compliance margin manufacturers feel is needed to ensure in-use compliance. The FEL becomes the standard for each group, and each group could have a different FEL so long as the projected sales-weighted average level met the fleet average standard at time of certification. Like the standard, the FEL will be set at one significant digit to the right of the decimal point. Manufacturers will compute a sales-weighted average for the NMHC emissions at the end of the model year and then determine credits generated or needed based on how much the average is above or below the standard.

[149] 40 CFR 86.1803-01.

One commenter questioned if the FEL approach would interfere with the Tier 2 program, which uses bins rather than FELs. We do not believe that the two approaches create a conflict because compliance with Tier 2 and the cold temperature standards operate independent of one another. Tier 2 standards and bins are not a factor when manufacturers demonstrate compliance with the cold temperature standards.

6. Credit Program

As described above, we are finalizing proposed provisions allowing manufacturers to average the FELs for NMHC emissions by sales of their vehicles and comply with a corporate average NMHC standard (see 71 FR 15850). In addition, we are finalizing, as proposed, banking and trading provisions: when a manufacturer's average NMHC emissions from vehicles certified and sold falls below the corporate average standard, the manufacturer may generate credits that it could save for later use (banking) or transfer to another manufacturer (trading). Manufacturers must consume any credits if their corporate average NMHC emissions were above the applicable standard for the weight class.

As proposed, credits may be generated prior to, during, and after the phase-in period. Manufacturers could certify LDVs/LLDTs to standards as early as the 2008 model year (2010 for HLDTs/MDPVs) and receive early NMHC credits for their efforts.

They could use credits generated under these “early banking” provisions after the phase-in begins in 2010 (2012 for HLDTs/MDPVs).

One organization opposed the use of credits from one weight class to offset debits in another weight class. However, EPA views the averaging, banking, and trading (ABT) provisions as an important element in setting emission standards reflecting the greatest degree of emission reduction achievable, considering factors including cost and lead time. If there are vehicles that will be particularly costly or have a particularly hard time coming into compliance with the standard, the ABT program allows a manufacturer to adjust the compliance schedule accordingly, without special delays or exceptions having to be written into the rule. This is an important flexibility especially given the current uncertainty regarding optimal technology strategies for any given vehicle line. In these circumstances, ABT allows us to consider a more stringent emission standard than might otherwise be achievable under the Clean Air Act, since ABT reduces the cost and improves the technological feasibility of achieving the standard. By enhancing the technological feasibility and cost-effectiveness of the new standard, ABT allows the standard to be attainable earlier than might otherwise be possible. Also see, e.g., 69 FR 38996-97, (June 19, 2004), which discusses an ABT program for nonroad diesel engines, which allows for use of credits across engine families. This type of credit use can be important in enhancing standards’ overall technical feasibility, cost-effectiveness, and pace of implementation.

a. How Credits Are Calculated

As proposed, the corporate average for each weight class will be calculated by computing a sales-weighted average of the FEL NMHC levels to which each group was certified. As discussed above, manufacturers will group vehicles into durability groups or test groups and establish an FEL for each group. This FEL becomes the standard for that group. Consistent with FEL practices in other vehicle standards, manufacturers may opt to select an FEL above the test level. The FEL will be used in calculating credits. The number of credits or debits will then be determined using the following equation:

Credits or Debits = (Standard - Sales weighted average of FELs to nearest tenth) × Actual Sales

If a manufacturer's average was below the 0.3 g/mi corporate average standard for LDVs/LDTs (below 0.5 g/mi for HLDTs/MDPVs), credits would be generated. These credits could then be used in a future model year when its average NMHC might exceed the 0.3 or the 0.5 standard. Conversely, if the manufacturer's fleet average was above the corporate average standard, banked credits could offset the difference, or credits could be purchased from another manufacturer.

b. Credits Earned Prior to Primary Phase-In Schedule

As proposed, we are finalizing provisions allowing manufacturers to earn early emissions credits if they introduce vehicles that comply with the new standards early and

the corporate average of those vehicles is below the applicable standard. Early credits could be earned starting in model year 2008 for vehicles meeting the 0.3 g/mile standard and in 2010 for vehicles meeting the 0.5 g/mile standard. These emissions credits generated before the start of the phase-in could be used both during and after the phase-in period and have all the same properties as credits generated by vehicles subject to the primary phase-in schedule. As mentioned in section V.B.4.b above, we are also finalizing a provision that allows manufacturers to apply for an alternative phase-in schedule for vehicles that are introduced early. The alternative phase-in and early credits provisions would operate independent of one another.

c. How Credits Can Be Used

A manufacturer can use credits in any future year when its corporate average is above the standard, or it can trade (transfer) the credits to other manufacturers. Because of separate sets of standards for the different weight categories, we are finalizing as proposed that manufacturers compute their corporate NMHC averages separately for LDV/LLDTs and HLDTs/MDPVs. Credit exchanges between LDVs/LLDTs and HLDTs/MDPVs will be allowed. This will provide added flexibility for fuller-line manufacturers who may have the greatest challenge in meeting the new standards due to their wide disparity of vehicle types/weights and emissions levels.

d. Discounting and Unlimited Life

Credits will allow manufacturers a way to address unexpected shifts in their sales mix. The NMHC emission standards in this program are quite stringent and do not present easy opportunities to generate credits. Therefore, we will not discount unused credits. Further, the degree to which manufacturers invest the resources to achieve extra NMHC reductions provides true value to the manufacturer and to 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, NMHC credits will not have a credit life limit. However, credits may only be used to offset deficits accrued with respect to the new 0.3/0.5 g/mile cold temperature standards, and cannot be used in Tier 2 or other programs.

e. Deficits Can Be Carried Forward

When a manufacturer has an NMHC deficit at the end of a model year – that is, its corporate average NMHC level is above the required corporate average NMHC standard –the manufacturer will be allowed to carry that deficit forward into the next model year. To prevent deficits from being carried forward indefinitely, we are finalizing, as proposed, that manufacturers will not be permitted to run a deficit for two years in a row. A deficit carry-forward may only occur after the manufacturer used any banked credits. If the deficit still exists and the manufacturer chooses not to, or is unable to, purchase credits, the deficit will be carried over. At the end of that next model year, the deficit must be covered with an appropriate number of credits that the manufacturer generated or

purchased. Any remaining deficit means that the manufacturer is not in compliance and can be subject to an enforcement action.

We believe that it is reasonable to provide this flexibility to carry a deficit for one year given the uncertainties that 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.

f. Voluntary Heavy-Duty Vehicle Credit Program

In addition to MDPV requirements in Tier 2, we also currently have chassis-based emissions standards for other complete heavy-duty vehicles (e.g., large pick-ups and cargo vans) above 8,500 pound GVWR. However, these standards do not include cold temperature CO standards. As noted below in section V.B.6.a, we did not propose to apply cold temperature NMHC standards to heavy-duty gasoline vehicles due to a current lack of emissions data on which to base such standards. Accordingly, the final rule does not contain any provisions for heavy-duty vehicle standards or credit program.

Our proposal discussed a few ideas for voluntary approaches where manufacturers could earn credits by including heavy-duty gasoline vehicles in the program. We only received one comment regarding a voluntary credit program for heavy-duty gasoline vehicles. The organization that submitted the comment opposed the creation of NMHC

credits applicable to other vehicle categories generated by reductions from heavy-duty vehicles. In light of this lack of support, as well as insufficient data, we are not including a heavy-duty standard or credit program at this time. We plan to revisit the need for and feasibility of standards as data become available.

### 7. Additional Vehicle Cold Temperature Standard Provisions

#### a. Applicability

As proposed, the new cold temperature NMHC standards apply to all gasoline-fueled light-duty vehicles and MDPVs sold nationwide. The cold NMHC standards do not apply to diesel vehicles, alternative-fueled vehicles, or to the non-gasoline portion of flex fuel vehicles (FFVs).[150] We are finalizing as proposed that FFVs will still require certification to the applicable cold NMHC standard, though only when operated on gasoline. FFVs operating on ethanol are not subject to the cold standard. When manufacturers submit their application for certification for FFVs (such as FFVs that can run on gasoline or E85[151]), the FFVs must have been tested using gasoline. The application must also include a statement that either confirms the same control strategies used with gasoline will be used when operating on ethanol, or that identifies any differences as an Auxiliary Emission Control Device (AECD). Again, dedicated alternative-fueled vehicles are not covered.

[150] In this preamble, we use the term flex fuel vehicle (FFV) to mean a vehicle capable of operating on two or more different fuel types, either separately or simultaneously. Most FFVs available today run on gasoline and ethanol mixtures. EPA regulations use the term "multi-fuel vehicle" when referring to these vehicles.

[151] E85 is a fuel mixture consisting of 85% ethanol and 15% gasoline

We requested comment on standards for vehicles operating on fuels other than gasoline. Vehicle manufacturers agreed that the cold NMHC standards should not apply to diesels and alternative fuel vehicles, stating that the standard would capture all but a very small percentage of air toxics emissions from the light-duty onroad fleet. We also received comments in support of a standard for diesel vehicles. One organization argued that the EPA must exercise its authority to gather the necessary data and establish a cold temperature NMHC standard for diesel, alternative fuel, and FFVs, or explain why such standards are not needed.

A comprehensive assessment of appropriate standards for diesel vehicles will require a significant amount of investigation and analysis of issues such as feasibility and costs. While we have significant amounts of data on which to base our final standards for light-duty gasoline vehicles, we have very little data for light-duty diesels. Currently, diesel vehicles are not subject to the cold CO standard, so, unlike the situation for gasoline motor vehicles where some certification data under cold conditions temperature are available, there is very limited data available on diesel cold temperature emissions. Also, many manufacturers are currently in the process of developing their diesel product offerings and the cold temperature performance of these vehicles cannot yet be evaluated.

Therefore, at this time, the cold NMHC standards will not apply to light-duty diesel vehicles. We will continue to evaluate data for these vehicles as they enter the fleet and will reconsider the need for standards. We have adopted cold temperature FTP

testing for diesels as part of the Fuel Economy Labeling rulemaking, including NMHC measurement.[152] These testing data would allow us to assess diesel NMHC certification levels over time. There are sound engineering reasons, however, to expect cold NMHC emissions for diesel vehicles to be as low as or even lower than those required for gasoline vehicles in the finalized standards. This is because diesel engines operate with leaner air-fuel mixtures compared to gasoline engines. Therefore diesels have fewer engine-out NMHC emissions due to the abundance of oxygen and more complete combustion. A very limited amount of confidential manufacturer-furnished information is consistent with this engineering hypothesis.

With respect to FFVs, although FFVs are currently required to certify to the cold CO standards at 20° F while operating on gasoline, there is no cold testing requirement for these vehicles while operating on the alternative fuel at 20° F. There are little data upon which to evaluate NMHC emissions when operating on alternative fuels at cold temperatures. For FFVs operating on E85[153], it is difficult to develop a reasonable standard due to a lack of fuel specifications, testing protocols, and test data for the 20° F cold CO cycle. Standards reflecting use of other fuels such as methanol and natural gas pose similar uncertainty. As in the case of diesels, it will take time to gain an understanding of these other technologies in sufficient detail to support a rulemaking. Therefore, as proposed, we are not adopting a cold NMHC testing requirement for FFVs while operating on the non-gasoline fuel or for alternative fuel vehicles under this final

[152] "Fuel Economy Labeling of Motor Vehicles; Revisions to Improve Calculation of Fuel Economy Estimates," Final Rule, 71 FR 77872, December 27, 2006.

[153] E85 is a fuel mixture consisting of 85% ethanol and 15% gasoline typical of a summer blend of an ethanol based alternative fuel

rulemaking. However, for FFVs, we are requiring confirmation that emission controls used when operating on gasoline are also used when operating on the non-gasoline fuel unless a reasonable exception why they cannot be used is declared. We will continue to investigate these other technologies.

Between the proposed rule and today's final rule, we conducted an initial emissions testing program on a limited number of FFVs operated on several blends of gasoline and ethanol at normal test temperatures and 20° F.[154] These vehicles were tested on summer gasoline and E85 under normal test temperatures and on winter gasoline and E70[155] at 20° F. At 20° F, HC emissions were significantly higher with E70 fuel than with gasoline, with the HC emissions largely consisting of unburned ethanol generated during the cold start. The reason for the elevated HC emission levels is that during cold starts, ethanol, which is an MSAT, does not readily burn in the combustion chamber due to its higher boiling point (approximately 180° F). FFVs must start on the gasoline portion of the alternative fuel, which can compose as little as 15% of the alternative fuel. Ethanol emissions are further increased at colder temperatures because the lower engine start temperature will require an increasing amount of the fuel mixture to start the vehicle and subsequently more unburned ethanol can escape the combustion process. However, the testing also indicates significantly lower benzene emission levels for FFVs when operating on the high ethanol blends. Benzene was 30% to 90% lower on E85 and

[154] "Flex Fuel Vehicles (FFVs) VOC/PM Cold Temperature Characterization When Operating on Ethanol (E10, E70, E85)" February, 2007

[155] E70 is a fuel mixture consisting of 70% ethanol and 30% gasoline typical of a winter blend of an ethanol based alternative fuel.

approximately 30% lower on E70 compared to the levels when run on gasoline. Acetaldehyde emissions are significantly higher with E85 relative to emissions from gasoline-fueled vehicles, since it is a byproduct of partial (i.e., incomplete) ethanol combustion. In addition, some other VOC-based toxics emissions were generally lower with the vehicles running on E85 and E70 compared with gasoline.

There are many issues that must be resolved before we are able to establish a cold temperature standard for FFVs when run on E85 (and E70 at cold temperatures). These include feasibility (i.e., levels that are technically achievable), cost, test procedures, test fuel specifications and the appropriate form of the standard. For example, because much of the VOC emissions from FFVs operating on the high ethanol blends at cold temperatures is unburned ethanol, we may need to consider whether higher NMHC level would be justified or whether an NMHC minus ethanol standard would have merit. We plan to address these issues as part of a broader assessment of E85 emissions regulatory issues in the future.

One organization commented that EPA must establish cold temperature standards for heavy-duty vehicles. Since there is no 20° F cold standard for heavy-duty vehicles, we have no data for heavy-duty gasoline-fueled vehicles, but we would expect a range of emissions performance similar to that of lighter gasoline-fueled trucks. Due to the lack of test data on which to base feasibility and cost analyses, we did not propose cold temperature NMHC standards for these vehicles. As mentioned previously, we plan to revisit this issue when sufficient data become available.

b. Useful Life

We are adopting the proposed requirement that the new cold temperature standards must be met over the full useful life of the vehicle, consistent with other emissions standards for Tier 2 vehicles. The "useful life" of a vehicle means the period of use or time during which an emission standard applies to light-duty vehicles and light-duty trucks.[156] Given that we expect that manufacturers will make calibration or software changes to existing Tier 2 technologies, it is reasonable for the new cold temperature standards to have the same useful life as the Tier 2 standards. For LDV/LLDT, the full useful life values will be 120,000 miles or 10 years, whichever comes first, and for HLDT/MDPV, full useful life is 120,000 miles or 11 years, whichever comes first.[157] We did not receive any comments regarding these useful life provisions.

c. High Altitude

We do not expect emissions to be significantly different at high altitude due to the use of common emissions control calibrations. Limited data submitted by a manufacturer suggest that FTP emissions performance at high altitude generally follows sea level performance. Furthermore, there are very limited cold temperature testing facilities at high altitudes. Therefore, under normal circumstances, manufacturers will not be required to submit vehicle test data for high altitude. Instead, manufacturers will be

[156] 40 CFR 86.1803-01
[157] 40 CFR 86.1805-04

required to submit an engineering evaluation indicating that common calibration approaches will be utilized at high altitude. Any deviation from sea level in emissions control practices must be included in the auxiliary emission control device (AECD) descriptions submitted by manufacturers at certification. In addition, any AECD specific to high altitude must include engineering emission data for EPA evaluation to quantify any emission impact and validity of the AECD. We did not receive any comments regarding these provisions relating to altitude.

d. In-Use Standards for Vehicles Produced During Phase-In

As proposed, we are finalizing provisions for an in-use standard that is 0.1 g/mile higher than the certification FEL for any given test group for a limited number of model years. For example, a test group with a 0.2 g/mile FEL would have an in-use standard of 0.3 g/mile. This would not change the FEL or averaging approaches and would only apply in cases where EPA tests vehicles in-use to ensure emissions compliance. Tables V.B-3 and V.B-4 provide the finalized schedule for the availability of the in-use standards.

Table V.B-3. - Schedule for In-use Standards for LDVs/LLDTs

| Model Year of Introduction | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| Models years that the in-use standard is available for carry-over test groups | 2008<br>2009<br>2010<br>2011 | 2009<br>2010<br>2011<br>2012 | 2010<br>2011<br>2012<br>2013 | 2011<br>2012<br>2013 | 2012<br>2013<br>2014 | 2013<br>2014 |

Table V.B-4. - Schedule for In-use Standards for HLDVs/MDPVs

| Model Year of Introduction | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Models years that the in-use standard is available for carry-over test groups | 2010<br>2011<br>2012<br>2013 | 2011<br>2012<br>2013<br>2014 | 2012<br>2013<br>2014<br>2015 | 2013<br>2014<br>2015 | 2014<br>2015<br>2016 | 2015<br>2016 |

This approach is similar to the one adopted in the Tier 2 rulemaking.[158] As we have indicated, the standards we are finalizing will be more challenging for some vehicles than for others. 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 calibrations or technologies. Thus, we believe it is appropriate, for the first

[158] "Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements," Final Rule, 65 FR 6796, February 10, 2000.

few years, for those vehicles 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 in use by a specified amount.

The in-use standards will be available for the first few model years of sales after a test group meeting the new standards is introduced, according to a schedule that provides more years for test groups introduced earlier in the phase-in. This schedule provides manufacturers with time to determine the in-use performance of vehicles and learn from the earliest years of the program to help ensure that vehicles introduced after the phase-in period meet the final standards in-use. The in-use compliance margin only applies to carry-over models. That is, once a test group is certified to the new standards, it will be carried over to future model years.

We received one comment on the provisions for an interim in-use standard. A manufacturer commented that the EPA should consider allowing an interim in-use increment greater than 0.1 g/mi to account for known variability in in-use conditions and vehicle technologies. However, we did not receive any data that supported the manufacturer's assertion, nor any indication of an acceptable increase beyond the 0.1 g/mi increment. Furthermore, no other manufacturers commented on this provision. We believe the 0.1 g/mi increment is sufficient and that anything greater may result in a reduction of emission control. Therefore, the interim in-use standard is finalized as proposed.

8. Monitoring and Enforcement

As proposed, manufacturers must either report that they met the relevant corporate average standard in their annual reports to the Agency, or show via the use of credits that they have offset any exceedance of the corporate average standard. Manufacturers must also report their credit balances or deficits. EPA will monitor the program.

As in Tier 2, the averaging, banking and trading program will be enforced through the certificate of conformity that manufacturers must obtain in order to introduce any regulated vehicles into commerce.[159] The certificate for each test group will require all vehicles to meet the emissions level to which the vehicles were certified, and will be conditioned upon the manufacturer meeting the corporate average standard within the required time frame. If a manufacturer fails to meet this condition, the vehicles causing the corporate average exceedance will be considered to be not covered by the certificate of conformity for that engine family. A manufacturer will be subject to penalties on an individual vehicle basis for sale of vehicles not covered by a certificate.

EPA will review the manufacturer's sales to designate the vehicles that caused the exceedance of the corporate average standard. We will designate as nonconforming those vehicles in those test groups with the highest certification emission values first, continuing until we reach a number of vehicles equal to the calculated number of

[159] "Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements," Final Rule, 65 FR 6797, February 10, 2000.

noncomplying vehicles, as determined above. In a test group where only a portion of vehicles are deemed nonconforming, we will determine the actual nonconforming vehicles by counting backwards from the last vehicle produced in that test group number. Manufacturers will be liable for penalties for each vehicle sold that is not covered by a certificate.

As proposed, we will condition certificates to enforce the requirements that manufacturers not sell credits that they have not generated. A manufacturer that transfers credits it does not have will create an equivalent negative credit balance or deficit that the manufacturer must make up by the reporting deadline for the same model year. A credit deficit in such cases at the reporting deadline will be a violation of the conditions under which EPA issued the certificate of conformity. EPA will identify the nonconforming vehicles in the same manner described above and nonconforming vehicles will not be covered by the certificate.

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, both the buyer and the seller will be liable, except in cases involving fraud. 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.

We did not propose any new compliance monitoring activities or programs for vehicles. These vehicles will be subject to the certification testing provisions of the CAP2000 rule[160]. We are not requiring manufacturer in-use testing to verify compliance. There is no cold CO manufacturer in-use testing requirement today (similarly, we do not require manufacturer in-use testing for SCO3 standards under the Supplemental Federal Test Procedures (SFTP) program largely due to the limited availability of the test facilities). As noted earlier, manufacturers have limited cold temperature testing capabilities and we believe these facilities will be needed for product development and certification testing. However, we have the authority to conduct our own in-use testing program for exhaust emissions to ensure that vehicles meet standards over their full useful life. We will pursue remedial actions when substantial numbers of properly maintained and used vehicles fail any standard in-use. We also retain the right to conduct Selective Enforcement Auditing of new vehicles at manufacturers' facilities.

The use of credits will not be permitted to address Selective Enforcement Auditing or in-use testing failures. The enforcement of the averaging standard will occur through the vehicle's certificate of conformity. A manufacturer's certificate of conformity will be conditioned upon compliance with the averaging provisions. If a manufacturer failed to meet the corporate average standard and did not obtain appropriate credits to cover its shortfalls in that model year or in the subsequent model year (see deficit carry forward provision in section V.B.5.e.), then the certificate for the affected test groups will be void for all past, present, and future sales related to that certificate. Manufacturers will need to track their certification levels and sales unless they produced

[160] 71, Federal Register, 2810, January 17, 2006

only vehicles certified to NMHC levels below the standard and did not plan to bank credits. We did not receive any comments on the provisions regarding Selective Enforcement Auditing or conditions of certification.

### C. What Evaporative Emissions Standards Are We Finalizing?

We are finalizing as proposed a set of numerically more stringent evaporative emission standards for all light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles. The standards we are finalizing are equivalent to California's LEV II standards, and these standards are shown in Table V.C-1. The new standards represent about a 20 to 50 percent reduction (depending on vehicle weight class and type of test) in the diurnal plus hot soak standards currently in place for Tier 2 vehicles.[161] As with the current Tier 2 evaporative emission standards, the standards we are finalizing vary by vehicle weight class. The increasingly higher standards for heavier weight class vehicles account for larger vehicle sizes and fuel tanks (non-fuel and fuel emissions).[162]

[161] Diurnal emissions (or diurnal breathing losses) means evaporative emissions as a result of daily temperature cycles or fluctuations for successive days of parking in hot weather. Hot soak emissions (or hot soak losses) are the evaporative emissions from a parked vehicle immediately after turning off the hot engine. For the evaporative emissions test procedure, diurnal and hot soak emissions are measured in an enclosure commonly called the SHED (Sealed Housing for Evaporative Determination).

[162] Larger vehicles may have greater non-fuel evaporative emissions, probably due to an increased amount of interior trim, vehicle body surface area, and larger tires.

Table V.C-1. - Final Evaporative Emission Standards [Grams of hydrocarbons per test]

| Vehicle Class | 3-Day Diurnal Plus Hot Soak | Supplemental 2-Day Diurnal Plus Hot Soak |
|---|---|---|
| LDVs | 0.50 | 0.65 |
| LLDTs | 0.65 | 0.85 |
| HLDTs | 0.90 | 1.15 |
| MDPVs | 1.00 | 1.25 |

1. Current Controls and Feasibility of the New Standards

As described earlier, we are reducing the numerical level of the evaporative emission standards applicable to diurnal and hot soak emissions from light-duty vehicles and trucks by about 20 to 50 percent. These new standards are meant to be effectively the same as the evaporative emission standards in the California LEV II program. Although the new standards are numerically more stringent, as we explained at proposal, we believe they are essentially equivalent to the current Tier 2 standards because of differences in testing requirements (see 71 FR 15854; also see section V.C.5 below for further discussion of such test differences, e.g., test temperatures and fuel volatilies). As discussed in the proposal, this view is supported by manufacturers and by current industry practices. Based on this understanding, we do not project additional VOC or air

toxics reductions from the evaporative standards we are finalizing today.[163] Also, we do not expect additional costs since we expect that manufacturers will continue to produce 50-state evaporative systems. Therefore, harmonizing the federal and California LEV-II evaporative emission standards will codify (i.e., lock in) the approach manufacturers have already indicated they are taking for 50-state evaporative systems.

We believe this action is an important step to ensure that the federal standards reflect the lowest possible evaporative emissions, and it also will provide states with certainty that the emissions reductions we project to occur due to 50-state compliance strategies will in fact occur. In addition, the new standards will assure that manufacturers continue to use available fuel system materials to minimize evaporative emissions.

In the proposal, we considered but did not propose more stringent evaporative requirements contained in the partial zero-emission vehicle (PZEV) portion of California's LEV II program. The LEV II program includes PZEV credits for vehicles that achieve near zero emissions (e.g., LDV evaporative emission standards for both the 2-day and 3-day diurnal plus hot soak tests are 0.35 grams/test, which are more stringent than the standards finalized today). State and local air quality organizations commented that EPA should adopt the PZEV evaporative standards. In addition, they indicated that California Air Resources Board estimates the additional per vehicle cost for a PZEV evaporative emission system to be about $10.20. They commented that EPA should consider the introduction of a similar standard for some vehicles. Moreover, they urged

[163] U.S. EPA, Office of Air and Radiation, *Update to the Accounting for the Tier 2 and Heavy-Duty 2005/2007 Requirements in MOBILE6*, EPA420-R-03-012, September 2003.

us to commit in the final rule to pursue actions to achieve further evaporative emission reductions in the future.

However, auto manufacturers supported the proposed evaporative emission standards. They indicated that, as EPA tentatively concluded in the proposed rule, it would be inappropriate for EPA to propose more stringent standards. Manufacturers noted that PZEVs have been limited to a small fraction of the light-duty fleet, mainly small 4-cylinder passenger cars, and that the PZEV standard has not proven feasible across the light-duty fleet. Furthermore, it is significantly more costly to comply with the PZEV evaporative emission standard because of significant modifications needed to the evaporative emission control system and fuel system. Also, the auto manufacturers suggested that emission benefits, if any, of the PZEV standard would be minimal.

We have decided not to set more stringent PZEV-equivalent evaporative standards at this time. The limited PZEV vehicles available today require additional evaporative emissions technology or hardware (e.g., modifications to fuel tank and secondary canister) beyond what will be needed for vehicles meeting the new standards that we are adopting today. As we described in the proposed rule, at this time, we need to better understand the evaporative system modifications (i.e., technology, costs, lead time, etc.) potentially needed across the vehicle fleet to meet PZEV-level standards before we can fully evaluate whether it is feasible to consider more stringent standards. For example, at this point we cannot determine whether the PZEV technologies could be used fleetwide or on only a limited set of vehicles. Thus, in the near term, we lack any of the

information necessary to determine if further reductions are feasible, and if they could be achievable considering cost, energy and safety issues. Moreover, sufficient new information or data was not provided from commenters on the proposed rule to close these gaps in our understanding. However, we intend to consider more stringent evaporative emission standards in the future.

2. Evaporative Standards Timing

As proposed, we will implement today's evaporative emission standards in model year 2009 for LDVs/LLDTs and model year 2010 for HLDTs/MDPVs. Many manufacturers already have begun or completed model year 2008 certification. Thus, model year 2009 is the earliest practical start date of new standards for LDVs/LLDTs. For HLDTs/MDPVs, the phase-in of the existing Tier 2 evaporative emission standards ends in model year 2009. Thus, the model year 2010 is the earliest start date possible for HLDTs/MDPVs. As discussed earlier, since we believe that manufacturers already meet these standards, there is no need for additional lead time beyond the implementation dates we are finalizing.

3. Timing for Flex Fuel Vehicles

For FFVs, the phase-in schedule we are finalizing for the new evaporative standards is somewhat different than the phase-in schedule we proposed for these

vehicles. In the proposal, we recognized that manufacturers will need a few additional years of lead time to adjust their evaporative systems to comply with the new evaporative emission standards for FFVs operating on the non-gasoline fuel, typically E85 (see 71 FR 15855). The existing regulations require that FFVs or E85 vehicles (vehicles designed to operate on fuel that is 85 percent ethanol and 15 percent gasoline) certify on both gasoline and E10 (E10 is a fuel containing 10 percent ethanol and 90 percent gasoline) for the evaporative emissions test procedure. E10 is considered the "worst case" test fuel for evaporative emissions, because it is the ethanol blend that results in greater evaporative emissions. Thus, E10 is the evaporative certification test fuel for E85 vehicles. Thus far, only a few FFV systems have been certified to California LEV-II standards on E10 fuel. Vehicles not certified with E10 in California are sold as gasoline-fueled only vehicles rather than FFVs. Some manufacturers are still developing FFVs for future introduction and the evaporative control systems in some cases have not been fully field tested and certified on the E10 fuel. Therefore, certifying FFVs to the new standards on the E10 fuel (which is required by Tier 2) represents a new requirement for manufacturers.

We proposed that FFVs would need to meet the new evaporative emission certification standards on the non-gasoline fuel beginning in the fourth year of the program -- 2012 for LDVs/LLDTs and 2013 for HLDTs/MDPVs. We proposed that the evaporative emission standards would be implemented in 2009 for LDVs/LLDTs and 2010 for HLDTs/MDPVs for the FFVs when run on gasoline (along with gasoline vehicles that are not flex fuel). At the time of proposal, we believed this additional three

years of lead time would provide sufficient time for manufacturers to make adjustments to their new evaporative systems for FFVs, which are limited product lines.

Auto manufacturers commented that additional lead time and flexibility beyond that proposed is needed for the non-gasoline portion of FFVs. Manufacturers requested the following revisions to the proposed timing of the new evaporative emission standards for the non-gasoline portion of FFVs:

- combine the LDV/LLDT and HLDT/MDPV fleets,
- implement the phase-in of this combined fleet starting in 2013, and
- permit a three-year phase-in of 30 percent/60 percent/100 percent for this combined fleet.

The auto industry indicated that for many manufacturers of FFVs, the new standards are considered new emission requirements for their FFVs. This is unlike the situation for gasoline vehicles, where EPA intends to codify what is already being done in practice rather than imposing any new requirements on gasoline vehicles. For most manufacturers of FFVs, there is no demonstrated capability at this time to meet the new evaporative emission standards from which to begin planning compliance to the new standards. Also, manufacturers expressed that there are important enough differences between fuels in the gasoline and FFVs (or the non-gasoline portion of FFVs) that independent evaluations of FFVs on gasoline and the non-gasoline fuel are warranted.

In addition, auto manufacturers stated that as interest in alternative fuels has increased due to energy supply concerns, they are suddenly considering widespread introduction of FFV models, across entire product lines. What was at first a limited offering of a few models may become more offerings across a manufacturer's full line of products in the timeframe of this rulemaking. The auto industry argues that these new developments justify lead time provisions commensurate with those when a new emission requirement applies across a manufacturer's light-duty product line.

They also indicated that model renewals provide the most cost-effective timing for the introduction of new emissions capability to meet the new standards. At this time, some manufacturers plan model renewals for multiple vehicle lines from model years 2013 to 2015. Allowing a three-year phase-in for the non-gasoline portion of FFVs provides more opportunities for scheduled model renewals to coincide with implementation dates for the new standards. Planning, engineering, and development activities needed to meet these new standards can be incorporated into the model redesign activities.

We believe that many of the concerns presented by manufacturers supporting additional lead time are valid. Most manufacturers have less experience meeting the new standards on the non-gasoline portion of FFVs compared to gasoline vehicles. The new standards will apply beginning in model year 2012 with a three-year phase-in, 30/60/100 percent, for LDVs/LLDTs and HLDTs/MDPVs grouped together (see Table V.C-2). Although auto manufacturers requested a start date of 2013 for a combined fleet, we

believe the additional flexibilities we are providing (three-year phase-in and grouping LDVs/LLDTs and HLDTs/MDPVs together) is sufficient flexibility for the production of FFVs. There is enough time between now and the implementation dates or phase-in schedule (2012 through 2014) for manufacturers to coordinate model renewals with the introduction of broader product offerings of FFVs. See the Summary and Analysis of Comments of this rulemaking for further discussion of comments and our responses to comments.

Table V.C-2. – Phase-in Schedule for Non-Gasoline Portion of FFVs: Evaporative Emission Standards*

| Vehicle GVWR (Category) | 2012 | 2013 | 2014 |
|---|---|---|---|
| ≤ 6000 lbs (LDVs/LLDTs)<br>and<br>> 6000lbs (HLDTs and MDPVs) | 30% | 60% | 100% |

*Phase-in schedules are grouped together for LDVs/LLDTs and HLDTs/MDPVs.

Provisions for in-use evaporative emission standards similar to those described below in section V.C.4 do not apply to the non-gasoline portion of FFVs. We believe that three to five additional years to prepare vehicles (or evaporative families) to meet the certification standards, and to simultaneously make vehicle adjustments from the federal in-use experience of other vehicles (including those that are not FFVs) is sufficient to resolve any issues for FFVs. Also, we did not receive comments requesting additional flexibility beyond the phase-in schedule for certification vehicles discussed earlier.

Therefore, we are finalizing our proposal not to provide additional in-use compliance margin to FFVs. According to the phase-in schedule for a combined fleet in Table V.C-2, the evaporative emission standards will apply both for certification and in-use beginning in 2012 for LDVs/LLDTs and HLDTs/MDPVs.

4. In-Use Evaporative Emission Standards

As described earlier in this section, we are adopting evaporative emission standards that are equivalent to California's LEV II standards. Currently, the Tier 2 evaporative emission standards are the same for certification and in-use vehicles. However, the California LEV II program permits manufacturers to meet less stringent standards in-use for a short time in order to account for potential variability in-use during the initial years of the program when technical issues are most likely to arise.[164] The LEV II program specifies that in-use evaporative emission standards of 1.75 times the certification standards will apply for the first three model years after an evaporative family is first certified to the LEV II standards (only for vehicles introduced prior to model year 2007, the year after 100 percent phase-in).[165, 166] An interim three-year period was considered sufficient to accommodate any technical issues that may arise.

[164] California Air Resources Board, *"LEV II" and "CAP 2000" Amendments to the California Exhaust and Evaporative Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles, and to the Evaporative Emission Requirements for Heavy-Duty Vehicles, Final Statement of Reasons*, September 1999.

[165] 1.75 times the 3-day diurnal plus hot soak and 2-day diurnal plus hot soak standards.

[166] For example, evaporative families first certified to LEV II standards in the 2005 model year shall meet in-use standards of 1.75 times the evaporative certification standards for 2005, 2006, and 2007 model year vehicles.

Federal in-use conditions may raise unique issues (e.g., salt/ice exposure) for evaporative systems certified to the new standards (which are equivalent to the LEV II standards), and thus, we will adopt a similar, interim in-use compliance provision for vehicles subject to these new federal standards. As with the LEV II program, this provision will enable manufacturers to make adjustments for unforeseen problems that may occur in-use during the first three years of a new evaporative family. We believe that a three-year period is enough time to resolve these problems, because it allows manufacturers to gain real world experience and to make adjustments to a vehicle within a typical product cycle.

Depending on the vehicle weight class and type of test, the Tier 2 certification standards are 1.3 to 1.9 times the LEV II certification standards. On average the Tier 2 standards are 1.51 times the LEV II certification standards. Thus, to maintain the same level of stringency for the in-use evaporative emission standards provided by the Tier 2 program, we will apply the Tier 2 standards in-use for only the first three model years after an evaporative family is first certified under today's new standards, instead of using the LEV II 1.75 multiplier approach described above. Since the new evaporative emission certification standards (equivalent to LEV II standards) will be implemented in model year 2009 for LDVs/LLDTs and model year 2010 for HLDTs/MDPVs, these same certification standards will apply in-use beginning in model year 2012 for LDVs/LLDTs and model year 2013 for HLDTs/MDPVs.[167] The schedule for in-use evaporative

[167]For example, evaporative families first certified to the new LDV/LLDT evaporative emission standards in the 2011 model year will be required to meet the Tier 2 LDV/LLDT evaporative emission standards in-use for 2011, 2012, and 2013 model year vehicles (applying Tier 2 standards in-use will be limited to the first three years after introduction of a vehicle), and 2014 and later model year vehicles of

emissions standards are shown in Tables V.C.-3 and V.C.-4 below.

Table V.C-3. - Schedule for In-use Evaporative Emission Standards for LDVs/LLDTs

| Model Year of Introduction | 2009 | 2010 | 2011 |
|---|---|---|---|
| Models Years That Tier 2 Standards Apply to In-use Vehicles | 2009<br>2010<br>2011 | 2010<br>2011<br>2012 | 2011<br>2012<br>2013 |

Table V.C-4. - Schedule for In-use Evaporative Emission Standards for HLDTs/MDPVs

| Model Year of Introduction | 2010 | 2011 | 2012 |
|---|---|---|---|
| Models Years That Tier 2 Standards Apply to In-use Vehicles | 2010<br>2011<br>2012 | 2011<br>2012<br>2013 | 2012<br>2013<br>2014 |

5. Existing Differences Between California and Federal Evaporative Emission Test Procedures

such evaporative families will be required to meet the new LDV/LLDT evaporative emission standards in-use.

As described above, the levels of the California LEV II evaporative emission standards are seemingly more stringent than EPA's Tier 2 standards, but due to differences in California and EPA evaporative test requirements, EPA and most manufacturers view the programs as similar in stringency. The Tier 2 evaporative program requires manufacturers to certify the durability of their evaporative emission systems using a fuel containing the maximum allowable concentration of alcohols (highest alcohol level 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 percent ethanol by volume.[168] We are retaining these Tier 2 durability requirements for the new evaporative emissions program. California does not require this provision. To compensate for the increased vulnerability of system components to alcohol fuel, manufacturers have indicated that they will produce a more durable evaporative emission system than the Tier 2 numerical standards would imply, using the same low permeability hoses and low loss connections and seals planned for California LEV II vehicles.

As shown in Table V.C-3, in addition to the maximum alcohol fuel content for durability testing, the other key differences between the federal and California test requirements are fuel volatilities, diurnal temperature cycles, and running loss test temperatures.[169] The EPA fuel volatility requirement is 2 psi greater than that of California. The high end of EPA's diurnal temperature range is 9° F lower than that of

[168]Manufacturers are required to develop deterioration factors using a fuel that contains the highest legal quantity of ethanol available in the U.S.

[169]Running loss emissions means evaporative emissions as a result of sustained vehicle operation (average trip in an urban area) on a hot day. The running loss test requirement is part of the 3-day diurnal plus hot soak test sequence.

California. Also, EPA's running loss temperature is 10° F lower than California's.

Table V.C-3. - Differences in Tier 2 and LEV II Evaporative Emission Test Requirements

| Test Requirement | EPA Tier 2 | California LEV II |
|---|---|---|
| Fuel volatility (Reid Vapor Pressure in psi): | 9 | 7 |
| Diurnal temperature cycle (degrees F): | 72 to 96 | 65 to 105 |
| Running loss test temperature (degrees F): | 95 | 105 |

Currently, California accepts evaporative emission results generated on the federal test procedure (using federal test fuel), because available data indicates the federal procedure to be a "worst case" procedure. In addition, manufacturers can currently obtain federal evaporative certification based upon California results (meeting LEV II standards under California fuels and test conditions), if they obtain advance approval from EPA.[170]

Auto manufacturers commented that meeting the new standards can be achieved more effectively if they are provided greater flexibility in the certification process. They recommended that EPA allow federal evaporative certification to the new standards, which are equivalent to California's LEV II standards, through California evaporative

[170] Currently, EPA may require comparative data from both federal and California tests.

testing results without obtaining advance approval. Since we are harmonizing federal evaporative standards with the LEV II evaporative emission standards in today's rule, we believe that for the new standards it is unnecessary to continue to require this advance approval for California results. Thus, we are finalizing provisions that would allow certification to the new evaporative emission standards in accordance with California test conditions and test procedures without pre-approval from EPA.

### D. Additional Exhaust Control Under Normal Conditions

We received comments recommending that EPA harmonize exhaust emissions standards with the California LEV II program. We also received comments from manufacturers stating that more stringent tailpipe standards beyond Tier 2 were not warranted and that the difference between Tier 2 and LEV II would not be meaningful. As discussed in the proposal (71 FR 15856), we did not propose to further align the federal light-duty exhaust emissions control program with that of California. We continue to believe, for reasons discussed below, that it would not be appropriate to adopt more stringent tailpipe standards under normal test conditions beyond those contained in Tier 2. It is possible that a future evaluation could result in EPA reconsidering the option of harmonizing the Tier 2 program with California's LEV-II program or otherwise seeking emission reductions beyond those of the Tier 2 program and those being finalized

today.[171] A full analysis of the comments is available in the Summary and Analysis of Comments document for this final rule.

As explained earlier, section 202(l)(2) requires EPA to adopt regulations that contain standards which reflect the greatest degree of emissions reductions achievable through the application of technology that will be available, taking into consideration existing motor vehicle standards, the availability and costs of the technology, and noise, energy and safety factors. The cold temperature NMHC program finalized today is appropriate under section 202(l)(2) as a near-term control: that is, a control that can be implemented relatively soon and without disruption to the existing vehicle emissions control program. We did not propose additional long-term controls (i.e., controls that require longer lead time to implement) because we lack the information necessary to assess their appropriateness. We believe it will be important to address the appropriateness of further MSAT controls in the context of compliance with other significant vehicle emissions regulations (discussed below).

In the late 1990's both the EPA and the California Air Resources Board finalized new and technologically challenging light-duty vehicle/truck emission control programs. The EPA Tier 2 program focuses on reducing NOx emissions from the light-duty fleet. In contrast, the California LEV-II program focuses primarily on reducing hydrocarbons

[171] See Sierra Club v. EPA, 325 F. 3d at 480 (EPA can reasonably determine that no further reductions in MSATs are presently achievable due to uncertainties created by other recently promulgated regulatory provisions applicable to the same vehicles).

by tightening the light-duty nonmethane organic gas (NMOG) standards.[172] Both programs will require the use of hardware and emission control strategies not used in the fleet under previously existing programs. Both programs will achieve significant reductions in emissions. Taken as a whole, the Tier 2 program presents the manufacturers with significant engineering challenges in the coming years. Manufacturers must bring essentially all passenger vehicles under the same emission control program regardless of their size, weight, and application. The Tier 2 program represents a comprehensive, integrated package of exhaust, evaporative, and fuel quality standards which will achieve significant reductions in NMHC, NOx, and PM emissions from all light-duty vehicles in the program. These reductions will include significant reductions in MSATs. Emission control in the Tier 2 program will be based on the widespread implementation of advanced catalyst and related control system technology. The standards are very stringent and will require manufacturers to make full use of nearly all available emission control technologies.

Today, the Tier 2 program remains in its phase-in. Cars and lighter trucks will be fully phased into the program with the 2007 model year, and the heavier trucks won't be fully entered into the program until the 2009 model year. Even though the lighter vehicles will be fully phased in by 2007, we expect the characteristics of this segment of the fleet to remain in a state of transition at least through 2009, because manufacturers will be making adjustments to their fleets as the larger trucks phase in. The Tier 2 program is designed to enable vehicles certified to the LEV-II program to cross over to

[172] NMOG includes emissions of nonmethane hydrocarbons plus all other nonmethane organic air pollutants (for example, aldehydes), which are ozone precursors. For gasoline and diesel vehicles, NMHC and NMOG emissions levels are very similar.

the federal Tier 2 program. At this point in time, however, it is difficult to predict the degree to which this will occur. The fleetwide NMOG levels of the Tier 2 program will ultimately be affected by the manner in which LEV-II vehicles are certified within the Tier 2 bin structure, and vice versa. We intend to carefully assess these two programs as they evolve and periodically evaluate the relative emission reductions and the integration of the two programs.

Today's final rule addresses toxics emissions from vehicles operating at cold temperatures. The technology to achieve this is already available and we project that compliance will not be costly. However, we do not believe that we could reasonably propose further controls at this time. There is enough uncertainty regarding the interaction of the Tier 2 and LEV-II programs to make it difficult to evaluate today what might be achievable in the future. Depending on the assumptions one makes, the LEV-II and Tier 2 programs may or may not achieve very similar NMOG emission levels. Therefore, the eventual Tier 2 baseline technologies and emissions upon which new standards would necessarily be based are not known today. Additionally, we believe it is important for manufacturers to focus in the near term on developing and implementing robust technological responses to the Tier 2 program without the distraction or disruption that could result from changing the program in the midst of its phase-in. We believe that it may be feasible in the longer term to seek additional emission reductions from the base Tier 2 program, and the next several years will allow an evaluation based on facts rather than assumptions. For these reasons, we are deferring a decision on seeking additional NMOG reductions from the base Tier 2 program.

## E. Vehicle Provisions for Small Volume Manufacturers

Before issuing a proposal for this rulemaking, we analyzed the potential impacts of these regulations on small entities. As a part of this analysis, we convened a Small Business Advocacy Review Panel (SBAR Panel, or 'the Panel'). During the Panel process, we gathered information and recommendations from Small Entity Representatives (SERs) on how to reduce the impact of the rule on small entities, and those comments are detailed in the Final Panel Report which is located in the public record for this rulemaking (Docket EPA-HQ-OAR-2005- 0036). Based on these comments, we proposed lead time transition and hardship provisions that will be applicable to small volume manufacturers as described below in section V.E.1 and V.E.2. For further discussion of the Panel process, see section XII.C of this rule and/or the Final Panel Report. We received no comments on this section in response to the proposed rulemaking.

As discussed in more detail in section XII.C, in addition to the major vehicle manufacturers, three distinct categories of businesses relating to highway light-duty vehicles would be covered by the new vehicle standards: small volume manufacturers (SVMs), independent commercial importers (ICIs),[173] and alternative fuel vehicle

[173] ICIs are companies that hold a Certificate (or certificates) of Conformity permitting them to import nonconforming vehicles and to modify these vehicles to meet U.S. emission standards.

converters.[174] We define small volume manufacturers as those with total U.S. sales less than 15,000 vehicles per year, and this status allows vehicle models to be certified under a slightly simpler certification process. For certification purposes, SVMs include ICIs and alternative fuel vehicle converters since they sell less than 15,000 vehicles per year.

About 34 out of 50 entities that certify vehicles are SVMs, and the Panel identified 21 of these 34 SVMs that are small businesses as defined by the Small Business Administration criteria (5 manufacturers, 10 ICIs, and 6 converters). Since a majority of the SVMs are small businesses and all SVMs have similar characteristics as described below in section V.E.1, the Panel recommended that we apply the lead time transition and hardship provisions to all SVMs. These manufacturers represent just a fraction of one percent of the light-duty vehicle and light-duty truck sales. Our final rule today is consistent with the Panel's recommendation.

1. Lead Time Transition Provisions

In these types of vehicle businesses, predicting sales is difficult and it is often necessary to rely on other entities for technology (see earlier discussions in section V on technology needed to meet the new standards).[175,176] Moreover, percentage phase-in

[174] Alternative fuel vehicle converters are businesses that convert gasoline or diesel vehicles to operate on alternative fuel (e.g., compressed natural gas), and converters must seek a certificate for all of their vehicle models.

[175] For example, as described later in section V.E.3, ICIs may not be able to predict their sales because they are dependent upon vehicles brought to them by individuals attempting to import uncertified vehicles.

[176] SMVs (those with sales less than 15,000 vehicles per year) include ICIs, alternative fuel vehicle converters, companies that produce specialty vehicles by modifying vehicles produced by others,

requirements pose a dilemma for an entity such as a SVM that has a limited product line. For example, it is challenging for a SVM to address percentage phase-in requirements if the manufacturer makes vehicles in only one or two test groups. Because of its very limited product lines, a SVM could be required to certify all their vehicles to the new standards in the first year of the phase-in period, whereas a full-line manufacturer (or major manufacturer) could utilize all four years of the phase-in. Thus, similar to the flexibility provisions implemented in the Tier 2 rule, the Panel recommended that we allow SVMs (includes all vehicle small entities that would be affected by this rule, which are the majority of SVMs) the following options for meeting cold temperature NMHC standards and evaporative emission standards as an element of determining appropriate lead time for these entities to comply with the standards.

For cold NMHC standards, the Panel recommended that SVMs simply comply with the standards with 100 percent of their vehicles during the last year of the four-year phase-in period. Since these entities could need additional lead time and the new standards for LDVs and LLDTs would begin in model year 2010 and would end in model year 2013 (25%, 50%, 75%, 100% phase-in over four years), we are finalizing, as proposed, a provision requiring only that SVMs certify 100 percent of their LDVs and LLDTs in model year 2013. Also, since the new standard for HLDTs and MDPVs would start in 2012 (25%, 50%, 75%, 100% phase-in over four years), we are finalizing, again as proposed, a provision requiring that the SVMs certify 100 percent of their HLDTs and MDPVs in model year 2015.

---

and companies that produce small quantities of their own vehicles, but rely on major manufacturers for engines and other vital emission related components.

In regard to evaporative emission standards, the Panel recommended that since the new evaporative emissions standards would not have phase-in years, we allow SVMs to simply comply with standards during the third year of the program. We have implemented similar provisions in past rulemakings. Given the additional challenges that SVMs face, as noted above, we believe that this recommendation is reasonable. Therefore, for a 2009 model year start date for LDVs and LLDTs, we are finalizing, as proposed, a provision requiring that SVMs meet the evaporative emission standards in model year 2011. For a model year 2010 implementation date for HLDTs and MDPVs, we are finalizing the proposed provision requiring that SVMs comply in model year 2012.

2. Hardship Provisions

In addition, the Panel recommended that case-by-case hardship provisions be extended to SVMs for the cold temperature NMHC and evaporative emission standards as an aspect of determining the greatest emission reductions feasible. These entities could, on a case-by-case basis, face hardship more than major manufacturers (manufacturers with sales of 15,000 vehicles or more per year), and we are finalizing as proposed this provision to provide what could prove to be a needed safety valve for these entities. SVMs will be allowed to apply for up to an additional 2 years to meet the 100 percent phase-in requirements for cold NMHC and the delayed requirement for evaporative emissions. As with hardship provisions for the Tier 2 rule, we are finalizing,

as proposed, a provision providing that applications for such hardship relief must be made in writing, must be submitted before the earliest date of noncompliance, must include evidence that the noncompliance will occur despite the manufacturer's best efforts to comply, and must include evidence that severe economic hardship will be faced by the company if the relief is not granted.

We will work with the applicant to ensure that all other remedies available under this rule are exhausted before granting additional relief. To avoid any perception that the existence of the hardship provision could prompt SVMs to delay development, acquisition and application of new technology, we want to make clear that we expect this provision to be rarely invoked, and that relief would rarely be granted. Today's rule contains numerous flexibilities for all manufacturers and it delays implementation dates for SVMs. We would expect SVMs to prepare for the applicable implementation dates in today's rule.

3. Special Provisions for Independent Commercial Importers (ICIs)

Although the SBAR panel did not specifically recommend it, we are finalizing as proposed provisions allowing ICIs to participate in the averaging, banking, and trading program for cold temperature NMHC fleet average standards (as described in Table IV.B.-1), but with appropriate constraints to ensure that fleet averages will be met. The existing regulations for ICIs specifically prohibit ICIs from participating in emission-related averaging, banking, and trading programs unless specific exceptions are provided

(see 40 CFR 85.1515(d)). The concern is that they may not be able to predict their sales and control their fleet average emissions because they are dependent upon vehicles brought to them by individuals attempting to import uncertified vehicles. However, an exception for ICIs to participate in an averaging, banking, and trading program was made for the Tier 2 NOx fleet average standards (65 FR 6794, February 10, 2000), and today we are finalizing, as proposed, a similar exception for the cold temperature NMHC fleet average standards.

If an ICI is able to purchase credits or to certify a test group to a family emission level (FEL) below the applicable cold temperature NMHC fleet average standard, the rule allows the ICI to bank credits for future use. Where an ICI desires to certify a test group to a FEL above the applicable fleet average standard, the rule allows them to do so if they have adequate and appropriate credits. Where an ICI desires to certify to an FEL above the fleet average standard and does not have adequate or appropriate credits to offset the vehicles, we will permit the manufacturer to obtain a certificate for vehicles using such a FEL, but will condition the certificate such that the manufacturer can only produce vehicles if it first obtains credits from other manufacturers or from other vehicles certified to a FEL lower than the fleet average standard during that model year.

Our experience over the years through certification indicates that the nature of the ICI business is such that these companies cannot predict or estimate their sales of various vehicles well. Therefore, we do not have confidence in their ability to certify compliance under a program that will allow them leeway to produce some vehicles to a higher FEL

now but sell vehicles with lower FELs later, such that they were able to comply with the fleet average standard. We also cannot reasonably assume that an ICI that certifies and produces vehicles one year, will certify or even be in business the next. Consequently, we are finalizing the proposed provision barring ICIs from utilizing the deficit carry forward provisions of the ABT program.

## VI. Gasoline Benzene Control Program

### A. Description of and Rationale for the Gasoline Benzene Control Program

We received comments on a wide range of issues regarding our proposal of a gasoline benzene control program. We have considered these comments carefully. This notice finalizes a gasoline benzene control program that is very similar to the proposed program, with the inclusion of an upper limit benzene standard on which we sought comment.

The gasoline benzene control program has three main components, each of which is discussed in this section:

- A gasoline benzene content standard. In general, refiners and importers will be subject to an annual average gasoline benzene standard of 0.62 volume percent (vol%), beginning January 1, 2011. This single standard will apply to all gasoline, both reformulated gasoline (RFG) and conventional gasoline (CG)

nationwide (except for gasoline sold in California, which is already covered by a similar state program).

- An upper limit benzene standard. In general, this "maximum average standard" will require that the annual average of actual benzene levels that each refinery produces be less than or equal to 1.3 vol% without the use of credits, beginning July 1, 2012[177].

- An averaging, banking, and trading (ABT) program. The ABT program allows refiners and importers to choose the most economical compliance strategy (investment in technology, credits, or both) for meeting the 0.62 vol% annual average benzene standard. The program allows refiners to generate "early credits" for making qualifying benzene reductions earlier than required and allows refiners and importers to generate "standard credits" for overcomplying with the 0.62 vol% benzene standard in 2011 and beyond. Credits may be used interchangeably towards compliance with the 0.62 vol% standard, "banked" for future use, and/or transferred nationwide to other refiners/importers subject to the standard. While credits may not be used to demonstrate compliance with the 1.3 vol% maximum average standard, the ABT program in its entirety provides the refining industry with significant compliance flexibility. To achieve compliance with the 0.62 vol% average standard in 2011 and beyond, refiners and importers may use credits generated and/or obtained under the ABT program, reduce their gasoline benzene levels, or any combination of these.

[177] The per-gallon benzene cap (1.3 vol%) in the RFG program will continue to apply separately.

- Provisions for refiners facing economic hardship. Refiners approved as "small refiners" will have access to special temporary relief provisions. In addition, any refiner facing extreme unforeseen circumstances or extreme hardship circumstances can apply for temporary relief.

1. Gasoline Benzene Content Standard

a. Description of the Average Benzene Content Standard

The program finalized in this rule requires significant reductions in the average levels of benzene in gasoline sold in the U.S. Beginning in 2011, the average benzene level of all batches of gasoline produced during a calendar year at each refinery will need to be at or below a standard of 0.62 vol% benzene. Approved small refiners must comply with this requirement by 2015. Each gasoline importer will need to meet the 0.62 vol% standard on average for its imported gasoline during each year. The 0.62 vol% average standard may be met through actual production/importation of fuel with a benzene content of 0.62 vol% or less, on average, and/or by using benzene credits. A deficit is created when compliance is not achieved in a given year. This deficit may be carried forward without regulatory approval but must be made up the next year. (See VI.B. (Implementation), below.) While this subsection focuses on the 0.62 vol% average standard, refiners and importers will also be subject to a "maximum average benzene standard" of 1.3 vol%, which is discussed below in section VI.A.1.d..

The 0.62 vol% average benzene standard applies to all gasoline, both RFG and CG. Gasoline sold nationwide is covered by the standard, with the exception of gasoline sold in California. California gasoline is covered by existing State of California benzene requirements that result in benzene reductions similar to the federal program finalized here.

The 0.62 vol% average benzene standard and the 1.3 vol% maximum average standard result in air toxics emissions reductions that are greater than required under all existing gasoline-related MSAT programs. As a result, upon implementation in 2011, the regulatory provisions for this gasoline benzene control program will become the regulatory mechanism used to implement the RFG and CG (Anti-Dumping) annual average toxics performance requirements and the annual average benzene content requirement for RFG. The current RFG and Anti-Dumping annual average toxics provisions thus will be replaced by this benzene control program. This final benzene control program will also replace the requirements of the 2001 MSAT rule ("MSAT1"). In addition, the program will satisfy certain conditions of the Energy Policy Act of 2005 (EPAct) and thus remove the need to revise individual MSAT1 toxics baselines for RFG otherwise required by the EPAct. In all of these ways, this program will significantly consolidate and simplify the existing national fuel-related MSAT regulatory program while achieving greater overall emission reductions.[178] See Section VI.C below for

[178] Although this program will supersede several compliance requirements from other programs, we are retaining certain recordkeeping and reporting requirements from these programs. For example, refiners will need to continue to provide gasoline fuel property data for more than just benzene. This is discussed in more detail in VI.B below.

additional discussion of this issue.

b. Why Are We Finalizing a Benzene Content Standard?

As discussed in the proposal, we believe a benzene content standard is the most cost-effective and most certain way to reduce gasoline benzene emissions from vehicles. Fuel benzene reductions directly and demonstrably result in benzene emissions reductions which also results in overall MSAT emission reductions. Focusing MSAT control on benzene alone means that the effectiveness of the control will not be affected by changes in fuel composition or vehicle technology. Because benzene is a small component of gasoline (around 1 vol%), gasoline octane is not significantly affected by a reduction in benzene content. Other fuel changes that could be undertaken to reduce MSATs would significantly impact octane, and replacing that octane would be costly and could increase emissions of MSATs other than benzene. Nonetheless, in addition to proposing to control fuel-related MSAT emissions by means of a gasoline benzene content standard, we sought comment on a number of alternative approaches, including control of toxics in addition to benzene and more stringent limits on gasoline sulfur and volatility. A number of commenters expressed support for some of these alternatives and others opposed them. In reaching our decision to finalize a benzene content standard, we evaluated the comments on each of the alternative approaches, and we discuss these next.

i. Standards That Would Include Toxics Other Than Benzene

We considered separate standards for each of the key fuel-related toxics (we discuss control of aromatic compounds separately) as well as a total toxics performance standard.

*A Standard for Total Toxics Performance*

Several commenters advocated a standard in the form of a toxics emissions performance standard, analogous to the current MSAT1 and RFG standards. Some commenters requested an air toxics standard in addition to the fuel benzene content standard we are finalizing. In general, these commenters expressed concern that if toxics other than benzene are not also controlled simultaneously, refiners may allow the emissions of these other compounds to increase, even while benzene is being reduced. Other commenters requested a toxics standard instead of fuel benzene control (or as an alternative compliance option). These commenters felt that a toxics performance standard offered more compliance flexibility. Other commenters supported our proposed benzene-only standard, stating that a total toxics standard would add complexity without additional benefit.

For several reasons, we continue to believe that a benzene-only standard is superior to a toxics emissions performance standard. First, because controlling benzene is much more cost-effective than controlling emissions of other MSATs, refiners historically have preferentially reduced benzene under the MSAT1 and other air toxics control programs. This is despite the theoretical flexibility that refiners have under a

toxics performance standard to change other fuel parameters instead of benzene. Thus, even if we were to express the proposed standard as an air toxics performance standard, we would expect the outcome to be the same – refiners would reduce benzene content and leave unchanged the levels of other MSATs.

Even with, or as a result of, this fuel benzene control, we do not expect refiners to actively modify their refinery operations such that increases will occur in emissions of the other MSATs currently controlled under the toxics performance standards. These other MSATs are acetaldehyde, formaldehyde, POM, and 1,3-butadiene, and they are all affected to varying degrees by VOC emissions control. VOC emissions are generally decreasing due to the gasoline sulfur controls recently phased in along with tighter vehicle controls under the Tier 2 program, as well as the vehicle controls being finalized under this program (see section V above). In combination, these changes are expected to decrease VOC-based MSAT emissions substantially.

In addition to reductions because of declining VOC emissions, formaldehyde emissions are currently, and for the foreseeable future, declining as MTBE use ends. See 71 FR 15860.

According to the Complex Model, the Agency's current gasoline emissions compliance model, POM emissions correlate directly with VOC emissions (see 40 CFR 80.45(e)(8). Therefore, we expect significant POM emission reductions as VOC emissions decline.

For 1,3-butadiene, the fuel parameter of interest is olefins. Increasing olefins increases 1,3-butadiene emissions. However, olefins are expected to decrease as a result of the implementation of the gasoline sulfur program because they are reduced along with sulfur during the desulfurization process. Olefins are also often used for their octane value, but because of increased ethanol use, this need should be reduced. As a result, we do not expect refiners to take actions to increase olefins, and thus 1,3-butadiene emissions should not increase. Also, 1,3-butadiene, like other MSATs, is reduced when VOC is reduced due to fuel and vehicles standards being implemented (see 71 FR 15860).

The one MSAT likely to increase in the future is acetaldehyde. Current market forces, along with state and federal policies and requirements such as the proposed Renewable Fuels Standard (RFS) Program,[179] ensure that ethanol use will increase, and thus acetaldehyde as well, since that MSAT is directly and substantially affected by ethanol use. Acetaldehyde emissions are currently about one-seventh the magnitude of benzene emissions from motor vehicles, but are increasing (while formaldehyde emissions are decreasing) due to the substitution of ethanol for MTBE in RFG as a result of state MTBE bans. Any action that refiners could take to offset the total toxics increase as a result of acetaldehyde increasing would be through benzene control, which we are already requiring to be controlled to the maximum extent possible. The EPAct, which charged EPA with developing the RFS program, also requires an evaluation of that Act's impacts on air quality. Any future control of acetaldehyde emissions will be based

[179] 71 FR 55552, September 22, 2006.

primarily on the results of that study. EPA thus believes it premature to act until we determine a course of future action reflecting the EPAct study, a draft of which is due to Congress in 2009.

As described above, with the exception of acetaldehyde, the benzene control program will ensure the certainty of additional MSAT reductions. Other MSAT emissions are thus unlikely to increase under this program. Because an air toxics standard would not provide any additional emission reductions, we believe that the regulatory controls, and the associated paperwork and the other administrative costs that would result if standards explicitly including these other MSATs were adopted, are not necessary. The benzene control program will thus ensure the certainty of additional MSAT reductions. A toxics emissions performance standard that would effectively achieve the same level of MSAT reduction would be more costly and complex. For all of these reasons, we believe a standard in the form of a benzene content standard will produce more certain environmental results with less complexity than a toxics emissions performance standard, and we are therefore finalizing only a benzene content standard.

*A Standard for Aromatic Compounds In Addition to Benzene*

In the proposal, we considered MSAT control through the reduction of the content of aromatics in addition to benzene in gasoline. For a number of reasons, we did not propose such control (see 71 FR 15860 and 15864). During the comment period, we received comments urging EPA to impose controls on non-benzene gasoline aromatic

compounds, in addition to controlling benzene. These commenters believe aromatics control would provide more toxics emissions reductions than a benzene-only control program, and they also believe it would improve air quality by significantly reducing fine particulate matter. Expanded use of E85 and flexible-fuel vehicles and ETBE were suggested as ways to replace the octane value which would be lost if aromatics were reduced. They also cited other benefits such as energy independence and reduction of trade deficits, and stated that costs to the refining industry would not be significant. A significant rebuttal to this request for aromatics control was presented by the refining industry.

We note first that regardless of specific regulatory action to control aromatics, the increased use of ethanol in response to current market forces and state and federal policies (including the RFS program) will contribute to lower aromatics levels. This will occur for two reasons. First, ethanol has historically been blended downstream of refineries, either as a "splash blend" or as a "match blend." In a splash blend, the ethanol is mixed with finished gasoline. In a match blend, refiners prepare a special subgrade of gasoline that, when blended with ethanol, becomes finished gasoline. In recent years, match blending has increased as refiners have been producing RFG with ethanol, and it is expected to increase even more as ethanol use expands. A splash blend will reduce aromatics by about 3 vol% by simple dilution.[180] A match blend will reduce aromatics by about 5 vol%.[181] With ethanol use expected to more than double, we expect a significant

[180] If the aromatics content of a gallon of gasoline is 30 vol%, adding 10% ethanol dilutes the aromatic content to about 27 vol%.

[181] Section 2.2 "Effects of Ethanol and MTBE on Gasoline Fuel Properties" in the Renewable Fuel Standard Program: Draft Regulatory Impact Analysis, September, 2006.

reduction in aromatics levels. Second, with all of this ethanol there will be excess octane in the gasoline pool. Thus, not only will increased ethanol use decrease aromatics concentrations through dilution, but refiners will make the economic decision to use ethanol to reduce or avoid producing aromatics for the purpose of increasing octane.

Because of differences in how refiners will respond to the rapid increase in ethanol use, it would be difficult to determine an appropriate level for an aromatics standard at this time. The gasoline market is going through an historic transition now due to the removal of MTBE, conversion of some portion of the MTBE production volume to other high octane blendstock production, growth of ethanol use, and the rise in crude oil prices. Consequently, it is difficult to reliably project a baseline level of aromatics for the gasoline pool with any confidence. This is compounded by a great deal of uncertainty in knowing how much of the market ethanol will capture. Projections by EIA are significantly higher now than just a few months ago, and Presidential and Congressional proposals could easily result in 100% of gasoline being blended with ethanol. Second, aromatics levels vary dramatically across refineries based on a number of factors, including refinery configuration and complexity, access to other high octane feedstocks, access to the chemicals market, crude sources, and premium grade versus regular grade production volumes. Third, without knowing with some certainty the range of aromatics contents of refineries' gasoline, we cannot determine the greatest degree of emission reduction achievable, and also cannot make reasonable estimates regarding cost, lead time, safety, energy impacts, etc. As a result, at this time we would not be able to determine an appropriate or meaningful aromatics standard.

For the purpose of reducing total toxics emissions, fuel benzene control is far more cost-effective than control of total aromatics, for a number of reasons. As we explained in the proposal, reducing the content of other aromatics in gasoline is much less effective at reducing benzene emissions than reducing fuel benzene content. Based on the Complex Model, [182] roughly 20 times greater reduction in total aromatics content is needed to achieve the same benzene emission reduction as is achieved by fuel benzene reductions. At the same time, to broaden the program to control other aromatics would result in a significant octane loss. While we have not yet conducted a thorough refinery modeling evaluation, based on existing refinery and market information the alternative sources of octane (other than ethanol) appear to be of limited supply and would be of limited effectiveness in replacing the octane lost from any fuel aromatics reductions. Furthermore, as noted above, the uncertainty in the extent to which ethanol will penetrate the market makes it difficult to project the potential replacement of aromatics with ethanol. Any significant reduction in aromatics would also affect the gasoline and diesel sulfur reduction programs because hydrogen, which is used in the desulfurization process, is produced when aromatics are produced. If refiners were required to reduce their aromatics levels, costs would increase further because some would have to expand or build new hydrogen production facilities.

[182] Total toxics emissions are as calculated by the Complex Model. This model is the tool used to determine compliance with the toxics emissions controls in the RFG, Anti-dumping, and MSAT1 programs. Cost estimates for aromatics control and analysis of relative benzene emissions with control of aromatics and benzene are found in Regulation of Fuels and Fuel Additives; Standards for Reformulated and Conventional Gasoline; Final rule, Table VI-A6 of the Regulatory Impact Analysis, February 16, 1994.

Reducing aromatics would also raise other environmental concerns that would need to be addressed in any regulation. Actions available to refineries for replacing octane, including adding ethanol, can increase other MSATs, as mentioned above. In addition, some commenters encouraged the use of the ether derived from ethanol, ETBE, to make up octane. Any regulatory action that required or was based on the use of ETBE would likely raise issues of potential groundwater contamination given the groundwater contamination caused by the use of the chemically similar MTBE.

There may be compelling reasons to consider aromatics control in the future, especially regarding reduction in secondary $PM_{2.5}$ emissions, to the extent that evidence supports a role for aromatics in secondary $PM_{2.5}$ formation.[183] Unfortunately, there are limitations in both primary and secondary PM science and modeling tools that limit our present ability to quantitatively predict what would happen for a given fuel control. Thus, at this point, we do not feel that the existing body of information and analytical tools provide a sufficient basis to determine if further fuel aromatics control is warranted. However, we do feel that additional research is very important. Test programs and analyses are planned to address primary PM issues, including those examining the role of aromatics. Also, more work is underway on how fuel aromatics, including toluene, affect secondary PM formation, and how aromatics control should be incorporated into air quality predictive models.[184]

[183] See Chapter 1 in the RIA for more on current studies on this subject.
[184] See Chapter 1 in the RIA for more on current studies on this subject.

In summary, we believe that aromatics levels will be falling even without an aromatics standard, and aromatics control will need to be evaluated in the context of what might be possible beyond what will occur through the expanded use of ethanol. Furthermore, any additional control would be costly and raise a number of other issues which need further investigation before EPA could responsibly initiate such a control effort. Thus, we have concluded that additional aromatics control for MSAT purposes is not warranted at this time.

ii. Control of Gasoline Sulfur and/or Volatility for MSAT Reduction

In the proposal, we outlined a number of issues related to further control of gasoline sulfur content and volatility (usually described as Reid vapor pressure, or RVP) as a means of MSAT emissions reduction.[185] (See 71 FR 15861-62.) In both cases, there was insufficient data on newest technology vehicles at that time to evaluate their effectiveness as MSAT controls. Therefore, we did not propose changes to existing standards.

We received several comments related to sulfur and RVP control, but there was general agreement in the comments from auto manufacturers and refiners that sufficient data does not yet exist for EPA to take action as a part of this rule. Consequently, we are not taking action to adopt additional control of gasoline sulfur or RVP. However, since the proposal, we have completed a small fuel effects test program in cooperation with several automakers to help evaluate the impact of fuel property changes on emissions

[185] For further discussion of the impact of these fuel properties on emissions, see RIA Chapter 7.

from Tier 2 vehicles. These data suggest that reducing gasoline sulfur below 30 ppm could bring significant reductions in VOC and NOx, but the data relating to air toxics reductions were not statistically significant. Unlike past programs on older technology vehicles, these data suggest that reducing gasoline volatility from 9 to 7 psi RVP under normal testing conditions (75°F) may actually increase exhaust toxics emissions. The program did not examine the impacts of fuel volatility on evaporative emissions. These data indicate that there may be benefits to future fuel control but that more testing is warranted. More details on the test program and its results are available in Chapter 6 of the RIA.

iii. Diesel Fuel Changes

In the proposal, EPA did not propose additional controls on diesel fuel for MSAT control. We continue to believe that the recent highway and nonroad diesel programs (see section IV. D. 1. c above) will achieve the greatest currently achievable reductions in diesel-related MSAT control (i.e., reductions in emissions of diesel particulate matter and exhaust organic gases). These emission reductions will result from the deep cuts in diesel fuel sulfur that will be implemented in the same time frame as this gasoline benzene rule, along with the associated diesel engine emission control requirements of the diesel programs. We said that we were unaware of other changes to diesel fuel that could have a significant effect on MSAT emissions, and requested comment about limiting this action to gasoline benzene.

One group of commenters stated in joint comments that they believe that EPA needs to do more to protect human health and the environment from the effects of diesel exhaust emissions. While they specifically mention actions to accelerate the introduction of cleaner diesel engines, they do not suggest any additional changes to diesel fuel. Another commenter, a refiner, believes that further diesel fuel controls are not warranted.

Some commenters support control of the polyaromatic hydrocarbon (PAH) content of diesel fuel. The actions refiners are taking to produce ultra-low sulfur diesel fuel (15 ppm sulfur) are expected to reduce the PAH content in diesel fuel.[186] In addition, available data indicate that the advent of exhaust emission controls on diesel engines under the recent diesel programs will reduce exhaust PAH, regardless of any changes to diesel fuel.

We continue to believe that existing regulations will achieve the greatest currently achievable reductions in MSAT emissions from diesel engines. EPA will continue to monitor MSAT issues related to diesel fuel. For example, there are active programs underway to measure PAH exhaust emissions from diesel engines meeting the 2007 PM engine standards.[187] However, at this time, we are not aware of diesel fuel controls that could significantly affect MSAT emissions and commenters did not offer specific information to the contrary. Consequently, we have focused our fuel-related MSAT action on gasoline benzene, as proposed.

---

[186] Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel – Final Rule, Section 5.9.4 of the Regulatory Impact Analysis, June 29, 2004.

[187] Health Effects Institute's Advanced Collaborative Emissions Study.

c. Why Are We Finalizing a Level of 0.62 vol% for the Average Benzene Standard?

We considered a range of average benzene standards, taking into account technological feasibility as well as cost and the other enumerated statutory factors. We received comments from a variety of parties supporting standards more stringent than the proposed level of 0.62 vol%. In general, the refining industry did not express strong opposition to a standard of 0.62 vol%. However, several small refiners opposed a benzene standard and argued for relief for small refiners if EPA went forward with such a program. One commenter, an importer, proposed a standard of 1.0 vol%. None of the commenters opposing the 0.62 vol% standard provided analytical support for a less stringent standard, or addressed how a less stringent standard might reflect the greatest emission reductions achievable based on the statutory factors. We have considered all of these comments and reassessed the level of the standard in light of the key factors we are required to consider, and have concluded that, as proposed, 0.62 vol% is the appropriate level for the average standard, because it achieves the greatest achievable emission reductions through the application of technology that will be available, considering cost, energy, safety, and lead time.[188] As discussed in section VI.A.1.d below, we have drawn this conclusion in the context of the 1.3 vol% maximum average benzene standard. We summarize our assessment of technological and economic factors next.

i. General Technological Feasibility of Benzene Control

[188] EPA does not believe that there are any noise issues associated with these standards, and no comments suggested any such issues exist.

*Benzene Control Technologies*

We have identified several technologies that can cost-effectively reduce gasoline benzene levels and we assessed their feasibility. These benzene control technologies function primarily by controlling the benzene in the feedstock to and the product stream from the reformer. They primarily focus on the reformer because refiners rely on the reformer to produce aromatic compounds for their octane content, and benzene is one of the aromatic compounds produced. For refiners who are not actively reducing the benzene in their gasoline today, we estimate that the reformer is responsible for about one half to three quarters of the benzene in gasoline.

Since the proposal, we learned of a change in how a particular gasoline blending stream is being routed in the refinery which affects its treatability for reducing benzene. After speaking to several refiners, we learned that natural gasoline is being blended differently into gasoline today because of the need to address the sulfur in this stream for compliance with Tier 2. Specifically, natural gasoline is being blended with the crude oil before the crude oil is refined in the refinery. Therefore the benzene in natural gasoline would be treated along with the naturally occurring benzene in crude oil using the benzene control technologies described below. We reflected this change in our refinery modeling.

One approach to reducing gasoline benzene levels is to reroute around the reformer the intermediate refiner streams that have the greatest tendency to form benzene in the reformer. This technology is usually termed light naphtha splitting. Assuming that a refinery applying this technology is not applying any sort of benzene control today, we estimate that this method reduces the benzene levels of reformate (the stream leaving the reformer) by 60 percent. This approach requires little or no capital investments in refineries to realize the results, but its effectiveness is limited because it does not address any of the naturally-occurring benzene found in crude oil and from natural gasoline and the other benzene which is formed in the reformer. Although this benzene control technology normally will not achieve the most substantial benzene control, refiners choosing it will achieve some measure of benzene control and then would likely need to purchase credits to comply with the 0.62 benzene standard.

To achieve deeper benzene control, refiners with an isomerization unit can send the rerouted intermediate refinery stream to their isomerization unit. The isomerization unit would saturate the naturally-occurring benzene from crude oil and natural gasoline in the rerouted refinery intermediate stream mentioned above, thus achieving additional benzene reduction. Using these two technologies together, refiners will be able to reduce reformer benzene levels by an estimated 80 percent. However, the benzene formed in the reformer would still not be treated using these two technologies together.

For even deeper benzene reductions than benzene precursor rerouting by itself or in combination with isomerization, refiners could choose between benzene saturation and

benzene extraction. Each of these technologies work by reducing the benzene levels in the reformate, achieving an estimated 96 percent reduction in benzene, assuming that the refinery is not already taking steps to control its benzene levels. Benzene saturation involves using hydrogen to saturate the benzene into cyclohexane, which is a compound usually found in gasoline. Benzene extraction units chemically extract the benzene from the rest of the hydrocarbon compounds in reformate and concentrate it to a high purity using distillation such that it is suitable for sale into the chemicals market. Either of these technologies is capable of achieving the deepest levels of gasoline benzene reductions, allowing virtually all refiners to meet or exceed the 0.62 vol% gasoline benzene standard.

The actual impact of these benzene control technologies on an individual refinery's finished gasoline benzene content, however, will be a function of many different refinery-specific factors. These factors include the types of refining units in each refinery and the benzene levels produced by them, and the extent to which they are already utilizing one or more of these benzene control technologies.

Each of the benzene control technologies associated with the reformer has been commercially demonstrated by at least half a dozen units in U.S. refineries today operating for at least two years. Also, we did not receive any comments questioning the viability of these technologies for achieving the benzene reduction attributed to these technologies in the proposed rule. We therefore conclude that these technologies can feasibly achieve the benzene reductions that we attribute to them. We discuss the economics for each of these approaches to benzene reduction in more detail in section

VIII.A. of this preamble, and we discuss their feasibility and cost in detail in Chapters 6 and 9 of the RIA.

We evaluated the benzene control level achievable without the use of credits by each refinery using either benzene saturation or extraction, since this would represent the maximum technologically feasible level of benzene control by each refinery. Our refinery cost model shows that based on the application of one or the other of these two benzene technologies, eight refineries would still not be able to achieve the final 0.62 vol% benzene average standard. We believe that these refineries would, however, be able to achieve the 1.3 vol% maximum average standard (which, as explained in section VI.A.1.d below, must be achieved without the use of credits) through the use of one of these technologies.

These eight refineries would be able to further reduce their gasoline benzene levels by treating the benzene contained in other gasoline blendstocks, particularly light straight run, light coker naphtha and light hydrocrackate. We believe that refiners could merge these streams with their reformate gasoline stream, so that these other sources of benzene would be treated along with the benzene in the reformate using either benzene saturation or benzene extraction. The results of this additional analysis summarized in the RIA show that these eight refineries would be able to meet the 0.62 vol% average standard if they were to apply one or more of these additional benzene control steps, though in some cases it may be at a considerably higher cost than through the purchase of credits. The cost and ultimate feasibility for controlling the benzene in light straight run,

light coker naphtha and light hydrocrackate is very difficult to determine without detailed and comprehensive knowledge about how refineries are configured and operated today. It might be possible for a refinery to adjust existing distillation units, either operationally or with minor capital investments, to change the cutpoints for these streams. They might then route the benzene in these streams to the reformer, where a benzene control technology would be applied. On the other hand, changing the cutpoints to reroute the benzene might require the addition of a whole new distillation column, similar in function to a reformate splitter. Adding such grassroots distillation columns to make these splits would be much more costly. Finally we have not found any commercially demonstrated benzene control technologies that can reduce the benzene of FCC naphtha, the second largest contributor of benzene to the gasoline pool.

*Impacts on Octane and Strategies for Recovering Octane Loss*

All these benzene reduction technologies tend to cause a small reduction in the octane value of the final gasoline, since benzene is high in octane (about 101 octane number ((R+M)/2). Understanding how lost octane will be recovered is critical to determining the feasibility and cost of benzene control. Regular grade gasoline must comply with a minimum 87 octane number (or a sub-octane rating of 86 for driving in altitude), while premium grade gasoline must comply with an octane rating which ranges from 91 to 93 octane numbers. Gasoline must meet these octane ratings to be sold at retail. Routing the benzene precursors around the reformer reduces the octane of the six-carbon compound stream (by foregoing the formation of benzene) which normally exits

the reformer with the rest of the reformate. Without these compounds in the reformate, our refinery model shows that a loss of octane in the gasoline pool of about 0.14 octane numbers will typically occur. If this rerouted stream can be sent to an isomerization unit additional octane loss will occur due to the saturation of benzene[189]; however, as described below, the isomerization unit offsets a part of the octane loss caused by this combination of saturation and rerouting. Benzene saturation and benzene extraction both affect the octane of reformate and therefore of the gasoline pool. Our refinery model estimates that benzene saturation typically reduces the octane of gasoline by 0.24 octane numbers, and benzene extraction typically reduces the octane of gasoline by 0.14 octane numbers.

Refiners have several choices available to them for recovering the lost octane. One is to blend in ethanol. Ethanol has a very high octane number rating of 115. Thus, only a small amount of ethanol (one percent of the gasoline pool or less) would be necessary to offset the octane loss associated with benzene reductions. Moreover, ethanol blending will occur for reasons independent of the benzene control requirements (and attendant octane loss) of the present rule. As explained in the discussion of potential aromatics controls above, current market forces and state and federal policies (including the RFS program) will increase the volume of renewable fuels, including ethanol, which is to be blended into gasoline. The volume of renewable fuels must increase from around 4 billion gallons in 2004 to 7.5 billion gallons in 2012 when the renewable fuels provisions of the RFS are fully implemented. However, as part of the Annual Energy

[189] The chemical process of benzene saturation in the isomerization unit is the same as the process that occurs in a benzene saturation unit, as described above.

Outlook for 2006, the Energy Information Administration projects that the economics driven by higher crude oil prices will result in more like 9.6 billion gallons of ethanol use by 2012.

Octane may also be increased by increasing the severity of the reformer (which determines the final octane of the reformate). However, if the refiner is reducing benzene through precursor rerouting or saturation, this strategy can be somewhat counterproductive. This is because increased severity increases the amount of benzene in the reformate and thus increases the cost of saturation and offsets some of the benzene reduction of precursor rerouting. Increasing reformer severity also decreases the operating cycle life of the reformer, requiring more frequent regeneration. However, where benzene extraction is used, increased reformer severity can improve the economics of extraction because not only is lost octane replaced by other aromatic compounds, but more benzene is extracted and sold.

Refiners can also recover lost octane by increased use of isomerization and alkylate units. As discussed above, saturating benzene in the isomerization unit results in an octane loss, but the octane loss is partially offset by the simultaneous formation of branch-chain compounds in the isomerization unit. The isomerization unit would only offset a portion of the octane loss caused by saturating the benzene if the unit has sufficient capacity to treat both the five-carbon hydrocarbons normally sent to the unit as well as the newly rerouted six-carbon hydrocarbons. Also, many refineries produce a high-octane blendstock called alkylate. Refiners can alter their refineries to produce

more alkylate or they may be able to purchase alkylate on the open market. Not only is alkylate moderately high in octane (93 or 94 octane numbers), but it converts four-carbon (i.e., butane) compounds that are too volatile to be blended in large amounts into the gasoline pool into heavier compounds that can be readily blended into gasoline, thus increasing gasoline volume.

All these means available to refiners for recovering the octane loss associated with gasoline benzene reductions are commercially demonstrated, and we did not receive any comments questioning our reliance on them at proposal for maintaining the octane of the gasoline pool in the proposal. Therefore, we conclude that it is feasible for refiners to recover the octane loss associated with benzene control.

ii. Appropriateness of the 0.62 vol% Average Benzene Content Standard

As discussed above, we received many comments about the proposed level of the benzene standard. Many commenters advocated a more stringent standard, generally pointing to refineries currently producing gasoline with benzene levels below the proposed 0.62 vol% standard and stating that the average standard should be sufficiently stringent that all refineries, especially those with higher benzene levels, would be required to use similar technologies and achieve similarly low levels. We also received broad support for the 0.62 vol% standard in the comments from the refining industry, although several small refiners opposed imposing a benzene standard and argued for relief for small refiners if EPA implemented the proposed standard. One importer was

concerned that the standard of 0.62 vol% could make it more difficult for importers to find compliant gasoline shipments and proposed a standard of 1.0 vol%. None of the commenters opposing the 0.62 vol% standard provided analytical support for a less stringent standard or addressed how a less stringent standard might reflect the greatest emission reductions achievable based on the statutory factors.

In the proposal, EPA described in detail what we believe would be the consequences of average standards of different stringencies to the overall goals of the program (see 71 FR 15866-67). These anticipated consequences relate in large part to how we believe refiners would respond to the benzene averaging and benzene credit trading provisions that were integral to the proposed program. For the final rule, we have reassessed how we believe refiners would respond to different average standards. We continue to believe that increasing the stringency of the average benzene standard would have the effect of reducing the number of benzene credits generated, since fewer refineries are likely or able to take actions to significantly reduce benzene further than required by the standard. This would reduce the liquidity of the credit trading market. As discussed in section VI.A.2, a well functioning averaging, banking, and trading program is integral to the achievability of the benzene standard. With fewer credits available that are affordable as an alternative to immediate capital investment, investment in relatively expensive benzene saturation equipment would be necessary for a greater number of refiners. We specifically considered a level of 0.50 vol% for the average standard, which we expected would require all refineries to install the most expensive benzene control technologies. We concluded that this level would clearly not be

achievable, considering cost. In a related analysis, we also showed that if, contrary to our expectations, credits were not easily available as a compliance option, there are several refineries for which it may be technologically feasible to reach benzene levels below 0.62 vol%, but only at costs far greater than for most other refiners.

Decreasing the stringency of the standard would fail to meet our obligation under 202(l)(2) to set the most stringent standard achievable considering costs and other statutory factors. First, over the last several years RFG benzene levels have already been averaging around 0.62 vol%, and we have no information to suggest that this level is not technologically feasible for the rest of the gasoline pool as well. In fact, our analysis shows that this level is feasible for the pool of gasoline as a whole. Commenters did not provide any analysis that a standard of 0.62 vol% was not the greatest achievable after considering cost and the other statutory factors. Second, a standard less stringent than 0.62 vol% would not achieve a number of important programmatic objectives. As shown in Table VI.C-1 below, a 0.62 vol% standard is necessary to satisfy the conditions on overall RFG toxics performance established by EPAct and thus to avoid the requirement for updated individual refinery baselines. We believe that any level for the standard above 0.62 vol% would require EPA to promulgate regulations requiring RFG refiners to continue to maintain individual refinery-specific baselines, adjusted to 2001-2 as required by EPAct. The refining industry believes that this would continue to penalize the cleanest refineries, constrain their flexibility, and cause market inefficiencies that increase costs. They have been strongly supportive of a program that eliminates the need for individual refinery baselines. EPA agrees with these concerns, and believes that the

nationwide ABT program allowed under this program will remove these impacts. Another of EPA's policy objectives that has been strongly supported by the refining industry was establishing the same standard nationwide for the combined pool of RFG and CG. The level of 0.62 vol% allows us to establish a single combined program for RFG and CG. In addition, the level of 0.62 vol% for the standard allows us to streamline with confidence our toxics regulations for RFG and CG, so that this benzene program (along with the gasoline sulfur program) will become the regulatory mechanism used to implement the RFG and CG annual average toxics performance requirements and the annual average benzene content requirement for RFG. Further, we believe that with such a stringent benzene standard, refiners should have the certainty they need for their investment and planning decisions.

Many comments that supported a more stringent standard pointed to average costs projected in the proposal that are higher than for the proposed standard, but are not large on a per-gallon basis compared to other EPA fuel programs. However, these commenters did not address the wide range of compliance costs for individual refineries that we discuss in the proposal (see Chapter 9 of the proposed and final RIA documents). It is critical to recognize that as more stringent average standards are considered, the costs for many refineries begin to rise significantly, especially for some individual technologically-challenged refineries. This potential for high costs at more stringent average standards exists if, as we expect, the ABT program functions as it is designed to. If the ABT program operates less efficiently than projected, the costs for some individual refineries could be higher still. (We discuss issues related to the 1.3 vol% maximum

average standard, which cannot be met through the use of credits, in section VI.A.1.d, "Upper Limit Benzene Standard," below.)

Based on our analysis of the projected response of the refining industry to an average benzene standard, we are finalizing the 0.62 vol% standard as proposed. We believe that this average benzene standard of 0.62, in the context of the associated ABT program and the 1.3 vol% maximum average standard, results in the greatest reductions achievable, taking into account cost and the other statutory factors in CAA 202(l)(2).

iii. Timing of the Average Standard

Section 202(l)(2) requires that we consider lead time in adopting any fuel control for MSATs. We proposed that refiners and importers meet the 0.62 vol% average benzene standard beginning January 1, 2011 (January 1, 2015 for small refiners). This date was based on the industry experience that most of the technological approaches that we believe refiners will apply – rerouting of benzene precursors around the reformer and use of an existing isomerization unit – will take less than two years. The more capital intensive approaches – saturation and extraction – generally take two to three years to complete. The January 1, 2011 date provides nearly four years of lead time. We believe this is an appropriate amount of lead time, even taking into account that other fuel control programs (notably the Nonroad Diesel program) will be implemented in the same time frame.

Some commenters supported earlier start dates, referring in some cases to the experience of Canada in regulating gasoline benzene. However, these comments failed to acknowledge the less stringent Canadian standard (0.95 vol%) which naturally takes less lead time to implement. No commenter provided information that challenged our assessments of the technical lead time for the range of benzene control approaches that will be implemented. Other commenters, mostly from the refining industry, supported a start date that would be at least four years after the date of the final rule. For the reasons described above, we do not believe this additional time is necessary for this program. We are finalizing a start date of January 1, 2011, as proposed.

We discuss the lead time for the 1.3 vol% maximum average standard, which takes effect July 1, 2012 for non-small refiners and importers, and July 1, 2016 for small refiners, in the next section.

d. Upper Limit Benzene Standard

In the proposal, we discussed the potential concern that without an upper limit, some refiners may choose to allow their benzene levels to increase, or to remain unchanged indefinitely. However, we also said that once an average standard is in place, any increase in benzene levels will necessarily come at the cost of purchasing additional credits. We tentatively concluded that this downward pressure on benzene levels meant there would likely be no increases in benzene from any refinery, whether or not there was an upper limit. In fact, we concluded that this pressure would result in actual reductions

at almost all refineries, especially into the future as refiners try to limit their reliance on credits as much as and whenever it is economical to do so (see 71 FR 15867-68).

We nonetheless considered the implications of an upper limit on the actual level of benzene in the gasoline that refiners produce (as opposed to the level achieved using credits). (See 71 FR 15678-79.) We considered an upper limit both in the form of a per-gallon benzene cap and a limit on the average of actual benzene in gasoline produced by a refinery ("maximum average standard"). Of these two approaches, we recognized that a per-gallon cap would be the more rigid. If every batch needed to meet the cap, there would be no opportunity to offset benzene spikes with lower-benzene production at other times. Even during times of normal operation, our review of refinery batch data indicated that unavoidable wide swings commonly occur in the benzene content of gasoline batches, even for refineries that have relatively low benzene levels on average. A per-gallon cap could result in refiners halting gasoline production during short-term shut-downs of benzene control equipment or in other temporary excursions in benzene levels. Unless a per-gallon limit were generous enough or included case-by-case exceptions (eroding the possible benefit of the cap), many refiners would likely need to implement much deeper and more costly reductions in benzene than would otherwise be necessary, simply to protect against such fluctuations. For some refiners, we concluded, a cap could make complying with the program prohibitively expensive.

The other option on which we solicited comment, a maximum average standard, would be more flexible. A maximum average standard would limit the average benzene

content of the actual production at each refinery over the course of the year, regardless of the extent to which credits may have been used to comply with the 0.62 vol% average standard. Thus, a maximum average standard would allow for short-term benzene fluctuations as long as the annual average benzene level of actual production was less than that upper limit.

Several commenters stated that an upper limit would add costs without resulting in additional benefits, and supported a program without upper limits. Other commenters, however, expressed serious concerns about the potential consequences of a program without upper limits. Several commenters were concerned that under the program as proposed, it would be possible for refiners to maintain benzene levels well above the standard indefinitely while complying through the use of credits, thus potentially reducing the benefits of the program where this gasoline is used. Some commenters noted that under the proposed program, gasoline in some areas could still have significantly higher benzene levels than in other parts of the country. These commenters believe that these projected disparities raise issues of fairness. While our modeling of the proposed average standard suggested that all refineries were likely to reduce their benzene levels to some extent and that there would be significant reductions in gasoline benzene levels in each PADD, the commenters noted that an upper limit would provide a guarantee of reduction to at least the level of the upper limit.

After evaluating the results of our updated refinery analysis and considering all of the comments, we have reconsidered the appropriateness of an upper limit standard. For

the reasons discussed above, we continue to believe that a per-gallon cap for CG would be inappropriate for a benzene control program due to actions refineries would need to take to protect against common fluctuations in benzene content, and the related adverse cost and energy implications if refineries invest in deeper benzene reductions or need to temporarily shut down. In contrast, the per-gallon cap for RFG of 1.3 vol%, which is currently in place, functions differently than would a per-gallon cap that applied to both the RFG and CG pools. The per-gallon cap for RFG alone is appropriate because the CG pool provides an outlet for batches of higher benzene RFG. However, if such a cap were applied to CG as well, refiners would be left without an outlet. As we said in the proposal, any meaningful level for a per-gallon cap applying to CG would thus overly restrict the normal fluctuations in gasoline benzene (see 71 FR 15869).

On the other hand, we now believe that the program should include a maximum average benzene standard, set at an appropriate level. The maximum average standard has the strong advantage of ensuring that the benzene content of gasoline produced by each refinery (or imported by each importer) will average no higher than this standard, regardless of the use of credits, providing greater assurance that actual in-use benzene reductions more clearly reflect our modeled projections which form the basis for this rule. At the same time, the maximum average standard avoids the serious drawbacks of a per-gallon cap.

Our refinery modeling is state of the art, but it cannot predict with high confidence each refinery's actions and how benzene trading will occur in each instance

We have done a refinery-by-refinery assessment of the most economical decisions we believe the industry will make to comply with the standard. However, in developing the model, we did not have access to specific information on many refineries, much of which is confidential business information. To fill these gaps, we used broader industry average information for a number of key model input parameters (including benzene levels in crude oil and in gasoline blendstocks, individual refinery unit throughput and operating conditions, distillation "cut points," and future refinery expansions). Since there is wide variation in these important parameters among different refineries that impacts their baseline benzene levels and their opportunities for control, our model's assumptions inherently vary from actual refinery circumstances. Furthermore, by necessity, our model assumes that all refineries will, in effect, work collectively to make the most economical investment decisions on a nationwide basis, as though each knew in advance the investment decisions of the others. In reality, each individual refinery will be making its decisions independently of each other, based on very limited information about other refineries' actions. In addition, our model assumes that refiners will limit their actions to only treat the principal benzene-containing stream (reformate). There are individual circumstances where it may be economical to also treat other refinery streams. If the benzene in these other streams is indeed treated by some refineries, it is possible that sufficient credits might be generated to allow more refineries to avoid benzene reductions altogether by simply purchasing credits. Consequently, although our refinery-by-refinery modeling predicts significant benzene reductions in all areas nationwide, individual refineries might continue to have gasoline with higher benzene levels than the model predicts. This may also result in higher regional variation in gasoline benzene levels than

the model predicts. Thus, we cannot dismiss this possibility with a high degree of confidence.

For these reasons, we believe that the addition of a maximum average standard to the 0.62 average standard provides far greater assurance that refineries will control benzene in the future as projected -- and certainly will not increase benzene levels to be greater than the level of the maximum average standard. Furthermore, through selection of an appropriate level for the maximum average standard, we believe that we are achieving this goal with a minimal impact on the overall costs of the program.

We did not originally propose a maximum average standard, largely because of our interpretation of our modeling done for the proposal. That modeling indicated that adding a maximum average standard would result in significantly more benzene reduction in some areas, but that these increases would cause other areas to experience slightly smaller benzene reductions (see 71 FR 15903). Our updated modeling results are similar. In the proposal, we considered this potential for smaller benzene reductions in some areas to be a reason not to propose a maximum average standard. However, upon further evaluation of these modeling results, given the level of uncertainty in the model to predict individual refinery and regional benzene levels (as discussed above), we do not have confidence in the size of any offsetting increases in benzene levels in other areas, or even whether they would occur. In addition, we recognize that some of the refiners that the model predicts would reduce benzene slightly less (creating the apparent offsetting regional effects) may in fact decide to overcomply with the standard in order to maintain

a compliance “safety margin,” regardless of the presence of a maximum average standard, and regardless of the strength of the market for the generated credits. In light of this, we do not think it warrants giving up the benefits resulting from the inclusion of the maximum average standard.

Absent concern about any measurable offsetting effects from a maximum average standard, we believe that the major benefit of such a standard can and should be pursued. That is, the program can achieve increased certainty that the significant gasoline benzene reductions across all parts of the nation that our modeling projects will indeed occur, and thus that regional variations in gasoline benzene levels will indeed be minimized as we project.

We believe that setting the maximum average standard at a level of 1.3 vol% accomplishes the goal of reasonably assuring lower benzene levels for all refineries while balancing the negative aspects of more- and less-stringent benzene standards. Virtually all the commenters who supported a maximum average standard agreed that 1.3 vol% would be a reasonable level for such a standard. EPA agrees. Implementing a maximum average standard lower than 1.3 vol% would begin to significantly increase the number of refineries that would need to install the more expensive benzene reduction equipment. This would quickly diminish the value of the flexibility provided by the ABT program and thus force an increasing number of refineries to make expenditures in benzene control that could otherwise be smaller or avoided entirely, significantly increasing the overall cost of the program. Conversely, a maximum average standard greater than 1.3

vol% would require progressively fewer refineries to take action to reduce their benzene levels. This would in turn provide less assurance that actual benzene levels would be broadly achieved. As shown in detail in Chapter 9 of the RIA, the addition of the 1.3 vol% standard has minimal impact on the overall costs of the program. It is for this reason that we find that the 0.62 vol% annual average standard, in tandem with the 1.3 vol% maximum average standard, represents the greatest benzene reductions achievable considering cost, energy supply, and other enumerated statutory factors.

We believe that it is very important to monitor levels of benzene as refiners and importers begin to respond to the average and maximum average standards. EPA currently collects information on benzene and several other gasoline parameters for every batch of gasoline produced in or imported into the U.S., and publishes it in aggregate form on the EPA website. By January 1, 2011, we plan to begin publishing a more detailed annual report on gasoline quality. We will present this data on a PADD-by-PADD basis (to the extent that protection of confidential business information allows). We expect that these reports will be a valuable tool to stakeholders and members of the public who are interested in following the real-world progress of this rule's gasoline benzene reductions.

Among other changes discussed in section VIII below, our updated refinery-by-refinery model uses year-round 2004 gasoline production data as a starting point (replacing 2003 summer production data used in the proposal) and incorporates updated crude oil and benzene prices. The model thus generates updated predictions of the

responses of refineries to the benzene standards. Our updated analysis shows that with the 0.62 vol% average standard and the maximum average benzene standard of 1.3 vol%, benzene levels will be reduced very significantly in all parts of the country. However, a degree of variation will continue to exist, due to the wide variety of refinery configurations, crude oil supplies, and approaches to benzene control, among other factors. This remaining variation is clearly legally permissible, notwithstanding the reasonable objective of assuring that reductions occur both regionally and nationally, because we do not read CAA section 202(l)(2) as requiring uniform gasoline benzene levels in each area of the country, since the standard is to be technology-based considering costs and other factors which vary considerably by region and by refinery. On the other hand, the maximum average standard will have the appropriate effect of directionally providing a greater degree of geographic uniformity of gasoline benzene levels and these levels remain achievable considering cost and the other enumerated factors. Reducing gasoline benzene levels on both a national and regional basis is within the discretion of the Administrator, since section 202(l)(2) does not specify whether the maximum degree of emission reductions are to be achieved nationally, regionally, or both.

The 1.3 vol% maximum average standard will become effective 18 months after the 0.62 vol% average standard, on July 1, 2012, and on July 1, 2016 for small refiners. While there is ample lead time for non-small refiners to meet the 0.62 vol% standard by January 1, 2011, we believe that staggering the implementation dates will ensure that the implementation of the programs by the refining industry is as smooth and efficient as

possible. An important aspect of the design of this program as proposed is the recognition that not all of the benzene reduction would occur at once. As discussed in detail in section VI.A.2.b below, we expect that individual refiners will use the ABT program to schedule their benzene control expenditures in the most efficient way, using the early credit and standard credit provisions. This will essentially create a gradual phasing-in of the reductions in gasoline benzene content, beginning well before the initial compliance date of January 1, 2011 and spreading out industry-wide compliance activities over several years. Since the 1.3 vol% standard may not be met using credits, we have set the implementation dates for this standard such that the credit program can continue to be fully utilized for an additional 18 months after the effective date of the 0.62 vol% average standard to allow the intended phasing-in of the program to occur (i.e., there will be 18 additional months during which the 0.62 vol% average standard may be achieved exclusively by using credits).

We acknowledge that by incorporating the 1.3 vol% maximum average standard into the program, we are creating additional compliance challenges for a small number of refineries that might have relied on credits but will now need to install capital equipment to meet the 1.3 vol% maximum average standard. Most refiners will need to take these steps by July 1, 2012. Small refiners will need to take these steps four years later, by July 1, 2016. Although we believe that most (possibly all) refiners will be able to install appropriate benzene control equipment by these future dates, there may be a small number of refiners that continue to face significant financial hurdles as these dates approach. We have considered this concern, and we believe that the leadtime provided,

including the longer leadtime for small refiners, and the hardship relief provisions discussed below, are sufficient to address any circumstances of severe economic impacts on individual refineries. We are making clear that serious economic difficulties in meeting the 1.3 vol% maximum average standard may be a basis for granting relief under the "extreme hardship" provision discussed in sectionVI.A.3. below.

2. Description of the Averaging, Banking, and Trading (ABT) Program

a. Overview

We are finalizing a nationwide averaging, banking, and trading (ABT) program that allows us to set a more stringent annual average gasoline benzene standard than would otherwise be justifiable. The ABT program allows refiners and importers to choose the most economical compliance strategy (investment in technology, credits, or both) for meeting the 0.62 vol% annual average benzene standard. The flexibility afforded by the program is especially significant and needed given the considerable variation in existing gasoline benzene levels, which reflects important differences in crude oil composition and individual refinery design.

From 2007-2010, refiners can generate "early credits" by making qualifying benzene reductions earlier than required. In 2011 and beyond, refiners and importers can generate "standard credits" by producing/importing gasoline with benzene levels below 0.62 volume percent (vol%) on an annual average basis. Credits may be used

interchangeably towards compliance with the 0.62 vol% standard, "banked" for future use, and/or transferred nationwide to other refiners/importers subject to the standard. In addition to the 0.62 vol% standard, refiners and importers must also meet a 1.3 vol% maximum average benzene standard beginning July 1, 2012. To comply with the maximum average standard, gasoline produced by a refinery or imported by an importer may not exceed 1.3 vol% on an annual average basis. While the 1.3 vol% maximum average standard places a limitation on credit use, we believe that the ABT program still provides the refining industry with significant compliance flexibility as described below.

b. Credit Generation

i. Eligibility

Under the ABT program, U.S. refiners (including "small refiners"[190]) who produce gasoline by processing crude oil and/or intermediate feedstocks through refinery processing units (see § 80.1270) are eligible to generate both early and standard benzene credits. Foreign refiners with individual refinery baselines established under § 80.910(d) who imported gasoline into the U.S. in 2004-2005 are also eligible to generate early credits. Importers, on the other hand, are only eligible to generate standard credits under the ABT program. As explained in the proposal, importers are precluded from generating early credits because, unlike refineries, they do not need additional lead time to comply with the standard since they are not investing in benzene control technology. Additionally, due to their variable operations, importers could potentially redistribute the

[190] Refiners approved as small refiners under § 80.1340.

importation of foreign gasoline to generate “windfall” early credits with no associated benzene emission reduction value (see 71 FR 15874).

Benzene credits may only be generated on gasoline which is subject to the benzene requirements as described at § 80.1235. This excludes California gasoline (gasoline produced or imported for use in California) but includes gasoline produced by California refineries for use outside of California. Despite the fact that California gasoline is not covered by this program, EPA sought comment on whether and how credits could be generated based on California gasoline benzene reductions and applied towards non-California gasoline compliance (see 71 FR 15873). We did not receive any substantive comments on this matter but nonetheless considered the feasibility of such a program (described in more detail in the Summary and Analysis of Comments). We concluded that such a program could be very problematic to implement and, based on the apparent lack of interest by California gasoline refineries, it is likely that there would be very few participants. As a result, we have decided to maintain the proposed ABT provision which excludes California gasoline from generating credits.

ii. Early Credit Generation

To encourage early innovation in gasoline benzene control technology, refiners are eligible to generate early credits for making qualifying benzene reductions prior to the start of the program. Refiners must first establish individual benzene baselines for each refinery planning on generating early credits (discussed further in section VI.B.1).

Benzene baselines are defined as the annualized volume-weighted benzene content of gasoline produced at a refinery from January 1, 2004 through December 31, 2005. To qualify to generate early credits, refineries must make operational changes and/or improvements in benzene control technology to reduce gasoline benzene levels in accordance with § 80.1275. Additionally, a refinery must produce gasoline with at least ten percent less benzene (on a volume-weighted annual average basis) than its 2004-2005 baseline. The first early credit generation period is from June 1, 2007 through December 31, 2007, and subsequent early credit generation periods are the 2008, 2009, and 2010 calendar years (2008 through 2014 calendar years for small refiners).

We are setting a ten percent reduction trigger point for early credits to ensure that changes in gasoline benzene levels result from real refinery process improvements. Without a substantial trigger point, refiners could earn credits for the normal year-to-year fluctuations in benzene level at a given refinery allowed under MSAT1. These windfall credits could negatively impact the ABT program because – as reflections of normal variability -- they would have no associated benzene emission reduction value. As described in the proposal, we believe that a percent reduction trigger point, as opposed to an absolute level or fixed reduction trigger point, is the most appropriate early credit validation tool considering the wide range in starting benzene levels. In addition, we believe that ten percent is an appropriate value for the trigger point because it prevents most windfall credit generation, yet is not so restrictive as to discourage refineries from making early benzene reductions (see 71 FR 15875).

Once the ten percent reduction trigger point is met, refineries can generate credits based on the entire gasoline benzene reduction. For example, if in 2008 a refinery reduced its annual average benzene level from a baseline of 2.00 vol% to 1.50 vol% (below the trigger point of 0.90 x 2.00 = 1.80 vol%), its early benzene credits would be determined based on the difference in annual benzene content (2.00 – 1.50 = 0.50 vol%) divided by 100 and multiplied by the gallons of gasoline produced in 2008 (expressed in gallons of benzene).

We proposed that refiners be prohibited from moving gasoline or gasoline blendstock streams from one refinery to another in order to generate early credits (see 71 FR 15875). We received comments indicating that many refiners trade blending components between refineries to maximize gasoline production while minimizing cost, and that such companies should not be prohibited from generating early credits. In fact, we are not prohibiting these types of normal refinery activities, nor are we prohibiting such refineries from participating in the early credit program. We are simply requiring that all refineries make real operational changes and/or improvements in benzene control technology to reduce gasoline benzene levels in order to be eligible to generate early credits. In most cases, moving gasoline blendstocks from one refinery to another does not result in a net benzene reduction (one refinery gets cleaner at the expense of another getting dirtier). Accordingly, refineries that lower their benzene levels exclusively through blendstock trading (no additional qualifying reductions) are not eligible to generate early credits under the ABT program. An exception exists for refineries that transfer benzene-rich reformate streams for processing at other refineries with qualifying

post-treatment capabilities, e.g., extraction or benzene saturation units. Under this scenario, the transferring refinery would be eligible to generate early credits because a real operational change to reduce gasoline benzene levels has been made. The regulations at § 80.1275 have been modified to more clearly reflect our intended early credit eligibility provisions, and specifically address blendstock trading.

iii. Standard Credit Generation

Refiners and importers may generate standard credits for overcomplying with the 0.62 vol% gasoline benzene standard on a volume-weighted annual average basis in 2011 and beyond (2015 and beyond for small refiners).[191] For example, if in 2011 a refinery's annual average benzene level is 0.52, its standard benzene credits would be determined based on the margin of overcompliance with the standard (0.62 – 0.52 = 0.10 vol%) divided by 100 and multiplied by the gallons of gasoline produced during the 2011 calendar year (expressed in gallons of benzene). Likewise, if in 2012 the same refinery were to produce the same amount of gasoline with the same average benzene content, they would earn the same number of credits. The standard credit generation opportunities for overcomplying with the standard continue indefinitely (see 71 FR 15872).

c. Credit Use

[191] Standard credit generation begins in 2011, or 2015 for small refiners, regardless of whether a refinery pursues early compliance with the 0.62 vol% standard under § 80.1334.

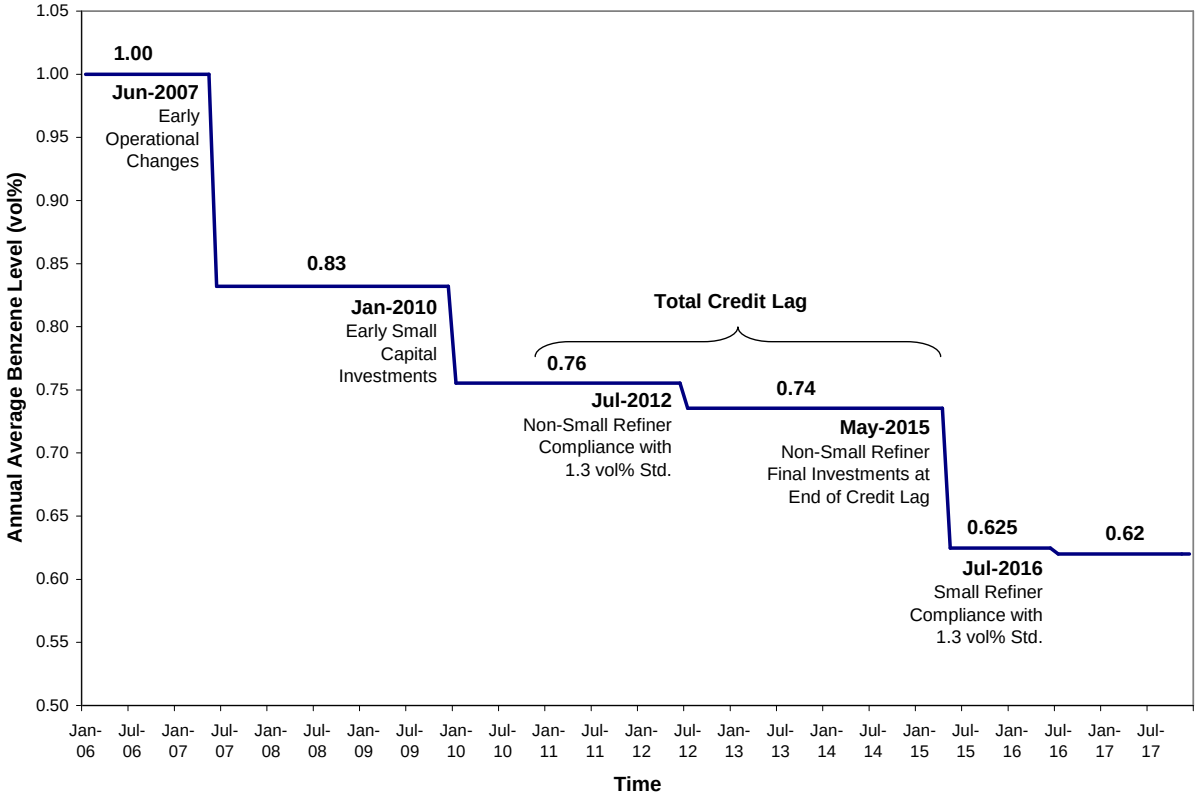
As proposed, we are finalizing a program where refiners and importers can use benzene credits generated or obtained under the ABT program to meet the 0.62 vol% annual average standard in 2011 and beyond (2015 and beyond for small refiners). We are also finalizing a 1.3 vol% maximum average standard which takes effect in July 2012 (July 2016 for small refiners). The maximum average standard must be met based on actual refinery benzene levels, essentially placing a cap on total credit use. As discussed above in section VI.A.1.d, we believe this is an appropriate strategy for addressing the current disparity in gasoline benzene levels throughout the country.

Overall, the ABT program will allow for a more gradual phase-in of the 0.62 vol% benzene standard and a more cost-effective program. The early credit program gives refiners an incentive to make initial gasoline benzene reductions sooner than required. The early credits generated can be used to provide refiners with additional lead time to make their final (more expensive) investments in benzene control technology. As a result, some benzene reductions will occur prior to the start of the program while others will lag (within the realms of the credit life provisions described below). We anticipate that there will be enough early credits generated to allow refiners to postpone their final investments by up to three years, which coincides with the maximum time afforded by the early credit life provisions. In addition, we predict that standard credits generated during the early credit lag period will allow for an additional 16 months of lead time. The result is a gradual phase-in of the 0.62 vol% benzene standard beginning in June 2007 and ending in July 2016, as shown below in Figure VI.A-1. Without early credits, refineries would be immediately constrained by the 0.62 vol% standard and likely forced

to make their final investments sooner (including those necessary to meet the 1.3 vol% maximum average standard).

## Figure VI.A-1

## Benzene Level vs. Time



In addition to earlier benzene reductions and a more gradual phase-in of the 0.62/1.3 vol% standards (as shown above), the ABT program results in a more cost-effective program for the refining industry. Our modeling shows that allowing refiners to average benzene levels nationwide to meet the 0.62 vol% standard reduces ongoing compliance costs by about 50% from 0.51 to 0.27 cents per gallon (refer to RIA Section 9.6.2). Our modeling further shows that the early credit program we are finalizing results in the lowest possible compliance costs during the phase-in period. Without an early credit program, the total amortized capital and operating costs incurred by the refining industry during the phase-in period is estimated to be $905 million (2003 dollars)[192] With an early credit program, the total cost incurred during the same phase-in period is reduced to $608 million, providing about $300 million in savings. In the absence of an ABT program altogether, the total cost incurred during the phase-in period would be $1.7 billion. As a result, the ABT program in its entirety could save the refining industry up to $1.1 billion in compliance costs from 2007-2015. For a more detailed discussion on compliance costs, refer to section VIII.A. For more information on how the cost savings associated with the ABT program were derived, refer to RIA Section 6.5.5.12.

Under the ABT program, early and standard benzene credits can be used interchangeably towards compliance with the 0.62 vol% standard (within the realms of the credit life provisions described below). Each credit (expressed in gallons of benzene) can be used on a one-for-one basis to offset the same volume of benzene

[192] ABT program cost calculations consider future gasoline growth and the time value of money. The gasoline growth rate from 2004-2012 was estimated by the refinery cost model and future growth rates were obtained from EIA's AEO 2006. The costs and resulting cost savings estimated for the phase-in period were calculated based on compliance costs presented in RIA Section 9.6.2 and adjusted back to 2007 to account for the time-value of money based on a 7% average rate of return.

produced/imported in gasoline above the standard. For example, if in 2011 a refinery's annual average benzene level was 0.72, the number of benzene credits needed to comply would be determined based on the margin of undercompliance with the standard (0.72 – 0.62 = 0.10 vol%) divided by 100 and multiplied by the gallons of gasoline produced during the 2011 calendar year. The credits needed would be expressed in gallons of benzene.

To enable enforcement of the program, the ABT program we are finalizing includes a limit on credit life (for both early and standard credits), a limit on the number of times credits may be traded, and a prohibition on outside parties taking ownership of credits. We believe that these provisions are necessary to ensure that the full benzene reduction potential of the program is realized and that the credit trading program is equitably administered among all participants. In the proposal, we acknowledged concerns that credit use limitations might in some circumstances unnecessarily hamper the credit market. Specifically, we requested comment on ways that some of the provisions might be reduced or eliminated while still maintaining an enforceable program (see 71 FR 15872). Although we received many comments on the proposed ABT program, we did not receive any substantive comments indicating that the proposed credit provisions would be a significant burden on refiners or importers. Likewise, we did not receive any substantive comments suggesting that the removal of such restrictions would greatly improve the efficiency of the ABT program. For these reasons, we are finalizing such provisions for credit use (described in more detail below).

i. Early Credit Life

Early credits must be used towards compliance within three years of the start of the program; otherwise they will expire and become invalid. In other words, early credits generated or obtained under the ABT program must be applied to the 2011, 2012, or 2013 compliance years. Similarly, early credits generated/obtained and ultimately used by small refiners must be applied to the 2015, 2016, or 2017 compliance years. The result is that no early credits may be used toward compliance with the 2014 year. This break in the early credit application period may help funnel surplus early credits facing expiration to small refiners in need.

ii. Standard Credit Life

Standard credits must be used within five years from the year they were generated (regardless of when/if they are traded). For example, standard credits generated in 2011 would have to be applied towards the 2012 through 2016 compliance year(s); otherwise they would expire and become invalid. To encourage trading to small refiners, there is a credit life extension for standard credits traded to and ultimately used by small refiners. These credits may be used towards compliance for an additional two years, giving standard credits a maximum seven-year life. For example, the same above-mentioned standard credits generated in 2011, if traded and used by a small refiner, would have until 2018 to be applied towards compliance before they would expire.

iii. Consideration of Unlimited Credit Life

Since compliance with the gasoline benzene standards is determined at the refinery or importer level, there are no enforceable downstream standards associated with this rulemaking. Thus, it is critical that EPA be able to conduct enforcement at the refinery or importer level. Additionally, since EPA enforcement activities are limited by the five-year statute of limitations in the Clean Air Act, allowing credit life beyond five years poses serious enforcement issues. As a result, we are finalizing three-year early credit life and five-year standard credit life provisions (as just described above). We believe that these credit life provisions are limited enough to satisfy enforcement and trading concerns yet sufficiently long to provide necessary program flexibility. However, we recognize that extending credit life might result in increased program flexibility. Accordingly, in the proposal, EPA sought comment on different ways to structure the program that would allow for unlimited credit life. Specifically, we asked for comment on how unlimited credit life could be beneficial to the program and/or how the associated increase in recordkeeping and enforcement issues could be mitigated (see 71 FR 15872). Comments received provided no support for why unlimited credit life would improve program flexibility or how enforcement issues could be addressed. Furthermore, we did not receive any comments suggesting that the proposed credit life provisions would significantly hamper trading. As such, we are finalizing the credit life provisions as proposed.

iv. Credit Trading Provisions

It is possible that benzene credits could be generated by one party, subsequently transferred or used in good faith by another, and later found to have been calculated or created improperly or otherwise determined to be invalid. If this occurs, as in past programs, both the seller and purchaser will have to adjust their benzene calculations to reflect the proper credits and either party (or both) could be determined to be in violation of the standards and other requirements if the adjusted calculations demonstrate noncompliance with the 0.62 vol% standard.

Credits must be transferred directly from the refiner or importer generating them to the party using them for compliance purposes. This ensures that the parties purchasing them are better able to assess the likelihood that the credits are valid. An exception exists where a credit generator transfers credits to a refiner or importer who inadvertently cannot use all the credits. In this case, the credits can be transferred a second time to another refiner or importer. After the second trade, the credits must be used or terminated. In the proposal, we requested comment on whether more than two trades should be allowed -- specifically, whether three or four trades were more appropriate and/or more beneficial to the program (see 71 FR 15876). We did not receive any comments providing analytical support for an additional number of trades. We are finalizing a maximum of two trades, consistent with other recent rulemakings, in order to provide flexibility while still maintaining enforceability as discussed in the proposal.

There are no prohibitions against brokers facilitating the transfer of credits from one party to another. Any person can act as a credit broker, regardless of whether such person is a refiner or importer, as long as the title to the credits is transferred directly from the generator to the user. This prohibition on outside parties taking ownership of credits was promulgated in response to problems encountered during the unleaded gasoline program and has since appeared in subsequent fuels rulemakings. To reevaluate potential stakeholder interest in removing this prohibition, EPA sought comment on this provision in the proposal - specifically, whether there were potential benefits to allowing other parties to take ownership of credits and how such a program would be enforced (see 71 FR 15876). We did not receive any comments on this issue and continue to believe that our proposal is appropriate. Therefore, to maintain maximum program enforceability and consistency with all of our other ABT programs for mobile sources and their fuels, we are maintaining our existing prohibition on outside parties taking ownership of credits.

We are not imposing any geographic restrictions on credit trading. Credits may be traded nationwide between refiners or importers as well as within companies to meet the 0.62 vol% national average benzene standard. We believe that restricting credit trading could reduce refiners' incentive to generate credits and hinder trading essential to this program. In addition, since there are no fuel-availability issues associated with this rule (as opposed to the case of the ultra-low sulfur diesel program), there is no need to impose a geographic restriction.

### 3. Provisions for Small Refiners and Refiners Facing Hardship Situations

In developing the MSAT2 program, we evaluated the need for and the ability of refiners to meet the proposed benzene standards as expeditiously as possible. We continue to believe that it is feasible and necessary for the vast majority of the program to be implemented in the time frame stated above to achieve the air quality benefits as soon as possible. Further, we believe that refineries owned by small businesses generally face unique hardship circumstances as compared to larger refiners. We are also finalizing provisions for other refiners to allow them to seek limited relief from hardship situations on a case-by-case basis. These provisions are discussed in detail below.

#### a. Provisions for Small Refiners

We proposed several special provisions for refiners that are approved as small refiners (see VI.A.3.a.ii below). This is due to the fact that small refiners generally have greater difficulty than larger companies (including those large companies that own small-capacity refineries) in raising capital for investing in benzene control equipment. Small refiners are also likely to have more difficulty in competing for engineering resources and in completing construction of the needed benzene control (and any necessary octane recovery) equipment in time to meet the required standards (see also the more detailed discussion at 71 FR 15877).

As explained in the discussion of our compliance with the Regulatory Flexibility

Act below in section XII.C and in the Final Regulatory Flexibility Analysis in Chapter 14 of the RIA, we carefully considered the impacts of the regulations on small businesses. Most of our analysis of small business impacts was performed as a part of the work of the Small Business Advocacy Review Panel ("SBAR Panel", or "the Panel") convened prior to the proposed rule, pursuant to the Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA). (The final report of the Panel is available in the docket.)

For the SBREFA process, EPA conducted outreach, fact-finding, and analysis of the potential impacts of our regulations on small businesses. Based on these factors and analyses by all Panel members, the Panel concluded that small refiners in general would likely experience a significant and disproportionate financial hardship in reaching the objectives of the MSAT2 program. We proposed many of the provisions recommended by the Panel and we are finalizing these provisions in this action.

i. Definition of Small Refiner for Purposes of the MSAT2 Small Refiner Provisions

The criteria to qualify for small refiner status for this program are in most ways the same as those required in the Gasoline Sulfur and the Highway and Nonroad Diesel rules. However, there are some differences; as stated in our more recent fuels programs, we believe that it is necessary to limit relief to those small entities most likely to experience adverse economic impacts from fuel regulations. We are finalizing the

following provisions for determining small refiner status.

To qualify as a small refiner, a refiner must demonstrate that it meets all of the following criteria: 1) produced gasoline from crude during calendar year 2005; 2) had no more than 1,500 employees, based on the average number of employees for all pay periods from January 1, 2005 to January 1, 2006; and, 3) had an average crude oil capacity less than or equal to 155,000 barrels per calendar day (bpcd) for 2005. We are likewise finalizing the provision requiring refiners to apply for, and for EPA to approve, a refiner's status as a "small refiner".

Small refiner provisions are limited to refiners of gasoline from crude because they are the entities that bear the investment burden and the consequent economic hardship. Therefore, blenders, importers, and additive component producers are not eligible. For these same reasons, small refiner status is limited to those refiners that owned and operated the refinery during the period from January 1, 2005 through December 31, 2005. This is consistent with the approach taken in the Nonroad Diesel rule, but we are revising the text to be more clear on this issue.

In determining its crude oil capacity and total number of employees, a refiner must include the crude oil capacity and number of employees of any subsidiary companies, any parent companies, any subsidiaries of the parent companies, and any joint venture partners. As stated in the proposal, there was confusion in past rules regarding ownership. Thus, we proposed defining a parent company as any company (or

companies) with controlling ownership interest, and a subsidiary of a company as any company in which the refiner or its parent(s) has a controlling ownership interest (see 71 FR 15878). We requested comment on these clarifications in the proposal, but did not receive any comments on these aspects of the small refiner definition. Therefore, we are finalizing the definition of parent company and related clarifying provisions such that the employees and crude capacity of all parent companies, and all subsidiaries of all parent companies, must be taken into consideration when evaluating compliance with these criteria.

We received comments regarding the small refiner employee count and crude capacity criteria. These commenters stated that they believed that EPA's criteria fail to provide relief to a small number of refiners whom they believe are similar in many respects to those refiners that will qualify as small under our criteria. The commenters pointed to recent Congressionally enacted programs, specifically the Energy Policy Act of 2005 (EPAct) and the American Jobs Creation Act of 2004 (Jobs Act), which use definitions that are different from the SBA definition, and from the criteria EPA is adopting in this rule. The EPAct focuses on refinery size rather than company size, and the Jobs Act focuses on refinery-only employees rather than employees company-wide. EPA has established the criteria for qualifying for small refiner relief based on the Small Business Administration's (SBA) small business definition (per 13 CFR 121.201).

We do not believe that it would be appropriate to change the proposed small refiner employee count or crude capacity limit criteria to fit the definitions used in either

of the two recent statutes. While Congress is able to establish special provisions for subsets of the industry in programs like those mentioned above, EPA appropriately focuses, under SBREFA and in this rulemaking, on consideration of relief on those refining companies that we believe are likely to face serious economic hardship as a result of compliance with the rule. Under programs subject to the EPAct and Jobs Act definitions, relief would be granted to refineries that are owned by larger companies, or companies that have additional sources of revenue (indicated by more employees and/or refining capacity), and also refineries owned by foreign governments. These definitions do not focus as directly on refiners which, due to their size, could incur serious adverse economic impact from fuel regulations; and EPA consequently is not adopting either of them in this rule. Further, SBA established its small business definition to set apart those companies which are most likely to be at an inherent economic disadvantage relative to larger businesses. We agree with the assessment that refiners of this size may be afforded special consideration under regulatory programs that have a significant economic impact on them (insofar as is consistent with Clean Air Act requirements). We continue to believe that it is most appropriate to remain consistent with our previous fuels programs and retain the criteria to qualify for small refiner status that have been used in the past (with some minor clarifications to avoid confusion), since these criteria best identify the class of small refiner which may incur disproportionate regulatory impact under the rule. We are therefore finalizing the small refiner qualification criteria that were proposed.

As previously stated, our intent has been, and continues to be, limiting the small refiner relief provisions to the small subset of refiners that are likely to be seriously

economically challenged as a result of the new regulations. We assume that new owners that purchase a refinery after December 31, 2005 do so with full knowledge of the proposed regulation. Given that they have the resources available to purchase the refinery assets, they are not in an economic hardship situation. Therefore, they should include compliance planning as part of their purchase decision. Similar to earlier fuel rules, we are finalizing a provision that a refiner that restarts a refinery in the future is eligible for small refiner status. In such cases, we will judge eligibility under the employment and crude oil capacity criteria based on the most recent 12 consecutive months before the application, unless we conclude from data provided by the refiner that another period of time is more appropriate. However, unlike past fuel rules, this will be limited to a company that owned the refinery at the time that it was shut down. New purchasers will not be eligible for small refiner status for the reasons described above. Companies with refineries built after January 1, 2005 will also not be eligible for the small refiner hardship provisions, again for the reasons given above.

Similar to previous fuel sulfur programs, we also proposed that refiners owned and controlled by an Alaska Regional or Village Corporation organized under the Alaska Native Claims Settlement Act are also eligible for small refiner status, based only on the refiner's employee count and crude oil capacity (see 71 FR 15878). We did not receive any comments on this provision, and we are finalizing it in this action.

ii. Small Refiner Status Application Requirements

A refiner applying for status as a small refiner under this program is required to apply and provide EPA with several types of information by December 31, 2007. (The application requirements are summarized in section VI.B.2, below.) A refiner seeking small refiner status under this program must apply for small refiner status, regardless of whether the refiner had been approved or rejected for small refiner status under another fuel program. As with applications for relief under other rules, applications for small refiner status under this rule that are later found to contain false or inaccurate information will be void ab initio.

iii. Small Refiner Provisions

*Delay in the Effective Date of the Standards*

We proposed that small refiners be allowed to postpone compliance with the 0.62 vol% benzene standard until January 1, 2015, four years after the general program would begin (see 71 FR 15878). At such time, approved small refiners would be required to meet the 0.62 vol% benzene standard. As stated in the proposal, this additional lead time is justified because small refiners face disproportionate challenges, which the additional lead time will help to mitigate. We requested comment on this proposed provision, and we received many comments supporting it and none opposing it.

Normally a period of two to three years of lead time is required for a refiner to secure necessary financing and to carry out capital improvements for benzene control

(see VI.A.1.c.i. above). Commenters specifically noted that additional lead time would allow small refiners to more efficiently obtain financing and contracts to carry out necessary capital projects (or to obtain credits) with less direct competition with non-small refiners for financing and for contractors to carry out capital improvements. Some commenters noted that they generally supported the proposed program of a 0.62 vol% benzene standard with no upper limit and the proposed small refiner relief. While we did not propose an upper limit, as discussed above in section VI.A.1, we have chosen to finalize a 1.3 vol% refinery maximum average.

The additional lead time also allows EPA to make programmatic adjustments, if necessary, before small refiners are required to comply with the benzene standards. As discussed below, we are finalizing a requirement that EPA review the program in 2012, leaving a number of years to adjust the program before small refiners are required to meet the benzene standards. The additional lead time for small refiners will also provide these refiners with three years of lead time following the review to take the review results into account in completing capital projects if necessary or desirable to meet the benzene standards. Based on these assessments, we are therefore finalizing a four-year period of additional lead time for small refiners for compliance with the 0.62 vol% benzene standard, until January 1, 2015 (and small refiners would continue to meet the requirements of MSAT1 until January 1, 2015). Further, we are finalizing an additional 4 years of lead time for small refiners to comply with the 1.3 vol% maximum average benzene standard, until July 1, 2016.

*Early ABT Credit Generation Opportunities*

During the development of the proposal, we anticipated that many small refiners would likely find it more economical to purchase credits for compliance than to comply by making capital investments to reduce gasoline benzene. However, some small refiners indicated that they would make reductions to their gasoline benzene levels to fully or partially meet the proposed 0.62 vol% benzene standard. Therefore, we proposed that small refiners that take steps to meet the benzene requirement before January 1, 2015 would be eligible to generate early credits (see 71 FR 15879). Current and previous fuels programs allow for credit generation opportunities to encourage early compliance, and extending this opportunity to small refiners, based on the small refiner effective date, is consistent with this objective. Small refiners generally supported this provision and we did not receive any adverse comments on it.

Early credit generation opportunities will provide more credits for the MSAT2 ABT program and will help to achieve the air quality goals of the MSAT2 program earlier than otherwise required. We are therefore finalizing an early credit generation provision for small refiners. This is similar to the general early credit generation provision that is provided to all refiners, except that small refiners may generate early credits until January 1, 2015. As discussed in section VI.A.2.b.ii above, refineries must reduce their 2004-2005 benzene levels by at least ten percent to generate early credits. This ten percent threshold is being set to ensure that changes in gasoline benzene levels result from real refinery process improvements, not just normal fluctuations in benzene

levels at a given refinery (allowed under MSAT1). The small refiner early credit generation period will be from June 1, 2007 to December 31, 2014, after which standard credits may be generated indefinitely for those that overcomply with the 0.62 vol% annual average standard.

*Extended Credit Life*

During the SBREFA process, many small refiners expressed interest in relying upon credits as an ongoing compliance strategy for meeting the 0.62 vol% gasoline benzene standard. However, several small refiners voiced concerns surrounding the idea of relying on the credit market to avoid large capital costs for benzene control. One of their primary concerns was that credits might not be available and/or traded to small refiners in need. To increase the certainty that credits would be available, we proposed a two-year credit life extension for credits generated by or traded to small refiners (see 71 FR 15879). Not only does this provision encourage trading to small refiners, it creates a viable outlet for credits facing expiration. Most small refiners supported the proposed credit life provision. However, one refiner suggested that we finalize unlimited credit life for credits traded to small refiners. Although unlimited credit life could have some perceived benefits, overall it poses serious enforcement problems. Therefore, for the reasons described above in VI.A.2.c.iii, we are not finalizing unlimited credit life for credits traded to small refiners. Further, we are finalizing a slightly modified version of the proposed small refiner extended credit life provision to better reflect its intended purpose. First, the two-year credit life extension pertains only to standard credits. The

extension does not apply to early credits because refiners already have an incentive to trade early credits to small refiners. Based on the nature of the early credit life program (three-year life based on the start of the program) and small refiners' delayed program start date (2015 as opposed to 2011), early credits traded to small refiners are already valid for an additional four years. Second, the two-year credit life extension applies only to standard credits traded to small refiners. There is no need to extend credit life for credits generated by small refiners, because in this event, the small refiner would already have the utmost certainly that the credits would be available for use.

*ABT Program Review*

We proposed that we would perform a review of the ABT program (and thus, the small refiner flexibility options) by 2012, one year after the general program begins (see 71 FR 15879). Coupled with the small refiner four-year additional lead time provision, the ABT program review after the first year of the overall program will provide small refiners with roughly three years, after learning the results of the review, to obtain financing and perform engineering and construction. We are committing to this provision today. The review will take into account the number of early credits generated industry-wide each year prior to the start of the MSAT2 program, as well as the number of credits generated and transferred during the first year of the overall benzene control program. In part to support this review, we are requiring that refiners submit pre-compliance reports, similar to those required under the highway and nonroad diesel programs. In addition, the first compliance report that refiners submit (for the 2011

compliance period) will provide important information on how many credits are actually being generated or utilized during the first year of the program.

The ABT pre-compliance reports will be due annually on June 1 from 2008 through 2011. The reports must include projections of how many credits will be generated and how many credits will need to be used at each refinery. The reports must also contain information on a refiner's plans (for each refinery) for compliance with the benzene standard, including whether or not the refiner will utilize credits alone to comply with the standard. Refiners must also report any early credits that may have been transferred to another entity prior to January 1, 2011 and the sale price of those credits.

In addition, ABT compliance reports will be due annually beginning February 28, 2012. For any refiner expecting to participate in the credit trading program (under §80.1275 and/or §80.1290, the report must include information on actual credit generation and usage. Refiners must also provide any updated information regarding plans for compliance. EPA will publish the results of these refinery compliance reports and the results of our review as soon as possible to provide small refiners with information on the ABT program roughly three years prior to the small refiner compliance date. EPA will maintain the confidentiality of information from individual refiners submitted in the reports. We will present generalized summaries of the reports annually.

If, following the review, EPA finds that the credit market is not adequate to

support the small refiner provisions, we will revisit the provisions to determine whether or not they should be altered or whether EPA can assist the credit market (and small refiners' access to credits). For example, the Panel suggested that EPA could consider actions such as: 1) the ''creation'' of credits by EPA that would be introduced into the credit market to ensure that there are additional credits available for small refiners; 2) a requirement that a percentage of all credits to be sold be set aside and only made available for small refiners; and 3) a requirement that credits sold, or a certain percentage of credits sold, be made available to small refiners before they are allowed to be sold to any other refiners.

Further, we are finalizing an additional hardship provision to assist small refiners. This hardship provision would be for the case of a small refiner for which compliance with the 0.62 vol% benzene standard would be feasible only through the purchase of credits, but for whom purchase of credits is not economically feasible. This hardship provision will only be available following the ABT program review, since EPA wishes to use the most accurate information to assess credit availability and the working of the credit market. The provision will only be afforded to a small refiner on a case-by-case basis, and must be based on a showing by the refiner of the practical or economic difficulty in acquiring credits for compliance with the 0.62 vol% benzene standard (or some other type of similar situation that would render its compliance with the standard not economically feasible). The relief offered under this hardship provision is a further delay, on an individual refinery basis, for up to two years. Applications for relief under this provision must meet the requirements set out in §80.1343. Following the two years,

a small refiner will be allowed to request one or more extensions of the hardship until the refinery's material situation has changed. Finally, if a small refiner is unable to comply with the 1.3 vol% refinery maximum average, it may apply for relief from this standard under the general hardship provisions discussed below in section VI.A.3.b. Applications for relief from the 1.3 vol% refinery maximum average must be received by January 1, 2013 and must meet the requirements set out in §80.1335.

iv. The Effect of Financial and Other Transactions on Small Refiner Status and Small Refiner Relief Provisions

We believe that the effects of financial (and other) transactions are also relevant to this action. We proposed these provisions (see 71 FR 15880) and did not receive any comments on them. We continue to believe that these provisions are appropriate and are finalizing the provisions discussed below.

*Large Refiner Purchasing a Small Refiner's Refinery*

One situation involves a ''non-small'' refiner that wishes to purchase a refinery owned by an approved small refiner. The small refiner may not have completed or even begun any necessary planning to meet the MSAT2 standards, since it would likely have planned to make use of the special small refiner relief provisions. We assume that the refiner would have incorporated financial planning for compliance into its purchase decision. However, we recognize that a limited amount of time would be required for the

physical completion of the refinery upgrades for compliance. (This situation would be similar to that addressed in the Nonroad Diesel program (96 FR 39051).)

We therefore believe that an appropriate period of lead time for compliance with the MSAT2 requirements is warranted where a refiner purchases any refinery owned by a small refiner, whether by purchase of a refinery or purchase of the small refiner entity. A refiner that acquires a refinery from an approved small refiner will be provided with 30 additional months from the date of the completion of the purchase transaction (or until the end of the applicable small refiner relief interim period if it is within 30 months). During this 30-month period, production at the newly-acquired refinery may remain at the benzene levels that applied to that refinery for the previous small refiner owner, and all existing small refiner provisions and restrictions will also remain in place for that refinery. At the end of this period, the refiner must comply with the ‘‘non-small refiner’’ standards. There will not be an adverse environmental impact of this provision, since the small refiner would already have been provided relief prior to the purchase and this provision would be no more generous.

We expect that in most (if not all) cases, the 30 months of additional lead time will be sufficient for the new refiner-owner to accomplish the necessary planning and any needed refinery upgrades. If a refiner nonetheless believes that the technical characteristics of its plans would require additional lead time, the refiner may apply for additional time and EPA will consider such requests on a case-by-case basis. Based on information provided in such an application and other relevant information, EPA will

decide whether additional time is technically necessary and, if so, how much additional time would be appropriate. As discussed above, in no case will compliance dates be extended beyond the time frame of the applicable small refiner relief.

*Small Refiner Losing Its Small Refiner Status Due To Merger or Acquisition*

Another type of potential transaction involves a refiner with approved small refiner status that later loses its small refiner status because it no longer meets the small refiner criteria. An approved small refiner that exceeds the small refiner employee or crude capacity limit due to merger or acquisition will lose its small refiner status. This includes exceedances of the employee or crude capacity criteria caused by acquisitions of assets such as plants and equipment, as well as acquisitions of business entities.

Our intent has been, and continues to be, to limit the small refiner relief provisions to a small subset of refiners that are most likely to be significantly economically challenged, as discussed above. At the same time, it is also our intent to avoid stifling normal business growth. Therefore, under this program, a refiner will be disqualified from small refiner status if it exceeds the small refiner criteria through its involvement in transactions such as being acquired by or merging with another entity, through the small refiner itself purchasing another entity or assets from another entity, or when it ceases to process crude oil. However, if a small refiner grows through normal business practices, and exceeds the employee or crude capacity criteria without merger or acquisition, it will retain its small refiner status for this program.

In the sole case of a merger between two approved MSAT2 small refiners, both small refiners will be allowed to retain their small refiner status under this program. As in past fuel rulemakings, we believe the justification for continued small refiner relief for each of the merged entities remains valid. Small refiner status for the two entities of the merger will not be affected, and hence the original compliance plans of the two refiners should not be impacted. Moreover, no environmental detriment will result from the two small refiners maintaining their small refiner status within the merged entity as they would have likely maintained their small refiner status had the merger not occurred. We did not receive any comments on this provision.

We recognize that a small refiner that loses its small refiner status because of a merger with, or acquisition of, a non-small refiner would face the same type of technical lead time concerns discussed above for a non-small refiner acquiring a small refiner's refinery. Therefore, we are also providing the 30 months of additional lead time described above for non-small refiners purchasing a small refiner's refinery.

b. Provisions for Refiners Facing Hardship Situations

The MSAT2 program includes a nationwide credit trading program of indefinite duration for the 0.62 vol% annual average benzene standard, and we expect that credits will be available at a reasonable cost industry-wide. However, as explained in the proposal (71 FR 15880-15881), there could be circumstances when refiners would need

hardship relief. We reiterate this conclusion here, especially given the 1.3 vol% refinery maximum average benzene standard in the final rule. These hardship provisions are available to all refiners, small and non-small, with relief being available on a case-by-case basis following a showing of certain requirements (as described in the regulations at sections 80.1335 and 80.1336). We believe that the inclusion of hardship provisions for refiners is a necessary part of adopting the benzene requirements as the maximum reduction achievable considering costs. Without a mechanism to consider economic hardship to particular refineries, the overall level of the standards would need to be higher to reflect the potential increased costs. Note, however, that we do not intend for these hardship waiver provisions to encourage refiners to delay planning and investments they would otherwise make.

We are finalizing two forms of hardship relief: the first applies to situations of extreme and unusual hardship, and the second applies to situations where unforeseen circumstances prevent the refiner from meeting the benzene standards. These provisions are similar to the hardship provisions that were proposed, but with some modification because this final rule includes a 1.3 vol% refinery maximum average benzene standard, which cannot be satisfied through the use of credits. While we sought comment in the proposal on such a standard, we did not propose it, and therefore also did not propose any hardship relief specific to it.

As discussed further below, the application requirements and potential relief available differ somewhat depending upon whether a refiner applies for hardship relief

for the 0.62 vol% benzene standard, the 1.3 vol% refinery maximum average, or both (a refiner may apply for relief from both standards, but EPA will address them independently). This is partly due to the fact that a refiner may use credits to meet the 0.62 vol% benzene standard, but credits cannot be used for compliance with the 1.3 vol% refinery maximum average standard. EPA can impose appropriate conditions on any hardship relief. Note also that any hardship relief granted under this rule will be separate and apart from EPA's authority under the Energy Policy Act to issue temporary waivers for extreme and unusual supply circumstances, under amended section 211(c)(4). In general, commenters stated that they supported the inclusion of hardship provisions, but they did not provide any specific comments regarding these provisions.

i. Temporary Waivers Based on Extreme Hardship Circumstances

We are finalizing the proposed hardship relief provisions based on a showing of extreme hardship circumstances, with some slight modifications from the proposed extreme hardship relief provision (see 71 FR 15881). We did not receive comment on the proposed hardship provision.

Extreme hardship circumstances could exist based on severe economic or physical lead time limitations of the refinery to comply with the benzene standards required by the program. Such extreme hardship may be due to an inability to physically comply in the time available, an inability to secure sufficient financing to comply in the time available, or an inability to comply in the time available in a manner that would not place the

refiner at an extreme competitive disadvantage sufficient to cause extreme economic hardship. A refiner seeking such hardship relief under this provision will have to demonstrate that these criteria were met. In addition to showing that unusual circumstances exist that impose extreme hardship in meeting the benzene standards, the refiner must show: (1) circumstances exist that impose extreme hardship and significantly affect the ability to comply with the gasoline benzene standards by the applicable date(s); and (2) that it has made best efforts to comply with the requirements. Refiners seeking additional time must apply for hardship relief, and the hardship applications must contain the information required under §80.1335.

For relief from the 0.62 vol% benzene standard in extreme hardship circumstances, an aspect of the demonstration of best efforts to comply is that severe economic or physical lead time limitations exist and that the refinery has attempted, but was unable, to procure sufficient credits. EPA will determine an appropriate extended deficit carry-forward time period based on the nature and degree of the hardship, as presented by the refiner in its hardship application, and on our assessment of the credit market at that time. Moreover, because we expect the credit program to be operating and robust, we believe that circumstances under which we would grant relief from the 0.62 vol% benzene standard will be rare, and should we grant relief, it would likely be for less than three years. Further, we may impose additional conditions to ensure that the refiner was making best efforts to comply with the benzene standards while offsetting any loss of emission control from the program (due to extended deficit carry-forward).

For relief from the 1.3 vol% refinery maximum average benzene standard in extreme hardship circumstances, a refiner must show that it could not meet the 1.3 vol% standard, despite its best efforts, in the timeframe required due to extreme economic or technical problems. Extreme hardship relief from the 1.3 vol% refinery maximum average standard is available for both non-small and small refiners. This provision is intended to address unusual circumstances that should be apparent now, or well before the standard takes effect. Thus, refiners must apply for such relief by January 1, 2008, or January 1, 2013 for small refiners. If granted, such hardship relief would consist of additional time to comply with the 1.3 vol% refinery maximum average. The length of such relief and any conditions on that relief will be granted on a case-by-case basis, following an assessment of the refiner's hardship application, but could be for a longer period than for relief from the 0.62 vol% standard since credits cannot be used for compliance with the 1.3 vol% refinery maximum average.

ii. Temporary Waivers Based on Unforeseen Circumstances

We are also finalizing the proposed temporary hardship provision based on unforeseen circumstances, which, at our discretion, will permit any refiner or importer to seek temporary relief from the benzene standards under certain rare circumstances (see 71 FR 15880). This waiver provision is similar to provisions in prior fuel regulations. It is intended to provide refiners and importers relief in unanticipated circumstances—such as a refinery fire or a natural disaster—that cannot be reasonably foreseen now or in the near future. We did not receive comments on this proposed hardship provision.

To receive hardship relief based on unforeseen circumstances, a refiner or importer will be required to show that: (1) the waiver is in the public interest; (2) the refiner/importer was not able to avoid the noncompliance; (3) the refiner/importer will meet the benzene standard as expeditiously as possible; (4) the refiner/importer will make up the air quality detriment associated with the nonconforming gasoline, where practicable; and (5) the refiner/importer will pay to the U.S. Treasury an amount equal to the economic benefit of the noncompliance less the amount expended to make up the air quality detriment. These conditions are similar to those in the RFG, Tier 2 gasoline sulfur, and the highway and nonroad diesel regulations, and are necessary and appropriate to ensure that any waivers that are granted will be limited in scope. Such a request must be based on the refiner or importer's inability to produce compliant gasoline at the affected facility due to extreme and unusual circumstances outside the refiner or importer's control that could not have been avoided through the exercise of due diligence.

For relief from the 0.62 vol% benzene standard based on unforeseen circumstances, the hardship request must also show that other avenues for mitigating the problem, such as the purchase of credits toward compliance under the credit provisions, had been pursued and yet were insufficient or unavailable. Hardship relief from that standard will allow a deficit to be carried forward for an extended, but limited, time period (more than the one year allowed by the rule). The refiner or importer must demonstrate that the magnitude of the impact was so severe as to require such an extension. EPA will determine an appropriate extended deficit carry-forward time period

based on the nature and degree of the hardship, as presented by the refiner or importer in its hardship application, and on our assessment of the credit market at that time.

For relief from the 1.3 vol% refinery maximum average benzene standard based on unforeseen circumstances, the hardship request must show that, despite its best efforts, the refiner or importer cannot meet the standard in the timeframe required. Relief will be granted on a case-by-case basis, following an assessment of the refiner's hardship application.

c. Option for Early Compliance in Certain Circumstances

We are finalizing an option that would allow a refinery to begin compliance with the MSAT2 benzene standards earlier than 2011 instead of maintaining compliance with its MSAT1 baseline. See 71 FR 15881 for the proposal's discussion of this option.[193] We are providing this option because refineries that meet the criteria discussed below are already providing the market with very clean gasoline from a mobile source air toxics perspective. In the proposal, we took comment on such an option, stating that eligibility for this option would be limited to those that have historically better than average toxics performance, lower than average benzene and sulfur levels, and a significant volume of gasoline impacted by the phase-out of MTBE use. However, in order to qualify for this option, a refinery must produce gasoline by processing crude and other intermediate feedstocks and not merely be a blender or importer of gasoline, as discussed later.

[193] The 1.3 vol% maximum average standard was not discussed in the proposal vis-a-vis this early compliance option. However, any refinery approved for this option should easily meet the 1.3 vol% standard.

A refinery that is approved for this option would comply with the 0.62 vol% annual average and 1.3 vol% maximum average benzene standards and would not be required to continue to comply with its applicable toxics performance requirements, i.e., its MSAT1 baseline and its anti-dumping or RFG toxics performance standards. We believe this option is appropriate because if qualifying refineries had to continue to comply with MSAT1[194] until 2011, they would likely be forced to reduce gasoline output in order to comply, while other refineries or importers, most likely with less clean MSAT1 baselines, would provide the replacement gasoline. The result would be less supply of these refineries' cleaner gasoline and more supply of fuel with higher toxics emissions, leading to a net detrimental effect on overall MSAT emissions in the surrounding region.

We chose 2003 as the period for determining eligibility for this option because State MTBE bans began taking effect in 2004. Refiners who had used MTBE generally now use ethanol as the replacement source for oxygen. Although RFG no longer has an oxygen requirement[195], MSAT1 baselines were established when that requirement was still in place. Even some CG producers used significant amounts of MTBE as reflected in their MSAT1 baselines. Ethanol provides less toxics reduction benefits than MTBE, and so the refinery must take other actions in order to continue to meet its MSAT1 standard. Consequently, while MSAT1 baseline adjustments in the past were limited to

[194]While refineries are subject to MSAT1 and anti-dumping or RFG toxics performance requirements depending on the gasoline type (CG and/or RFG) they produce, in almost all cases, the MSAT1 standard is more stringent than the corresponding anti-dumping or RFG toxics standard.

[195]71 FR 26691, May 8, 2006.

RFG, it may be possible for a refinery to also qualify to adopt MSAT2 early for its CG pool. Both qualification and the ability to adopt MSAT2 are allowed separately for RFG and CG. For example, a refinery that qualifies to adopt MSAT2 early for RFG will be permitted to do so for RFG alone while maintaining its MSAT1 baseline for its CG, or vice versa.

As mentioned in the proposal, the criteria for eligibility for early compliance are similar in concept to those EPA has used in granting refinery-specific adjustments to MSAT1 baselines, that is, significantly cleaner than the national average for toxics, benzene, and sulfur, and relatively high MTBE use. We re-evaluated those criteria to determine the numerical criteria that a refinery would have to meet in order to qualify for this option. Specifically, a refinery must at minimum meet the following criteria:

- 2003 annual average benzene level less than or equal to 0.62 vol%
- 2003 annual average MTBE use greater than 6.0 vol%
- 2003 annual average sulfur level less than 140 ppm
- MSAT1 RFG baseline greater than 30.0% reduction or CG less than 80 mg/mile

Many refineries can reduce benzene and sulfur levels to reduce toxics emissions. However, those that used a significant amount of MTBE and already have low benzene and sulfur levels also have fairly stringent toxics emissions performance standards. As a result, they may have little ability to further reduce sulfur or benzene or make other refinery changes to offset the impact of switching from MTBE to ethanol. Refineries that

are not in this situation are not so constrained. We believe that the criteria above are an appropriate screening to delineate between these two groups.

To qualify for this provision we believe it is appropriate for a refinery to have used at least 6.0 vol% MTBE in their gasoline in their 2003 baseline; when the oxygen provided by this amount of MTBE is provided instead by ethanol, a substantial loss in toxics performance results. A benzene average of less than or equal to the 0.62 vol% standard is appropriate because if a refinery's average benzene is higher, they would have to further reduce benzene to comply with the MSAT2 standard early. However, to qualify for this provision to switch to MSAT2 early, a refinery should have no viable options for reducing benzene further to continue to meet their MSAT1 baseline. We chose the 140 ppm sulfur level because we found that even for refineries with significant MTBE use (in the 6-13 vol% range), the sulfur reductions brought about by the Tier 2 gasoline sulfur standard provided sufficient benefit to offset much of the increase in toxics emissions that results from eliminating MTBE and replacing it with ethanol. Finally, refineries should have had MSAT1 baseline toxics performance significantly cleaner than the average in order to qualify. The MSAT1 baseline toxics performance thresholds listed above were set based on past experience with baseline adjustments where we found that only those with significantly clean baselines (in addition to low benzene, low sulfur, and high MTBE use) would have to reduce production in order to comply with their MSAT1 standard in the face of MTBE bans. Thus, we are limiting this provision to those with relatively clean baselines as our goal is preventing the perverse outcome that refineries with cleaner gasoline may be forced to reduce their production

volume only to have it be made up by refineries with dirtier baselines. The threshold helps ensure that only those refineries in situations where such an outcome could realistically have otherwise occurred are permitted to exercise this option. Refineries that do not fulfill all of the threshold requirements may have to take further refinery processing-related actions to meet their MSAT1 baseline, but are unlikely to have to reduce production and/or have that production replaced by someone with a less clean standard.

In addition to meeting the screening criteria mentioned, a refinery would still have to apply to EPA to use this compliance option and would need to demonstrate that it cannot further reduce its benzene or sulfur levels, nor make other refinery processing changes in order to maintain compliance with its MSAT1 baseline due to the impact of switching from MTBE to ethanol. Details of the application requirements and approval process are provided in section 80.1334 of the regulations. We estimate that less than 10 refineries may meet the screening criteria and thus potentially qualify for this option based on our analysis of their 2003 data and MSAT1 baselines. Note that this early compliance option will apply only to the type of gasoline that qualifies – RFG or CG – not to the refinery's total pool. In 2011, the MSAT2 benzene standards will apply to the refinery's total applicable gasoline pool.

We are limiting this compliance option to refineries that produce gasoline by processing crude and intermediate feedstocks through refinery processing equipment. Thus, this option is not available to gasoline blenders and importers. While gasoline

blenders and importers may have gasoline with significantly cleaner than average toxics performance, benzene and sulfur levels, and may have used large amounts of MTBE, they have more options in the marketplace for obtaining qualifying gasoline and gasoline blending components. Refineries have comparatively less ability to adjust their refining operations, without significantly reducing volume, in order to accommodate the change from MTBE to ethanol.

Few comments were received regarding this provision. All commenters supported the provision. Many of those suggested that it be available to any refinery. We continue to believe that this provision should apply only to those entities that meet the criteria above. Those that do not meet the criteria have the ability to further adjust their benzene and sulfur content values to be able to comply with their MSAT1 baselines. If this provision was available to all refineries, it could result in an overall nationwide backsliding on MSAT1. The intent of this provision is to provide appropriate relief to a limited number of entities that have unique challenges, while at the same time ensuring that the net result is cleaner gasoline in the marketplace than would otherwise be there.

EPA also took comment on when entities that are approved for this option should be allowed to begin compliance with the MSAT2 benzene standards. We received comment supporting allowing such compliance for the entire calendar year 2007, even though the rule will not be final until partway into that year. Other suggested options include the next calendar year, and partial year compliance for 2007. This latter option would likely be unworkable under MSAT1 due to differences between summer and

winter MSAT performance. Thus, we decided that refineries that are approved for this option will be allowed to comply with the MSAT2 benzene standard for the entire 2007 period. We have also decided against requiring approved refineries to wait until the 2008 compliance period because we want to ensure that gasoline production from these refineries is maximized, and waiting until 2008 would not achieve that goal. Because this is an optional program for those that qualify, approved refiners may choose to comply with MSAT2 beginning in 2007, or beginning in 2008.

As a final note on this subject, we also proposed that refineries that meet the criteria and are approved for early compliance with the MSAT2 benzene standards would not be allowed to generate early benzene credits (see 71 FR 15881). A few commenters thought that such refineries should be allowed to generate early credits. However, the criteria for generating early credits require that the refinery reduce benzene by 10% below its 2004-2005 baseline benzene level. The early compliance provision is predicated on the fact that an approved refinery has almost no ability to reduce benzene in order to maintain compliance with its MSAT1 baseline. If such a refinery were able to further reduce benzene, it would negate its need for early compliance with the MSAT2 benzene standard. Therefore, we are finalizing this early compliance option with this limitation as proposed.

B. How will the Gasoline Benzene Standard Be Implemented?

This section summarizes the main implementation provisions in the regulations

and provides additional clarification in a few cases.

1. General Provisions

Compliance with the 0.62 vol% annual average and 1.3 vol% maximum average benzene standards is determined over a refiner's or importer's total gasoline pool, RFG and conventional gasoline (CG) combined. For the 0.62 vol% standard, the first annual compliance period for non-small refiners and for importers is 2011. For the 1.3 vol% standard, the first compliance period for these entities is July 1, 2012 through December 31, 2013. Thereafter, compliance is determined annually. Small refiners will comply with the 0.62 vol% on an annual basis beginning in 2015. Compliance with the 1.3 vol% maximum average standard commences for small refiners on July 1, 2016. For small refiners, the first compliance period for the 1.3 vol% standard is July 1, 2016 through December 31, 2017. Thereafter, compliance is determined annually.

Compliance with the benzene standards is achieved separately for each refinery of a refiner.[196] For an importer, compliance is achieved over its total volume of imports, regardless of point of entry. As discussed in the proposal, gasoline produced by a foreign refiner is included in the compliance calculation of the importer of that gasoline, with certain exceptions for early credit generation and small foreign refiners.

Finished gasoline and gasoline blendstock that becomes finished gasoline solely

[196]Aggregation of facilities for compliance is not allowed under this benzene control program. However, as pointed out in the proposal, the ABT program's credit generation and transfer provisions provide compliance flexibility similar to that provided by aggregation.

upon the addition of oxygenate are included in the compliance determination. Gasoline produced for use in California is not included. Gasoline produced for use in the American territories -- Guam, Northern Mariana Islands, American Samoa – is not subject to the benzene standard. Gasoline produced for use in these areas is currently exempt from the MSAT1 standards, and for the same reasons we discussed in the MSAT1 final rule[197], including distance from gasoline producers, low gasoline use, and distinct environmental conditions, we are exempting gasoline produced for these areas from this rule.

Oxygenate and butane blenders are not subject to the benzene standard unless they add other gasoline blending components beyond oxygenates and butane. Similarly, transmix processors are not subject to the benzene standard. We proposed that transmix processors would be subject to the benzene standard if they add gasoline blending components to the gasoline produced from transmix (see 71 FR 15891). One commenter suggested that only the blending component added to the gasoline produced from transmix should be subject to the standard because the transmix processor has no control over the benzene level in the gasoline produced from transmix, and the benzene in the gasoline produced from transmix would have already been accounted for by another entity. We agree with this comment, and have modified the final rule accordingly.

As discussed earlier, this benzene program has both an early credit generation period and a standard credit generation period that begins when the program takes effect. Early credits may be generated from January 1, 2007 through December 31, 2010 by

[197] 66 FR 17253, March 29, 2001.

refineries with approved benzene baselines. For small refiners, early credit generation extends through December 31, 2014 for their refineries with approved benzene baselines. Benzene baselines are based on a refinery's 2004-2005 average benzene content, and refiners can begin applying for benzene baselines as early as March 1, 2007. Although there is no single cut-off date for applying for a baseline, refiners planning to generate early credits must submit individual refinery baseline applications at least 60 days prior to beginning credit generation at that refinery.

As explained earlier, in order to generate early credits, a refinery's annual average benzene level must be at least 10 percent lower than its baseline benzene level, and the refinery must show that its low benzene levels result, in part, from operational changes and/or improvements in benzene control technology since the baseline period. Foreign refiners who sent gasoline to the U.S. during 2004-2005 under their foreign refiner baseline may generate early credits if they are able to establish a benzene baseline and agree to comply with other requirements that help to ensure enforcement of the regulation at the foreign refinery. Early credits generated or obtained under the ABT program must be used towards compliance within three years of the start of the program; otherwise they will expire and become invalid. In other words, early credits must be applied to the 2011, 2012, or 2013 compliance years. In the case of small refiners, early credits must be applied to the 2015, 2016, or 2017 compliance years.

Standard credits may be generated by refiners and importers beginning with the 2011 compliance period. Standard credits may be generated by small refiners beginning

with the 2015 compliance period. For refiners, credits are generated on a refinery-by-refinery basis for each facility. For importers, credits are generated over the total volume imported, regardless of point of entry. Foreign refiners are not allowed to generate standard credits because compliance for their gasoline is the responsibility of the importer. In order to generate standard credits, a refinery's or importer's annual average benzene level must be less than 0.62 vol%. Standard credits are valid for five years from the year they were generated. A credit life extension exists for standard credits traded to and ultimately used by small refiners. These credits may be used towards compliance for an additional two years, giving standard credits a maximum seven-year life.

Compliance with the 0.62 vol% standard is based on the annual average benzene content of the refinery's or importer's gasoline production or importation, any credits used, and any compliance deficit carried forward from the previous year. Credits may be used in any quantity and combination (i.e., early or standard credits) to achieve compliance with the 0.62 vol% benzene standard beginning with the first compliance period in 2011, or 2015 for approved small refiners. For the 2011 and 2012 compliance periods, credits may be used in any amount, and from any starting average benzene level. For example, if the refinery's annual average benzene level at the end of 2011 is 1.89 vol%, it may use credits to meet the 0.62 vol% standard for that compliance period. If its average benzene level at the end of 2012 is 1.45 vol%, it may likewise use credits to meet the 0.62 vol% standard for that period.

The first averaging period for the 1.3 vol% standard for non-small refiners and

importers begins July 1, 2012 and ends December 31, 2013, an 18-month period. Similarly, the first averaging period for the 1.3 vol% standard for small refiners begins July 1, 2016 and ends December 31, 2017. Credits may not be used to achieve compliance with the 1.3 vol% standard at any time. A refinery must make capital improvements and/or operational or blending practice changes such that it achieves an actual average benzene level of no greater than 1.3 vol% for the initial (18-month) compliance period, and each annual compliance period thereafter. (An importer must bring in gasoline with benzene levels that will average to 1.3 vol% or less during these same compliance periods.) Continuing from our previous example, if at the end of 2012, the refinery's average benzene level is 1.45 vol%, no further action is yet needed to meet the 1.3 vol% standard. However, the refinery must make capital improvements and/or operational or blending practice changes such that it achieves an actual average benzene level of no greater than 1.3 vol% for the 18-month period July 1, 2012-December 31, 2013. We will assume for this example that the refinery has a 1.0 vol% average benzene level at the end of 2013. The refinery can then use credits to meet the 0.62 vol% standard.

Lack of compliance with the 0.62 vol% standard creates a deficit that may be carried over to the next year's compliance determination. Lack of compliance with the 0.62 vol% standard could occur for a number of reasons, for example, a refinery or importer may choose not to use (buy) sufficient offsetting credits. However, in the next year, the refinery or importer must make up the deficit (through credit use and/or refining

or import improvements) and be in compliance with the 0.62 vol% standard.[198] There is no deficit carry-forward provision associated with the 1.3 vol% standard. If a refinery or importer is out of compliance with the 1.3 vol% standard, it is subject to enforcement action immediately.

2. Small Refiner Status Application Requirements

A refiner applying for status as a small refiner under this program is required to apply to and to provide EPA with several types of information by December 31, 2007. The application requirements are summarized below. A refiner seeking small refiner status under this program would need to apply to EPA for that status, regardless of whether or not the refiner had been approved for small refiner status under another fuel program. As with applications for relief under other rules, applications for small refiner status under this rule that are later found to contain false or inaccurate information would be void *ab initio*. Requirements for small refiner status applications include:

- The total crude oil capacity as reported to the Energy Information Administration (EIA) of the U.S. Department of Energy (DOE) for the most recent 12 months of operation. This would include the capacity of all refineries controlled by a refiner and by all subsidiaries and parent companies and their subsidiaries. We will presume that the information submitted to EIA is correct. In cases where a company disagreed with this information, the company could petition EPA with

[198] An extension of the period of deficit carryover may be allowed in certain hardship situations, as discussed in section A.3.

appropriate data to correct the record when the company submitted its application for small refiner status. EPA could accept such alternate data at its discretion.

- The name and address of each location where employees worked from January 1, 2005 through December 31, 2005; and the average number of employees at each location during this time period. This must include the employees of the refiner and all subsidiaries and parent companies and their subsidiaries.
- In the case of a refiner who reactivated a refinery that was shutdown or non-operational between January 1, 2005, and January 1, 2006, the name and address of each location where employees worked since the refiner reactivated the refinery and the average number of employees at each location for each calendar year since the refiner reactivated the refinery.
- The type of business activities carried out at each location.
- The small refiner option(s) the refiner intends to use for each refinery.
- Contact information for a corporate contact person, including: name, mailing address, phone and fax numbers, e-mail address.
- A letter signed by the president, chief operating officer, or chief executive officer of the company (or a designee) stating that the information contained in the application was true to the best of his/her knowledge and that the company owned the refinery as of January 1, 2007.

3. Administrative and Enforcement Provisions

Most of the administrative and enforcement provisions are similar to those in

effect for other gasoline programs, as discussed in the proposal. The discussion below highlights those areas that we wish to clarify and those that received significant comment.

a. Sampling/Testing

Because compliance with this program and with the gasoline sulfur program will become the compliance mechanism for certain RFG and anti-dumping requirements, some reporting simplifications will occur, as described below. However, sampling, testing, and reporting of all of the current fuel parameters will continue to be required. It is important to continue to monitor how refiners continue to achieve the toxics control required of RFG and CG through fuel composition changes, and how other toxics emissions may be affected by this MSAT2 benzene rule. Continued collection of all of the fuel parameters will facilitate future toxics evaluation activities.

We proposed to require every-batch sampling for CG under this program, but indicated that results would not have to be available before the batch leaves the refinery (see 71 FR 15893). RFG already is every-batch tested, and the results must be available before the batch leaves the refinery because of RFG's 1.3 vol% per gallon cap. Several commenters stated that every-batch testing for CG was unnecessary because the benzene standard is an average standard, and that it would be costly, especially for small refiners. These commenters requested that continued composite sampling be allowed for conventional gasoline.[199] Nevertheless, we are concerned about potential downstream benzene addition. Requiring every-batch testing for CG will allow for closer monitoring

[199] § 80.101(i).

of the movement of high benzene streams. In this program, we are relying on there being no significant incentive to dump benzene-rich streams into gasoline downstream of the refinery where the benzene levels are originally measured. With every-batch benzene testing of all gasoline, we will be able to better discern if high benzene batches originated at the refinery, or downstream. With composite testing, it would be significantly more difficult to determine the source of the high benzene streams. Thus, we are finalizing every-batch benzene testing for all gasoline.

b. Recordkeeping/Reporting

This program will require some new records to be kept, such as the benzene baseline, credits generated, and credit transactions, and new reports to be filed (e.g., benzene pre-compliance reports). However, because the current regulations for RFG and anti-dumping toxics controls and MSAT1 controls are being removed, certain recordkeeping and reporting requirements will be reduced or eliminated, as detailed in the regulations. Because the program will not be fully implemented until small refiners are also subject to both the 0.62 vol% and the 1.3 vol% benzene standards, the process of streamlining the reporting forms will not be complete until that time.

As mentioned above, in order to provide an early indication of the credit market for refiners and importers planning on relying upon benzene credits as a compliance strategy in 2011 and beyond, we are requiring refiners to submit pre-compliance reports to us in the years leading up to start of the program. Pre-compliance reporting has proven

to be an indispensable mechanism in implementing the gasoline and diesel sulfur programs, and we expect this to be the case in this program as well. Refiners are required to submit annual pre-compliance reports on June 1st of every year beginning in 2008 and continuing through 2011 (2015 for small refiners). The pre-compliance reports must contain engineering and construction plans as well as actual/projected gasoline production levels, actual/projected gasoline benzene levels, and actual/projected credit generation and use.

Several commenters suggested that the RFG NOx retail survey be discontinued after 2006, and that the RFG toxics retail survey be discontinued after 2010. The surveys use fuel parameters of RFG sampled from retail stations to estimate VOC, NOx, and toxics emissions. There are also fuel benzene and oxygen content surveys. If a survey is "failed", gasoline sent to the area must meet a more stringent standard. Because we are finalizing, as proposed, provisions that make the gasoline sulfur program the sole regulatory mechanism used to implement gasoline NOx requirements, and the benzene control program the sole regulatory mechanism used to implement the toxics requirements of RFG[200] and anti-dumping, we agree that the NOx and toxics surveys are no longer needed. A discussion of the origin of the survey program, and how the toxics and NOx requirements for CG and RFG will be met under the MSAT2 program is provided in Chapter 6.13 of the RIA for this rulemaking.

C. How Will the Program Relate to Other Fuel-Related Toxics Programs?

[200] The 1.3 vol% per gallon cap on RFG benzene remains.

In the proposal we presented an analysis that examined quantitatively how the fuel performance under the new gasoline content standard and vehicle emissions standard as proposed would compare to current toxics performance requirements and to performance as modified by the Energy Policy Act of 2005. This analysis suggested that the fuel standard alone would exceed previous performance for RFG, and significantly exceed it for CG.

We have updated the results of this analysis, using better estimates of future ethanol use developed for the RFS final rulemaking, as well as the updated benzene projections from the refinery-by-refinery analysis done for this final rulemaking. As shown in Table VI.C-1, these updated analyses continue to support the conclusion that the MSAT2 fuel program will provide greater toxics reductions for both CG and RFG.

**Table VI.C-1.**

**Estimated Annual Average Total Toxics Performance of Light Duty Vehicles in mg/mi Under Current and Projected Scenarios.[a]**

| Regulatory Scenario | Fleet Year | RFG by PADD | | | CG by PADD | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | I | II | III | I | II | III | IV | V |
| MSAT1 Baseline[b] (1998-2000) | 2002 | 112 | 129 | 97 | 114 | 145 | 107 | 145 | 156 |
| EPAct Baseline[b] (RFG: 2001-2002) | 2002 | 104 | 121 | 87 | 114 | 145 | 107 | 145 | 156 |
| **EPAct Baseline, 2011[c]** | **2011** | **67** | **78** | **52** | **62** | **83** | **54** | **82** | **88** |
| **MSAT2 program**, 2011[c] (Fuel standard only) | 2011 | 66 | 76 | 52 | 60 | 77 | 52 | 74 | 81 |
| **MSAT2** program, 2011[c] (Fuel + vehicle standards) | 2011 | 64 | 72 | 48 | 56 | 74 | 47 | 70 | 78 |
| **MSAT2** program, 2025[c] (Fuel + vehicle standards) | 2025 | 39 | 45 | 31 | 36 | 45 | 31 | 44 | 48 |

[a] Total toxics performance for this analysis includes overall emissions of 1,3-butadiene, acetaldehyde, acrolein, benzene and formaldehyde as calculated by MOBILE6.2. Although POM appears in the Complex Model, it is not included here. However, it contributes a small and relatively constant mass to the total toxics figure (~4%), and therefore doesn't make a significant difference in the comparisons. Toxics performance figures here are for representative cities in each PADD, and therefore some geographical variation is not captured here.

[b] Baseline figures generated in this analysis were calculated differently from the regulatory baselines determined as part of the MSAT1 program, and are only intended to be a point of comparison for future year cases.

[c] Future year scenarios include (in addition to the MSAT2 standards, where stated) effects of the Tier 2 vehicle and gasoline sulfur standards, and vehicle fleet turnover with time, as well as estimated effects of the renewable fuels standard and the phase-out of ether blending as developed in the RFS rulemaking.

D. How Does This Program Satisfy the Statutory Requirements of Clean Air Act Section 202(l)(2)?

As discussed earlier in this section, we have concluded that the most effective and appropriate program for MSAT emission reduction from gasoline is a benzene control program. We are finalizing, as proposed, an average benzene content standard of 0.62 vol% along with a specially-designed ABT program, as well as a maximum average annual standard of 1.3 vol%. In sections VI.A.1.c and d above, we summarize our evaluation of the feasibility of the program, and in section VIII.A we summarize our evaluation of the costs of the program. The analyses supporting our conclusions in these sections are discussed in detail in Chapters 6 and 9 of the RIA.

Taking all of this information into account, we believe that a more stringent program would not be achievable, taking costs into consideration. As we have discussed, making the 0.62 vol% standard more stringent would require more refiners to install the more expensive benzene control equipment, with very little incremental decrease in benzene emissions. Also, we have shown that refinery costs increase very rapidly as the level of the average standard is made more stringent, especially for certain individual technologically-challenged refineries. We discuss the costs of this program in detail in section VIII.A of this preamble and in Chapter 9 of the RIA. Moreover, the 0.62 vol% standard achieves significant reductions in benzene levels nationwide, and achieves significant reductions in each PADD. The 1.3 vol% annual average standard makes it

more certain that the predicted emission reductions will in fact occur.

Conversely, we believe that a less stringent national average standard than 0.62 vol% would not satisfy our statutory obligation to promulgate the most stringent standard achievable considering cost and other factors along with technological feasibility. Furthermore, as discussed in section VI.A, less stringent standards would not accomplish several important programmatic objectives, such as avoiding the triggering of the provisions in the 2005 EPAct to adjust the MSAT1 baseline for RFG. We have also considered energy implications of the proposed program, as well as noise and safety, and we believe that the MSAT2 program will have very little impact on any of these factors (although, as explained in section VI.A above, some of the alternative toxic control strategies urged by commenters could have adverse energy supply implications). Analyses supporting these conclusions are also found in Chapter 9 of the RIA. We carefully considered lead time in establishing the stringency and timing of the proposed program (see section VI.A above).

We have carefully reviewed the technological feasibility (see section VI.A.1.c.i above and chapter 6 of the RIA) and costs of this program. Based on the considerations outlined in this section VI, we conclude that this program meets the requirements of section 202(l)(2) of the Clean Air Act, reflecting ‘‘the greatest degree of emission reduction achievable through the application of technology which is available, taking into consideration …the availability and costs of the technology, and noise, energy, and safety factors, and lead time.’’

## VII. Portable Fuel Containers

As described in this section, we are adopting new HC emissions standards for portable gasoline containers (gas cans) essentially as proposed. We are also finalizing the same requirements for portable diesel and kerosene containers, containers which could easily be used for gasoline. Manufacturers must begin meeting the new requirements on January 1, 2009. These new emissions control requirements will reduce HC emissions from uncontrolled gasoline containers by about 75%, including reducing spillage losses. The final rule also includes new certification and compliance requirements that will help ensure that the containers achieve emissions control in use over the life of the container. The standards and program requirements we are finalizing are very similar to those adopted by California in 2005, so that manufacturers will be able to sell 50-state products. Overall, commenters were very supportive of the proposed new emissions control program for portable fuel containers.

We are establishing the portable fuel container (PFC) standards and emissions control requirements under section 183(e) of the Clean Air Act, which directs EPA to study, list, and regulate consumer and commercial products that are significant sources of VOC emissions. In 1995, after conducting a study and submitting a Report to Congress on VOC emissions from consumer and commercial products, EPA published an initial list of product categories to be regulated under section 183(e). Based on criteria that we established pursuant to section 183(e)(2)(B), we listed for regulation those consumer and

commercial products that we considered at the time to be significant contributors to the ozone nonattainment problem, but we did not include PFC emissions.[201] After analyzing the emissions inventory impacts of these containers, we published a Federal Register notice that added PFCs to the list of consumer products to be regulated.[202] We requested comment on the data underlying the listing but did not receive any comments.[203] We continue to believe that the standards we proposed and are finalizing for fuel containers represent "best available controls" as required by section 183(e)(3)(A). Determination of the "best available controls" requires EPA to determine the degree of reduction achievable through use of the most effective control measures (which includes chemical reformulation, and other measures) after considering technological and economic feasibility, as well as health, energy, and environmental impacts.[204]

### A. What Are the New HC Emissions Standards For PFCs?

#### 1. Description of Emissions Standard

We are finalizing as proposed a performance-based standard of 0.3 grams per gallon per day (g/gal/day) of HC to control evaporative and permeation losses. The standard will be measured based on the emissions from the container over a diurnal test cycle. The cans will be tested as a system with their spouts attached. Manufacturers will

---

[201] 60 FR 15264 "Consumer and Commercial Products: Schedule for Regulation," March 23, 1995.

[202] 71 FR 28320 "Consumer and Commercial Products: Schedule for Regulation," May 16, 2006.

[203] See not only the notice cited in the previous note, but also 71 FR 15894 ("EPA will afford interested persons the opportunity to comment on the data underlying the listing before taking final action on today's proposal)".

[204] See section 183(e)(1); see also section 183(e)(4) providing broad authority to include "systems of regulation" in controlling VOC emissions from consumer products.

test the containers by placing them in an environmental chamber which simulates summertime ambient temperature conditions and cycling the containers through the 24-hour temperature profile (72-96° F), as discussed below. The test procedures, which are described in more detail below, ensure that containers meet the emissions standard over a range of in-use conditions such as different temperatures, different fuels, and taking into consideration factors affecting durability. EPA received only supportive comments on the proposed emissions standards.

2. Determination of Best Available Control

We continue to believe that the 0.3 g/gal/day emissions standard and associated test procedures reflect the performance of the best available control technologies including durable permeation barriers, auto-closing spouts, and a can that is well-sealed to reduce evaporative losses. The standard is both economically and technologically feasible. To comply with California's program, gas can manufacturers have developed gas cans with low VOC emissions at a reasonable cost (see section XIII. for costs). Testing of cans designed to meet CARB standards has shown the new standards to be technologically feasible. When tested over cycles very similar to those we are adopting, emissions from these cans have been in the range of 0.2-0.3 g/gal/day.[205] These cans have been produced with permeation barriers representing a high level of control (over 90 percent reductions) and with auto-closing spouts, which are technologies that represent best available controls for gas cans. Establishing the standard at 0.3 g/gal/day will

[205] "Quantification of Permeation and Evaporative Emissions From Portable Fuel Container", California Air Resources Board, June 2004.

require the use of best available technologies. As discussed in the proposal, we are finalizing a level at the upper end of the tested performance range to account for product performance variability (see 71 FR 15896). In addition, we believe that current best designs can achieve these levels, so we do not believe that the standard forecloses use of any of the existing performing product designs. Our detailed feasibility analysis is provided in the Regulatory Impact Analysis. We did not receive any comments on our feasibility analysis.

In addition to considering technological and economic feasibility, section 183(e)(1)(A) requires us to consider "health, environmental, and energy impacts" in assessing best available controls. Environmental and health impacts are discussed in section III. Moreover, control of spillage from containers may reduce fire hazards as well because cans would stay tightly closed if tipped over. We expect the energy impacts of gas can control to be positive, because the standards will reduce evaporative fuel losses.

3. Diesel, Kerosene and Utility Containers

Diesel and kerosene containers are manufactured by the same manufacturers as are gasoline containers and are identical to gasoline containers except for color (diesel containers are yellow and kerosene containers are blue). In the proposal, we requested comment on applying the emissions control requirements being proposed for gasoline containers to diesel and kerosene containers (see 71 FR 15897). California included diesel and kerosene cans in their regulations largely due to the concern that they would be

purchased as substitutes for gasoline containers. We received only supportive comments for including these containers in the program. Several states and state organizations urged EPA to include these containers in the EPA program, viewing their omission as a significant difference between the California program and EPA's proposed program.

We recognize that using uncontrolled diesel and kerosene containers as a substitute for gasoline containers would result in a loss of emissions reductions. California collected limited survey data which indicated that about 60 percent of kerosene containers were being used for gasoline. In addition, keeping gasoline in containers marked for other fuels could lead to misfueling of equipment and possible safety issues. Finally, not including these containers would likely be viewed as a gap in EPA's program, resulting in states adopting or retaining their own emissions control program for PFCs. This would hamper the ability of manufacturers to have a 50-state product line. For these reasons, we are including diesel and kerosene containers in the program.

We are also clarifying that utility jugs are considered portable gasoline containers and therefore are subject to the program. They are designed and marketed for use with gasoline, often to fuel recreational equipment such as all-terrain vehicles and personal watercraft. This interpretation is consistent with the scope of the California program. California recently issued a clarification that these containers are covered by their program, after some utility jug manufacturers failed to meet the existing California requirements.

4. Automatic Shut-Off

We received a few comments encouraging EPA to consider or evaluate spillage control requirements. California's original program which began in 2001 required automatic shut-off as a way to reduce spillage. However, for reasons discussed in the proposal, we did not propose and are not finalizing automatic shut-off requirements (see 71 FR 15896). Automatic shut-off is supposed to stop the flow of fuel when the fuel reaches the top of the receiving tank in order to prevent over-filling. However, due to a wide variety of receiving fuel tank designs, the auto shut-off spouts do not work well with a variety of equipment types. In California, this problem led to spillage and consumer dissatisfaction, and California has removed automatic shut-off requirements from their program.

We continue to believe that including an automatic shut-off requirement would be counterproductive at this time. We believe that the automatic closing cans, even without automatic shut-off requirements, will lead to reduced spillage. Consumers will be able to watch the fuel rise in the receiving tank and stop fuel flow using the automatic close features prior to overfill. As discussed in the proposal, automatic closure keeps the cans closed when they are not in use and provides more control to the consumer during use. We believe consumers will appreciate this feature and see it as an improvement over existing cans, whereas an automatic shut-off that worked with only some equipment types would not be acceptable.

B. Timing of Standard

We are finalizing as proposed a start date for the new PFC standards of January 1, 2009. We received comments from state organizations recommending that the program start on January 1, 2008. In the proposal we recognized that adequate lead time is a key aspect of the standard's technological feasibility. Manufacturers have developed the primary technologies to reduce emissions from gas cans but will need a few years of lead time to certify products and ramp up production to a national scale. The certification process will take at least six months due to the required durability demonstrations described below, and manufacturers will need time to procure and install the tooling needed to produce gas cans with permeation barriers for nationwide sales. Commenters did not provide any new information to counter these points and we continue to believe for these reasons that the January 1, 2009 start date is appropriate.

The standards apply to containers manufactured on or after the start date of the program and do not affect cans produced before the start date. As proposed, as of July 1, 2009, manufacturers and importers must not enter into U.S. commerce any products not meeting the emissions standards. This provides manufacturers with a 6-month period to clear any stocks of containers manufactured prior to the January 1, 2009 start of the program, allowing the normal sell-through of these cans to the retail level. Retailers may sell their stocks of containers through the course of normal business without restriction. Containers are required by this rule to be stamped with their production date (consistent with current industry practices), which will allow EPA to determine which cans are

required to meet the new standards. We did not receive any comments on these aspects of the proposal or comments suggesting that the proposed lead times would not be adequate.

### C. What Test Procedures Would Be Used?

As proposed, we are finalizing a system of regulations for containers that includes test conditions designed to assure that the intended emission reductions occur over a range of in-use conditions such as operating at different temperatures, with different fuels, and considering factors affecting durability. These test procedures are authorized under section 183(e)(4) as part of a system of regulations to achieve the appropriate level of emissions reductions. Emission testing on all containers that manufacturers produce is not feasible due to the high annual production volumes and the cost and time involved with emissions testing. Instead, before the containers are introduced into commerce, the manufacturer will need to receive a certificate of conformity from EPA that the containers conform to the emissions standards, based on manufacturers' applications for certification. Manufacturers must submit test data on a sample of containers that are prototypes of the products the manufacturer intends to produce. The certificate issued by EPA will cover the range of production containers represented by the prototype container. As part of the application for certification, manufacturers also need to declare that their production cans will not deviate in materials or design from the prototype cans that are tested. If the production containers do deviate, then they will not be coved by the certificate and it will be a violation of the regulations to introduce such uncertified

containers into commerce. Manufacturers must obtain their certification from EPA prior to introducing their products into commerce. The test procedures and certification requirements are described in detail below. Unless otherwise noted below, we did not receive comments on these test procedures.

We are requiring that manufacturers test cans in their most likely storage configuration. The key to reducing evaporative losses from gasoline containers is to ensure that there are no openings on the cans that could be left open by the consumer. Traditional cans have vent caps and spout caps that are easily lost or left off cans, which leads to very high evaporative emissions. We expect manufacturers to meet the evaporative standards by using automatic closing spouts and by removing other openings that consumers could leave open. However, if manufacturers choose to design cans with an opening that does not close automatically, we are requiring that containers be tested in their open condition. If the containers have any openings that consumers could leave open (for example, vents with caps), these openings thus would need to be left open during testing. This applies to any opening other than where the spout attaches to the can. We believe it is important to take this approach because these openings could be a significant source of in-use emissions and there is a realistic possibility that these openings would be inadvertently left open in use.

Except for pressure cycling, discussed below, spouts would be in place during testing because this would be the most likely storage configuration for the emissions compliant cans. Spouts would still be removable so that consumers would be able to

refill the cans, but we would expect the containers to be resealed by consumers after being refilled in order to prevent spillage during transport. We do not believe that consumers would routinely leave spouts off cans because spouts are integral to the cans' use and it is obvious that they need to be sealed.

1. Diurnal Test

We are finalizing as proposed a test procedure for diurnal emissions testing where the containers are placed in an environmental chamber or a Sealed Housing for Evaporative Determination (SHED), the temperature is varied over a prescribed temperature and time profile, and the hydrocarbons escaping from the can are measured. Containers are to be tested over the same 72-96°F (22.2-35.6°C) temperature profile used for automotive applications. This temperature profile represents a hot summer day when ground level ozone emissions would be highest. Three containers must be tested, each over a three-day test. Testing three cans for certification will help address variability in products or test measurements. All three cans must individually meet the standard. As noted above, cans must be tested in their most likely storage configuration.

The final results are to be reported in grams per gallon, where the grams are the mass of hydrocarbons escaping from the container over 24 hours and the gallons are the nominal can capacity. The daily emissions will then be averaged for each can to demonstrate compliance with the standard. This test captures hydrocarbons lost through permeation and any other evaporative losses from the container as a whole. The grams of

hydrocarbons lost may be determined by either weighing the gas can before and after the diurnal test cycle or measuring emissions directly using the SHED instrumentation.

Consistent with the automotive test procedures, we are requiring that the testing take place using 9 pounds per square inch (psi) Reid Vapor Pressure (RVP) certification gasoline, which is the same fuel required by EPA to be used in its other evaporative test programs. We are requiring testing be done using E10 fuel (10% ethanol blended with the gasoline described above) to help ensure in-use emission reductions on ethanol-gasoline blends, which tend to have increased evaporative emissions with certain permeation barrier materials. We continue to believe that including ethanol in the test fuel will lead to the selection of materials by manufacturers that are consistent with "best available control" requirements for all likely contained gasolines, and is clearly appropriate given the expected increase over time of the use of ethanol blends of gasoline under the renewable fuel provisions of the Energy Policy Act of 2005.

Diurnal emissions are not only a function of temperature and fuel volatility, but of the size of the vapor space in the container as well. We are finalizing as proposed that the fill level at the start of the test be 50% of the nominal capacity of the can. This would likely be the average fuel level of the gas can in-use. Nominal capacity of the cans is defined as the volume of fuel, specified by the manufacturer, to which the can could be filled when sitting on level ground. The vapor space that normally occurs in a container, even when "full," would not be considered in the nominal capacity of the can. All of these test requirements are meant to represent typical in-use storage conditions for

containers, on which EPA can base its emissions standards. The above provisions for diurnal testing are included as a way to implement the standards effectively, which, in conjunction with the new emissions standard, will lead to the use of best available technology at a reasonable cost. We did not receive comment on these test procedures.

Before testing for certification, the container must be run through the durability tests described below. Within 8 hours of the end of the soak period contained in the durability cycle, the cans are to be drained and refilled to 50 percent nominal capacity with fresh fuel, and then the spouts re-attached. When the can is drained, it must be immediately refilled to prevent it from drying out. The timing of these steps is needed to ensure that the stabilized permeation emissions levels are retained. The can will then be weighed and placed in the environmental chamber for the diurnal test. After each diurnal, the can must be re-weighed. In lieu of weighing the container, manufacturers may opt to measure emissions from the SHED directly. For any in-use testing of containers, the durability procedures will not be run prior to testing.

California's test procedures are very similar to those described above. However, the California procedure contains a more severe temperature profile of 65-105°F. As proposed, we will allow manufacturers to use this temperature profile to test cans as long as other parts of the EPA test procedures are followed, including the durability provisions below.

2. Preconditioning to Ensure Durable In-Use Control

a. Durability cycles

As proposed, we are specifying three durability aging cycles to help ensure durable permeation barriers: slosh, pressure-vacuum cycling, and ultraviolet (UV) exposure. They represent conditions that are likely to occur in-use for gas cans, especially for those cans used for commercial purposes and carried on truck beds or trailers. The purpose of these deterioration cycles is to help ensure that the technology chosen by manufacturers is durable in-use, representing best available control, and the measured emissions are representative of in-use permeation rates. Fuel slosh, pressure cycling, and ultraviolet (UV) exposure each impact the durability of certain permeation barriers, and we believe these cycles are needed to ensure long-term emissions control. Without these durability cycles, manufacturers could choose to use materials that meet the standard when they are new but have degraded performance in-use, leading to higher emissions. We do not expect these procedures to adversely impact the feasibility of the standards, because there are permeation barriers available at a reasonable cost that do not deteriorate significantly under these conditions (these permeation barriers are examples of best available controls).

For slosh and pressure cycling, we are finalizing durability tests that are based on draft recommended SAE practice for evaluating permeation barriers.[206] For slosh testing, the container is to be filled to 40 percent capacity with E10 fuel and rocked for 1

[206] Draft SAE Information Report J1769, "Test Protocol for Evaluation of Long Term Permeation Barrier Durability on Non-Metallic Fuel Tanks," (Docket A-2000-01, document IV-A-24).

million cycles. The pressure-vacuum testing contains 10,000 cycles from -0.5 to 2.0 psi. This pressure may be applied though the opening where the spout attaches, in order to avoid the need to drill a hole in the container. The third durability test is intended to assess potential impacts of ultraviolet (UV) sunlight (0.2 µm - 0.4 µm) on the durability of a surface treatment. In this test, the container must be exposed to a UV light of at least 0.40 Watt-hour/meter$^2$ /minute on the container surface for 15 hours per day for 30 days. Alternatively, containers may be exposed to direct natural sunlight for an equivalent period of time. We have also established these same durability requirements as part of our program to control permeation emissions from recreational vehicle fuel tanks.[207] While there are obvious differences in the use of gas cans compared to the use of recreational vehicle fuel tanks, we believe the test procedures offer assurance that permeation controls used by manufacturers will be robust and will continue to perform as intended when in use.

Manufacturers may also do an engineering evaluation, based on data from testing on their permeation barrier, to demonstrate that one or more of these factors (slosh, UV exposure, and pressure cycle) do not impact the permeation rates of their fuel containers and therefore that the durability cycles are not needed. Manufacturers may use data collected previously on gas cans or other similar containers made with the same materials and processes to demonstrate that the emissions performance of the materials does not degrade when exposed to slosh, UV, and/or pressure cycling. The test data must be

[207] Final Rule, "Control of Emissions from Nonroad Large Spark-ignition engines, and Recreational Engines (Marine and Land-based)", 67 FR 68287, November 8, 2002.

collected under equivalent or more severe conditions as those noted above. EPA must approve an alternative demonstration method prior to its use for certification.

b. Preconditioning Fuel Soak

It takes time for fuel to permeate through the walls of containers. Permeation emissions will increase over time as fuel slowly permeates through the container wall, until the permeation finally stabilizes when the saturation point is reached. We want to evaluate emissions performance once permeation emissions have stabilized, to ensure that the emissions standard is met in-use. Therefore, as proposed, prior to testing the containers, the cans need to be preconditioned by allowing the cans to sit with fuel in them until the hydrocarbon permeation rate has stabilized. Under this step, the container is filled with a 10-percent ethanol blend in gasoline (E10), sealed, and soaked for 20 weeks at a temperature of 28 ± 5°C. As an alternative, the fuel soak may be performed, for example, for 10 weeks at 43 ± 5°C to shorten the test time, if the certifier can demonstrate that the hydrocarbon permeation rate has stabilized. During this fuel soak, the container must be sealed with the spout attached. This is representative of how the gas cans would be stored in-use. We have established these soak temperatures and durations based on protocols EPA has established to measure permeation from fuel tanks made of HDPE.[208] These soak times should be sufficient to achieve stabilized permeation emission rates. However, if a longer time period is necessary to achieve a

[208] Final Rule, "Control of Emissions from Nonroad Large Spark-ignition engines, and Recreational Engines (Marine and Land-based)", 67 FR 68287, November 8, 2002.

stabilized rate for a given container, the manufacturer must use a longer soak period (and/or higher temperature) consistent with good engineering judgment.

Durability testing that is performed with fuel in the container may be considered part of the fuel soak provided that the container continuously has fuel in it. This approach would shorten the total test time. For example, the length of the UV and slosh tests may be considered as part of the fuel soak provided that the container is not drained between these tests and the beginning of the fuel soak. In such cases, manufacturers must use the 40 percent fill level for the soak period. The reduced fill level will not affect the permeation rate of the container because the vapor space in the container will be saturated with fuel vapor.

c. Spout Actuation

In its recently revised program for PFCs, California included a durability demonstration for spouts. We are finalizing as proposed a durability demonstration consistent with California's procedures. Automatically closing spouts are a key part of the emissions controls expected to be used to meet the new standards. If these spouts stick or deteriorate, in-use emissions could remain very high, at essentially uncontrolled levels. California requires manufacturers to actuate the spouts 200 times prior to the soak period and 200 times near the conclusion of the soak period to simulate spout use. The spouts' internal components would be required to be exposed to fuel by tipping the can between each cycle. Spouts that stick open or leak during these cycles would be

considered failed. The total of 400 spout actuations represents about 1.5 actuations per week on average over the average container life of 5 years. In the absence of data, we believe this number of actuations appears to reasonably replicate the number that can occur in-use for high- end usage and will help ensure quality spout designs that do not fail in-use. We also believe that finalizing requirements consistent with California will help manufacturers to avoid duplicate testing.

One commenter stated that 400 actuations over a short period of time is not representative of real life and that many containers will last 15-25 years. In response, we understand that 5 years is an estimate of the average life and that some containers will be used longer than 5 years. However, we continue to believe that the approach we are finalizing is reasonable. This provision is meant to help ensure that spouts are made of quality materials so that the emissions performance will not deteriorate readily during normal use. The provision also helps to ensure that spouts will not break easily or stick open during normal use, and helps to identify issues during the certification process prior to sale. In addition, this approach balances the need to ensure quality designs with the manufacturers' need to be able to conduct certification testing in a reasonable amount of time. This type of "accelerated aging" of components is a necessary part of many of EPA's mobile source emissions control programs.

D. What Certification and In-Use Compliance Provisions Is EPA Adopting?

1. Certification

Section 183(e)(4) authorizes EPA to adopt appropriate systems of regulations to implement the program, including requirements ranging from registration and self-monitoring of products, to prohibitions, limitations, economic incentives and restrictions on product use. We are finalizing as proposed a certification mechanism pursuant to these authorities. Manufacturers are required to apply for and receive an EPA certificate of conformity, using the certification process specified in the regulations, before entering their containers into U.S. commerce. To have their products certified, manufacturers must first define their emission families. This is generally based on selecting groups of products that have similar emissions. For example, co-extruded containers of various geometries could be grouped together. The manufacturer must select a worst-case configuration for testing, such as the thinnest-walled container. Manufacturers may group gasoline, diesel, and kerosene containers together as long as the containers do not differ materially in a way that could be anticipated to cause differences in emissions performance. These determinations must be made using good engineering judgment and are subject to EPA review. Testing with those products, as specified above, must show compliance with emission standards. The manufacturers must then send us an application for certification. As proposed, we define the manufacturer as the entity that is in day-to-day control of the manufacturing process (either directly or through contracts with component suppliers) and responsible for ensuring that components meet emissions-related specifications. Importers are not considered a manufacturer under this program, and thus would not receive certificates. The manufacturers of the PFCs they import

would have to certify the cans. Importers will only be able to import PFCs that are certified.

After reviewing the information in the application, if all the required information is provided and it demonstrates compliance with the standards, then we will issue a certificate of conformity allowing manufacturers to introduce into commerce the containers from the certified emission family. We expect EPA review to typically take about 90 days or less, but could be longer if we have questions regarding the application. The certificate of conformity will be for a production period of up to 5 years. Manufacturers are allowed to carry over certification test data if no changes are made to their products that would affect emissions performance. We may revoke or void a certificate if we find that data and information on which it is based is false or inaccurate. We will notify the manufacturer in writing and the manufacturer may request a hearing. Changes to the certified products that affect emissions require reapplication for certification. Manufacturers wanting to make changes without doing testing are required to present an engineering evaluation demonstrating that emissions are not affected by the change.

The manufacturer is responsible for meeting applicable emission standards. Importers are also responsible for the product meeting the standards. While we are not including requirements for manufacturers to conduct production-line testing, we may pursue EPA in-use testing of certified products to evaluate compliance with emission standards. If we find that containers do not meet emissions standards in use, we would

consider the new information during future product certification. Also, we may require certification prior to the end of the 5-year production period otherwise allowed between certifications. The details of the certification process are provided in the regulatory text. We did not receive any comments on the certification procedures described above.

EPA is authorized under the Independent Offices Appropriation Act of 1952 to establish fees for Government services and things of value that it provides. This provision encourages Federal regulatory agencies to recover, to the fullest extent possible, costs provided to identifiable recipients. The agency currently collects fees for compliance programs administered by EPA including those for certification of motor vehicles and motor vehicle engines. At this time, we are not finalizing a fee program for PFC certification. However, we may establish a certification fee for PFCs in a future rulemaking.

2. Emissions Warranty and In-Use Compliance

We are finalizing as proposed an emissions warranty period of one year to be provided by the manufacturer of the PFC to the consumer. The warranty covers emissions-related materials defects and breakage under normal use. For example, the warranty covers failures related to the proper operation of the auto-closing spout or defects with the permeation barriers. We are also requiring that manufacturers submit a warranty and defect report documenting successful warranty claims and the reason for the claim to EPA annually so that EPA may monitor the program. Unsuccessful claims will

not need to be submitted. We believe that this warranty will encourage designs that work well for consumers and are durable. Although it does not fully cover the average life of the product, it is not typical for very long consumer warranties to be offered with such products and therefore we believe a one-year warranty is reasonable. Also, the warranty period is more similar to the expected life of gas cans when used in commercial operations, which would need to be considered by the manufacturers in their designs. We did not receive any comments on these warranty provisions.

EPA views this aspect of the final rule as another part of the "system of regulation" it is finalizing to control VOC emissions from PFCs. A warranty will promote the objective of the rule by providing consumers with an opportunity to replace containers that have failed in use. The warranty provides an obvious remedy to consumers if issues arise. The provision also helps to ensure that manufacturers will "stand behind" their product if they fail in use, thus improving product design and performance. Similarly, the defect reporting requirement will promote product integrity by allowing EPA to readily monitor in-use performance by tracking successful warranty claims.

Gas cans have a typical life of about 5 years on average before they are scrapped. We are including durability provisions as part of certification testing to help ensure containers perform well in use. Under this final rule, we could test containers within their five-year useful life period to monitor in-use performance and take steps to correct in-use failures, including denying certification, for container designs that are consistently

failing to meet emissions standards. (This provision thus would work in tandem with the warranty claim reporting provision contained in the preceding paragraph.)

### 3. Labeling

Since the requirements will be effective based on the date of manufacture of the container, we are requiring as proposed that the date of manufacture must be indelibly marked on the can. This is consistent with current industry practices. This is needed so that we and others can recognize whether a unit is regulated or not. In addition, we are requiring a label providing the manufacturer name and contact information, a statement that the can is EPA certified, citation of EPA regulations, and a statement that it is warranted for one year from the date of purchase. The manufacturer name and contact information is necessary to verify certification. Indicating that a one-year warranty applies will ensure that consumers have knowledge of the warranty and a way to contact the manufacturer. Enforcement of the warranty is critical to the defect reporting system. In finalizing this labeling requirement, we further believe, pursuant to CAA section 183(e)(8), that these labeling requirements will be useful in meeting the NAAQS for ozone. They provide necessary means of implementing the various measures described above which help ensure that VOC emission reductions from the proposed standard will in fact occur in use. We did not receive any comments on these labeling requirements.

## E. How Would State Programs Be Affected By EPA Standards?

Several states have adopted emissions control programs for PFCs. California implemented an emissions control program for PFCs in 2001. Fifteen other states, mostly in the northeast, have adopted or are considering adopting the California program.[209] In 2005, California adopted a revised program, which will go into effect on July 1, 2007. The revised California program is very similar to the program we are finalizing. We believe that although a few aspects of the program we are finalizing are different, manufacturers will be able to meet both EPA and CARB requirements with the same container designs and therefore sell a single product in all 50 states. In most cases, we believe manufacturers will take this approach. By closely aligning with California where possible, we will allow manufacturers to minimize research and development (R&D) and emissions testing, while potentially achieving better economies of scale. It may also reduce administrative burdens and market logistics from having to track the sale of multiple can designs. We consider these to be important factors under CAA section 183(e) which requires us to consider economic feasibility of controls.

States that have adopted the original California program will likely choose to either adopt the new California program or eliminate their state program in favor of the federal program. Because the programs are similar, we expect that most states will eventually choose to rely on implementation of the EPA program rather than continue their own program. Including diesel and kerosene containers in our final program further

[209] Delaware, Maine, Maryland, Pennsylvania, New York, Connecticut, Massachusetts, New Jersey, Rhode Island, Vermont, Virginia, Washington DC, Texas, Ohio, and New Hampshire.

aligns the two programs and several states commented in support of this approach. We expect very little difference in the emissions reductions provided by the EPA and California programs in the long term.

### F. Provisions for Small PFC Manufacturers

As discussed in previous sections, prior to issuing our proposal for this rulemaking, we analyzed the potential impacts of these regulations on small entities. As a part of this analysis, we convened a Small Business Advocacy Review Panel (SBAR Panel, or "the Panel"). During the Panel process, we gathered information and recommendations from Small Entity Representatives (SERs) on how to reduce the impact of the rule on small entities, and those comments are detailed in the Final Panel Report which is located in the public record for this rulemaking (Docket EPA-HQ-OAR-2005-0036). Based upon these comments, we proposed to include flexibility and hardship provisions for container manufacturers. Since nearly all manufacturers are small entities and they account for about 60 percent of sales, the Panel recommended that we extend the flexibility options and hardship provisions to all manufacturers. Our proposal was consistent with that recommendation. We did not receive any comments on our proposed flexibilities and are finalizing them as proposed. The flexibility provisions are incorporated into the program requirements described earlier in sections VII.B through VII.D. The hardship provisions are described below. For further discussion of the Panel process, see section X.C of this rule and/or the Final Panel Report.

The Panel recommended and we are finalizing two types of hardship provisions for container manufacturers. These entities could, on a case-by-case basis, face hardship, and we are finalizing these provisions to provide what could prove to be needed safety valves for these entities. Thus, the hardship provisions are as follows:

1. First Type of Hardship Provision

Container manufacturers may petition EPA for limited additional lead-time to comply with the standards. A manufacturer would have to demonstrate that it has taken all possible business, technical, and economic steps to comply but the burden of compliance costs prevents it from meeting the requirements of this subpart by the required compliance date and not having an extension would jeopardize the company's solvency. Hardship relief may include requirements for interim emission reductions.

2. Second Type of Hardship Provision

Container manufacturers are permitted to apply for hardship relief if circumstances outside their control cause the failure to comply (i.e., an “Act of God,” a fire at the manufacturing plant, or the unforeseen shut down of a supplier with no alternative available), and if failure to sell the subject containers would jeopardize the company's solvency. The terms and timeframe of the relief will depend on the specific circumstances of the company and the situation involved.

For both types of hardship provisions, the length of the hardship relief will be established, during the initial review, for not more than one year and will be reviewed annually thereafter as needed. As part of its application, a company is required to provide a compliance plan detailing when and how it will achieve compliance with the standards.

## VIII. What Are the Estimated Impacts of the Rule?

### A. Refinery Costs of Gasoline Benzene Reduction

The benzene control program we are finalizing today is expected to result in many refiners investing in benzene control hardware and changing the operations in their refineries to reduce their gasoline benzene levels. The finalized benzene control program requires refiners and importers to reduce their gasoline benzene levels on average down to 0.62 vol% benzene. The averaging, banking and trading (ABT) provisions being finalized along with the 0.62 vol% average benzene control standard allows refineries that reduce their gasoline benzene levels below 0.62 vol% to earn credits and transfer those credits to other refineries which would find it more expensive to reduce their benzene levels down to the average standard. The ABT program will allow refiners to optimize their investments, which we believe will result in achieving the average benzene control standard nationwide at much lower costs. The final benzene control program also puts into place a 1.3 vol% benzene maximum average standard which requires each refinery to reduce its gasoline benzene levels to or below this standard and will increase

the benzene control costs only slightly compared to a benzene control program which does not contain a maximum average standard. We estimate that the national average refinery costs incurred to comply with the fully phased-in benzene control program will be 0.27 cents per gallon, averaged over all gasoline. This estimate includes the capital costs, which are amortized over the volume of gasoline produced.

In this section we summarize the methodology used to estimate the costs of benzene control (including changes we have made since the proposal) and our estimated costs for the program. In addition we evaluate the cost estimate provided by the American Petroleum Institute. A detailed discussion of all of these analyses is found in Chapter 9 of the RIA.

1. Methodology

a. Overview of the Benzene Program Cost Methodology

The basic methodology we used to estimate the cost of benzene control for the final rule is the same as that used for the proposed rule. Using a refinery-by-refinery cost model that we developed for this rulemaking, we projected which refineries implement what benzene control technology, and the cost of each refinery's benzene control step, to estimate compliance with the final benzene control program. We aggregated the individual refinery costs to develop a national average cost estimate for the final benzene control program. Based on the flexibilities offered by the ABT program, refiners are

expected to come very close to achieving the 0.62 vol% average benzene standard on average with little overcompliance. For this reason, we modeled refiners achieving the average standard without any overcompliance. To the extent that any overcompliance does occur the costs and benefits of the benzene program will increase.

b. Changes to the Cost Estimation Methodology Used in the Proposed Rule

In deriving the cost estimate for the final rule, we identified and made a number of changes to the refinery modeling methodology used for the proposed rule. One of the primary changes was to base the future year fuel prices on the Annual Energy Outlook (AEO) 2006 instead of AEO 2005, which increased the crude oil price used in the analysis from $27 per barrel to $47 per barrel. Other changes included: 1) updating the refinery modeling base year to 2004 (used for calibrating each refinery's gasoline benzene levels); 2) modeling the baseline benzene levels and reductions on an annual basis instead of on a summer-only basis; 3) increasing the tax-hurdle rate of return to 15 percent from the 10 percent hurdle used in the proposed rule, and 4) including the treatment of the benzene in natural gasoline, which was assumed to be left untreated in the proposed rule analysis.

In addition, we also made some adjustments that were based on comments we received on the cost analysis that we conducted for the proposal, as well as the peer review process that we undertook for the proposal's refinery cost model. One of the peer reviewers for the refinery-by-refinery cost model, and API in its comments on the

proposed rule, provided capital cost estimates for the benzene control technologies.[210] We reviewed these capital cost estimates and made some adjustments to somewhat increase the capital cost figures used in the final rule analysis. These changes were partially responsible for the higher costs reported here compared to those reported in the proposed rule. More complete descriptions of these and other changes made to the refinery cost model are contained in Chapter 9 the RIA.

c. Linear Programming Cost Model

We considered performing our cost assessments using a linear programming (LP) cost model. LP cost models are based on a set of complex mathematical representations of refineries which, for national analyses, are usually conducted on a regional basis. This type of refining cost model has been used by the government and the refining industry for many years for estimating the cost and other implications of changes to fuel quality.

The design of LP models lends itself to modeling situations where every refinery in a region is expected to use the same control strategy and/or has the same process capabilities. As we began to develop a gasoline benzene control program with an ABT program, it became clear that LP modeling was not well suited for evaluating such a program. Because refiners will be choosing a variety of technologies for controlling benzene, and because the program will be national and will include an ABT program, we

[210] An important reason for the discrepancy between our capital cost estimate and that by API (which was about three times higher) was that we only estimated the capital costs related to the benzene control technologies, not those related to octane recovery and increased hydrogen production needed for saturation or to replace the octane lost due to reduced benzene production by the reformer. For the final rule, we estimated these additional capital costs and included them in our capital cost estimates.

initiated development of a more appropriate cost model, as described below. However, the LP model remained important for providing many of the inputs into the cost model developed for this rulemaking.

d. Refinery-by-Refinery Cost Model

In contrast to LP models, refinery-by-refinery cost models are useful when individual refineries are expected to respond to program requirements in different ways and/or have significantly different process capabilities. Thus, in the case of modeling gasoline benzene control programs, we needed a model that could accurately simulate the variety of decisions refiners will make at different refineries, especially in the context of a nationwide ABT program. For this and other related reasons, we developed a refinery-by-refinery cost model specifically to evaluate the benzene control program.

Our refinery-by-refinery benzene cost model incorporates the capacities of all the major units in each refinery in the country, as reported by the Energy Information Administration and in the Oil and Gas Journal. Regarding operational information, we know less about how specific refineries use the various units to produce gasoline and about such factors as octane and hydrogen costs for individual refineries. We used the LP model to estimate these factors on a regional basis, and we applied the average regional result to each refinery in that region (PADD). We calibrated the model for each individual refinery based on 2004 gasoline volumes and benzene levels (from the RFG data base), which was the most recent year for which data was available. After

calibration, each refinery's gasoline volume and benzene level closely matched their actual gasoline volumes and benzene levels. We also compared cost estimates of similar benzene control cases from both the refinery-by-refinery model and the LP model, and the results were in close agreement.[211]

Refinery-by-refinery cost models have been used in the past by both EPA and the oil industry for such programs as the highway and nonroad diesel fuel sulfur standards, and they are a proven means for estimating the cost of compliance for fuel control programs. For this refinery-by-refinery benzene cost model, we conducted a peer review process, and have received some comments on the design of our model. We summarize some of these comments here, and they are summarized and addressed in detail in the RIA. (See Chapter 9 of the RIA for our responses to these peer-review comments.) The oil industry has also conducted similar analyses using a refinery-by-refinery modeling technique, including the oil industry's cost analysis carried out for this rulemaking.

Based on our understanding of the primary benzene control technologies (see section VI.A.1.c.i. above), the cost model assumes that four technologies will be used, as appropriate, for reducing benzene levels. All of these technologies focus on addressing benzene in the reformate stream. They are 1) routing the benzene precursors around the reformer (also called light naphtha splitting and reformer feed fractionation); 2) routing

[211] Despite our commitment to accurately model the baseline operations of each refinery, we recognize that without detailed refinery-specific operations information at our disposal, that our modeling may not be accurate in some specific cases. Particular refineries may choose a different benzene control path than that estimated by our analysis for a number of reasons, including differences in the baseline and our lack of knowledge for investment and ABT program use preferences for each refiner. We believe, though, that overall our refinery cost model captures the strategies and costs for complying with the benzene control program.

benzene precursors to an existing isomerization unit, if available; 3) benzene extraction (extractive distillation); and 4) benzene saturation. For the proposed rulemaking we assumed that only the usual feed or the product stream of the reformer will be processed by these benzene control technologies. However, since the proposal, we learned that another refinery stream -- natural gasoline -- contains some benzene and will likely be treated by the saturation and extraction processes in refineries if they have or install these units. For the proposal, we assumed that natural gasoline would be blended directly into gasoline and not be treated by refiners if faced with a benzene control standard. However, most refiners have been combining natural gasoline with their crude oil to enable treating the sulfur in natural gasoline to help comply with the Tier 2 gasoline sulfur standard. Because the natural gasoline will be refined along with crude oil, the benzene in natural gasoline can and will be treated along with the benzene in crude oil.

The nationwide ABT program is intended to optimize benzene reduction by allowing each refinery to individually choose the most cost-effective means of complying with the program. To model this phenomenon, we first establish an estimated cost for the array of technologies that could be employed by each refinery to reduce its gasoline benzene levels. We then deployed these technologies to refineries with baseline benzene levels above the 1.3 vol% benzene maximum average standard to bring them into compliance with this standard. Next we ranked the refineries in order from lowest to highest benzene control cost per gallon of gasoline and estimated the impact of their projected benzene control strategies on refinery benzene levels. The model then follows this ranking, starting with the lowest-cost refineries, and adds refineries and their

associated control technologies one-by-one until the projected national average benzene level reaches 0.62 vol% benzene. This modeling strategy projects the benzene control technology that will be used by each refinery, as well as identifies those refineries that are expected to generate credits and those that are expected to use credits in lieu of investing in benzene control. The sum of the costs of the refineries expected to invest in benzene control provides the projected overall cost of the program.

Finally, we projected how the ABT program will affect the program cost and benzene levels starting in 2007 when early credits can be generated. We assumed that refiners will use operational changes (benzene precursor rerouting, with isomerization if available) to the maximum extent possible in mid-2007, when they are able to start to generate credits. We also assumed that refiners will choose to accumulate additional early credits by making their initial lowest-cost capital investments for reducing their gasoline benzene levels, and that these changes will take effect in 2010. We modeled compliance by nonsmall and small refiners with the maximum average standard taking effect in mid-2012 and the beginning of 2015, respectively, as well as the final benzene control step to meet the 0.62 vol% standard – the phase-in of which depends on the aggregate amount of credits generated.[212]

e. Price of Chemical Grade Benzene

[212] The ABT analysis assumed that small refiners would comply with the 1.3 vol% maximum average standard in January 2015 at the same time as the 0.62 vol% annual average standard. We are finalizing a later maximum average standard implementation date (July 2016) which will have very little effect on the overall program and therefore has not been incorporated into this analysis.

The price of chemical grade benzene is critical to the benzene control program because it defines the opportunity cost for benzene removed using benzene extraction and sold into the chemicals market. According to 2004 World Benzene Analysis authored by Chemical Market Associates Incorporated (CMAI), during the consecutive five-year period ending with 2004, the price of benzene averaged 24 dollars per barrel higher than regular grade gasoline. During the three consecutive year period ending with 2004, the price of benzene averaged 28 dollars per barrel higher than regular grade gasoline. However, during the first part of 2004, the price of benzene relative to gasoline rose steeply, primarily because of high energy prices adding to the cost of extracting benzene. The 2004 benzene price averaged 78 dollars per barrel higher than regular grade gasoline. Since early 2006, CMAI has been projecting that the future price of benzene relative to gasoline will return to more historic levels, in the range of 30 dollars per barrel higher than regular grade gasoline (in 2005, CMAI was projecting that the benzene price would be 20 dollars per barrel higher than gasoline). We have based our modeling for the final rule on the 30 dollar per barrel value.

2. Summary of Costs

a. Nationwide Costs of the Final Benzene Control Program

We have used the refinery-by-refinery cost model to estimate the costs of the benzene control program being finalized today. In general, the cost model indicates that among the four primary reformate-based technologies, benzene precursor rerouting will

be the most cost-effective. The next most cost-effective technologies are isomerization of the rerouted light straight run material, revamped extraction units and new installations of large extraction units. The model indicates that benzene saturation and small installations of new extraction units will be the least cost-effective.

Based on the results of our analysis using the refinery-by-refinery model, we estimate that when the benzene control program is fully phased in, 78 refineries of the total 104 gasoline-producing refineries in the U.S. (outside of California) will have to put in new capital equipment or change their refining operations to reduce the benzene levels in their gasoline. Of these refineries, we estimate that 17 will use benzene precursor removal, 28 refineries will use benzene precursor removal coupled with isomerization, 16 will use extraction, and 17 will use benzene saturation. We project that 52 refineries will continue to produce gasoline with benzene levels greater than the average standard and will need to purchase credits to comply. Including the refineries with benzene levels currently below 0.62, we project that there will be a total of 50 refineries that will produce gasoline with benzene levels at 0.62 or lower and will generate credits for sale to other refineries. Finally, the model projects that 26 refineries will take no steps to reduce their gasoline benzene levels, which includes those which remain above the average benzene standard as well as those already below the average standard.

Based on the results of our cost analysis, we estimate that the final benzene control program will cost 0.27 cents per gallon when it is fully phased-in, assuming that capital investments are amortized at a 7 percent return on investment before taxes and

expressed in 2003 dollars. Our cost analysis projects that the ABT program will result in a phase-in of the benzene control standard from mid-2007 to early in 2015. Starting in mid-2007 we believe that refiners will take the opportunity to achieve modest benzene reductions to generate early credits using simple operational changes. We project that these actions taken in mid-2007 will result in a reduction of the average U.S. gasoline benzene level from 0.99 to 0.81 vol% at an average cost of 0.04 cents per gallon.

To take full advantage of the flexibility provided to refiners by the ABT program to delay more expensive capital investments, refiners are expected to make additional early benzene reductions to generate more early credits, requiring modest investments in capital. Because of the time it takes to assess, design and install the capital equipment, we project that these additional early benzene reductions will not occur until the beginning of 2010, although in reality these investments and associated benzene reductions would likely occur before and after the beginning of 2010. These benzene reductions are expected to further reduce the average benzene level of U.S. gasoline to 0.74 vol% and cost 0.05 cents per gallon averaged over all U.S. gasoline. Refiners are expected to make $324 million of capital investments to achieve this benzene reduction. In 2011 when the 0.62 vol% benzene control standard takes effect, we do not anticipate any further reduction in benzene because we project that the refining industry will be able to comply using early credits.

In mid-2012, when refineries with high benzene levels need to comply with the 1.3 vol% maximum average standard, we anticipate that U.S. gasoline benzene levels will

decline further, to 0.73 vol% benzene, and cost an additional 0.04 cents per gallon averaged over all U.S. gasoline. Refiners are expected to make another $153 million in capital investments. Although the early credit use period terminates at the end of 2013, refiners will again have flexibility in scheduling their most expensive capital investments by using standard credits (which will have been accruing since the start of 2011). Because we expect that refiners will first use their early credits, the standard credits will be banked and will start to be used in 2014 to show compliance with the 0.62 vol% benzene standard. Our analysis suggests that the U.S. refining industry will be able to delay their highest capital investments until May 2015 when the standard credits accumulated since the beginning of 2011 run out. Small refiners must meet the 1.3 vol% maximum average standard which was assumed to occur at the beginning of 2015 so they also will be reducing their gasoline benzene levels to that standard or below.[213] Taken together, these reductions in 2015 will bring the U.S. gasoline pool down to the 0.62 vol% benzene standard at an average cost of 0.14 cents per gallon averaged over all U.S. gasoline, based on the addition of $634 million in capital investments.

To comply with the fully phased-in final benzene control program, refiners are expected to have made a total of $1110 million in capital investments. This will amount to an average of $14 million in capital investment in each refinery that adds such equipment.

[213] The ABT analysis assumed that small refiners would comply with the 1.3 vol% maximum average standard in January 2015 at the same time as the 0.62 vol% annual average standard. We are finalizing a later maximum average standard implementation date (July 2016) which will have very little effect on the overall program and therefore has not been incorporated into this analysis.

We also estimated annual aggregate costs, including the amortized capital costs, associated with the new fuel standard. As shown in Table VIII.A-1, these costs are projected to begin at $28 million in 2007 and increase to $363 million in 2015 when the benzene program is fully phased in. These aggregated costs continue to increase over time as fuel demand increases.

Table VIII.A-1. Per-Gallon and Annual Aggregate Fuel Costs for the Final Benzene Control Program (7% ROI before taxes and 2003 dollars)

| Year | Per-Gallon Cost (c/gal) | Aggregate Cost ($million) |
|---|---|---|
| 2007 | 0.02 | 28 |
| 2008 | 0.04 | 49 |
| 2009 | 0.04 | 50 |
| 2010 | 0.09 | 101 |
| 2011 | 0.09 | 104 |
| 2012 | 0.11 | 133 |
| 2013 | 0.13 | 164 |
| 2014 | 0.13 | 166 |
| 2015 | 0.27 | 363 |
| 2020 | 0.27 | 388 |
| 2025 | 0.27 | 412 |
| 2030 | 0.27 | 437 |
| 2035 | 0.27 | 464 |

Several observations can be made from these results of our nationwide cost analysis. First, significantly reducing gasoline benzene levels to low levels, coupled with

the flexibility of an ABT program, will incur fairly modest aggregate program costs. This is primarily because we expect that refiners will optimize their benzene control strategies, resulting in large benzene reductions at a relatively low overall program cost. With higher benzene prices relative to those of gasoline projected to continue (even if they drop from the recent very high levels), extraction is expected to be a very low-cost technology -- the primary reason why the cost of the overall program is very low. Also, precursor rerouting, either with or without isomerization in an existing unit, is a low-cost technology requiring little or no capital to realize. The model concludes that even the higher-cost benzene saturation technology will be fairly cost-effective overall because larger refineries that install this technology will take advantage of their economies of scale.

b. Regional Costs

The benzene reductions estimated by the cost model and associated costs vary significantly by region. Table VIII.A-2 summarizes the estimated per-gallon costs for complying with the benzene control standard by PADD region.

Table VIII.A-2.

Projected Benzene Control Costs by PADD for the Final Benzene Control Program

(2003 dollars, 7% ROI before taxes)

| | **PADD** | | | | | **U.S.** |
|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5 (w/o CA)** | |
| **Cost (c/gal)** | 0.14 | 0.35 | 0.15 | 0.55 | 1.21 | 0.268 |

Table VIII.A-2 shows that the PADD-average costs are highest in PADD 5 followed next by PADD 4. In PADDs 1, 2 and 3, where reformulated gasoline programs have already forced gasoline benzene levels lower, the benzene control costs are lower. Extraction is the technology most used in PADDs 1 and 3, resulting in lower benzene control cost in these regions. Individual refineries show a wider range of control costs than the PADD-average costs. There are 20 refineries for which we estimate benzene control costs lower than 0.20 cents per gallon. Also, there are 11 refineries, all of which are very small refineries, with costs in the range of 3 to 7 cents per gallon range.

c. Refining Industry Cost Study

The American Petroleum Institute (API) conducted its own refinery modeling study to evaluate the cost of benzene control. The API study analyzed the cost of three different benzene control programs. Two of the benzene control programs analyzed by API were very different than our final benzene control program and we will not discuss them here (see Chapter 9 of the RIA). The third program analyzed by API was nearly identical to the final benzene control standard, and we have carefully compared API's cost analysis to ours.

API analyzed a benzene control program with a nationwide 0.60 vol% benzene standard and with an ABT program and with no upper benzene limit. API also assumed that credits will not be traded freely, but instead that refining companies would hold onto 10 percent of their credits in case they have a future problem with their benzene control unit. Including the compliance margin and the 10 percent credit margin, the API study estimated that under its modeled benzene control program and associated assumptions that U.S. gasoline would average 0.56 vol% benzene. The API study estimates the cost of complying with its modeled benzene control program to be 1.00 cent per gallon.[214] This estimated benzene control cost is substantially higher than our estimated 0.27 cents per gallon cost for our nearly identical program. After comparing their methodology to ours we identified three primary differences which explain the large difference in costs.

The first difference is that API modeled a somewhat lower benzene control standard and assumed a credit generation margin which resulted in refiners achieving a

[214] This cost estimate includes an adjustment we made to convert the API capital cost amortization from the after-tax 10 percent rate of return that was the basis for the estimated costs in their report to a before-tax 7 percent rate of return, which is how our rules are estimated

much lower benzene level than the 0.62 vol% benzene control standard. A primary reason why the refining industry study modeled overcompliance with the benzene standard is due to an assumption that refiners will want to hold onto a substantial quantity of credits, yet the API cost study did not provide a justification for the accumulation of credits. EPA does not believe that refiners will significantly overcomply with the average benzene standard. This is because the 0.62 vol% benzene standard is an averaging standard which is met across the entire industry, not a cap standard, and can be met by the accumulation of gasoline batches with benzene levels higher or lower than the standard. Thus, if a refinery produced gasoline with lower or higher gasoline benzene levels over the first part of the year, the operations could be adjusted to balance out the gasoline benzene levels for the rest of the year. Also, our program includes several provisions which give refiners significant flexibility for compliance. For example, refiners could overcomply slightly with the standard early on in the program's implementation and hold onto the credits for up to five years before they expire. If a refinery's benzene control unit goes down, the refiner would be able to use those accumulated credits, the refiner could purchase credits from other refineries, or the refiner could create a benzene reduction deficit at that refinery and make it up the following year. With this degree of flexibility, any significant overcompliance with the 0.62 vol% average benzene standard is unnecessary.

The second reason why the API costs are much higher than ours is because API used a more restrictive assumption with respect to benzene extraction – a more cost-effective benzene control technology than benzene saturation, as discussed above. API

assumed that no new grassroots benzene extraction capacity will be installed in the future, but that existing extraction units could be expanded. We agree that existing units will likely be expanded. However, we also believe that several refineries will install new grassroots extraction units. Our premise is supported by CMAI projections of a robust benzene market in the future with benzene priced higher than its historical margin above gasoline. Higher benzene price margins will provide an incentive to refiners to add grassroots benzene extraction units, even in areas where benzene markets are smaller. For example, one refiner has indicated to us that if the proposed gasoline benzene standard was to be finalized, it would install a grassroots benzene extraction unit at one of its refineries in the Midwest, where the benzene market is small with less room for increased supply (although this benzene could be shipped down to the Gulf Coast). This is a strong indicator that new grassroots benzene extraction units will also be installed on the Gulf and East Coasts, where benzene markets are much larger with much more room to absorb increased supply.

The third reason why the API benzene control costs are much higher than ours is their very high octane control costs. For both studies, the octane loss that occurs due to the modeled application of the various benzene control technologies is accounted for by assigning a dollar per octane-barrel cost to the octane loss. However, API's costs for restoring octane are higher than the future octane recovery costs that we are projecting. The octane costs used by API are higher because API used the rack price differential between premium and regular grade gasolines as summarized by the Energy Information Administration. However, the rack price differential between premium and regular grade

gasolines reflects a significant amount of profit. For example, the cost difference to produce premium gasoline is usually only a few cents per gallon more than for producing regular grade gasoline, yet refiners and marketers usually charge 20 to 30 cents more per gallon for premium gasoline at retail. Some of this inflated price appears at the rack price differential between regular and premium grades of gasoline. In addition, future octane control costs, when the benzene control standard takes effect, are expected to be much lower due to the very large volume of ethanol that is expected to enter the gasoline market by then.

Overall, we have carefully evaluated the differences between our cost analysis and that provided by API. Except for the differences described above, the assumptions used and the conclusions reached were very similar. We believe our revised analysis provides a more accurate assessment of the costs of the benzene control program.

B. What Are the Vehicle Cost Impacts?

In assessing the economic impact of setting cold temperature emission standards, we have made a best estimate of the necessary vehicle modifications and their associated costs. In making our estimates we have relied on our own technology assessment, which includes information supplied by individual manufacturers and our own in-house testing. Estimated costs typically include variable costs (for hardware and assembly time) and fixed costs (for research and development, retooling, and certification). All costs are

presented in 2003 dollars. Full details of our cost analysis can be found in Chapter 8 of the RIA.

As described in section V, we are not expecting hardware changes to Tier 2 vehicles in response to new cold temperature standards. Tier 2 vehicles are already being equipped with very sophisticated emissions control systems. We expect manufacturers to use these systems to minimize emissions at cold temperatures. We were able to demonstrate significant emissions reductions from a Tier 2 vehicle through recalibration alone. In addition, the standard we are finalizing is based on averaging which allows some vehicles to be above the numeric standard as long as those excess emissions are offset by vehicles below the standard. Averaging will help manufacturers in cases where they are not able to achieve the numeric standard for a particular vehicle group, thus helping manufacturers avoid costly hardware changes. The phase-in of standards and emissions credits provisions also help manufacturers avoid situations where expensive vehicle modifications will be needed to meet the new cold temperature NMHC standard. Therefore, we are not projecting hardware costs or additional assembly costs associated with meeting new cold temperature NMHC emissions standards.

Manufacturers will incur research and development (R&D) costs associated with a new cold temperature standard, and some likely will need to upgrade testing facilities to handle an increased number of cold tests during vehicle development. We have estimated the fixed costs associated with R&D and test facilities. We project that manufacturers will recover R&D costs over a five-year period and their facilities costs

over a ten-year period. Long-term impacts on engine costs are expected to decrease as manufacturers fully amortize their fixed costs. Because manufacturers recoup fixed costs over a large volume of vehicles, average per vehicle costs due to the new cold temperature NMHC standards are expected to be low. We project that the average incremental costs associated with the new cold temperature standards will be less than $1 per vehicle.

We did not receive comments on the methodology we used to derive average cost estimates. However, we did receive comments from one manufacturer with a limited product line that believes new hardware will be needed on its vehicles to meet the new cold temperature standards. Other manufacturers did not comment that hardware changes would be needed, and they generally supported our leadtime, phase-in, and other transitional provisions as providing the flexibility needed to meet the standards. We continue to believe that manufacturers will be able to meet the standards through vehicle development without additional hardware. However, we conducted a sensitivity analysis in response to this comment, assuming the commenter would use new hardware to meet the cold temperature standard. If one percent of new vehicles required additional hardware costing $100 - $200 per vehicle, the average cost would increase from less than $1 to the range of $1.60 - $2.60 per vehicle. The commenter did not provide cost information in their comments and we believe that the costs used in our sensitivity analysis are conservatively high, given the lead time provided for vehicle development and market pressures to keep costs in line with those of competitors. In any event, we believe the costs associated with the program are reasonable. Additional discussion of

the comments received on the vehicle cold temperature standard is provided in Chapter 3 of the Summary and Analysis of Comments for this rule.

We are not anticipating additional costs for the new evaporative emissions standard. As discussed in section V, we expect that manufacturers will continue to produce 50-state evaporative systems that meet LEV II standards. Therefore, harmonizing with California's LEV-II evaporative emission standards will streamline certification and be an "anti-backsliding" measure. It also codifies the approach manufacturers have already indicated they are taking for 50-state evaporative systems.

We also estimated annual aggregate costs associated with the new cold temperature emissions standards. These costs are projected to increase with the phase-in of standards and peak in 2014 at about $13.4 million per year, then decrease as the fixed costs are fully amortized. The projected aggregate costs are summarized below, with annual estimates provided in Chapter 8 of the RIA.

Table VIII.B-1. Annual Aggregate Costs

| 2010 | 2012 | 2014 | 2016 | 2018 | 2020 |
|---|---|---|---|---|---|
| $11,119,000 | $12,535,000 | $13,406,000 | $12,207,000 | $10,682,000 | $0 |

C. What Are The PFC Cost Impacts?

For PFCs, we have made a best estimate of the necessary technologies and their associated costs. Estimated costs include variable costs (for hardware and assembly time) and fixed costs (for research and development, retooling, and certification). The analysis also considers fuels savings associated with low emission PFCs. Cost estimates based on the projected technologies represent an expected change in the cost of PFCs as they begin to comply with new emission standards. All costs are presented in 2003 dollars. We did not receive comments on estimated costs for PFCs controls. Full details of our cost analysis, including fuel savings, can be found in Chapter 10 of the RIA.

Table VIII.C-1 summarizes the projected near-term and long-term per unit average costs to meet the new emission standards. Long-term impacts on PFCs are expected to decrease as manufacturers fully amortize their fixed costs. We project that manufacturers will generally recover their fixed costs over a five-year period, so these costs disappear from the analysis after the fifth year of production. These estimates are based on the manufacturing cost rather than predicted price increases.[215] The table also shows our projections of average fuel savings over the life of the PFC when used with gasoline. Fuel savings can be estimated based on the VOC emissions reductions due to controls.

Table VIII.C-1. Estimated Average Per Unit PFC Costs and Lifetime Fuel Savings

| | Cost |
|---|---|

[215] These costs numbers may not necessarily reflect actual price increases as manufacturer production costs, perceived product enhancements, and other market impacts will affect actual prices to consumers.

| | |
|---|---|
| Near-Term Costs | $2.69 |
| Long-Term Costs | $1.52 |
| Fuel Savings (NPV) | $4.24 |

With current and projected estimates of PFC sales, we translate these costs into projected direct costs to the nation for the new emission standards in any year. A summary of the annual aggregate costs to manufacturers is presented in Table VIII.C-2. The annual cost savings due to fuel savings start slowly, then increase as greater numbers of compliant PFCs enter the market. Table VIII.C-2 also presents a summary of the estimated annual fuel savings. Aggregate costs are projected to peak in 2013 at about $61 million and then drop to about $34 million once fixed costs are recovered. The change in numbers beyond 2015 occurs due to projected growth in sales and population.

Table VIII.C-2. Total Annualized Costs and Fuel Savings

| | 2009 | 2013 | 2015 | 2020 |
|---|---|---|---|---|
| Costs | $58,070,000 | $60,559,000 | $34,004,000 | $37,543,000 |
| Fuel Savings | $15,347,000 | $83,506,000 | $102,523,000 | $109,589,000 |

D. Cost Per Ton of Emissions Reduced

We have calculated the cost per ton of HC, benzene, total MSATs, and PM emissions reductions associated with the fuel, vehicle, and PFC programs using the costs

described above and the emissions reductions described in section IV. More detail on the costs, emissions reductions, and cost per ton estimates can be found in the RIA. We have calculated the costs per ton using the net present value of the annualized costs of the program, including PFC gasoline fuel savings, from 2009 through 2030 and the net present value of the annual emission reductions through 2030. We have also calculated the cost per ton of emissions reduced in the year 2030 using the annual costs and emissions reductions in that year alone. This number represents the long-term cost per ton of emissions reduced. For fuels, the cost per ton estimates include costs and emission reductions that will occur from all motor vehicles and nonroad engines fueled with gasoline.[216]

For vehicles and PFCs, we are establishing NMHC and HC standards, respectively, which will also reduce benzene and other VOC-based toxics. For vehicles, we are also expecting direct PM reductions due to the NMHC standard.[217] Section IV above provides an overview of how we are estimating benzene and PM reductions resulting from the NMHC standards for vehicles and benzene reductions resulting from the HC standard for PFCs. We have not attempted to apportion costs across these various pollutants for purposes of the cost per ton calculations since there is no distinction in the technologies, or associated costs, used to control the pollutants. Instead, we have calculated costs per ton by assigning all costs to each individual pollutant. If we

[216] The proposed standards do not apply to nonroad engines, since section 202 (l) authorizes controls only for "motor vehicles," which term does not include nonroad vehicles (CAA section 216 (2)). However, we are reducing benzene in all gasoline, including that used in nonroad equipment. Therefore, we are including both the costs and the benzene emissions reductions associated with the fuel used in nonroad equipment.

[217] Again, although gasoline PM is not a mobile source air toxic, the rule will result in emission reductions of gasoline PM which reductions are accounted for in our analysis.

apportioned costs among the pollutants, the costs per ton presented here would be proportionally lowered depending on what portion of costs were assigned to the various pollutants.

The results for HC for vehicles and PFCs are provided in Table VIII.D-1 using both a three percent and a seven percent social discount rate. Again, this analysis assumes that all costs are assigned to HC control. The discounted cost per ton of HC reduced for the final rule as a whole would be $0 because the gasoline fuel savings from PFCs offsets the costs of PFC and vehicle controls. The table presents these as $0 per ton, rather than calculating a negative value that has no clear meaning. For vehicles in 2030, the cost per ton is $0 because by 2030 all fixed costs have been recovered and there are no variable costs estimated for the new vehicle program.[218]

The cost per ton estimates for each individual program are presented separately in the tables below, and are part of the justification for each of the programs. For informational purposes, we also present the cost per ton for the three programs combined.

[218] We note that in determining whether the new vehicle controls represent the greatest emissions reductions achievable considering costs, we have considered the new cold-start standards separately from any other new control program. Similarly, in considering whether the new controls for PFCs represent the best available control considering economic feasibility, we considered the PFC standards separately from any other new control program.

Table VIII.D-1. – HC Aggregate Cost per Ton and Long-Term Annual Cost Per Ton ($2003)

| | **Discounted Lifetime Cost per ton at 3%** | **Discounted Lifetime Cost per ton at 7%** | **Long-Term Cost per Ton in 2030** |
|---|---|---|---|
| Vehicles | $14 | $18 | $0 |
| PFCs (without fuel savings) | $240 | $270 | $190 |
| PFCs (with fuel savings) | $0 | $0 | $0 |
| Combined (with fuel savings) | $0 | $0 | $0 |

The cost per ton of benzene reductions for fuels, vehicles, and PFCs are shown in Table VIII.D-2 using the same methodology as noted above for HC. The results are calculated by assigning all costs to benzene control.

Table VIII.D-2. – Benzene Aggregate Cost per Ton and Long-Term Annual Cost Per Ton ($2003)

| | **Discounted Lifetime Cost per ton at 3%** | **Discounted Lifetime Cost per ton at 7%** | **Long-Term Cost per Ton in 2030** |
|---|---|---|---|
| Fuels | $22,400 | $23,100 | $22,500 |
| Vehicles | $270 | $360 | $0 |
| PFCs (without fuels savings) | $74,500 | $82,900 | $56,200 |
| PFCs (with fuel savings) | $0 | $0 | $0 |
| Combined (with fuel savings) | $8,200 | $8,600 | $5,900 |

The cost per ton of reductions of all MSAT reductions for fuels, vehicles, and PFCs are shown in Table VIII.D-3 using the same methodology as noted above for HC and benzene. The results are calculated by assigning all costs to MSAT control.

Table VIII.D-3. – MSAT Aggregate Cost per Ton and Long-Term Annual Cost Per Ton ($2003)

| | **Discounted Lifetime Cost per ton at 3%** | **Discounted Lifetime Cost per ton at 7%** | **Long-Term Cost per Ton in 2030** |
|---|---|---|---|
| Fuels | $22,400 | $23,100 | $22,500 |
| Vehicles | $42 | $54 | $0 |
| PFCs (without fuel savings) | $2,800 | $3,100 | $2,200 |
| PFCs (with fuel savings) | $0 | $0 | $0 |
| Combined (with fuel savings) | $1,700 | $1,800 | $1,100 |

We have also calculated a cost per ton for direct PM reductions for vehicles. Again, this analysis assigns all related costs to direct PM reductions.

Table VIII.D-4. – Direct PM Aggregate Cost per Ton and Long-Term Annual Cost Per Ton

($2003)

| | **Discounted Lifetime Cost per ton at 3%** | **Discounted Lifetime Cost per ton at 7%** | **Long-Term Cost per Ton in 2030** |
|---|---|---|---|
| Vehicles | $650 | $870 | $0 |

E. Benefits

This section presents our analysis of the health and environmental benefits that will occur as a result of the final standards throughout the period from initial implementation through 2030. In terms of emission benefits, we expect to see significant reductions in mobile source air toxics (MSATs) from the vehicle, fuel and PFC standards; reductions in VOCs (an ozone and $PM_{2.5}$ precursor) from the cold temperature vehicle and PFC standards; and reductions in direct $PM_{2.5}$ from the cold temperature vehicle standards. When translating emission benefits to health effects and monetized values, however, we quantify only the PM-related benefits associated with the cold temperature vehicle standards.

The reductions in $PM_{2.5}$ from the cold temperature vehicle standards will result in significant reductions in premature deaths and other serious human health effects, as well as other important public health and welfare effects. We estimate that in 2030, the

benefits we are able to monetize will be approximately $6.3 billion using a 3 percent discount rate and $5.7 billion using a 7 percent discount rate. Total social costs of the entire rule for the same year (2030) are $400 million. Details on the costs of the final standards are in section VIII.F. These estimates, and all monetized benefits presented in this section, are in year 2003 dollars.

The $PM_{2.5}$ benefits are scaled based on relative changes in direct $PM_{2.5}$ emissions between this rule and the proposed Clean Air Nonroad Diesel (CAND) rule.[219] As explained in Section 12.2.1 of the RIA for this rule, the $PM_{2.5}$ benefits scaling approach is limited to those studies, health impacts, and assumptions that were used in the proposed CAND analysis. As a result, PM-related premature mortality is based on the updated analysis of the American Cancer Society cohort (ACS; Pope et al., 2002). However, it is important to note that since the CAND rule, EPA's Office of Air and Radiation (OAR) has adopted a different format for its benefits analyses in which characterization of the uncertainty in the concentration-response function is integrated into the main benefits analysis. This new approach follows the recommendation of NRC's 2002 report "Estimating the Public Health Benefits of Proposed Air Pollution Regulations" to begin moving the assessment of uncertainties from its ancillary analyses into its main benefits presentation through the conduct of probabilistic analyses. Within this context, additional data sources are available, including a recent expert elicitation and updated analysis of the Six-Cities Study cohort (Laden et al., 2006). Please see the PM NAAQS

[219] Due to time and resource constraints, EPA scaled the final CAND benefits estimates from the benefits estimated for the CAND proposal. The scaling approach used in that analysis, and applied here, is described in the RIA for the final CAND rule.

RIA for an indication of the sensitivity of our results to use of alternative concentration-response functions.

We also demonstrate that the final standards will reduce cancer and noncancer risk from reduced exposure to MSATs (as described in Section IV of this preamble). However, we do not translate this risk reduction into benefits. We also do not quantify the benefits related to ambient reductions in ozone and $PM_{2.5}$ due to the VOC emission reductions associated with the final standards. The following section describes in more detail why these benefits are not quantified.

1. Unquantified Health and Environmental Benefits

This benefit analysis estimates improvements in health and human welfare that are expected as a result of the final standards, and monetizes those benefits. The benefits will come from reductions in emissions of air toxics (including benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, naphthalene, and other air toxic pollutants discussed in section III), ambient ozone (as a result of VOC controls), and direct $PM_{2.5}$ emissions.

While there will be benefits associated with air toxic pollutant reductions, notably with regard to reductions in exposure and risk (see section IV), we do not attempt to monetize those benefits. This is primarily because available tools and methods to assess air toxics risk from mobile sources at the national scale are not adequate for extrapolation

to incidence estimations or benefits assessment. The best suite of tools and methods currently available for assessment at the national scale are those used in the National-Scale Air Toxics Assessment (NATA; these tools are discussed in Chapter 3 of the RIA). The EPA Science Advisory Board specifically commented in their review of the 1996 NATA that these tools were not yet ready for use in a national-scale benefits analysis, because they did not consider the full distribution of exposure and risk, or address sub-chronic health effects.[220] While EPA has since improved the tools, there remain critical limitations for estimating incidence and assessing benefits of reducing mobile source air toxics. We continue to work to address these limitations, and we are exploring the feasibility of a quantitative benefits assessment for air toxics through a benzene case study as part of the revised study of "The Benefits and Costs of the Clean Air Act" (also known as the "Section 812" report).[221] In this case study, we are attempting to monetize the benefits of reduced cancer incidence, specifically leukemia, and are not addressing other cancer or noncancer endpoints.

We also do not estimate the monetized benefits of VOC controls in this benefits analysis. Though VOCs will be demonstrably reduced as a result of the cold temperature vehicle standards, we assume that these emissions will not have a measurable impact on ozone formation since the standards will reduce VOC emissions at cold ambient temperatures and ozone formation is primarily a warm ambient temperature issue. The PFC controls will likely result in ozone benefits, though we do not attempt to monetize

[220] Science Advisory Board. 2001. NATA – Evaluating the National-Scale Air Toxics Assessment for 1996 – an SAB Advisory. http://www.epa.gov/ttn/atw/sab/sabrev.html.

[221] The analytic blueprint for the Section 812 benzene case study can be found at http://www.epa.gov/air/sect812/appendixi51203.pdf.

those benefits. This is primarily due to the magnitude of, and uncertainty associated with, the estimated changes in ambient ozone associated with the final standards. In Section IV.C., we discuss that the ozone modeling conducted for the final PFC standards results in a net reduction in ambient ozone concentrations within the modeled domain (37 Eastern states and the District of Columbia). The net improvement is very small, however, and will likely lead to negligible monetized benefits. Instead, we acknowledge that this analysis may underestimate the benefits associated with reductions in ozone precursor emissions achieved by the various standards. We discuss these benefits qualitatively within the RIA.

The VOC reductions resulting from the cold temperature vehicle standards and PFC standards will also likely reduce secondary $PM_{2.5}$ formation. However, we did not quantify the impacts of these reductions on ambient $PM_{2.5}$ or estimate any resulting benefits. As described further below, we estimated PM benefits by scaling from a previous analysis, and this analysis did not examine the relationship between VOC reductions and ambient PM. As a result, we did not quantify PM benefits associated with this rule's VOC reductions, and we acknowledge that this analysis may therefore underestimate benefits.

Table VIII.E-1 lists each of the MSAT and ozone health and welfare effects that remain unquantified because of current limitations in the methods or available data. This table also includes the PM-related health and welfare effects that also remain unquantified due to current method and data limitations. Chapter 12 of the RIA for the

final standards provides a qualitative description of the health and welfare effects not quantified in this analysis.

Table VIII.E-1. Unquantified and Non-Monetized Effects

| Pollutant/ Effects | Effects Not Included in Primary Estimates - Changes in: |
|---|---|
| **Ozone Health**[a] | Premature mortality: short-term exposures[b] |
| | Hospital admissions: respiratory |
| | Emergency room visits for asthma |
| | Minor restricted-activity days |
| | School loss days |
| | Asthma attacks |
| | Cardiovascular emergency room visits |
| | Acute respiratory symptoms |
| | Chronic respiratory damage |
| | Premature aging of the lungs |
| | Non-asthma respiratory emergency room visits |
| | Exposure to UVb (+/-)[e] |
| **Ozone Welfare** | Decreased outdoor worker productivity |
| | Agricultural yields for |
| | -commercial forests |
| | -some fruits and vegetables |
| | -non-commercial crops |
| | Damage to urban ornamental plants |
| | Impacts on recreational demand from damaged forest aesthetics |
| | Ecosystem functions |
| | Exposure to UVb (+/-)[e] |

| Pollutant/ Effects | Effects Not Included in Primary Estimates - Changes in: |
|---|---|
| **PM Health**[c] | Premature mortality – short-term exposures[d] |
| | Low birth weight |
| | Pulmonary function |
| | Chronic respiratory diseases other than chronic bronchitis |
| | Non-asthma respiratory emergency room visits |
| | Exposure to UVb (+/-)[e] |
| **PM Welfare** | Visibility in many Class I areas |
| | Residential and recreational visibility in non-Class I areas |
| | Soiling and materials damage |
| | Damage to ecosystem functions |
| | Exposure to UVb (+/-)[e] |
| **MSAT Health**[f] | Cancer (benzene, 1,3-butadiene, formaldehyde, acetaldehyde, naphthalene) |
| | Anemia (benzene) |
| | Disruption of production of blood components (benzene) |
| | Reduction in the number of blood platelets (benzene) |
| | Excessive bone marrow formation (benzene) |
| | Depression of lymphocyte counts (benzene) |
| | Reproductive and developmental effects (1,3-butadiene) |
| | Irritation of eyes and mucus membranes (formaldehyde) |
| | Respiratory irritation (formaldehyde) |
| | Asthma attacks in asthmatics (formaldehyde) |
| | Asthma-like symptoms in non-asthmatics (formaldehyde) |
| | Irritation of the eyes, skin, and respiratory tract (acetaldehyde) |
| | Upper respiratory tract irritation and congestion (acrolein) |
| | Neurotoxicity (n-hexane, toluene, xylenes) |

| Pollutant/ Effects | Effects Not Included in Primary Estimates - Changes in: |
|---|---|
| **MSAT Welfare**[f] | Direct toxic effects to animals<br>Bioaccumulation in the food chain<br>Damage to ecosystem function<br>Odor |

[a] In addition to primary economic endpoints, there are a number of biological responses that have been associated with ozone health effects including increased airway responsiveness to stimuli, inflammation in the lung, acute inflammation and respiratory cell damage, and increased susceptibility to respiratory infection.

[b] Recent analyses provide evidence that short-term ozone exposure is associated with increased premature mortality. As a result, EPA is considering how to incorporate ozone mortality benefits into its benefits analyses as a separate estimate of the number of premature deaths that would be avoided due to reductions in ozone levels.

[c] In addition to primary economic endpoints, there are a number of biological responses that have been associated with PM health effects including morphological changes and altered host defense mechanisms. The public health impact of these biological responses may be partly represented by our quantified endpoints.

[d] While some of the effects of short-term exposures are likely to be captured in the estimates, there may be premature mortality due to short-term exposure to PM not captured in the cohort study upon which the primary analysis is based. However, the PM mortality results derived from the expert elicitation do take into account premature mortality effects of short-term exposures.

[e] May result in benefits or disbenefits.

[f] The categorization of unquantified toxic health and welfare effects is not exhaustive.

## 2. Quantified Human Health and Environmental Effects of the Final Cold Temperature Vehicle Standard

In this section we discuss the benefits of the final cold temperature vehicle standard related to reductions in directly emitted $PM_{2.5}$. To estimate $PM_{2.5}$ benefits, we rely on a benefits transfer technique. The benefits transfer approach uses as its

foundation the relationship between emission reductions and ambient $PM_{2.5}$ concentrations modeled across the contiguous 48 states (and DC) for the Clean Air Nonroad Diesel (CAND) proposal.[222] For a given future year, we first calculate the ratio between CAND direct $PM_{2.5}$ emission reductions and direct $PM_{2.5}$ emission reductions associated with the final cold temperature vehicle control standard (cold temperature vehicle emission reductions/CAND emission reductions). We multiply this ratio by the percent that direct $PM_{2.5}$ contributes towards population-weighted reductions in total $PM_{2.5}$ due to the CAND standards. This calculation results in a "benefits apportionment factor" for the relationship between direct PM emissions and primary $PM_{2.5}$, which is then applied to the BenMAP-based incidence and monetized benefits from the CAND proposal. In this way, we apportion the results of the proposed CAND analysis to its underlying direct PM emission reductions and scale the apportioned benefits to reflect differences in emission reductions between the two rules.[223] This benefits transfer method is consistent with the approach used in other recent mobile and stationary source rules.[224]

Table VIII.E-2 presents the estimates of reduced incidence of $PM_{2.5}$-related health effects for the years 2020 and 2030 for the final cold temperature vehicle control strategies. In 2030, we estimate that $PM_{2.5}$-related annual benefits will result in

[222]See 68 FR 28327, May 23, 2003.

[223]Note that while the final regulations also control VOCs, which contribute to PM formation, the benefits transfer scaling approach only scales benefits based on NOx, $SO_2$, and direct PM emission reductions. PM benefits will likely be underestimated as a result, though we are unable to estimate the magnitude of the underestimation.

[224] See: Clean Air Nonroad Diesel final rule (69 FR 38958, June 29, 2004); Nonroad Large Spark-Ignition Engines and Recreational Engines standards (67 FR 68241, November 8, 2002); Final Industrial Boilers and Process Heaters NESHAP (69 FR 55217, September 13, 2004); Final Reciprocating Internal Combustion Engines NESHAP (69 FR 33473, June 15, 2004); Final Clean Air Visibility Rule (EPA-452/R-05-004, June 15, 2005); Ozone Implementation Rule (documentation forthcoming).

approximately 880 fewer premature fatalities, 600 fewer cases of chronic bronchitis, 1,600 fewer non-fatal heart attacks, and 900 fewer hospitalizations (for respiratory and cardiovascular disease combined). In addition, we estimate that the emission controls will reduce days of restricted activity due to respiratory illness by about 600,000 days and reduce work-loss days by about 100,000 days. We also estimate substantial health improvements for children from reduced upper and lower respiratory illness, acute bronchitis, and asthma attacks.

It is important to note that since the CAND rule, EPA's Office of Air and Radiation (OAR) has adopted a different format for its benefits analysis in which characterization of the uncertainty in the concentration-response function is integrated into the main benefits analysis. Within this context, additional data sources are available, including a recent PM-related premature mortality expert elicitation and updated analysis of the Six-Cities Study cohort (Laden et al., 2006). Please see the PM NAAQS RIA for an indication of the sensitivity of our results to use of alternative concentration-response functions.

TABLE VIII.E-2 Estimated Annual Reductions in Incidence of Health Effects Related to the Final Cold Temperature Vehicle Standard[a]

| **Health Effect** | **2020 Annual Incidence Reduction** | **2030 Annual Incidence Reduction** |
|---|---|---|
| **PM-Related Endpoints:** | | |
| Premature Mortality[b]<br>Adult, age 30+ and Infant, age <1 year | 480 | 880 |

| | | |
|---|---|---|
| Chronic bronchitis (adult, age 26 and over) | 330 | 570 |
| Non-fatal myocardial infarction (adult, age 18 and over) | 810 | 1,600 |
| Hospital admissions - respiratory (all ages)[c] | 260 | 530 |
| Hospital admissions - cardiovascular (adults, age >18)[d] | 210 | 390 |
| Emergency room visits for asthma (age 18 years and younger) | 350 | 610 |
| Acute bronchitis, (children, age 8-12) | 780 | 1,400 |
| Lower respiratory symptoms (children, age 7-14) | 9,300 | 16,000 |
| Upper respiratory symptoms (asthmatic children, age 9-18) | 7,000 | 12,000 |
| Asthma exacerbation (asthmatic children, age 6-18) | 12,000 | 20,000 |
| Work Loss Days | 62,000 | 100,000 |
| Minor restricted activity days (adults age 18-65) | 370,000 | 600,000 |

[a] Incidence is rounded to two significant digits. Estimates represent benefits from the final rule nationwide, excluding Alaska and Hawaii.

[b] PM-related adult mortality based upon the ACS cohort study (Pope, et al., 2002).[225] PM-related infant mortality based upon studies by Woodruff, Grillo, and Schoendorf,1997.[226] Due to analytical constraints associated with the PM benefits scaling approach, we are unable to present the premature mortality impacts associated with the recent Six-Cities study (Laden et al.,2006) or the impacts associated with the recent PM-related premature mortality expert elicitation (IEc, 2006). Chapter 12.6 of the RIA discusses the implications these new studies have on the benefits estimated for the final rule.

[c] Respiratory hospital admissions for PM include admissions for chronic obstructive pulmonary disease (COPD), pneumonia and asthma.

[d] Cardiovascular hospital admissions for PM include total cardiovascular and subcategories for ischemic heart disease, dysrhythmias, and heart failure.

---

[225]Pope, C.A., III, R.T. Burnett, M.J. Thun, E.E. Calle, D. Krewski, K. Ito, and G.D. Thurston. 2002. "Lung Cancer, Cardiopulmonary Mortality, and Long-term Exposure to Fine Particulate Air Pollution." *Journal of American Medical Association* 287:1132-1141.

[226]Woodruff, T.J., J. Grillo, and K.C. Schoendorf. 1997. "The Relationship Between Selected Causes of Postneonatal Infant Mortality and Particulate Infant Mortality and Particulate Air Pollution in the United States." *Environmental Health Perspectives* 105(6):608-612.

$PM_{2.5}$ also has numerous documented effects on environmental quality that affect human welfare. These welfare effects include direct damages to property, either through impacts on material structures or by soiling of surfaces, and indirect economic damages through the loss in value of recreational visibility or the existence value of important resources. Additional information about these welfare effects can be found in Chapter 12 of the Regulatory Impact Analysis.

3. Monetized Benefits

Table VIII.E-3 presents the estimated monetary value of reductions in the incidence of those health effects we are able to monetize for the final cold temperature vehicle standard. Total annual PM-related health benefits are estimated to be approximately $6.3 or $5.7 billion in 2030 (3 percent and 7 percent discount rate, respectively). These estimates account for growth in real gross domestic product (GDP) per capita between the present and 2030.

Table VIII.E-3 indicates with a "B" those additional health and environmental benefits of the rule that we are unable to quantify or monetize. These effects are additive to the estimate of total benefits, and are related to the following sources:

- There are many human health and welfare effects associated with PM, ozone, and toxic air pollutant reductions that remain unquantified because

of current limitations in the methods or available data. A listing of the benefit categories that could not be quantified or monetized in our benefit estimates are provided in Table VIII.E-1.

- The $PM_{2.5}$ benefits scaled transfer approach, derived from the Clean Air Nonroad Diesel rule, does not account for VOCs as precursors to ambient $PM_{2.5}$ formation. To the extent that VOC emission reductions associated with the final regulations contribute to reductions in ambient $PM_{2.5}$, this analysis does not capture the related health and environmental benefits of those changes.
- The PM air quality model only captures the benefits of air quality improvements in the 48 states and DC; PM benefits for Alaska and Hawaii are not reflected in the estimate of benefits.

TABLE VIII.E-3. Estimated Annual Monetary Value of Reductions in Incidence of Health and Welfare Effects Related to the Final Cold Temperature Vehicle Standard (Millions of 2003$)[a,b]

| Health Effect | Pollutant | 2020 Estimated Value of Reductions | 2030 Estimated Value of Reductions |
|---|---|---|---|
| PM-Related Premature mortality[c,d] | | | |
| Adult, 30+ years and Infant, <1 year | | | |
| 3 percent discount rate | $PM_{2.5}$ | $3,100 | $5,800 |
| 7 percent discount rate | | $2,800 | $5,200 |
| Chronic bronchitis (adults, 26 and over) | $PM_{2.5}$ | $150 | $260 |
| Non-fatal acute myocardial infarctions | | | |
| 3 percent discount rate | | $79 | $150 |
| 7 percent discount rate | $PM_{2.5}$ | $76 | $140 |
| Hospital admissions for respiratory causes | $PM_{2.5}$ | $4.7 | $10 |
| Hospital admissions for cardiovascular causes | $PM_{2.5}$ | $5.0 | $9.1 |
| Emergency room visits for asthma | $PM_{2.5}$ | $0.11 | $0.20 |
| Acute bronchitis (children, age 8-12) | $PM_{2.5}$ | $0.32 | $0.56 |
| Lower respiratory symptoms (children, age 7-14) | $PM_{2.5}$ | $0.16 | $0.29 |
| Upper respiratory symptoms (asthma, age 9-11) | $PM_{2.5}$ | $0.20 | $0.35 |
| Asthma exacerbations | $PM_{2.5}$ | $0.56 | $1.0 |
| Work loss days | $PM_{2.5}$ | $9.1 | $14 |
| Minor restricted activity days (MRADs) | $PM_{2.5}$ | $21 | $35 |
| Monetized Total[e] | | | |
| Base estimate: | | | |
| 3 percent discount rate | $PM_{2.5}$ | $3,300+ B | $6,300+ B |

| | | | |
|---|---|---|---|
| 7 percent discount rate | | $3,000+ B | $5,700+ B |

[a] Dollars are rounded to two significant digits. The PM estimates represent benefits from the final rule across the contiguous United States.

[b] Monetary benefits adjusted to account for growth in real GDP per capita between 1990 and the analysis year (2020 or 2030).

[c] Valuation of premature mortality based on long-term PM exposure assumes discounting over the SAB recommended 20-year segmented lag structure described in the Regulatory Impact Analysis for the Final Clean Air Interstate Rule (March 2005). Results show 3 percent and 7 percent discount rates consistent with EPA and OMB guidelines for preparing economic analyses (US EPA, 2000 and OMB, 2003).[227,228]

[d] Adult mortality based upon the ACS cohort study (Pope et al., 2002). Infant mortality based upon studies by Woodruff, Grillo, and Schoendorf, 1997. Due to analytical constraints associated with the PM benefits scaling approach, we are unable to present the premature mortality impacts associated with the recent Six-Cities study (Laden et al., 2006) study or the impacts associated with the recent PM-related premature mortality expert elicitation (IEc, 2006). Chapter 12.6 of the RIA discusses the implications these new studies have on the benefits estimated for the final rule.

[e] B represents the monetary value of health and welfare benefits not monetized. A detailed listing is provided in Table VIII.E-1.

### 4. What Are the Significant Limitations of the Benefit Analysis?

The most significant limitation of this analysis is our inability to quantify a number of potentially significant benefit categories associated with improvements in air quality that would result from the final standards. Most notably, we are unable to estimate the benefits from reduced air toxics exposures because the available tools and

[227] U.S. Environmental Protection Agency, 2000. Guidelines for Preparing Economic Analyses. http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html.

[228] Office of Management and Budget, The Executive Office of the President, 2003. Circular A-4. http://www.whitehouse.gov/omb/circulars.

methods to assess mobile source air toxics risk at the national scale are not adequate for extrapolation to incidence estimations or benefits assessment. We also do not quantify ozone benefits associated with the final PFC standards, despite the fact that there are net benefits, when population-weighted, in the ozone design value metric across the modeled domain (see section IV.C). We do not quantify these benefits because of their magnitude and the uncertainty associated with them.

More generally, every benefit-cost analysis 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 quantitative changes in health and environmental effects. Deficiencies in the economics literature often result in the inability to assign economic values even to those health and environmental outcomes which can be quantified. These general uncertainties in the underlying scientific and economics literature, which can cause the valuations to be higher or lower, are discussed in detail in the RIA and its supporting references. Key uncertainties that have a bearing on the results of the benefit-cost analysis of the final standards include the following:

- The exclusion of potentially significant and unquantified benefit categories (such as health, odor, and ecological benefits of reduction in air toxics, ozone, and PM);
- Errors in measurement and projection for variables such as population

growth;

- Uncertainties in the estimation of future year emissions inventories and air quality;
- Uncertainties associated with the scaling of the PM results of the modeled benefits analysis to the final standards, especially regarding the assumption of similarity in geographic distribution between emissions and human populations and years of analysis;
- Uncertainty in the estimated relationships of health and welfare effects to changes in pollutant concentrations including the shape of the C-R function, the size of the effect estimates, and the relative toxicity of the many components of the PM mixture;
- Uncertainties in exposure estimation; and
- Uncertainties associated with the effect of potential future actions to limit emissions.

As Table VIII.E-3 indicates, total benefits are driven primarily by the reduction in premature fatalities each year. Elaborating on the list of uncertainties above, some key assumptions underlying the primary estimate for the premature mortality category include the following:

1. Inhalation of fine particles is causally associated with premature death at concentrations near those experienced by most Americans on a daily basis.

Although biological mechanisms for this effect have not yet been completely established, the weight of the available epidemiological, toxicological, and experimental evidence supports an assumption of causality. The impacts of including a probabilistic representation of causality were explored in the expert elicitation-based results of the recently published PM NAAQS RIA. Because the analysis of the final cold temperature vehicle standard is constrained to the studies included in the CAND PM benefits scaling approach, we are unable to conduct the same analysis of expert elicitation-based mortality incidence for the final standards.[229] However, we qualitatively describe the expert elicitation-based mortality results associated with the final PM NAAQS to provide an indication of the sensitivity of our PM-related premature mortality results to use of alternative concentration-response functions. We present this discussion in the RIA.

2. Since the publication of CAIR and CAND, a follow up to the Harvard Six-Cities study on premature mortality was published (Laden et al., 2006 based on Dockery et al., 1993),[230,231] which both confirmed the effect size from the first study and provided additional evidence that reductions in $PM_{2.5}$ directly result in reductions in the risk of premature death. The impacts of including this study in the primary analysis were explored in the results of the recently

[229] The scaling approach relies on the incidence and valuation estimates derived from the studies available at the time of the CAND analysis. Incidence estimates and monetized benefits derived from new information, including mortality derived from the full expert elicitation, are not available for scaling. Please refer to section 2 of this preamble and Chapter 12 of the RIA for more information about the benefits scaling approach.

[230] Laden, F., J. Schwartz, F.E. Speizer, and D.W. Dockery. 2006. Reduction in Fine Particulate Air Pollution and Mortality. American Journal of Respiratory and Critical Care Medicine. 173: 667-672.

[231] Dockery, D.W., C.A. Pope, X.P. Xu, J.D. Spengler, J.H. Ware, M.E. Fay, B.G. Ferris, and F.E. Speizer. 1993. "An Association between Air Pollution and Mortality in Six U.S. Cities." New England Journal of Medicine 329(24):1753-1759.

published PM NAAQS RIA. Because the analysis of the final cold temperature vehicle standard is constrained to the studies included in the CAND PM benefits scaling approach, we are unable to characterize PM-related mortality based on Laden et al. However, we discuss the implications of these results in the RIA for the final standards.

3. All fine particles, regardless of their chemical composition, are equally potent in causing premature mortality. This is an important assumption, because PM produced via transported precursors emitted from vehicles at cold temperatures may differ significantly from PM precursors released from electric generating units and other industrial sources. However, no clear scientific grounds exist for supporting differential effects estimates by particle type.

4. The concentration-response function for fine particles is approximately linear within the range of ambient concentrations under consideration. Thus, the estimates include health benefits from reducing fine particles in areas with varied concentrations of PM, including both regions that may be in attainment with $PM_{2.5}$ standards and those that are at risk of not meeting the standards.

Taking into account these uncertainties, we believe this benefit-cost analysis provides a conservative estimate of the expected economic benefits of the final standards for cold temperature vehicle control in future years because of the exclusion of potentially significant benefit categories. Acknowledging benefits omissions and uncertainties, we present a best estimate of the total benefits based on our interpretation

of the best available scientific literature and methods. Furthermore, our analysis reflects many methodological improvements that were incorporated into the analysis of the final Clean Air Interstate Rule (CAIR), including a revised value of a statistical life, a revised baseline rate of future mortality, and a revised mortality lag assumption. Details of these improvements can be found in the RIA for this rule and in the final CAIR rule RIA.[232] Once again, however, it should be noted that since the CAIR rule, EPA's Office of Air and Radiation (OAR) has adopted a different format for its benefits analysis in which characterization of uncertainty is integrated into the main benefits analysis. Please see the PM NAAQS RIA for an indication of the uncertainty present in the base estimate of benefits and the sensitivity of our results to the use of alternative concentration-response functions.

In contrast to the additional benefits of the final standards discussed above, it is also possible that this rule will result in disbenefits in some areas of the United States. The effects of ozone and PM on radiative transfer in the atmosphere can lead to effects of uncertain magnitude and direction on the penetration of ultraviolet light and climate. Ground level ozone makes up a small percentage of total atmospheric ozone (including the stratospheric layer) that attenuates penetration of ultraviolet - b (UVb) radiation to the ground. EPA's past evaluation of the information indicates that potential disbenefits would be small, variable, and with too many uncertainties to attempt quantification of relatively small changes in average ozone levels over the course of a year.[233] EPA's

[232] See Chapter 4 of the Final Clean Air Interstate Rule RIA (www.epa.gov/cair) for a discussion of EPA's ongoing efforts to address the NAS recommendations in its regulatory analyses.

[233] EPA, 2005. Air Quality Criteria for Ozone and Related Photochemical Oxidants (First External Review Draft). January. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=114523

most recent provisional assessment of the currently available information indicates that potential but unquantifiable benefits may also arise from ozone-related attenuation of UVb radiation.[234] In addition, EPA believes that we are unable to quantify any net climate-related disbenefit or benefit associated with the combined ozone and PM reductions in this rule.

### 5. How Do the Benefits Compare to the Costs of The Final Standards?

The final rule provides three separate provisions that reduce air toxics emissions from mobile sources: cold temperature vehicle controls, a PFC emissions control program, and a control program limiting benzene in gasoline. A full appreciation of the overall economic consequences of these provisions requires consideration of the benefits and costs expected to result from each standard, not just those that could be expressed here in dollar terms. As noted above, due to limitations in data availability and analytical methods, our benefits analysis only monetizes the $PM_{2.5}$-related benefits from direct PM emission reductions associated with the cold temperature standards. There are a number of health and environmental effects associated with the final standards that we were unable to quantify or monetize (see Table VIII.E-1).

Table VIII.E-4 contains the estimates of monetized benefits of the final cold temperature vehicle standards only and estimated social welfare costs for all of the final

[234] EPA, 2005. Air Quality Criteria for Ozone and Related Photochemical Oxidants (Second External Review Draft). August. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=137307

control programs.[235] The annual social welfare costs of all provisions of the final rule are described more fully in Section VIII.F. It should be noted that the estimated social welfare costs for the vehicle program contained in this table are for 2019. The 2019 vehicle program costs are included for comparison purposes only and are therefore not included in the total 2020 social costs. There are no compliance costs associated with the vehicle program after 2019; as explained elsewhere in this preamble, the vehicle compliance costs are primarily R&D and facilities costs that are expected to be recovered by manufacturers over the first ten years of the program.

The results in Table VIII.E-4 suggest that the 2020 monetized benefits of the cold temperature vehicle standards are greater than the expected social welfare costs of that program in 2019. Specifically, the annual benefits of the program will be approximately $3,300 + B million or $3,000 + B million annually in 2020 (using a 3 percent and 7 percent discount rate in the benefits analysis, respectively), compared to estimated social welfare costs of approximately $10.6 million in the last year of the program (2019). These benefits are expected to increase to $6,300 + B million or $5,700 + B million annually in 2030 (using a 3 percent and 7 percent discount rate in the benefits analysis, respectively), even as the social welfare costs of that program fall to zero. Table VIII.E-4 also presents the costs of the other rule provisions: a PFC emissions control program and a control program limiting benzene in gasoline. Though we are unable to present the benefits associated with these two programs, the benefits associated with the final cold

[235] Social costs represent the welfare costs of the rule to society. These social costs do not consider transfer payments (such as taxes) that are simply redistributions of wealth.

temperature vehicle standards alone outweigh the costs of all three rule provisions combined.

Table VIII.E-4. Summary of Annual Benefits of the Final Cold Temperature Vehicle Standards and Costs of All Provisions of the Final Standards[a] (Millions of 2003 dollars)

| Description | 2020 (Millions of 2003 dollars) | 2030 (Millions of 2003 dollars) |
|---|---|---|
| **Estimated Social Welfare Costs[b]** | | |
| **Cold Temperature Vehicle Standards** | $10.6[c] | $0 |
| **PFC Standards** | $37.5 | $45.7 |
| **Fuel Standards[d]** | $402.6 | $445.8 |
| **Total** | $440.1 | $491.5 |
| **Fuel Savings** | -$80.7 | -$91.5 |
| **Net Social Welfare Costs** | $359.4 | $400.0 |
| **Total $PM_{2.5}$-Related Health Benefits of the Cold Temperature Vehicle Standards[e]** | | |
| **3 percent discount rate** | $3,300 + B[f] | $6,300 + B[f] |
| **7 percent discount rate** | $3,000 + B[f] | $5,700 + B[f] |

[a] All estimates are rounded to two significant digits and represent annualized benefits and costs anticipated for the years 2020 and 2030, except where noted. Totals may not sum due to rounding.

[b] Note that costs are the annual costs of reducing all pollutants associated with each provision of the final MSAT control package in 2020 and 2030 (unless otherwise noted). To estimate fixed costs associated with the vehicle standards, we use a 7 percent average before-tax rate of return over 5 years to amortize the capital fixed costs. For the fuel standards, we use a 7 percent before-tax rate of return over 15 years to amortize the capital costs. Note that by

2020, PFC container standard costs are only variable and do not use a rate of return assumption. See Chapters 8 and 9 for discussion of the vehicle and fuel standard costs, respectively. In Chapter 13, however, we do use both a 3 percent and 7 percent social discount rate to calculate the net present value of total social costs consistent with EPA and OMB guidelines for preparing economic analyses (US EPA, 2000 and OMB, 2003).[236,237].

[c] These costs are for 2019; the vehicle program compliance costs terminate after 2019 and are included for illustrative purposes. They are not included in the total social welfare cost sum for 2020.

[d] Our modeling for the total costs of the proposed gasoline benzene program included participation by California refineries (achieving benzene reductions below the 0.62 proposed benzene standard - thus generating credits), since it was completed before we decided that California gasoline would not be covered by the program. For the final rule, we exclude California refineries from the analysis. By excluding California refineries, other higher cost refineries will have to comply in their place, slightly increasing the costs for the program.

[e] Annual benefits reflect only direct PM reductions associated with the cold temperature vehicle standards. Annual benefits analysis results reflect the use of a 3 percent and 7 percent discount rate in the valuation of premature mortality and nonfatal myocardial infarctions, consistent with EPA and OMB guidelines for preparing economic analyses (US EPA, 2000 and OMB, 2003). Valuation of premature mortality based on long-term PM exposure assumes discounting over the SAB recommended 20-year segmented lag structure described in the Regulatory Impact Analysis for the Final Clean Air Interstate Rule (March 2005). Valuation of nonfatal myocardial infarctions (MI) assumes discounting over a 5-year period, reflecting lost earnings and direct medical costs following a nonfatal MI. Note that we do not calculate a net present value of benefits associated with the cold temperature vehicle standards.

[f] Not all possible benefits or disbenefits are quantified and monetized in this analysis. B is the sum of all unquantified benefits and disbenefits. Potential benefit categories that have not been quantified and monetized are listed in Table VIII.E-1.

## F. Economic Impact Analysis

We prepared an Economic Impact Analysis (EIA) to estimate the economic impacts of this rule on the portable fuel container (PFC), gasoline fuel, and light-duty

[236] U.S. Environmental Protection Agency, 2000. Guidelines for Preparing Economic Analyses. http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html.

[237] Office of Management and Budget, The Executive Office of the President, 2003. Circular A-4. http://www.whitehouse.gov/omb/circulars.

vehicle markets. In this section we briefly describe the Economic Impact Model (EIM) we developed to estimate both the market-level changes in price and outputs for affected markets and the social costs of the program and their distribution across affected stakeholders. We also present the results of our analysis.

We estimate the net social costs of the program to be about $359.4 million in 2020. This estimate reflects the estimated costs associated with compliance with the gasoline, PFC, and vehicle controls and the expected gasoline fuel savings from better evaporative controls on PFCs. The results of the economic impact modeling performed for the gasoline fuel and PFC control programs suggest that the social costs of those two programs are expected to be about $440.1 million in 2020, with consumers of these products expected to bear about 58.4 percent of these costs. We estimate gasoline fuel savings of about $80.7 million in 2020, which will accrue to consumers. There are no social costs associated with the vehicle program in 2020 (these accrue only in the 10-year period from 2010 through 2019). These estimates, and all costs presented in this section, are in year 2003 dollars.

With regard to market-level impacts in 2020, the maximum price increase for gasoline fuel is expected to be about 0.3 percent (0.5 cents per gallon), for PADD 5. The price of PFCs is expected to increase by about 1.9 percent ($0.20 per can) in areas that already have PFC requirements and 32.5 percent ($1.52 per can) in areas that do not.

Detailed descriptions of the EIM, the model inputs, modeling results, and several

sensitivity analyses can be found in Chapter 13 of the Regulatory Impact Analysis prepared for this rule.

1. What Is an Economic Impact Analysis?

An Economic Impact Analysis (EIA) is prepared to inform decision makers about the potential economic consequences of a regulatory action. The analysis consists of estimating the social costs of a regulatory program and the distribution of these costs across stakeholders. These estimated social costs can then be compared with estimated social benefits (as presented in Section VIII.E). As defined in EPA's *Guidelines for Preparing Economic Analyses*, *social costs* are the value of the goods and services lost by society resulting from a) the use of resources to comply with and implement a regulation and b) reductions in output.[238] In this analysis, social costs are explored in two steps. In the *market analysis*, we estimate how prices and quantities of goods affected by the emission control program can be expected to change once the program goes into effect. In the *economic welfare analysis*, we look at the total social costs associated with the program and their distribution across stakeholders.

2. What Is the Economic Impact Model?

The Economic Impact Model (EIM) is a behavioral model developed to estimate price and quantity changes and total social costs associated with the emission controls set

[238] *EPA Guidelines for Preparing Economic Analyses*, EPA 240-R-00-003, September 2000, p 113. A copy of this document can be found at http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html#download

out in this rule. The EIM simulates how producers and consumers of affected products can be expected to respond to an increase in production costs associated with compliance with the emission control program. In this EIM, compliance costs are directly borne by producers of affected goods. Depending on the producers' and consumers' sensitivity to price changes, producers may be able to pass some or all of these compliance costs on to the consumers of these goods in the form of higher prices. Consumers adjust their consumption of affected goods in response to these price changes. This information is passed back to the producers in the form of purchasing decisions. The EIM takes these behavioral responses into account to estimate new market equilibrium quantities and prices for all modeled sectors and the resulting distribution of social costs across these stakeholders (producers and consumers).

### 3. What Economic Sectors Are Included in this Economic Impact Analysis?

There are three economic sectors affected by the control programs described in this rule: PFCs, gasoline fuel, and light-duty vehicles. In this Economic Impact Analysis we model only the impacts on the PFC and gasoline fuel markets. We did not model the impacts on the light-duty vehicle market. This is because the compliance costs for the vehicle program are expected to be very small, less than $1 per vehicle and, even if passed on entirely, are unlikely to affect producer or consumer behavior. Therefore, we do not expect these controls to affect the quantity of vehicles produced or their prices. At the same time, however, the light-duty vehicle compliance costs are a cost to society and should be included in the economic welfare analysis. We do this by adding the vehicle

program engineering compliance cost estimates to the estimated social costs of the gasoline and PFC programs.

With regard to the gasoline fuel and PFC markets, we model the impacts on residential users of these products. This means that we focus the analysis on the use of these products for personal transportation (gasoline fuel) or residential lawns and garden care or recreational uses (PFCs) and do not separately model how the costs of complying with the standards may affect the production of goods and services that use gasoline fuel or PFCs as production inputs. We believe this approach is reasonable because the commercial share of the end-user markets for both gasoline fuel and PFCs is relatively small.[239, 240] In addition, for most commercial users the share of the cost of these products to total production costs is also small (e.g., the cost of a PFC is only a very small part of the total production costs for an agricultural or construction firm). Therefore, a price increase of the magnitude anticipated for this control program is not expected to have a noticeable impact on prices or quantities of goods produced using these inputs (e.g., agricultural product or buildings).

With regard to the gasoline fuel analysis, it should be noted that this EIA does not

[239] The U.S Department of Energy estimates that about 92 percent of gasoline used in the United States for transportation is used in light-duty vehicles. About 6 percent is used for commercial or industrial transportation, and the remaining 2 percent is used in recreational marine vessels. See U.S Department of Energy, Energy Information Administration, 2004. "Annual Energy Outlook 2004 with projections to 2025." Last updated June 2, 2004. Table A-2 and Supplemental Table 34. http://www.eia.doe.gov/oiaf/aeoref_tab.html.

[240] A recent study by CARB (1999) found that 94 percent of portable fuel containers in California were used by residential households California Environmental Protection Agency, Air Resources Board (CARB) 1999. See "Hearing Notice and Staff Report, Initial Statement of Reasons for Proposed Rule Making Public Hearing to Consider the Adoption of Portable Fuel Container Spillage Control Regulation." Sacrament, CA: California Environmental Protection Agency, Air Resources Board (CARB). A copy of this document is available at http://www.arb.ca.gov/regact/spillcon/isor.pdf

include California fuels in the market analysis. California currently has state-level controls that address air toxics from gasoline. Also, consistent with the cost analysis, the economic impact analysis does not distinguish between reformulated and conventional gasoline fuels.

The EIM models the economic impacts on two PFC markets (states that currently have requirements for PFCs and those that do not), and four gasoline fuel markets (PADDs 1+3, PADD 2, PADD 4, PADD 5). The markets included in this EIA are described in more detail in Chapter 13 of the RIA for this rule.

In the EIM, the gasoline fuel and PFC markets are not linked (there is no feedback mechanism between the PFC and gasoline fuel model segments). This is because these two sectors represent different aspects of fuel consumption (fuel storage and fuel production) and production and consumption of PFCs is not expected to have an impact on the production and supply of gasoline, and vice versa. Production and consumption of each of these products are the result of other factors that have little cross-over impacts (the need for fuel storage; the need for personal transportation).

4. What Are the Key Features of the Economic Impact Model?

A detailed description of the features of the EIM and the data used in the analysis is provided in Chapter 13 of the RIA prepared for this rule. The model methodology is firmly rooted in applied microeconomic theory and was developed following the

methodology set out in the OAQPS's *Economic Analysis Resource Document*.[241]

The EIM is a computer model comprised of a series of spreadsheet modules that simulate the supply and demand characteristics of the affected markets. The initial market equilibrium conditions are shocked by applying the compliance costs for the control program to the supply side of the markets (this is done by shifting the relevant supply curves by the amount of the compliance costs). The model equations can be analytically solved for equilibrium prices and quantities for the markets with the regulatory program and these new prices and quantities are used to estimate the social costs of the model and how those costs are shared among affected markets.

The EIM is a partial equilibrium, intermediate-run model that assumes perfect competition in the relevant markets. As explained in EPA's *Guidelines for Preparing Economic Analyses*, "partial equilibrium" means that the model considers markets in isolation and that conditions in other markets are assumed either to be unaffected by a policy or unimportant for social cost estimation.[242] The use of the intermediate run means that some factors of production are fixed and some are variable. In very short analyses, all factors of production would be assumed to be fixed, leaving the producers with no means to respond to the increased production costs associated with the regulation (e.g., they cannot adjust labor or capital inputs). Under this time horizon, the costs of the regulation fall entirely on the producer. In the long run, all factors of production are

[241]U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Innovative Strategies and Economics Group, *OAQPS Economic Analysis Resource Document*, April 1999. A copy of this document can be found at http://www.epa.gov/ttn/ecas/econdata/Rmanual2/

[242]*EPA Guidelines for Preparing Economic Analyses*, EPA 240-R-00-003, September 2000, p. 125-6.

variable and producers can adjust production in response to cost changes imposed by the regulation (e.g., using a different labor/capital mix). In the intermediate run there is some resource immobility which may cause producers to suffer producer surplus losses, but they can also pass some of the compliance costs to consumers.

The perfect competition assumption is widely accepted economic practice for this type of analysis, and only in rare cases are other approaches used.[243] It should be noted that the perfect competition assumption is not primarily about the number of firms in a market. It is about how the market operates: the nature of the competition among firms. Indicators that allow us to assume perfect competition include absence of barriers to entry, absence of strategic behavior among firms in the market, and product differentiation.

With regard to the fuel market, the Federal Trade Commission (FTC) has developed an approach to ensure competitiveness in gasoline fuel markets. It reviews oil company mergers and frequently requires divestiture of refineries, terminals, and gas stations to maintain a minimum level of competition. This is discussed in more detail in the industry profile prepared for this rule.[244]

With regard to the PFC market, the small number of firms in the market is offset by several features of this market. Because PFCs are compact and lightweight, they are

[243] See, for example, *EPA Guidelines for Preparing Economic Analyses*, EPA 240-R-00-003, September 2000, p 126.

[244] Section 3 Industry Organization, "Characterizing Gasoline Markets: a Profile," Final Report, prepared for EPA by RTI, August 2005

easy to transport far from their place of manufacture. This means that production is not limited to local producers. Although they vary by size and material, consumers are likely to view all PFCs designed for storing a particular fuel (gasoline, diesel fuel, kerosene) as good substitutes for the storage of that particular fuel. Because the products are similar enough to be considered homogeneous (e.g., perfectly substitutable), consumers can shift their purchases from one manufacturer to another. There are only minimal technical barriers to entry that would prevent new firms from freely entering the market, since manufacturing is based on well-known plastic processing methods. In addition, there is significant excess capacity, enabling competitors to respond quickly to changes in price. Excess production capacity in the general container manufacturing market also means that manufacturers could potentially switch their product lines to compete in this segment of the market, often without a significant investment. In addition, there is no evidence of high levels of strategic behavior in the price and quantity decisions of the firms. Finally, it should be noted that contestable market theory asserts that oligopolies and even monopolies will behave very much like firms in a competitive market if manufacturers have extra production capacity and this capacity could allow them to enter the market costlessly (i.e., there are no sunk costs associated with this kind of market entry or exit).[245] As a result of all of these conditions, producers and consumers in the PFC market are expected to take the market price as given when making their production and consumption choices and the market can be modeled as a competitive market even

[245]A monopoly or firms in oligopoly may not behave as neoclassical economic theories of the firm predict because they may be concerned about new entrants to the market. If super-normal profits are earned, potential competitors may enter the market. To respond to this treat, existing firm(s) in the market will keep prices and output at a level where only normal profits are made, setting price and output levels at or close to the competitive price and output. See Chapter 13 of the RIA for more information, Section 13.2.3.

though the number of producers is small.

5. What Are the Key Model Inputs?

Key model inputs for the EIM are the behavioral parameters, compliance costs estimates, and market equilibrium quantities and prices.

The EIM is a behavioral model. The estimated social costs of this emission control program are a function of the ways in which producers and consumers of the PFC and gasoline fuel affected by the standards change their behavior in response to the costs incurred in complying with the standards. These behavioral responses are incorporated in the EIM through the price elasticity of supply and demand (reflected in the slope of the supply and demand curves), which measure the price sensitivity of consumers and producers. The price elasticities used in this analysis are described in Chapter 13 of the RIA. The gasoline elasticities were obtained from the literature and are -0.2 for demand and 0.2 for supply. This means that both the quantity supplied and demanded are expected to be fairly insensitive to price changes and that increases in prices are not expected to cause sales to fall or production to increase by very much. Because we were unable to find published supply and demand elasticities for the PFC market, we estimated these parameters using the procedures described in Chapter 13 of the RIA. This approach yielded a demand elasticity of -0.01 and a supply elasticity of 1.5. The estimated demand elasticity is nearly perfectly inelastic (equal to zero), which means that changes in price are expected to have very little effect on the quantity of PFCs demanded. However,

supply is fairly elastic, meaning producers are expected to respond to a change in price. Therefore, consumers are expected to bear more of the burden of PFC regulatory control costs than producers.

Initial market equilibrium conditions are simulated using the same current year sales quantities and growth rates used in the engineering cost analysis. The initial equilibrium prices for PFCs and gasoline fuel were obtained from industry sources and published government data. The initial equilibrium market conditions are shocked by applying the engineering compliance cost estimates described in earlier in this section. Although both the PFC and gasoline fuel markets are competitive markets, the model is shocked by applying the sum of variable and fixed costs. Two sets of compliance costs are used in the PFC market analysis, reflecting states with existing controls and states without existing controls. The compliance costs used to shock the gasoline fuel market are based on an average total cost (variable + fixed) analysis. An explanation for this approach can be found in Section 13.2.4.1 of the RIA prepared for this rule. These gasoline fuel compliance costs differ across PADDs but are the same across years. Because California already has existing gasoline fuel controls, fuel volumes for that state are not included in the market analysis.

Additional costs that need to be considered in the EIM are the gasoline fuel savings associated with the PFC controls and the costs of the light-duty vehicle controls. The PFC controls are expected to reduce gasoline evaporative emissions from fuel storage, leading to gasoline fuel savings for users of these containers. These gasoline fuel

savings are not included in the market analysis for this economic impact analysis because these savings are not expected to affect consumer decisions with respect to the purchase of new containers. Gasoline fuel savings are included in the social cost analysis, however, because they are a savings that accrues to society. The estimated gasoline fuel savings are added to the estimated social costs as a separate line item. As noted above, the economic impacts of the light-duty vehicle controls are not modeled in the EIM. Instead, the estimated engineering compliance costs are used as a proxy, and are also added into the estimated social costs as a separate line item.

The EIM relies on the estimated compliance costs for the PFC and gasoline fuel programs described elsewhere in this preamble. Thus, the EIM reflects cost savings associated with ABT or other flexibility programs to the extent they are included in the estimated compliance costs.

6. What Are the Results of the Economic Impact Modeling?

Using the model and data described above, we estimated the economic impacts of the rule. The results of our modeling for selected years are summarized in this section. The year 2009 is presented because that is the first year in which both the PFC and the gasoline programs are in effect (the PFC program begins in 2009; the gasoline fuel program go into effect January 1, 2011 but the compliance cost analysis includes a phase-in starting in 2007 that ends May 2015). The year 2012 is presented because it is a high

cost year due to the way the fuel program compliance costs were estimated.[246] The year 2015 is presented because beginning with that year compliance costs are stabilized for future years for both the gasoline and PFC programs (the vehicle program compliance costs continue for five more years). Detailed results for all years are included in the appendices to Chapter 13 of the RIA. Also included as an appendix to that chapter are sensitivity analyses for several key inputs.

*Market Impact Analysis*. In the market analysis, we estimate how prices and quantities of goods affected by the emission control program can be expected to change once the program goes into effect. As explained above, we estimated market impacts for only the gasoline fuel and PFC markets. The analysis relies on the baseline equilibrium prices and quantities for each market and the price elasticity of supply and demand. It predicts market reactions to the increase in production costs due to the new compliance costs. It should be noted that this analysis does not allow any other factors to vary. In other words, it does not consider that manufacturers may adjust their production processes or marketing strategies in response to the control program.

The market analysis results for 2009, 2012, 2015, and 2020 are presented in Table VIII.F-1. With regard to the gasoline fuel program, the market impacts are expected to be small, on average. The price of gasoline fuel is expected to increase by less than 0.5 percent, depending on PADD, with smaller increases during the program phase-in. The expected reduction in quantity of fuel produced is expected to be less than 0.1 percent.

[246] Actual fuel program compliance costs are expected to be spread more evenly across years.

The market impacts for the PFC program are expected to be more significant. In 2009, the first year of PFC program, the model predicts a price increase of about seven percent for PFCs in states that currently have regulations for PFCs and about 57 percent for those that do not. Even with these large price increases, however, the quantity produced is not expected to decrease by very much: less than 0.6 percent. These percent price increases and quantity decreases are much smaller after the first five years. In 2015, the estimated PFC price increase is expected to be less than two percent for states that currently regulate PFCs and about 32.5 percent for states without such regulations. The quantity produced is expected to decrease by less than 0.4 percent. The results for 2020 are substantially the same as 2015, with a larger decrease in the number of PFCs produced.

Table VIII.F-1. Summary of Market Impacts (2009, 2012, 2015, and 2020; 2003$)

| **Market** | **Engineering Cost Per Unit** | **Change in Price** | | **Change in Quantity** | |
|---|---|---|---|---|---|
| | | Absolute | Percent | Absolute | Percent |
| 2009 | | | | | |
| | ¢/gallon | ¢/gallon | | Million gallons | |
| Gasoline Fuel | | | | | |
| PADD 1 & 3 | 0.016¢ | 0.009¢ | 0.006% | -0.9 | -0.001% |
| PADD 2 | 0.091¢ | 0.050¢ | 0.033% | -2.7 | -0.007% |
| PADD 4 | 0.033¢ | 0.018¢ | 0.011% | -0.1 | -0.002% |
| PADD 5 (w/out CA) | 0.007¢ | 0.004¢ | 0.002% | -0.0 | 0.000% |
| | $/can | | | Thousand Cans | |
| Portable Fuel Containers | $0.77 | $0.76 | 6.9% | -8.0 | -0.07% |
| States with existing Programs | $2.70 | $2.68 | 57.5% | -104.7 | -0.57% |
| States without existing programs | | | | | |
| 2012 | | | | | |
| | ¢/gallon | | | Million Gallons | |
| Gasoline Fuel | | | | | |
| PADD 1 & 3 | 0.058¢ | 0.032¢ | 0.021% | -3.3 | -0.004% |
| PADD 2 | 0.308¢ | 0.168¢ | 0.111% | -9.7 | -0.022% |
| PADD 4 | 0.213¢ | 0.116¢ | 0.074% | -0.8 | -0.015% |
| PADD 5 (w/out CA) | 0.140¢ | 0.768¢ | 0.046% | -0.8 | -0.009% |
| | $/can | | | Thousand Cans | |

| | | | | | |
|---|---|---|---|---|---|
| Portable Fuel Containers | $0.77 | $0.76 | 6.9% | -8.5 | -0.07% |
| States with existing Programs | $2.70 | $2.68 | 57.5% | -111.1 | -0.57% |
| States without existing programs | | | | | |
| 2015 | | | | | |
| | ¢/gallon | | | Million Gallons | |
| Gasoline Fuel | | | | | |
| PADD 1 & 3 | 0.149¢ | 0.081¢ | 0.055% | -8.9 | -0.011% |
| PADD 2 | 0.307¢ | 0.167¢ | 0.111% | -10.4 | -0.022% |
| PADD 4 | 0.501¢ | 0.273¢ | 0.174% | -1.8 | -0.035% |
| PADD 5 (w/out CA) | 0.997¢ | 0.544¢ | 0.327% | -6.1 | -0.065% |
| | $/can | | | Thousand Cans | |
| Portable Fuel Containers | $0.21 | $0.20 | 1.9% | -2.4 | -0.02% |
| States with existing Programs | $1.53 | $1.52 | 32.5% | -66.7 | -0.32% |
| States without existing programs | | | | | |
| 2020 | | | | | |
| | ¢/gallon | | | Million Gallons | |
| Gasoline Fuel | | | | | |
| PADD 1 & 3 | 0.149¢ | 0.081¢ | 0.055% | -9.5 | -0.011% |
| PADD 2 | 0.307¢ | 0.167¢ | 0.111% | -10.7 | -0.022% |

| | | | | | |
|---|---|---|---|---|---|
| PADD 4 | 0.501¢ | 0.273¢ | 0.174% | -2.0 | -0.035% |
| PADD 5 (w/out CA) | 0.997¢ | 0.544¢ | 0.327% | -6.4 | -0.065% |
| Portable Fuel Containers | $/can | | | Thousand Cans | |
| States with existing Programs | $0.21 | $0.20 | 1.9% | -2.7 | -0.02% |
| States without existing programs | $1.53 | $1.52 | 32.5% | -73.6 | -0.32% |

*Economic Welfare Analysis*. In the economic welfare analysis we look at the costs to society of the emission control program in terms of losses to key stakeholder groups that are the producers and consumers in the gasoline and PFC markets. These surplus losses are combined with estimated vehicle compliance costs, gasoline fuel savings, and government revenue losses to estimate the net economic welfare impacts of the program. Detailed economic welfare results for the rule are presented in Appendix C and are summarized below.

The estimated annual net social costs (total social costs less gasoline fuel savings) for all years are presented in Table VIII.F-2. These social costs follow the trend of the fuel program compliance costs. Initially, the estimated social costs of the program are relatively small as the gasoline program begins to phase in. The net social costs increase to 2012, fall somewhat for 2013 and 2014 due to changes in the fuel program compliance costs, and then increase again in 2015, after which time the per-gallon costs are expected to be stable. Some of the decrease in social costs in 2014 is also due a decrease in costs

associated with the PFC program, since fixed costs are fully amortized by 2014. The slight decrease in 2020 is due to the end of the vehicle compliance costs, which are incurred in the 10-year period from 2010 through 2019.

Table VIII.F-2. Estimated Engineering Compliance and Social Costs Through 2035 (Including Fuel Savings; $million; 2003$)

| Year | Engineering Compliance Costs | Social Costs |
|---|---|---|
| 2007 | $29.5 | $29.5 |
| 2008 | $51.3 | $51.3 |
| 2009 | $99.0 | $98.9 |
| 2010 | $161.9 | $161.7 |
| 2011 | $152.6 | $152.4 |
| 2012 | $228.7 | $228.5 |
| 2013 | $190.9 | $190.8 |
| 2014 | $150.8 | $150.7 |
| 2015 | $350.8 | $350.7 |
| 2016 | $354.5 | $354.4 |
| 2017 | $358.0 | $357.9 |
| 2018 | $361.9 | $361.8 |

| Year | Engineering Compliance Costs | Social Costs |
|---|---|---|
| 2019 | $366.1 | $366.0 |
| 2020 | $359.5 | $359.4 |
| 2021 | $363.5 | $363.4 |
| 2022 | $367.1 | $367.0 |
| 2023 | $370.7 | $370.6 |
| 2024 | $374.7 | $374.6 |
| 2025 | $378.7 | $378.6 |
| 2026 | $383.1 | $383.0 |
| 2027 | $387.5 | $387.4 |
| 2028 | $391.6 | $391.4 |
| 2029 | $396.0 | $395.9 |
| 2030 | $400.1 | $400.0 |
| 2031 | $404.6 | $404.5 |
| 2032 | $409.2 | $409.1 |
| 2033 | $413.9 | $413.7 |
| 2034 | $418.6 | $418.4 |
| 2035 | $423.4 | $423.2 |

| Year | Engineering Compliance Costs | Social Costs |
|---|---|---|
| 3% NPV (2006 -2035) | $5,356.8 | $5,354.6 |
| 7% NPV (2006 -2035) | $2,901.0 | $2,899.7 |

Table VIII.F-3 shows how the social costs are expected to be shared across stakeholders, for selected years. Information for all years can be found in Appendix C. According to these results, consumers are expected to bear approximately 99 percent of the cost of the PFC program. This reflects the inelastic price elasticity on the demand side of the market and the elastic price elasticity on the supply side. The burden of the gasoline fuel program is expected to be shared more evenly, with about 54.5 percent expected to be borne by consumers and about 45.5 percent expected to be borne by producers. In all years, the estimated loss to consumer welfare will be offset somewhat by the gasoline fuel savings associated with PFCs. Beginning at about $11 million per year, these savings increase to about $76 million by 2015 as compliant PFCs are phased in. These savings continue for the life of the PFCs; total annual savings increase as the number of cans increases.

Table VIII.F-3. Summary of Estimated Social Costs, 2009, 2012, 2015, and 2020 ($million; 2003$)

| **Market** | **Change in Consumer Surplus** | **Change in Producer Surplus** | **Total** |
|---|---|---|---|
| 2009 | | | |

| Market | Change in Consumer Surplus | Change in Producer Surplus | Total |
|---|---|---|---|
| Gasoline US | -$28.5 | -$23.8 | -$52.3 |
| | *(54.6%)* | *(45.4%)* | |
| PADD 1 & 3 | -$6.7 | -$5.6 | -$12.2 |
| PADD 2 | -$20.6 | -$17.2 | -$37.8 |
| PADD 4 | -$0.9 | -$0.7 | -$1.6 |
| PADD 5 (w/out CA) | -$0.3 | -$0.3 | -$0.6 |
| Portable Fuel Containers US | -$57.5 | -$0.4 | -$57.9 |
| | *(99.3%)* | *(0.7%)* | |
| States with existing programs | -$8.9 | -$0.1 | -$8.9 |
| States without existing programs | -$48.7 | -$0.3 | -$49.0 |
| **Subtotal** | **-$86.1** | **-$24.1** | **-$110.2** |
| | ***(78.1%)*** | ***(22%)*** | |
| Fuel Savings | | | $11.3 |
| Vehicle Program | | | $0 |
| **Total** | | | **-$98.9** |
| 2012 | | | |
| Gasoline US | -$110.7 | -$92.3 | -$203.0 |
| | *(54.5%)* | *(45.5%)* | |
| PADD 1 & 3 | -$24.8 | -$20.7 | -$45.5 |
| PADD 2 | -$73.2 | -$61.0 | -$134.2 |
| PADD 4 | -$5.9 | -$4.9 | -$10.9 |
| PADD 5 (w/out CA) | -$6.8 | -$4.7 | -$12.4 |
| Portable Fuel Containers US | -$61.1 | -$0.4 | -$61.5 |
| | *(99.3%)* | *(0.7%)* | |
| States with existing programs | -$9.4 | -$0.1 | -$9.5 |

| Market | Change in Consumer Surplus | Change in Producer Surplus | Total |
|---|---|---|---|
| States without existing programs | -$51.7 | -$0.4 | -$52.1 |
| **Subtotal** | **-$171.8** | **-$92.7** | **-$264.5** |
| | ***(65.0%)*** | ***(35.0%)*** | |
| Fuel Savings | | | $48.5 |
| Vehicle Program | | | -$12.5 |
| **Total** | | | **-$228.5** |
| 2015 | | | |
| Gasoline US | -$207.0 | -$172.5 | -$379.4 |
| | *(54.5%)* | *(45.5%)* | |
| PADD 1 & 3 | -$66.3 | -$55.3 | -$121.6 |
| PADD 2 | -$75.9 | -$63.2 | -$139.1 |
| PADD 4 | -$14.5 | -$12.1 | -$26.6 |
| PADD 5 (w/out CA) | -$50.3 | -$41.9 | -$92.2 |
| Portable Fuel Containers US | -$33.7 | -$0.2 | -$34.0 |
| | *(99.3%)* | *(0.7%)* | |
| States with existing programs | -$2.7 | $0.0 | -$2.7 |
| States without existing programs | -$31.0 | -$0.2 | -$31.3 |
| **Subtotal** | **-$240.7** | **-$172.7** | **-$413.4** |
| | ***(58.2%)*** | ***(41.8%)*** | |
| Fuel Savings | | | $75.5 |
| Vehicle Program | | | -$12.9 |
| **Total** | | | **-$350.7** |
| 2020 | | | |
| Gasoline US | -$219.6 | -$183.0 | -$402.6 |
| | *(54.5%)* | *(45.5%)* | |

| Market | Change in Consumer Surplus | Change in Producer Surplus | Total |
|---|---|---|---|
| PADD 1 & 3 | -$70.4 | -$58.6 | -$129.0 |
| PADD 2 | -$80.5 | -$67.1 | -$147.6 |
| PADD 4 | -$15.4 | -$12.8 | -$28.2 |
| PADD 5 (w/out CA) | -$53.4 | -$44.5 | -$97.8 |
| Portable Fuel Containers US | -$37.2 *(99.3%)* | -$0.2 *(0.7%)* | -$37.5 |
| States with existing programs | -$3.0 | $0.0 | -$3.0 |
| States without existing programs | -$34.3 | -$0.2 | -$34.5 |
| **Subtotal** | **-$256.8** ***(58.4%)*** | **-$183.3** ***(41.6%)*** | **-$440.1** |
| Fuel Savings | | | $80.7 |
| Vehicle Program | | | -$0 |
| **Total** | | | **-$359.4** |

The present value of net social costs (discounted back to 2006) of the standards through 2035, contained in Table VIII.F-2, is estimated to be about $5.4 billion (2003$). This present value is calculated using a social discount rate of three percent and the stream of economic welfare costs through 2035. We also performed an analysis using a seven percent social discount rate.[247] Using that discount rate, the present value of the net social costs through 2035 is estimated to be about $2.9 billion (2003$).

[247] EPA presents the present value of cost and benefits estimates using both a three percent and a seven percent social discount rate. According to OMB Circular A-4, "the 3 percent discount rate represents the 'social rate of time preference'… [which] means the rate at which 'society' discounts future consumption flows to their present value"; "the seven percent rate is an estimate of the average before-tax rate of return to private capital in the U.S. economy … [that] approximates the opportunity cost of capital."

Table VIII.F-4. Net Present of Estimated Social Costs 2007 through 2035, Discounted to 2006 ($million; 2003$)

| **Market** | **Change in Consumer Surplus** | **Change in Producer Surplus** | **Total** |
|---|---|---|---|
| Gasoline, U.S. | -$3,115.4 *(54.5%)* | -$2,596.2 *(45.5%)* | -$5,711.6 |
| PADD 1 & 3 | -$959.7 | -$799.8 | -$1,759.5 |
| PADD 2 | -$1,260.4 | -$1,050.4 | -$2,310.8 |
| PADD 4 | -$210.8 | -$175.6 | -$386.4 |
| PADD 5 (w/out CA) | -$229.5 | -$570.4 | -$1,254.8 |
| | -$684.5 | | |
| Portable Fuel Containers US | -$754.9 *(99.3%)* | -$5.0 *(0.7%)* | -$759.9 |
| States with existing programs | -$78.7 | -$0.5 | -$79.3 |
| States without existing programs | -$676.2 | -$4.5 | -$680.7 |
| Subtotal | -$3870.3 *59.8%* | -$2,601.2 *40.2%* | -$6,471.6 |
| Fuel Savings | $1,208.0 | | $1,208.0 |
| Vehicle Program | | -$91.1 | -$91.1 |
| Total | -$2,662.3 | -$2,692.3 | -$5,354.6 |

Table VIII.F-4 shows the distribution of total surplus losses for the cumulative net social costs of the rule. This analysis includes the estimated social costs from 2007 through 2035, discounted to 2006 at a 3 percent discount rate. These results suggest that consumers will bear about 60 percent of the total social costs associated with the PFC and

gasoline fuel programs for that period. The consumer share of the NPV social costs is about $3,870 million, or about 60 percent of the total. Of that loss of consumer surplus, about $3,115 million (about 80 percent) is from the gasoline fuel program. When the total costs of the program are taken into account, including the fuel savings and the vehicle program costs, the loss of consumer surplus decreases to about $2,662.3 million (about 50 percent of the social costs of the program).

## IX. Public Participation

Many interested parties participated in the rulemaking process that culminates with this final rule. This process provided opportunity for submitting written public comments following the proposal that we published on March 29, 2006 (71 FR 15804). We considered these comments in developing the final rule. In addition, we held a public hearing on the proposed rulemaking on April 12, 2006, and we have considered comments presented at the hearing.

Throughout the rulemaking process, EPA met with stakeholders including representatives from the fuel refining and distribution industry, automobile industry, emission control manufacturing industry, gas can industry, environmental organizations, states, interests, and others.

We have prepared a detailed Summary and Analysis of Comments document, which describes comments we received on the proposal and our response to each of these

comments. The Summary and Analysis of Comments is available in the docket for this rule at the internet address listed under **ADDRESSES**, as well as on the Office of Transportation and Air Quality website (www.epa.gov/otaq/toxics.htm#mobile). In addition, comments and responses for key issues are included throughout this preamble.

## X. Statutory and Executive Order Reviews

### A. Executive Order 12866: Regulatory Planning and Review

Under section 3(f)(1) of Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), this action is an "economically significant regulatory action" because it is likely to "have an annual effect on the economy of $100 million or more" and "raise novel legal and policy issues." Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under EO 12866, and any changes made in response to OMB recommendations have been documented in the docket for this action.

A final Regulatory Impact Analysis has been prepared and is available in the docket for this rulemaking and at the docket internet address listed under **ADDRESSES**.

### B. Paperwork Reduction Act

The information collection requirements in this 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 information collection requirements are not enforceable until OMB approves them.

The Agency will collect information to ensure compliance with the provisions in this rule. This includes a variety of requirements, both for vehicle manufacturers, fuel producers, and portable fuel container manufacturers. Information-collection requirements related to vehicle manufacturers are in EPA ICR #0783.52 (OMB Control Number 2060-0104); requirements related to fuel producers are in EPA ICR #1591.22 (OMB Control Number 2060-0277); requirements related to portable fuel container manufacturers are in EPA ICR #2213.02. For vehicle and fuel standards, section 208(a) of the Clean Air Act requires that manufacturers provide information the Administrator may reasonably require to determine compliance with the regulations; submission of the information is therefore mandatory. We will consider confidential all information meeting the requirements of section 208(c) of the Clean Air Act. For portable fuel container standards, recordkeeping and reporting requirements for manufacturers would be pursuant to the authority of sections 183(e) and 111 of the Clean Air Act.

As shown in Table X.B–1, the total annual burden associated with this rule is about 28,000 hours and $1,993,723, based on a projection of 521 respondents. The estimated burden for vehicle manufacturers and fuel producers is a total estimate for both new and existing reporting requirements. The portable fuel container requirements represent our first regulation of these containers, so those burden estimates reflect only new reporting requirements. Burden means the total time, effort, or financial resources

expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

TABLE X.B–1.—ESTIMATED BURDEN FOR REPORTING AND RECORDKEEPING REQUIREMENTS

| Industry sector | Number of respondents | Annual burden hours | Annual costs |
|---|---|---|---|
| Vehicles…… | 35 | 770 | $80,900 |
| Fuels……. | 476 | 26,592 | 1,888,032* |
| Portable fuel containers…..….. | 10 | 638 | 24,791 |
| Total…… | 521 | 28,000 | 1,993,723 |

*Does not include non-postage purchased services of approximately $1,988,000.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The

OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR chapter 15.

When this ICR is approved by OMB, the Agency will publish a technical amendment to 40 CFR part 9 and 48 CFR chapter 15 in the **Federal Register** to display the OMB control number for the approved information collection requirements contained in this final rule. EPA received various comments on the rulemaking provisions covered by the ICRs, but no comments on the paperwork burden or other information in the ICRs. All comments that were submitted to EPA are considered in the relevant Summary and Analysis of Comments, which can be found in the docket.

C. Regulatory Flexibility Act (RFA), as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 USC 601 et seq.

1. Overview

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) a small business as defined by the Small Business Administration's (SBA) regulations at 13 CFR 121.201 (see table below); (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field. The following table provides an overview of the primary SBA small business categories potentially affected by this regulation:

| Industry | Defined as small entity by SBA if less than or equal to: | NAICS Codes [a] |
|---|---|---|
| Light-duty vehicles: | | |
| - vehicle manufacturers | 1,000 employees | 336111 |
| (*including small volume manufacturers*) | | |
| - independent commercial importers | $6 million annual sales | 811111, 811112, 811198 |
| - alternative fuel vehicle converters | 100 employees | 424720 |
| | 1,000 employees | 335312 |
| | $6 million annual sales | 811198 |
| Gasoline fuel refiners | 1500 employees [b] | 324110 |
| Portable fuel container manufacturers: | | |
| - plastic container manufacturers | 500 employees | 326199 |
| - metal gas can manufacturers | 1,000 employees | 332431 |

Notes:

[a] North American Industrial Classification System

[b] EPA has included in past fuels rulemakings a provision that, in order to qualify for EPA's small refiner flexibilities, a refiner must also produce no greater than 155,000 bpcd crude capacity.

Pursuant to section 603 of the RFA, EPA prepared an initial regulatory flexibility analysis (IRFA) for the proposed rule and convened a Small Business Advocacy Review Panel (SBAR Panel, or 'the Panel') to obtain advice and recommendations of

representatives of the regulated small entities. A detailed discussion of the Panel's advice and recommendations is found in the Panel Report (see Docket EPA-HQ-OAR-2005-0036). A summary of the Panel's recommendations is presented at 71 FR 15922 (March 29, 2006).

As required by section 604 of the RFA, we also prepared a final regulatory flexibility analysis (FRFA) for today's final rule. The FRFA addresses the issues raised by public comments on the IRFA, which was part of the proposal of this rule. The FRFA is available for review in Chapter 14 of the RIA and is summarized below.

Key elements of our FRFA include:

- a description of the reasons the Agency is considering this action, and the need for, and objectives of, the rule;
- a summary of the significant issues raised by the public comments on the IRFA, a summary of the Agency's assessment of those issues, and any changes made to the proposed rule as a result of those comments;
- a description of the types and number of small entities to which the rule will apply;
- a description of the reporting, recordkeeping, and other compliance requirements of the rule;
- an identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap, or conflict with the rule; and

- a description of the steps taken to minimize the significant economic impact on small entities consistent with the stated objectives of the applicable statutes.

2. The Need For and Objectives of This Rule

Mobile sources emit air toxics that can cause cancer and other serious health effects (Section III of this preamble and Chapter 1 of the Regulatory Impact Analysis for this rule describe these compounds and their health effects). Mobile sources contribute significantly to the nationwide risk from breathing outdoor sources of air toxics. In this action we are finalizing: standards to limit the exhaust hydrocarbons from passenger vehicles during cold temperature operation; evaporative hydrocarbon emissions standards for passenger vehicles; limiting the average annual benzene content of gasoline; and hydrocarbon emissions standards for gas cans that would reduce evaporation, permeation, and spillage from these containers. (Detailed discussions of each of these programs are in sections V, VI, and VII of the preamble and Chapters 5, 6, and 7 of the RIA). Standards for vehicles and gasoline benzene control are being pursued under section 202(l)(2) of the Clean Air Act (CAA), which directs EPA to establish requirements to control emissions of mobile source air toxics from new motor vehicles and fuels. Controls for gas cans are being pursued under CAA section 183(e), the provisions applying to consumer and commercial products.

3. Summary of the Significant Issues Raised By the Public Comments

We did not receive comments on the proposed flexibilities and hardships for small volume vehicle manufacturers or gas can manufacturers. We received comments from small refiners supporting the inclusion of flexibility provisions and hardships for small gasoline refiners. These comments generally supported additional lead-time, credit generation provisions (early credit generation and extra credit life for credits generated by or transferred to small refiners), and a review of the credit program.

Small refiners also indicated that they could incur significant economic impact in complying with the 1.3 vol% refinery maximum average benzene standard. Our economic analysis indicates that most small refiners will be able to comply with this standard without incurring significant adverse economic impact. We also believe that allowing additional lead time (until July 1, 2016) to meet this standard ameliorates potential economic impact. In addition, we believe that any other refiners that still demonstrate instances of severe economic impact can be accommodated through the hardship relief provision set out in the regulations at §80.1335. This issue is discussed in more detail in section VI.A.3, in chapter 14 of the final RIA, and in individual comment responses.

We also received comments regarding the fact that two recent statutes use definitions that are not the same as the small refiner criteria that we proposed. The commenters generally stated that EPA should use one of the definitions from those statutes. However, we do not believe that it would be appropriate to change the small

refiner employee count or crude capacity limit criteria to fit either of those programs' definitions; rather, we believe that it is prudent to continue using criteria similar to our current and previous fuel programs. (Please see section VI.A.3.a.i above for a more detailed discussion of this comment and our response.)

4. Summary of Regulated Small Entities

The following section discusses the small entities directly regulated by this action.

a. Highway Light-Duty Vehicles

In addition to the major vehicle manufacturers, three distinct categories of businesses relating to highway light-duty vehicles will be covered by the new vehicle standards: small volume manufacturers (SVMs), independent commercial importers (ICIs), and alternative fuel vehicle converters. SVMs are companies that sell less than 15,000 vehicles per year, as defined in past EPA regulations, and this status allows vehicle models to be certified under a slightly simpler certification process. Independent commercial importers are companies that hold a Certificate (or certificates) of Conformity permitting them to alter imported vehicles to meet U.S emission standards. Alternative fuel vehicle converters are businesses that convert gasoline or diesel vehicles to operate on alternative fuel, and converters must seek a certificate for all of their vehicle models. From an assessment performed for our SBREFA Panel process, we continue to believe that there are about 14 SVMs, 10 alternative fuel vehicle converters, and 10 ICIs.

Of these, EPA believes 5 SVMs, 6 converters, and all 10 ICIs would meet the small-entity criteria as defined by SBA (no major vehicle manufacturers meet the small-entity criteria). It is believed that these small entities comprise about 0.02 percent of the total light-duty vehicle sales in the U.S. for the year 2004.

b. Gasoline Refiners

EPA's current assessment is that 14 refiners (owning 16 refineries) meet SBA's criterion of having 1,500 employees or less and our criterion of having a crude capacity of less than or equal to 155,000 bpcd. It should be noted that because of the dynamics in the refining industry (i.e., mergers and acquisitions) and decisions by some refiners to enter or leave the gasoline market, the actual number of refiners that ultimately qualify for small refiner status under an MSAT program could be different than these estimates. Current data further indicates that these refiners produce about 2.5 percent of the total gasoline pool.

c. Portable Fuel Container Manufacturers

EPA conducted an industry profile to identify the manufacturers of portable fuel containers -- 98 percent are plastic containers and 2 percent are metal gas cans. Using this industry profile, EPA identified 9 domestic manufacturers and 1 foreign manufacturer. Of these 9 U.S. manufacturers, 8 meet the SBA definition of a small

entity. One small business accounted for over 50 percent of the U.S. sales in 2002, and the other small entities comprised about 10 percent of U.S. sales.

5. Description of the Reporting, Recordkeeping, and Other Compliance Requirements of the Rule

For highway light-duty vehicles, the reporting, recordkeeping, and compliance requirements prescribed for this category in 40 CFR 86 will be continued. Key among these requirements are certification requirements and provisions related to reporting of production, emissions information, flexibility use, etc.

For any fuel control program, EPA must have assurance that fuel produced by refiners meets the applicable standard, and that the fuel continues to meet the standard as it passes downstream through the distribution system to the ultimate end user. As stated in section VI above, the recordkeeping, reporting and compliance provisions of the MSAT program will be consistent with those currently in place for existing fuel programs. These provisions include: the submission of refinery pre-compliance reports (similar to those required under the highway and nonroad diesel fuel programs), the submission of refinery batch reports, small refiner status and small refiner baseline applications, and retention of all records for this program for five years.

For portable fuel containers, requirements similar to those in the California program (such as submitting emissions testing information, reporting of certification families, and use of transition provisions) were proposed and are being finalized today.

6. Relevant Federal Rules

We are aware of a few other current or proposed Federal rules that are related to this rule. The primary related federal rules are the first MSAT rule (66 FR 17230, March 29, 2001), the Tier 2 Vehicle/Gasoline Sulfur rulemaking (65 FR 6698, February 10, 2000), the fuel sulfur rules for highway diesel (66 FR 5002, January 18, 2001) and nonroad diesel (69 FR 38958, June 29, 2004), the Reformulated Gasoline and Anti-dumping rule (59 FR 7813 and 59 FR 7860, February 16, 1994), and the Cold Temperature Carbon Monoxide Rulemaking (57 FR 31888, July 17, 1992).

In addition, the Evaporative Emissions Streamlining Direct Final Rulemaking was issued on December 8, 2005 (70 FR 72917). For portable fuel containers, the Occupational Safety and Health Administration (OSHA) has safety regulations for containers used in workplace settings. Containers that meet OSHA's requirements, commonly called safety cans, are exempt from the California program, and we are thus exempting them from the EPA program.

Section 1501 of the Energy Policy Act of 2005 requires the Agency to implement a Renewable Fuels Standard (RFS) program. Beginning in 2006, this program will

require increasing volumes of renewable fuel to be used in gasoline, until a total of 7.5 billion gallons is required in 2012. The most prevalent renewable fuel is expected to be ethanol. There are a wide variety of potential impacts of ethanol blending on MSAT emissions that will be evaluated as part of the RFS rulemaking process. In general, as ethanol use increases, other sources of octane in gasoline can decrease. Depending on these changes, the impact on benzene emissions will vary. The specific effects of ethanol on benzene are addressed in the Regulatory Impact Analysis (RIA) to this rule and in other fuels rulemakings, such as the RFS rule (71 FR 55552, September 22, 2006).

### 7. Steps Taken to Minimize the Significant Economic Impact on Small Entities

#### a. Significant Panel Findings

The SBAR Panel considered many regulatory options and flexibilities that would help mitigate potential adverse effects on small businesses as a result of this rule. During the SBREFA Panel process, the Panel sought out and received comments on the regulatory options and flexibilities that were presented to Small Entity Representatives (SERs) and Panel members. The major flexibilities and hardship relief provisions that were recommended by the Panel were proposed and are generally being finalized today (for more information regarding the Panel process, see Section 9 of the SBREFA Final Panel Report, which is available in the public docket for this rule).

b. Outreach With Small Entities (and the Panel Process)

As required by section 609(b) of the RFA as amended by SBREFA, EPA conducted outreach to small entities and convened a SBAR Panel prior to proposing the MSAT rule to obtain advice and recommendations of representatives of the small entities that potentially would be subject to the rule's requirements.

As part of the SBAR Panel process, we conducted outreach with representatives from the various small entities that would be affected by the rule. We met with these SERs to discuss the potential rulemaking approaches and potential options to decrease the impact of the rulemaking on their industries. The Panel received written comments from the SERs, specifically on regulatory alternatives that could help to minimize the rule's impact on small businesses.

In general, SERs representing the portable fuel container industry raised concerns on how the MSAT rule's requirements would be coordinated with the California program and other requirements, and that there should be adequate opportunity for sell through at the start of the program. The small volume manufacturer, ICI, and vehicle converter SERs that participated had questions about the form of the new standards for light-duty vehicles, specifically testing and certification requirements. The gasoline refiner SERs generally stated that they believed that small refiners would face challenges in meeting a new standard. More specifically, they raised the concern that the rule could be very costly and dependence on credits may not be a comfortable situation; they were also

concerned about the timing of the standards for this rule, given other upcoming fuel standards.

The Panel agreed that EPA should consider the issues raised by the SERs (and discussions had by the Panel itself) and that EPA should consider comments on flexibility alternatives that would help to mitigate any negative impacts on small businesses. Alternatives discussed throughout the Panel process included those offered in previous or current EPA rulemakings, as well as alternatives suggested by SERs and Panel members, and the Panel recommended that all be considered in the development of the rule.

A summary of the Panel's recommendations, what the Agency proposed, and what is being finalized today is discussed below. A detailed discussion of the regulatory alternatives and hardship provisions discussed and recommended by the Panel can be found in the SBREFA Final Panel Report. A complete discussion of the transition and hardship provisions that are being finalized today can be found in Sections V, VI, and VII (vehicle, fuels, and portable fuel container sections) of this preamble.

c. Small Business Flexibilities

i. Highway Light-Duty Vehicles

(a) Highway Light-Duty Vehicle Flexibilities

For certification purposes (and for the sake of simplicity for Panel discussions regarding flexibility options), SVMs include ICIs and alternative fuel vehicle converters since they sell less than 15,000 vehicles per year. Similar to the flexibility provisions implemented in the Tier 2 rule, the Panel recommended that we allow SVMs (includes all vehicle small entities that would be affected by this rule, which are the majority of SVMs) the following flexibility options for meeting cold temperature NMHC standards and evaporative emission standards:

*Cold NMHC Standards*- The Panel recommended that SVMs simply comply with the standards with 100 percent of their vehicles during the last year of the four-year phase-in period. For example, if the standard for light-duty vehicles and light light-duty trucks (0 to 6,000 pounds GVWR) were to begin in 2010 and end in 2013 (25%, 50%, 75%, 100% phase-in over four years), the SVM provision would be 100 percent in 2013. If the standard for heavy light-duty trucks and medium-duty passenger vehicles (greater than 6,000 pounds GVWR) were to start in 2012 (25%, 50%, 75%, 100% phase-in over four years), the SVM provision would be 100 percent in 2015.

*Evaporative Emission Standards*- The Panel recommended that since the evaporative emissions standards will not have phase-in years, we allow SVMs to simply comply with standards during the third year of the program (we have implemented similar provisions in past rulemakings). For a 2009 start date for light-duty vehicles and light light-duty trucks, SVMs would need to meet the evaporative emission standards in 2011. For a

2010 implementation date for heavy light-duty trucks and medium-duty passenger vehicles, SVMs would need to comply in 2012.

We proposed the recommendations given by the Panel for these small business entities. We agree that SVMs may need additional lead time flexibility and the new cold NMHC standards for LDVs and LLDTs will begin in model year 2010 and end in model year 2013, therefore we are finalizing (as proposed) that the SVM provision would be 100 percent in model year 2013. Also, since the new cold NMHC standard for HLDTs and MDPVs will begin in 2012, we are finalizing as proposed that the SVM provision will be 100 percent in model year 2015. We believe that the Panel's recommendation for flexibilities with regard to the evaporative emission standards is reasonable. Therefore, for a 2009 model year start date for LDVs and LLDTs we proposed, and are finalizing, that SVMs meet the evaporative emission standards in model year 2011. For a model year 2010 implementation date for HLDTs and MDPVs, we proposed and are finalizing that SVMs comply in model year 2012. (Please see section V.E.1 for a greater discussion on flexibility provisions for small volume manufacturers.)

(b) Highway Light-Duty Vehicle Hardships

In addition, the Panel recommended that hardship flexibility provisions be extended to SVMs for the cold temperature VOC and evaporative emission standards. The provisions that the Panel recommended are:

SVMs would be allowed to apply (EPA would need to review and approve application) for up to an additional 2 years to meet the 100 percent phase-in requirements for cold VOC and the delayed requirement for evaporative emissions. Appeals for such hardship relief must be made in writing, must be submitted before the earliest date of noncompliance, must include evidence that the noncompliance will occur despite the manufacturer's best efforts to comply, and must include evidence that severe economic hardship will be faced by the company if the relief is not granted.

We proposed the Panel-recommended flexibility and hardship provisions described above, and we are finalizing these provisions in this action. (Please see section V.E.2 for a greater discussion on the hardship provisions for small volume manufacturers.)

(c) Special Provisions for Independent Commercial Importers (ICIs)

Although the SBAR panel did not specifically recommend it, we proposed, and are finalizing, that ICIs may participate in the averaging, banking, and trading (ABT) program for cold temperature NMHC fleet average standards, but with appropriate constraints to ensure that fleet averages will be met. The existing regulations for ICIs specifically prohibit ICIs from participating in emission-related averaging, banking, and trading programs unless specific exceptions are provided. However, an exception for

ICIs to participate in an averaging, banking, and trading program was made for the Tier 2 NOx fleet average standards, and today we are finalizing as proposed to apply a similar exception for the cold temperature NMHC fleet average standards. We also proposed, and are finalizing, that ICIs not be allowed to utilize the deficit carry-forward provisions of the ABT program. (Please see section V.E.3 for a greater discussion on the hardship provisions for small volume manufacturers.)

ii. Gasoline Refiners

(a) Gasoline Refiner Flexibilities

The Panel recommended that EPA propose certain provisions to encourage early compliance with lower benzene standards. The Panel recommended that EPA propose that small refiners be afforded the following flexibility options to help mitigate the impacts on small refiners:

*Delay in Standards*- The Panel recommended that a four-year delay period be proposed for small refiners (in order to allow for a review of the ABT program, as discussed below, to occur one year after implementation but still roughly three years prior to the small refiner compliance deadline). It was noted by the small refiners that three years are generally needed for small refiners to obtain financing and perform engineering and construction. The Panel was also in support of allowing for refinery expansion within the delay option, and recommended that refinery expansion be provided for in the rule.

*Early ABT Credits*- The Panel recommended that small refiners be eligible to generate early credits if they take some steps to meet the 0.62 vol% benzene requirement prior to the effective date of the standard. Depending on the start date of the program, and coupled with the four-year delay option for small refiners, a small refiner could have a total credit generation period of five to seven years. The Panel was also in support of allowing refiners (small, as well as non-small, refiners) to generate credits for reductions to their benzene emissions levels, rather than credits only for meeting the 0.62 vol% benzene standard that is set by the rule.

*ABT Program Review*- The Panel recommended a review of the credit trading program and small refiner flexibility options one year after the general program starts. The Panel further recommended that the review could take into account the number of early credits generated, as well as the number of credits generated and sold during the first year of the program. The Panel recommended that if the review were to conclude that changes to either the program or the small refiner provisions were necessary, EPA should also consider some of the suggestions provided by the small refiners (their comments are located in Appendix E of the Final Panel Report), such as:

- The general MSAT program should require pre-compliance reporting (similar to EPA's highway and nonroad diesel rules);
- Following the review, EPA should revisit the small refiner provisions if it is found that the credit trading market does not exist, or if credits are only available at a cost that would not allow small refiners to purchase credits for compliance;

- The review should offer ways either to help the credit market, or help small refiners gain access to credits (e.g., EPA could 'create' credits to introduce to the market, EPA could impose additional requirements to encourage trading with small refiners, etc.).
- In addition, the Panel recommended that EPA consider in this rulemaking establishing an additional hardship provision to assist those small refiners that cannot comply with the MSAT with a viable credit market. (This suggested hardship provision was also suggested by the small refiners in their comments, located in Appendix E of the Final Panel Report). This hardship provision would address concerns that, for some small refineries, compliance may be technically feasible only through the purchase of credits and it may not be economically feasible to purchase those credits. This flexibility would be provided to a small refiner on a case-by-case basis following the review and based on a summary, by the refiner, of technical or financial infeasibility (or some other type of similar situation that would render its compliance with the standard difficult). This hardship provision might include further delays and/or a slightly relaxed standard on an individual refinery basis for a duration of two years; in addition, this provision might allow the refinery to request, and EPA grant, multiple extensions of the flexibility until the refinery's material situation changes. The Panel also stated that it understood that EPA may need to modify or rescind this provision, should it be implemented, based on the results of the program review.

We proposed and are finalizing the recommended four-year period of additional lead time (until January 1, 2015, four years after the general program start date) for compliance with the 0.62 vol% benzene standard. With respect to the 0.62 vol% standard, we agreed that a four-year period of additional lead time for small refiners would provide these refiners with roughly three years of lead time following the review of the credit program to complete capital projects if necessary or desirable to meet the 0.62 vol% benzene standard rather than to rely on credits. Further, we are finalizing an additional 18 months of lead time for small refiners to comply with the 1.3 vol% maximum average benzene standard (similar to 18-month lead-time afforded under the general program), until July 1, 2016. We likewise believe that this additional lead-time will provide small refiners with appropriate additional opportunity to raise capital and complete projects necessary to comply with the maximum average benzene standard.

With regard to credits, we proposed the Panel's recommendation that small refiners that take steps to meet the 0.62 vol% benzene requirement prior to January 1, 2015 would be eligible to generate early credits, and that credits remain available for small refiners for an additional amount of time. Early credit generation opportunities will provide more credits for the MSAT ABT program and will help to achieve the air quality goals of the MSAT program earlier than otherwise required. Therefore, we are finalizing an early credit generation provision for small refiners. Further, we believe that some incentive to trade credits with small refiners is warranted to help ensure that sufficient credits are available. Therefore, as stated above in section VI.A.3, we are finalizing the proposed provision that standard credits that are traded to, and ultimately used by, small

refiners have an additional credit life of two years beyond the limit that is otherwise allowed.

We proposed that we would perform a review of the ABT program (and thus, the small refiner flexibility options) by 2012, one year after the general program begins. We are finalizing this provision today. In part to support this review, we are also requiring that refiners submit pre-compliance reports. If, following the review, EPA finds that the credit market is not adequate to support the small refiner provisions, we will revisit the provisions to determine whether or not they should be altered or whether EPA can assist the credit market (and small refiners' access to credits) to enable a successful ABT program. We are finalizing an additional hardship provision to assist small refiners if it is found that some small refiners still cannot comply with the 0.62 vol% benzene standard even with a viable credit market. The provision will only be available following the ABT program review and will only be afforded to small refiners on a case-by-case basis, and is in addition to the general refiner hardship provisions that are available to all refiners. Please see section VI.A.3.a.iii of this preamble for a more detailed discussion of this hardship provision.

(b) Gasoline Refiner Hardships

During the Panel process, we stated that we intended to propose the extreme unforeseen circumstances hardship and extreme hardship provisions (for all gasoline refiners and importers), similar to those in prior fuels programs. A hardship based on

extreme unforeseen circumstances is intended to provide short-term relief due to unanticipated circumstances beyond the control of the refiner, such as a natural disaster or a refinery fire; an extreme hardship is intended to provide short-term relief based on extreme circumstances (e.g., extreme financial problems, extreme operational or technical problems, etc.) that impose extreme hardship and thus significantly affect a refiner's ability to comply with the program requirements by the applicable dates. The Panel agreed with the proposal of such provisions and recommended that we include them in the MSAT rulemaking; thus, we proposed these provisions.

We are finalizing the extreme hardship provision and the extreme unforeseen circumstances hardship provision with some modifications, as this final rule includes a 1.3 vol% refinery maximum average benzene standard. As discussed in more detail in section VI.A.3.b, relief will be granted on a case-by-case basis; however, it may differ somewhat depending upon whether a refiner applies for hardship relief for the 0.62 vol% benzene standard or for the 1.3 vol% refinery maximum average standard (while a refiner may apply for relief from both standards, hardship relief will be addressed independently for each standard). This is partly due to the fact that a refiner may use credits to meet the 0.62 vol% benzene standard, but credits cannot be used for compliance with the 1.3 vol% refinery maximum average.

Extreme hardship circumstances could exist based on severe economic or physical lead time limitations of the refinery to comply with the required benzene standards at the start of the program. For relief from the 0.62 vol% benzene standard in extreme hardship

circumstances, relief will likely be in the form of an extension of the one-year deficit carry-forward allowed by the rule. Relief from the 1.3 vol% refinery maximum average benzene standard in extreme hardship circumstances would consist of additional time to comply with the 1.3 vol% refinery maximum average. Refiners must apply by January 1, 2008 (or, January 1, 2013 for approved small refiners) for extreme hardship relief from the 1.3 vol% refinery maximum average standard, as this provision is intended to address unusual circumstances that should be apparent now, or well before the standard takes effect.

The extreme unforeseen circumstances hardship is available to both refiners and importers, and is intended to provide relief in extreme and unusual circumstances outside a refiner or importer's control that could not have been avoided through the exercise of due diligence. Hardship relief for the 0.62 vol% benzene standard will allow a deficit to be carried forward for an extended, but limited, time period (more than the one year allowed by the rule). Relief from the 1.3 vol% refinery maximum average benzene standard based on unforeseen circumstances will be granted on a case-by-case basis, following an assessment of the hardship application, and would generally be in the form of an extension of time to comply with the standard.

iii. Portable Fuel Containers

(a) Portable Fuel Container Flexibilities

Since nearly all portable fuel container manufacturers are small entities and they account for about 60 percent of sales, the Panel planned to extend the flexibility options to all portable fuel container manufacturers. Moreover, implementation of the program would be much simpler by doing so. The recommended flexibilities are the following:

*Design Certification*- The Panel recommended that we propose to permit portable fuel container manufacturers to use design certification in lieu of running any or all of the durability aging cycles. Manufacturers could demonstrate the durability of their gas cans based in part on emissions test data from designs using the same permeation barriers and materials. Under a design-based certification program a manufacturer would provide evidence in the application for certification that their container would meet the applicable standards based on its design (e.g., use of a particular permeation barrier). The manufacturer would submit adequate engineering and other information about its individual design such that EPA could determine that the emissions performance of their individual design would not be negatively impacted by slosh, UV exposure, and/or pressure cycling (whichever tests the manufacturer is proposing to not run prior to emissions testing).

*Broaden Certification Families*- This approach would relax the criteria used to determine what constitutes a certification family. It would allow small businesses to limit their certification families (and therefore their certification testing burden), rather than testing all of the various size containers in a manufacturer's product line. Some small entities may be able to put all of their various size containers into a single certification family.

Manufacturers would then certify their containers using the "worst case" configuration within the family. To be grouped together, containers would need to be manufactured using the same materials and processes even though they are of different sizes.

*Additional Lead-time*- Since it may take additional time for the portable fuel container SERs to gather information to fully evaluate whether or not additional lead-time is needed beyond the 2009 start date, the Panel recommended that we discuss lead-time in the proposal and request comments on the need for additional lead-time to allow manufacturers to ramp up to a nationwide program.

*Product Sell-through*- As with past rulemakings for other source sectors, the Panel recommended that EPA propose to allow normal sell through of portable fuel containers as long as manufacturers do not create stockpiles of noncomplying portable fuel containers prior to the start of the program.

We proposed these Panel-recommended flexibilities for all portable fuel container manufacturers. As stated above, we did not receive any comments on the proposed flexibilities, and are therefore finalizing them as proposed (the flexibility provisions are incorporated into the program requirements described earlier in sections VII.B through VII.D).

(b) Portable Fuel Container Hardships

The Panel recommended that EPA propose two types of hardship programs for small portable fuel container manufacturers.

The first would allow small manufacturers to petition EPA for limited additional lead-time to comply with the standards. A manufacturer would have to demonstrate that it has taken all possible business, technical, and economic steps to comply but the burden of compliance costs or would have a significant adverse effect on the company's solvency. Hardship relief may include requirements for interim emission reductions.

The second hardship provision would permit small manufacturers to apply for hardship relief if circumstances outside their control cause the failure to comply (i.e., supply contract broken by parts supplier) and if failure to sell the subject containers would have a major impact on the company's solvency. The terms and timeframe of the relief would depend on the specific circumstances of the company and the situation involved.

We proposed, and are finalizing, the above hardship provisions for portable fuel container manufacturers. These entities could, on a case-by-case basis, face hardship, and we are finalizing these provisions to provide what could prove to be needed safety valves for these entities. For both types of hardship provisions, the length of the hardship relief will be established, during the initial review, for not more than one year and will be reviewed annually thereafter as needed. (Please see section VII.F for a more detailed discussion of these hardship provisions.)

As required by section 212 of SBREFA, EPA also is preparing a Small Entity Compliance Guide to help small entities comply with this rule. The compliance guide will be available on the web at: http://www.epa.gov/otaq/toxics.htm.

D. 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 in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the Administrator publishes with the final rule an explanation of why that alternative was not adopted.

Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

This 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 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 final rule represents the least costly, most cost-effective approach to achieve the statutory requirements of the rule. The costs and benefits associated with the final rule are discussed above and in the Regulatory Impact Analysis, as required by the UMRA.

E. Executive Order 13132: Federalism

Executive Order 13132, entitled “Federalism” (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure “meaningful and timely input by State and local officials in the development of regulatory policies that have federalism

implications." "Policies that have federalism implications" is defined in the Executive Order to include regulations that have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government."

This final rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132.

Although section 6 of Executive Order 13132 does not apply to this rule, EPA did consult with representatives of various State and local governments in developing this rule. EPA has also consulted representatives from STAPPA/ALAPCO, which represents state and local air pollution officials.

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicited comment on the proposed rule from State and local officials.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175, entitled "Consultation and Coordination with Indian Tribal Governments" (65 FR 67249, November 9, 2000), requires EPA to develop an accountable process to ensure "meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications."

This final rule does not have tribal implications as specified in Executive Order 13175. This rule will be implemented at the Federal level and impose compliance costs only on vehicle manufacturers (includes alternative fuel vehicle converters and ICIs), fuel producers, and portable gasoline container manufacturers. Tribal governments will be affected only to the extent they purchase and use regulated vehicles, fuels, and portable gasoline containers. Thus, Executive Order 13175 does not apply to this rule.

### G. Executive Order 13045: Protection of Children from Environmental Health and Safety Risks

Executive Order 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 Executive Order 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 final rule is subject to the Executive Order because it is an economically significant regulatory action as defined by Executive Order 12866, and we believe that by addressing the environmental health or safety risk this action may have a disproportionate beneficial effect on children. Accordingly, we have evaluated the potential environmental health or safety effects of VOC and toxics emissions from gasoline-fueled mobile sources and gas cans on children. The results of this evaluation are described below and contained in sections III and IV.

Exposure to a number of the compounds addressed in this rule may have a disproportionate effect on children. First, exposure to carcinogens that cause cancer through a mutagenic mode of action during childhood development may have an incrementally disproportionate impact. Because of their small size, increased activity, and increased ventilation rates compared to adults, children may have greater exposure to these compounds in the ambient air, on a unit body weight basis. Moreover, for PM, because children's breathing rates are higher, their exposures may be higher and because their respiratory systems are still developing, children may be more susceptible to problems from exposure to respiratory irritants.

H. Executive Order 13211: Actions that Significantly Affect Energy Supply, Distribution, or Use

This rule is not a “significant energy action” as defined in Executive Order 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use” (66 FR 28355 (May 22, 2001)) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. The gasoline benzene provisions of the final rule will shift about 12,500 barrels per day of benzene from the gasoline market to the petrochemical market. This volume represents about 0.1 percent of nationwide gasoline production. The actual impact of the rule on the gasoline market, however, is likely to be less due to offsetting changes in the production of petrochemicals, as well as expected growth in the petrochemical market absent this rule. The major sources of benzene for the petrochemical market other than reformate from gasoline production are also derived from gasoline components or gasoline feedstocks. Consequently, the expected shift toward more benzene production from reformate due to this final rule will be offset by less benzene produced from other gasoline feedstocks.

The rule will require refiners to use a small additional amount of energy in processing gasoline to reduce benzene levels, primarily due to the increased energy used for benzene extraction. Our modeling of increased energy use indicates that the process energy used by refiners to produce gasoline would increase by about 0.6 percent (or, six-tenths of a percent). Overall, we believe that the final rule will result in no significant adverse energy impacts.

The gasoline benzene provisions will not affect the current gasoline distribution practices.

We discuss our analysis of the energy and supply effects of the gasoline benzene standard further in section VIII of this preamble and in Chapter 9 of the Regulatory Impact Analysis.

The fuel supply and energy effects described above will be offset substantially by the positive effects on gasoline supply and energy use of the gas can standards also promulgated in today's action. These provisions will greatly reduce the gasoline lost to evaporation from gas cans. This will in turn reduce the demand for gasoline, increasing the gasoline supply and reducing the energy used in producing gasoline.

## I. National Technology Transfer Advancement Act

As noted in the proposed rule, Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law No. 104-113, 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress,

through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This rulemaking involves technical standards. Therefore, the Agency conducted a search to identify potentially applicable voluntary consensus standards. However, we identified no such standards. Therefore, for the cold temperature NMHC standards, EPA will use the existing EPA cold temperature CO test procedures (manufacturers currently measure hydrocarbon emissions with current cold CO test procedures), which were adopted in a previous EPA rulemaking (1992). The fuel standards referenced in today's rule involve the measurement of gasoline fuel parameters. The measurement standards for gasoline fuel parameters referenced in today's rulemaking are government-unique standards that were developed by the Agency through previous rulemakings. Both the cold temperature CO test procedures and the measurement standards for gasoline fuel parameters have served the Agency's emissions control goals well since their implementation and have been well accepted by industry. For gas cans, EPA is promulgating new procedures for measuring hydrocarbon emissions.

### J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order (EO) 12898 (59 FR 7629 (Feb. 16, 1994)) establishes federal executive policy on environmental justice. Its main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of

their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this final rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it does not affect the level of protection provided to human health or the environment.

The final rule will reduce VOC and toxics emissions from gasoline-fueled mobile sources (particularly highway light-duty vehicles) and gas cans, and thus, it will decrease the amount of air pollution to which the entire population is exposed. The rule will also reduce PM emissions from highway light-duty vehicles. EPA evaluated the population residing close to high traffic density (near roadways), and we found that this population has demographic differences from the general population, including a greater fraction of lower income and minority residents. The rule will reduce emissions from roadways. Since those living near roadways are more likely to be lower income and minority residents, this population will have a disproportionate benefit from the rule. Thus, this rule does not have a disproportionately high adverse human health or environmental effect on minority populations.

K. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 et seq., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States before the rule is published in the **Federal Register**. This rule is a "major rule" as defined by 5 U.S.C. 804(2).

## XI. Statutory Provisions and Legal Authority

Statutory authority for the fuels controls in this final rule can be found in sections 202 and 211(c) of the Clean Air Act (CAA), as amended, 42 U.S.C. sections 7521 and 7545(c). Additional support for the procedural and enforcement-related aspects of the fuel controls in this final rule, including the recordkeeping requirements, come from sections 114(a) and 301(a) of the CAA, 42 U.S.C. sections 7414(a) and 7601(a).

Statutory authority for the vehicle controls in this final rule can be found in sections 202, 206, 207, 208, and 301 of the CAA, 42 U.S.C. sections 7521, 7525, 7541, 7542 and 7601.

Statutory authority for the portable fuel container controls in this final rule can be found in sections 183(e) and 111 of the CAA, 42 U.S.C. sections 7511b(e) and 7411.

**List of Subjects**

*40 CFR Part 59*

Environmental protection, Administrative practice and procedure, Confidential business information, Incorporation by reference, Labeling, Consumer or Commercial Products pollution, Penalties, Reporting and recordkeeping requirements.

*40 CFR Part 80*

Environmental protection, Air pollution control, Fuel additives, Gasoline, Imports, Incorporation by reference, Labeling, Motor vehicle pollution, Penalties, Reporting and recordkeeping requirements.

*40 CFR Part 85*

Environmental protection, Administrative practice and procedure, 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, Incorporation by reference, Labeling, Motor vehicle pollution, Penalties, Reporting and recordkeeping requirements.

Dated:

**Stephen L. Johnson**,

*Administrator*.

For the reasons set forth in the preamble, parts 59, 80, 85 and 86 of title 40 of the Code of Federal Regulations are amended as follows:

**PART 59—National Volatile Organic Compound Emission Standards for Consumer and Commercial Products**

1. The authority citation for part 59 is revised to read as follows:

Authority: 42 U.S.C. 7414 and 7511b(e)

2. A new Subpart F is added to part 59 to read as follows:

**Subpart F—CONTROL OF EVAPORATIVE EMISSIONS FROM NEW AND IN-USE PORTABLE FUEL CONTAINERS**

**Overview and Applicability**

Sec.

59.600 Does this subpart apply for my products?

59.601 Do the requirements of this subpart apply to me?

59.602 What are the general prohibitions and requirements of this subpart?

59.603 How must manufacturers apply good engineering judgment?

59.605 What Portable Fuel Containers are excluded from this subpart's requirements?

59.607 Submission of information.

**Emission Standards and Related Requirements**

59.611 What evaporative emission requirements apply under this subpart?

59.612 What emission-related warranty requirements apply to me?

59.613 What operation and maintenance instructions must I give to buyers?

59.615 How must I label and identify the portable fuel containers I produce?

**Certifying Emission Families**

59.621 Who may apply for a certificate of conformity?

59.622 What are the general requirements for obtaining a certificate of conformity and producing portable fuel containers under it?

59.623 What must I include in my application?

59.624 How do I amend my application for certification?

59.625 How do I select emission families?

59.626 What emission testing must I perform for my application for a certificate of conformity?

59.627 How do I demonstrate that my emission family complies with evaporative emission standards?

59.628 What records must I keep and what reports must I send to EPA?

59.629 What decisions may EPA make regarding my certificate of conformity?

59.630 EPA testing.

59.650 General testing provisions.

59.652 Other procedures.

59.653 How do I test portable fuel containers?

**Special Compliance Provisions**

59.660 Exemption from the standards.

59.662 What temporary provisions address hardship due to unusual circumstances?

59.663 What are the provisions for extending compliance deadlines for manufacturers under hardship?

59.664 What are the requirements for importing portable fuel containers into the United States?

**Definitions and Other Reference Information**

59.680 What definitions apply to this subpart?

59.685 What symbols, acronyms, and abbreviations does this subpart use?

59.695 What provisions apply to confidential information?

59.697 State actions.

59.698 May EPA enter my facilities for inspections?

59.699 How do I request a hearing?

**Subpart F—CONTROL OF EVAPORATIVE EMISSIONS FROM NEW AND IN-USE PORTABLE FUEL CONTAINERS**

## Overview and Applicability

### §59.600 Does this subpart apply for my products?

(a)Except as provided in §59.605 and paragraph (b) of this section, the regulations in this subpart F apply for all portable fuel containers (defined in §59.680) that are manufactured on or after January 1, 2009.

(b) See §59.602 (a) and (b) to determine how to apply the provisions of this subpart for containers that were manufactured before January 1, 2009.

### §59.601 Do the requirements of this subpart apply to me?

(a) Unless specified otherwise in this subpart, the requirements and prohibitions of this subpart apply to all manufacturers and importers of portable fuel containers. Certain prohibitions in § 59.602 apply to all other persons.

(b) New portable fuel containers that are subject to the emissions standards of this part must be covered by a certificate of conformity that is issued to the manufacturer of the container. If more than one person meets the definition of manufacturer for a portable fuel container, see § 59.621 to determine if you are the manufacturer who may apply for and receive a certificate of conformity.

(c) Unless specifically noted otherwise, the term "you" means manufacturers, as defined in §59.680.

**§59.602 What are the general prohibitions and requirements of this subpart?**

(a) General prohibition for manufacturers and importers. No manufacturer or importer may sell, offer for sale, introduce or deliver for introduction into commerce in the United States, or import any new portable fuel container that is subject to the emissions standards of this subpart and is manufactured after December 31, 2008 unless it is covered by a valid certificate of conformity, it is labeled as required, and it complies with all of the applicable requirements of this subpart, including compliance with the emissions standards for its useful life. After June 30, 2009, no manufacturer or importer may sell, offer for sale, introduce or deliver into commerce in the United States, or import any new portable fuel container that was manufactured prior to January 1, 2009 unless it meets the requirements of this subpart.

(b) General prohibition for wholesale distributors. No wholesale distributor may sell, offer for sale, or distribute any portable fuel container in the United States that is subject to the emissions standards of this subpart and is manufactured after December 31, 2008 unless it is covered by a valid certificate of conformity and is labeled as required. After December 31, 2009, no wholesale distributor may sell, offer for sale, or distribute in the United States any portable fuel container that was manufactured prior to January 1, 2009 unless it meets the requirements of this subpart. After December 31, 2009, all new portable fuel containers shall be deemed to be manufactured after December 31, 2008 unless they are in retail inventory.

(c) Reporting and recordkeeping. (1) You must keep the records and submit the reports specified in § 59.628. Records must be retained for at least 5 years from the date of manufacture or importation and must be supplied to EPA upon request.

(2) No person may alter, destroy, or falsify any record or report required by this subpart.

(d) Testing and access to facilities. You may not keep us from entering your facility to observe tests or inspect facilities if we are authorized to do so. Also, you must perform the tests we require (or have the tests done for you). Failure to perform this testing is prohibited.

(e) Warranty. You may not fail to offer, provide notice of, or honor the emissions warranty required under this subpart.

(f) Replacement components. No person may sell, offer for sale, introduce or deliver for introduction into commerce in the United States, import, or install any replacement component for portable fuel containers subject to the standards of this subpart where the component has the effect of disabling, bypassing, or rendering inoperative the emissions controls of the containers.

(g) Violations. If a person violates any prohibition or requirement of this subpart or the Act concerning portable fuel containers, it shall be considered a separate violation for each portable fuel container.

(h) Assessment of penalties and injunctions. We may assess administrative penalties, bring a civil action to assess and recover civil penalties, bring a civil action to enjoin and restrain violations, or bring criminal action as provided by the Clean Air Act.

**§59.603 How must manufacturers apply good engineering judgment?**

(a) In addition to other requirements and prohibitions set forth in this subpart, you must use good engineering judgment for decisions related to any requirements under this

subpart. This includes your applications for certification, any testing you do to show that your portable fuel containers comply with requirements that apply to them, and how you select, categorize, determine, and apply these requirements.

(b) Upon request, you must provide EPA a written description of the engineering judgment in question. Such information must be provided within 15 working days unless EPA specifies a different period of time to respond.

(c) We may reject your decision if it is not based on good engineering judgment or is otherwise inconsistent with the requirements that apply, and we may -

(1) Suspend, revoke, or void a certificate of conformity if we determine you used incorrect or incomplete information or failed to consider relevant information, or that your decision was not based on good engineering judgment; or

(2) Notify you that we believe any aspect of your application or other information submission may be incorrect or invalid due to lack of good engineering judgment or other cause. Unless a different period is specified, you will have 30 days to respond to our notice and specifically address our concerns. After considering your information, we will notify you regarding our finding, which may include the actions provided in paragraph (c)(1) of this section.

(d) If you disagree with our conclusions under paragraph (c) of this section, you may file a request for a hearing with the Designated Compliance Officer as described in § 59.699. In your request, you must specifically state your objections, and include relevant data or supporting analysis. The request must be signed by your authorized representative. If we agree that your request raises a substantial factual issue, we will hold the hearing according to §59.699.

**§59.605 What portable fuel containers are excluded from this subpart's requirements?**

This section describes exclusions that apply to certain portable fuel containers. The prohibitions and requirements of this subpart do not apply for containers excluded under this section. Exclusions under this section are based on inherent characteristics of the containers. See §59.660 for exemptions that apply based on special circumstances.

(a) Containers approved as safety cans consistent with the requirements of 29 CFR 1926.150 through 1926.152 are excluded. Such cans generally have a flash-arresting screens, spring-closing lids and spout covers and have been approved by a nationally recognized testing laboratory such as Factory Mutual Engineering Corp. or Underwriters Laboratories, Inc., or Federal agencies such as Bureau of Mines, or U.S. Coast Guard.

(b) Containers with a nominal capacity of less than 0.25 gallons or more than 10.0 gallons are excluded.

(c) Containers designed and marketed solely to deliver fuel directly to nonroad engines during engine operation, such as containers with a connection for a fuel line and a reserve fuel area, are considered to be nonroad fuel tanks, and are thus excluded.

**§59.607 Submission of information.**

(a) You are responsible for all statements you make to us related to this subpart F, including information not required during certification. You are required to provide truthful and complete information. This subpart describes the consequences of failing to meet this obligation. The consequences also may include prosecution under 18 U.S.C. 1001 and 42 U.S.C. 7431(c)(2).

(b) We may require an officer or authorized representative of your company with knowledge of the information contained in the submittal to approve and sign any submission of information to us, and to certify that all the information submitted is accurate and complete.

**Emission Standards and Related Requirements**

**§59.611 What evaporative emission requirements apply under this subpart?**

(a) Hydrocarbon emissions from portable fuel containers may not exceed 0.3 grams per gallon per day when measured with the test procedures in **§§**59.650 through 59.653. This procedure measures diurnal venting emissions and permeation emissions.

(b) For the purpose of this section, portable fuel containers include spouts, caps, gaskets, and other parts provided with the container.

(c) The following general requirements also apply for all portable fuel containers subject to the standards of this subpart:

(1) Prohibited controls. The following controls are prohibited:

(i) For anyone to design, manufacture, or install emission control systems so they cause or contribute to an unreasonable risk to public health, welfare, or safety while operating.

(ii) For anyone to design, manufacture, or install emission control systems with features that disable, deactivate, reduce effectiveness, or bypass the emission controls, either actively or passively. For example, you may not include a manual vent that the operator can open to bypass emission controls. You may ask us to allow such features if needed for safety reasons or if the features operate during emission tests described in subpart F of this part.

(2) Leaks. You must design and manufacture your containers to be free of leaks. This requirement applies when your container is upright, partially inverted, or completely inverted.

(3) Refueling. You are required to design your portable fuel containers to minimize spillage during refueling to the extent practical. This requires that you use good engineering judgment to avoid designs that will make it difficult to refuel typical vehicle and equipment designs without spillage.

(d) Portable fuel containers must meet the standards and requirements specified in this subpart throughout the useful life of the container. The useful life of the container is five years beginning on the date of sale to the ultimate purchaser.

**§59.612 What emission-related warranty requirements apply to me?**

(a) General requirements. You must warrant to the ultimate purchaser that the new portable fuel container, including all parts of its evaporative emission-control system, is:

(1) Designed, built, and equipped so it conforms at the time of sale to the ultimate purchaser with the requirements of this subpart.

(2) Is free from defects in materials and workmanship that may keep it from meeting these requirements.

(b) Warranty notice and period. Your emission-related warranty must be valid for a minimum of one year from the date of sale to the ultimate purchaser.

(c) Notice. You must provide a warranty notice with each container.

**§59.613 What operation and maintenance instructions must I give to buyers?**

You must provide the ultimate purchaser of the new portable fuel container written instructions for properly maintaining and using the emission-control system.

**§59.615 How must I label and identify the portable fuel containers I produce?**

This section describes how you must label your portable fuel containers.

(a) At the time of manufacture, indelibly mark the month and year of manufacture on each container

(b) Mold into or affix a legible label identifying each portable fuel container. The label must be:

(1) Attached so it is not easily removable.

(2) Secured to a part of the container that can be easily viewed when the can is in use, not on the bottom the container.

(3) Written in English.

(c) The label must include:

(1) The heading "EMISSION CONTROL INFORMATION".

(2) Your full corporate name, trademark and warranty contact information.

(3) A standardized identifier such as EPA's standardized designation for the emission families, the model number, or the part number.

(4) This statement: "THIS CONTAINER COMPLIES WITH U.S. EPA EMISSION REGULATIONS FOR PORTABLE FUEL CONTAINERS (40 CFR Part 59).".

(5) This statement: "THE EMISSIONS WARRANTY IS VALID FOR A MINIMUM OF ONE YEAR FROM DATE OF PURCHASE.".

(d) You may add information to the emission control information label to identify other emission standards that the container meets or does not meet (such as California standards). You may also add other information to ensure that the portable fuel container will be properly maintained and used.

(e) You may request that we approve modified labeling requirements in this subpart F if you show that it is necessary or appropriate. We will approve your request if your alternate label is consistent with the requirements of this subpart.

(f) You may identify the name and trademark of another company instead of their own on your emission control information label, subject to the following provisions:

(1) You must have a contractual agreement with the other company that obligates that company to take the following steps:

(i) Meet the emission warranty requirements that apply under §59.612. This may involve a separate agreement involving reimbursement of warranty-related expenses.

(ii) Report all warranty-related information to the certificate holder.

(2) In your application for certification, identify the company whose trademark you will use and describe the arrangements you have made to meet your requirements under this section.

(3) You remain responsible for meeting all the requirements of this subpart.

**Certifying Emission Families**

**§59.621 Who may apply for a certificate of conformity?**

A certificate of conformity may be issued only to the manufacturer that completes the construction of the portable fuel container. In unusual circumstances, upon a petition by a manufacturer, we may allow another manufacturer of the container to hold the certificate of conformity. However, in order to hold the certificate, the manufacturer must demonstrate day-to-day ability to ensure that containers produced under the certificate will comply with the requirements of this subpart.

**§59.622 What are the general requirements for obtaining a certificate of conformity and producing portable fuel containers under it?**

(a) You must send us a separate application for a certificate of conformity for each emission family. A certificate of conformity for containers is valid from the indicated effective date until the end of the production period for which it is issued. We may

require new certification prior to the end of the production period if we finds that containers are not meeting the standards in use during their useful life.

(b) The application must be written in English and contain all the information required by this subpart and must not include false or incomplete statements or information (see §§59.607 and 59.629).

(c) We may ask you to include less information than we specify in this subpart, as long as you maintain all the information required by §59.628.

(d) You must use good engineering judgment for all decisions related to your application (see §59.603).

(e) An authorized representative of your company must approve and sign the application.

(f) See §59.629 for provisions describing how we will process your application.

(g) If we approve your application, we will issue a certificate that will allow you to produce the containers that you described in your application for a specified production period. Certificates do not allow you to produce containers that were not described in your application, unless we approve the additional containers under §59.624.

**§59.623 What must I include in my application?**

This section specifies the information that must be in your application, unless we ask you to include less information under §59.622(c). We may require you to provide additional information to evaluate your application.

(a) Describe the emission family's specifications and other basic parameters of the emission controls. List each distinguishable configuration in the emission family.

Include descriptions and part numbers for all detachable components such as spouts and caps.

(b) Describe and explain the method of emission control.

(c) Describe the products you selected for testing and the reasons for selecting them.

(d) Describe the test equipment and procedures that you used, including any special or alternate test procedures you used (see §59.650).

(e) List the specifications of the test fuel to show that it falls within the required ranges specified in §59.650.

(f) Include the maintenance and use instructions and warranty information you will give to the ultimate purchaser of each new portable fuel containers (see §59.613).

(g) Describe your emission control information label (see §59.615).

(h) State that your product was tested as described in the application (including the test procedures, test parameters, and test fuels) to show you meet the requirements of this subpart.

(i) Present emission data to show your products meet the applicable emission standards. Where applicable, §§59.626 and 59.627 may allow you to submit an application in certain cases without new emission data.

(j) Report all test results, including those from invalid tests or from any other tests, whether or not they were conducted according to the test procedures of §§59.650 through 59.653. We may ask you to send other information to confirm that your tests were valid under the requirements of this subpart.

(k) Unconditionally certify that all the products in the emission family comply with the requirements of this subpart, other referenced parts of the CFR, and the Clean Air Act.

(l) Include estimates of U.S.-directed production volumes.

(m) Include the information required by other sections of this subpart.

(n) Include other relevant information, including any additional information requested by EPA.

(o) Name an agent for service located in the United States. Service on this agent constitutes service on you or any of your officers or employees for any action by EPA or otherwise by the United States related to the requirements of this subpart.

**§59.624 How do I amend my application for certification?**

Before we issue you a certificate of conformity, you may amend your application to include new or modified configurations, subject to the provisions of this section. After we have issued your certificate of conformity, you may send us an amended application requesting that we include new or modified configurations within the scope of the certificate, subject to the provisions of this section. You must amend your application if any changes occur with respect to any information included in your application.

(a) You must amend your application before you take either of the following actions:

(1) Add a configuration to an emission family. In this case, the configuration added must be consistent with other configurations in the emission family with respect to the criteria listed in §59.625.

(2) Change a configuration already included in an emission family in a way that may affect emissions, or change any of the components you described in your application for certification. This includes production and design changes that may affect emissions any time during the portable fuel containers' lifetime.

(b) To amend your application for certification, send the Designated Compliance Officer the following information:

(1) Describe in detail the addition or change in the configuration you intend to make.

(2) Include engineering evaluations or data showing that the amended emission family complies with all applicable requirements. You may do this by showing that the original emission data are still appropriate with respect to showing compliance of the amended family with all applicable requirements.

(3) If the original emission data for the emission family are not appropriate to show compliance for the new or modified configuration, include new test data showing that the new or modified configuration meets the requirements of this subpart.

(c) We may ask for more test data or engineering evaluations. You must give us these within 30 days after we request them.

(d) For emission families already covered by a certificate of conformity, we will determine whether the existing certificate of conformity covers your new or modified configuration. You may ask for a hearing if we deny your request (see §59.699).

(e) For emission families already covered by a certificate of conformity and you send us a request to amend your application, you may sell and distribute the new or modified configuration before we make a decision under paragraph (d) of this section, subject to the provisions of this paragraph. If we determine that the affected configurations do not meet applicable requirements, we will notify you to cease production of the configurations and any containers from the new or modified configuration will not be considered covered by the certificate. In addition, we may require you to recall any affected containers that you have already distributed, including those sold to the ultimate

purchasers. Choosing to produce containers under this paragraph (e) is deemed to be consent to recall all containers that we determine do not meet applicable emission standards or other requirements and to remedy the nonconformity at no expense to the owner. If you do not provide information required under paragraph (c) of this section within 30 days, you must stop producing the new or modified containers.

**§59.625 How do I select emission families?**

(a) Divide your product line into families of portable fuel containers that are expected to have similar emission characteristics throughout the useful life.

(b) Group containers in the same emission family if they are the same in all the following aspects:

(1) Type of material (including pigments, plasticizers, UV inhibitors, or other additives that may affect control of emissions).

(2) Production method.

(3) Spout and cap design.

(4) Gasket material and design.

(5) Emission control strategy.

(c) You may subdivide a group of containers that is identical under paragraph (b) of this section into different emission families if you show the expected emission characteristics are different.

(d) You may group containers that are not identical with respect to the things listed in paragraph (b) of this section in the same emission family if you show that their emission characteristics will be similar throughout their useful life.

**§59.626 What emission testing must I perform for my application for a certificate of conformity?**

This section describes the emission testing you must perform to show compliance with the emission standards in §59.611.

(a) Test your products using the procedures and equipment specified in §§59.650 through 59.653.

(b) Select an emission-data unit from each emission family for testing. You must test a production sample or a preproduction product that will represent actual production. Select the configuration that is most likely to exceed (or have emissions nearest to) the applicable emission standard. For example, for a family of multilayer portable fuel containers, test the container with the thinnest barrier layer. Test three identical containers.

(c) We may measure emissions from any of your products from the emission family. You must supply your products to us if we choose to perform confirmatory testing.

(d) You may ask to use emission data from a previous production period (carryover) instead of doing new tests, but only if the emission-data from the previous production period remains the appropriate emission-data unit under paragraph (b) of this section. For example, you may not carryover emission data for your family of containers if you have added a thinner-walled container than was tested previously.

(e) We may require you to test a second unit of the same or different configuration in addition to the unit tested under paragraph (b) of this section.

(f) If you use an alternate test procedure under §59.652 and later testing shows that such testing does not produce results that are equivalent to the procedures specified in this subpart, we may reject data you generated using the alternate procedure and base our compliance determination on the later testing.

**§59.627 How do I demonstrate that my emission family complies with evaporative emission standards?**

(a) For purposes of certification, your emission family is considered in compliance with an evaporative emission standard in §59.611(a) if the test results from all portable fuel containers in the family that have been tested show measured emissions levels that are at or below the applicable standard.

(b) Your emissions family is deemed not to comply if any container representing that family has test results showing an official emission level above the standard.

(c) Round the measured emission level to the same number of decimal places as the emission standard. Compare the rounded emission levels to the emission standard.

**§59.628 What records must I keep and what reports must I send to EPA?**

(a) Organize and maintain the following records:

(1) A copy of all applications and any other information you send us.

(2) Any of the information we specify in §59.623 that you were not required to include in your application.

(3) A detailed history of each emission-data unit. For each emission-data unit, include all of the following:

(i) The emission-data unit's construction, including its origin and buildup, steps you took to ensure that it represents production containers, any components you built specially for it, and all the components you include in your application for certification.

(ii) All your emission tests, including documentation on routine and standard tests, as specified in §§59.650 through 59.653, and the date and purpose of each test.

(iii) All tests to diagnose emission-control performance, giving the date and time of each and the reasons for the test.

(iv) Any other relevant events or information.

(4) Production figures for each emission family divided by assembly plant.

(5) If you identify your portable fuel containers by lot number or other identification numbers, keep a record of these numbers for all the containers you produce under each certificate of conformity.

(b) Keep data from routine emission tests (such as test cell temperatures and relative humidity readings) for one year after we issue the associated certificate of conformity. Keep all other information specified in paragraph (a) of this section for five years after we issue your certificate.

(c) Store these records in any format and on any media, as long as you can promptly send us organized, written records in English if we ask for them. You must keep these records readily available. We may review them at any time.

(d) Send us copies of any maintenance instructions or explanations if we ask for them.

(e) Send us an annual warranty report summarizing successful warranty claims by emission family under §59.612, including the reason for the claim. You must submit the report by July 1 for the preceding calendar year.

**§59.629 What decisions may EPA make regarding my certificate of conformity?**

(a) If we determine your application is complete and shows that the emission family meets all the requirements of this subpart and the Act, we will issue a certificate of conformity for your emission family for the specified production period. We may make the approval subject to additional conditions.

(b) We may deny your application for certification if we determine that your emission family fails to comply with emission standards or other requirements of this subpart or the Act. Our decision may be based on a review of all information available to us. If we deny your application, we will explain why in writing.

(c) In addition, we may deny your application or suspend, revoke, or void your certificate if you do any of the following:

(1) Refuse to comply with any testing or reporting requirements.

(2) Submit false or incomplete information.

(3) Render inaccurate any test data.

(4) Deny us from completing authorized activities (see §59.698). This includes a failure to provide reasonable assistance.

(5) Produce portable fuel containers for importation into the United States at a location where local law prohibits us from carrying out authorized activities.

(6) Fail to supply requested information or amend your application to include all portable fuel containers being produced.

(7) Take any action that otherwise circumvents the intent of the Act or this subpart.

(d) If we deny your application or suspend, revoke, or void your certificate, you may ask for a hearing (see §59.699).

**§59.630 EPA testing.**

We may test any portable fuel container subject to the standards of this subpart.

(a) Certification and production sample testing. Upon our request, a manufacturer must supply a prototype container or a reasonable number of production samples to us for verification testing. These samples will generally be tested using the full test procedure of §59.653.

(b) In-use testing. We may test in-use containers using the test procedure of §59.653 without preconditioning.

**§59.650 General testing provisions.**

(a) The test procedures of this subpart are addressed to you as a manufacturer, but they apply equally to anyone who does testing for you.

(b) Unless we specify otherwise, the terms “procedures” and “test procedures” in this subpart include all aspects of testing, including the equipment specifications, calibrations, calculations, and other protocols and procedural specifications needed to measure emissions.

(c) The specification for gasoline to be used for testing is given in 40 CFR 1065.710. Use the grade of gasoline specified for general testing. Blend this grade of gasoline with reagent grade ethanol in a volumetric ratio of 90.0 percent gasoline to 10.0 percent ethanol. You may use ethanol that is less pure if you can demonstrate that it will not affect your ability to demonstrate compliance with the applicable emission standards.

(d) Accuracy and precision of all temperature measurements must be ±2.2°C or better.

(e) Accuracy and precision of mass balances must be sufficient to ensure accuracy and precision of two percent or better for emission measurements for products at the maximum level allowed by the standard. The readability of the display may not be coarser than half of the required accuracy and precision.

**§59.652 Other procedures.**

(a) Your testing. The procedures in this subpart apply for all testing you do to show compliance with emission standards, with certain exceptions listed in this section.

(b) Our testing. These procedures generally apply for testing that we do to determine if your portable fuel containers complies with applicable emission standards. We may perform other testing as allowed by the Act.

(c) Exceptions. We may allow or require you to use procedures other than those specified in this subpart as follows:

(1) You may request to use special procedures if your portable fuel containers cannot be tested using the specified procedures. We will approve your request if we determine that it would produce emission measurements that represent in-use

operation and we determine that it can be used to show compliance with the requirements of §59.611.

(2) You may ask to use emission data collected using other procedures, such as those of the California Air Resources Board. We will approve this only if you show us that using these other procedures do not affect your ability to show compliance with the applicable emission standards. This generally requires emission levels to be far enough below the applicable emission standards so that any test differences do not affect your ability to state unconditionally that your containers will meet all applicable emission standards when tested using the specified test procedures.

(3) You may request to use alternate procedures that are equivalent to allowed procedures, or more accurate or more precise than allowed procedures.

(4) You may not use other procedures under this paragraph (c) until we approve your request.

**§59.653 How do I test portable fuel containers?**

You must test the portable fuel container as described in your application, with the applicable spout attached except as otherwise noted. Tighten fittings in a manner representative of how they would be tightened by a typical user.

(a) Preconditioning for durability. Complete the following steps before an emissions test, in any order, unless we determine that omission of one or more of these durability steps will not affect the emissions from your container.

(1) Pressure cycling. Perform a pressure test by sealing the container and cycling it between +13.8 and -1.7 kPa (+2.0 and -0.5 psig) for 10,000 cycles at a rate of 60 seconds per cycle. For this test, the spout may be removed and the pressure applied through the opening where the spout attaches. The purpose of this test is to represent environmental wall stresses caused by pressure changes and other factors (such as vibration or thermal expansion). If your container cannot be tested using the pressure cycles specified by this paragraph (a)(1), you may ask to use special test procedures under §59.652(c).

(2) UV exposure. Perform a sunlight-exposure test by exposing the container to an ultraviolet light of at least 24 $W/m^2$ (0.40 $W\text{-}hr/m^2/min$) on the container surface for at least 450 hours. Alternatively, the container may be exposed to direct natural sunlight for an equivalent period of time, as long as you ensure that the container is exposed to at least 450 daylight hours.

(3) Slosh testing. Perform a slosh test by filling the portable fuel container to 40 percent of its capacity with the fuel specified in paragraph (e) of this section and rocking it at a rate of 15 cycles per minute until you reach one million total cycles. Use an angle deviation of +15° to -15° from level.

(4) Spout actuation. Perform the following spout actuation and inversion steps at the end on the slosh testing, and at the end of the preconditioning soak.

(i) Perform one complete actuation/inversion cycle per day for ten days.

(ii) One actuation/inversion cycle consists of the following steps:

(A) Remove and replace the spout to simulate filling the container.

(B) Slowly invert the container and keep it inverted for at least 5 seconds to ensure that the spout and mechanisms become saturated with fuel. Any fuel leaking from any part of the container will denote a leak and must be reported as part of

certification. Once completed, place the container on a flat surface in the upright position.

(C) Actuate the spout by fully opening and closing without dispensing fuel. The spout must return to the closed position without the aid of the operator (e.g., pushing or pulling the spout closed). Repeat for a total of 10 actuations. If at any point the spout fails to return to the closed position, the container fails the test.

(D) Repeat the step contained in paragraph (a)(4)(ii)(B) of this section (i.e., the inversion step).

(E) Repeat the steps contained in paragraph (a)(4)(ii)(C) of this section (i.e., ten actuations).

(b) Preconditioning fuel soak. Complete the following steps before a diurnal emission test:

(1) Fill the portable fuel container with the specified fuel to its nominal capacity, seal it using the spout, and allow it to soak at 28 ±5°C for 20 weeks. Alternatively, the container may be soaked for 10 weeks at 43 ±5°C. You may count the time of the preconditioning steps in paragraph (a) of this section as part of the preconditioning fuel soak, as long as the ambient temperature remains within the specified temperature range and the fuel tank is at least 40 percent full; you may add or replace fuel as needed to conduct the specified durability procedures.

(2) Pour the fuel out of the container and immediately refill to 50 percent of nominal capacity. Be careful to not spill any fuel on the container. Wipe the outside of the container as needed to remove any liquid fuel that may have spilled on it.

(3) Install the spout assembly that will be used in the production containers. The spout and other openings (such as vents) on the container must be tested in their open condition unless they close automatically and are unlikely to be left open by the user during typical storage. All manual closures such as caps must be left off the container and spout during testing.

(c) Reference container. A reference container is required to correct for buoyancy effects that may occur during testing. Prepare the reference tank as follows:

(1) Obtain a second container of the same model as the test tank. You may not use a container that has previously contained fuel or any other contents that might affect the stability of its mass.

(2) Fill the reference container with enough dry sand (or other inert material) so that the mass of the reference container is approximately the same as the test container when filled with fuel. Use good engineering judgment to determine how similar the mass of the reference container needs to be to the mass of the test container considering the performance characteristics of your balance.

(3) Ensure that the sand (or other inert material) is dry. This may require heating the container or applying a vacuum to it.

(4) Seal the container.

(d) Diurnal test run. To run the test, take the following steps for a portable fuel container that was preconditioned as specified in paragraph (a) of this section.

(1) Stabilize the fuel temperature within the portable fuel container at 22.2°C. Vent the container at this point to relieve any positive or negative pressure that may have developed during stabilization.

(2) Weigh the sealed reference container and record the weight. Place the reference on the balance and tare it so that it reads zero. Place the sealed test container on the balance and record the difference between the test container and the reference container. This value is $M_{initial}$ Take this measurement within 8 hours of filling the test container with fuel as specified in paragraph (b)(2) of this section.

(2) Immediately place the portable fuel container within a well ventilated, temperature-controlled room or enclosure. Do not spill or add any fuel.

(3) Close the room or enclosure.

(4) Follow the temperature profile in the following table for all portable fuel containers. Use good engineering judgment to follow this profile as closely as possible. You may use linearly interpolated temperatures or a spline fit for temperatures between the hourly setpoints.

Table 1 of §59.653—Diurnal Temperature Profile for Portable Fuel Containers

| Time (hours) | Ambient Temperature (°C) Profile |
|---|---|
| 0 | 22.2 |
| 1 | 22.5 |
| 2 | 24.2 |
| 3 | 26.8 |
| 4 | 29.6 |
| 5 | 31.9 |

| Time (hours) | Ambient Temperature (°C) Profile |
|---|---|
| 6 | 33.9 |
| 7 | 35.1 |
| 8 | 35.4 |
| 9 | 35.6 |
| 10 | 35.3 |
| 11 | 34.5 |
| 12 | 33.2 |
| 13 | 31.4 |
| 14 | 29.7 |
| 15 | 28.2 |
| 16 | 27.2 |
| 17 | 26.1 |
| 18 | 25.1 |
| 19 | 24.3 |
| 20 | 23.7 |
| 21 | 23.3 |
| 22 | 22.9 |
| 23 | 22.6 |
| 24 | 22.2 |

(5) At the end of the diurnal period, retare the balance using the reference container and weigh the portable fuel container. Record the difference in mass between the reference container and the test. This value is $M_{final}$ .

(6) Subtract $M_{final}$ from $M_{initial}$ and divide the difference by the nominal capacity of the container (using at least three significant figures) to calculate the g/gallon/day emission rate as follows:

$$\text{Emission rate} = (M_{initial} - M_{final})/(\text{nominal capacity})/(\text{one day})$$

(7) Round your result to the same number of decimal places as the emission standard.

(8) Instead of determining emissions by weighing the container before and after the diurnal temperature cycle, you may place the container in a SHED meeting the specifications of 40 CFR 86.107-96(a)(1) and measure emissions directly. Immediately following the stabilization in paragraph (d)(1) of this section, purge the SHED and follow the temperature profile from paragraph (d)(4) of this section. Start measuring emissions when you start the temperature profile and stop measuring emissions when the temperature profile concludes.

(e) For metal containers, you may demonstrate for certification that your portable fuel containers comply with the evaporative emission standards without performing the pre-soak or container durability cycles (i.e., the pressure cycling, UV exposure, and slosh testing) specified in this section. For other containers, you may demonstrate compliance without performing the durability cycles specified in this section only if we approve it

after you have presented data clearly demonstrating that the cycle or cycles do not negatively impact the permeation rate of the materials used in the containers.

**Special Compliance Provisions**

**§59.660 Exemption from the standards.**

In certain circumstances, we may exempt portable fuel containers from the evaporative emission standards and requirements of §59.611 and the prohibitions and requirements of §59.602. You do not need an exemption for any containers that you own but do not sell, offer for sale, introduce or deliver for introduction into U.S. commerce, or import into the United States. Submit your request for an exemption to the Designated Compliance Officer.

(a) Portable fuel containers that are intended for export only and are in fact exported are exempt provided they are clearly labeled as being for export only. Keep records for five years of all portable fuel containers that you manufacture for export. Any introduction into U.S. commerce of such portable fuel containers for any purpose other than export is considered to be a violation of §59.602 by the manufacturer. You do not need to request this exemption.

(b) You may ask us to exempt portable fuel containers that you will purchase, sell, or distribute for the sole purpose of testing them.

(c) You may ask us to exempt portable fuel containers for the purpose of national security, as long as your request is endorsed by an agency of the federal government responsible for national defense. In your request, explain why you need the exemption.

(d) You may ask us to exempt containers that are designed and marketed solely for rapidly refueling racing applications which are designed to create a leak proof seal with the target tank or are designed to connect with a receiver installed on the target tank. This exemption is generally intended for containers used to rapidly refuel a race car during a pit stop and similar containers. In your request, explain how why these containers are unlikely to be used for nonracing applications. We may limit these exemptions to those applications that are allowed to use gasoline exempted under 40 CFR 80.200(a).

(e) EPA may impose reasonable conditions on any exemption, including a limit on the number of containers that are covered by an exemption.

**§59.662 What temporary provisions address hardship due to unusual circumstances?**

(a) After considering the circumstances, we may exempt you from the evaporative emission standards and requirements of §59.611 of this subpart and the prohibitions and requirements of §59.602 for specified portable fuel containers that do not comply with emission standards if all the following conditions apply:

(1) Unusual circumstances that are clearly outside your control and that could not have been avoided with reasonable discretion prevent you from meeting requirements from this subpart.

(2) You exercised prudent planning and were not able to avoid the violation; you have taken all reasonable steps to minimize the extent of the nonconformity.

(3) Not having the exemption will jeopardize the solvency of your company.

(4) No other allowances are available under the regulations in this chapter to avoid the impending violation, including the provisions of §59.663.

(b) To apply for an exemption, you must send the Designated Compliance Officer a written request as soon as possible before you are in violation. In your request, show that you meet all the conditions and requirements in paragraph (a) of this section.

(c) Include in your request a plan showing how you will meet all the applicable requirements as quickly as possible.

(d) You must give us other relevant information if we ask for it.

(e) We may include reasonable additional conditions on an approval granted under this section, including provisions to recover or otherwise address the lost environmental benefit or paying fees to offset any economic gain resulting from the exemption.

(f) We may approve renewable extensions of up to one year. We may review and revise an extension as reasonable under the circumstances.

(g) Add a legible label, written in English, to a readily visible part of each container exempted under this section. This label must prominently include at least the following items:

(1) Your corporate name and trademark.

(2) The statement “EXEMPT UNDER 40 CFR 59.662.”.

**§59.663 What are the provisions for extending compliance deadlines for manufacturers under hardship?**

(a) After considering the circumstances, we may extend the compliance deadline for you to meet new emission standards, as long as you meet all the conditions and requirements in this section.

(b) To apply for an extension, you must send the Designated Compliance Officer a written request. In your request, show that all the following conditions and requirements apply:

(1) You have taken all possible business, technical, and economic steps to comply.

(2) Show that the burden of compliance costs prevents you from meeting the requirements of this subpart by the required compliance date.

(3) Not having the exemption will jeopardize the solvency of your company.

(4) No other allowances are available under the regulations in this subpart to avoid the impending violation.

(c) In describing the steps you have taken to comply under paragraph (b)(1) of this section, include at least the following information:

(1) Describe your business plan, showing the range of projects active or under consideration.

(2) Describe your current and projected financial standing, with and without the burden of complying in full with the applicable regulations in this subpart by the required compliance date.

(3) Describe your efforts to raise capital to comply with regulations in this subpart.

(4) Identify the engineering and technical steps you have taken or plan to take to comply with regulations in this subpart.

(5) Identify the level of compliance you can achieve. For example, you may be able to produce containers that meet a somewhat less stringent emission standard than the regulations in this subpart require.

(d) Include in your request a plan showing how you will meet all the applicable requirements as quickly as possible.

(e) You must give us other relevant information if we ask for it.

(f) An authorized representative of your company must sign the request and include the statement: "All the information in this request is true and accurate, to the best of my knowledge.".

(g) Send your request for this extension at least nine months before the relevant deadline.

(h) We may include reasonable requirements on an approval granted under this section, including provisions to recover or otherwise address the lost environmental benefit. For example, we may require that you meet a less stringent emission standard.

(i) We may approve renewable extensions of up to one year. We may review and revise an extension as reasonable under the circumstances.

(j) Add a permanent, legible label, written in English, to a readily visible part of each container exempted under this section. This label must prominently include at least the following items:

(1) Your corporate name and trademark.

(2) The statement "EXEMPT UNDER 40 CFR 59.663.".

**§59.664 What are the requirements for importing portable fuel containers into the United States?**

As specified in this section, we may require you to post a bond if you import into the United States containers that are subject to the standards of this subpart. See paragraph (f) of this section for the requirements related to importing containers that have been certified by someone else.

(a) Prior to importing containers into the U.S., we may require you to post a bond to cover any potential compliance or enforcement actions under the Clean Air Act if you cannot demonstrate to us that you have assets of an appropriate liquidity readily available in the United States with a value equal to the retail value of the containers that you will import during the calendar year.

(b) We may set the value of the bond up to five dollars per container.

(c) You may meet the bond requirements of this section by obtaining a bond from a third-party surety that is cited in the U.S. Department of Treasury Circular 570, "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" (http://www.fms.treas.gov/c570/c570.html#certified).

(d) If you forfeit some or all of your bond in an enforcement action, you must post any appropriate bond for continuing importation within 90 days after you forfeit the bond amount.

(e) You will forfeit the proceeds of the bond posted under this section if you need to satisfy any United States administrative final order or judicial judgment against you arising from your conduct in violation of this subpart.

(f) This paragraph (f) applies if you import for resale containers that have been certified by someone else. You and the certificate holder are each responsible for compliance with the requirements of this subpart and the Clean Air Act. No bond is required under this section if either you or the certificate holder meet the conditions in paragraph (a) of this section. Otherwise, the importer must comply with the bond requirements of this section.

## Definitions and Other Reference Information

### §59.680 What definitions apply to this subpart?

The following definitions apply to this subpart. The definitions apply to all subparts unless we note otherwise. All undefined terms have the meaning the Act gives to them. The definitions follow:

Act means the Clean Air Act, as amended, 42 U.S.C. 7401 - 7671q.

Adjustable parameter means any device, system, or element of design that someone can adjust and that, if adjusted, may affect emissions. You may ask us to exclude a parameter if you show us that it will not be adjusted in use in a way that affects emissions.

Certification means relating to the process of obtaining a certificate of conformity for an emission family that complies with the emission standards and requirements in this subpart.

Configuration means a unique combination of hardware (material, geometry, and size) and calibration within an emission family. Units within a single configuration differ only with respect to normal production variability.

Container means portable fuel container.

Designated Compliance Officer means the Manager, Engine Programs Group (6403-J), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

Designated Enforcement Officer means the Director, Air Enforcement Division (2242A), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW.,Washington, DC 20460.

Emission-control system means any device, system, or element of design that controls or reduces the regulated evaporative emissions from.

Emission-data unit means a portable fuel container that is tested for certification. This includes components tested by EPA.

Emission-related maintenance means maintenance that substantially affects emissions or is likely to substantially affect emission deterioration.

Emission family has the meaning given in §59.625.

Evaporative means relating to fuel emissions that result from permeation of fuel through the portable fuel container materials and from ventilation of the container.

Good engineering judgment means judgments made consistent with generally accepted scientific and engineering principles and all available relevant information. See §59.603 for the administrative process we use to evaluate good engineering judgment.

Hydrocarbon (HC) means total hydrocarbon (THC).

Manufacture means the physical and engineering process of designing and/or constructing a portable fuel container.

Manufacturer means any person who manufactures a portable fuel container for sale in the United States.

Nominal capacity means the expected volumetric working capacity of a container.

Official emission result means the measured emission rate for an emission-data unit.

Portable fuel container means any reusable container designed and marketed (or otherwise intended) for use by consumers for receiving, transporting, storing, and dispensing gasoline, diesel fuel, or kerosene. For the purpose of this subpart, all utility jugs that are red, yellow or blue in color are deemed to be portable fuel containers, regardless of how they are labeled or marketed.

Production period means the period in which a portable fuel container will be produced under a certificate of conformity. The maximum production period is five years.

Revoke means to terminate the certificate or an exemption for an emission family. If we revoke a certificate or exemption, you must apply for a new certificate or exemption before continuing to introduce the affected containers into commerce. This does not apply to containers you no longer possess.

Round has the meaning given in 40 CFR 1065.1001.

Suspend means to temporarily discontinue the certificate or an exemption for an emission family. If we suspend a certificate, you may not introduce into commerce portable fuel containers from that emission family unless we reinstate the certificate or

approve a new one. If we suspend an exemption, you may not introduce into commerce containers that were previously covered by the exemption unless we reinstate the exemption.

Total hydrocarbon means the combined mass of organic compounds measured by the specified procedure for measuring total hydrocarbon, expressed as a hydrocarbon with a hydrogen-to-carbon mass ratio of 1.85:1.

Ultimate purchaser means, with respect to any portable fuel container, the first person who in good faith purchases such a container for purposes other than resale.

Ultraviolet light means electromagnetic radiation with a wavelength between 300 and 400 nanometers.

United States means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, Guam, American Samoa, and the U.S. Virgin Islands.

U.S.-directed production volume means the amount of portable fuel containers, subject to the requirements of this subpart, produced by a manufacturer for which the manufacturer has a reasonable assurance that sale was or will be made to ultimate purchasers in the United States.

Useful life means the period during which a portable fuel container is required to comply with all applicable emission standards. See §59.611.

Void means to invalidate a certificate or an exemption ab initio (i.e. retroactively). Portable fuel containers introduced into U.S. commerce under the voided certificate or exemption is a violation of this subpart, whether or not they were introduced before the certificate or exemption was voided.

We (us, our) means the Administrator of the Environmental Protection Agency and any authorized representatives.

**§59.685 What symbols, acronyms, and abbreviations does this subpart use?**

The following symbols, acronyms, and abbreviations apply to this subpart:

| | |
|---|---|
| CFR | Code of Federal Regulations. |
| EPA | Environmental Protection Agency. |
| HC | hydrocarbon. |
| NIST | National Institute of Standards and Technology. |
| THC | total hydrocarbon. |
| U.S.C. | United States Code. |

**§59.695 What provisions apply to confidential information?**

(a) Clearly show what you consider confidential by marking, circling, bracketing, stamping, or some other method.

(b) We will store your confidential information as described in 40 CFR part 2. Also, we will disclose it only as specified in 40 CFR part 2. This applies both to any information you send us and to any information we collect from inspections, audits, or other site visits.

(c) If you send us a second copy without the confidential information, we will assume it contains nothing confidential whenever we need to release information from it.

(d) If you send us information without claiming it is confidential, we may make it available to the public without further notice to you, as described in 40 CFR 2.204.

**§59.697 State actions.**

The provisions in this subpart do not preclude any State or any political subdivision of a State from:

(a) Adopting and enforcing any emission standard or limitation applicable to anyone subject to the provisions of this part; or

(b) Requiring the regulated entity to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of a facility for manufacturing a consumer product.

**§59.698 May EPA enter my facilities for inspections?**

(a) We may inspect your portable fuel containers, testing, manufacturing processes, storage facilities (including port facilities for imported containers or other relevant facilities), or records, as authorized by the Act, to enforce the provisions of this subpart. Inspectors will have authorizing credentials and will limit inspections to reasonable times—usually, normal operating hours.

(b) If we come to inspect, we may or may not have a warrant or court order.

(1) If we do not have a warrant or court order, you may deny us entry.

(2) If we have a warrant or court order, you must allow us to enter the facility and carry out the activities it describes.

(c) We may seek a warrant or court order authorizing an inspection described in this section, whether or not we first tried to get your permission to inspect.

(d) We may select any facility to do any of the following:

(1) Inspect and monitor any aspect of portable fuel container manufacturing, assembly, storage, or other procedures, and any facilities where you do them.

(2) Inspect and monitor any aspect of test procedures or test-related activities, including test container selection, preparation, durability cycles, and maintenance and verification of your test equipment's calibration.

(3) Inspect and copy records or documents related to assembling, storing, selecting, and testing a container.

(4) Inspect and photograph any part or aspect of containers or components use for assembly.

(e) You must give us reasonable help without charge during an inspection authorized by the Act. For example, you may need to help us arrange an inspection with the facility's managers, including clerical support, copying, and translation. You may also need to show us how the facility operates and answer other questions. If we ask in writing to see a particular employee at the inspection, you must ensure that he or she is present (legal counsel may accompany the employee).

(f) If you have facilities in other countries, we expect you to locate them in places where local law does not keep us from inspecting as described in this section. We will not try to inspect if we learn that local law prohibits it, but we may suspend your certificate if we are not allowed to inspect.

**§59.699 How do I request a hearing?**

(a) You may request a hearing under certain circumstances, as described elsewhere in this subpart. To do this, you must file a written request with the Designated Compliance Officer, including a description of your objection and any supporting data, within 30 days after we make a decision.

(b) For a hearing you request under the provisions of this subpart, we will approve your request if we find that your request raises a substantial factual issue.

(c) If we agree to hold a hearing, we will use the procedures specified in 40 CFR part 1068, subpart G.

**PART 80—REGULATION OF FUELS AND FUEL ADDITIVES**

3. The authority citation for part 80 is revised to read as follows:

**Authority**: 42 U.S.C. 7414, 7521(1), 7545 and 7601(a).

Subpart D – [Amended]

4. Section 80.41 is amended as follows:

a. By redesignating paragraph (e) as paragraph (e)(1).

b. By adding paragraphs (e)(2) and (e)(3).

c. By redesignating paragraph (f) as paragraph (f)(1).

d. By adding paragraphs (f)(2) and (f)(3).

§80.41 Standards and requirements for compliance.

* * * * *

(e) * * *

(2)(i) The NOx emissions performance reduction specified in paragraph (e)(1) of this section shall no longer apply beginning January 1, 2007, except as provided in paragraph (e)(2)(ii) of this section.

(ii) For a refiner subject to the small refiner gasoline sulfur standards at §80.240, the NOx emissions performance reduction specified in paragraph (e)(1) of this section shall no longer apply beginning January 1, 2008. For a refiner subject to the gasoline sulfur standards at §80.240 that has received an extension of its small refiner gasoline sulfur standards under §80.553, the NOx emissions performance reduction specified in paragraph (e)(1) of this section shall no longer apply beginning January 1, 2011.

(3)(i) Beginning January 1, 2011, or January 1, 2015 for small refiners approved under §80.1340, the toxic air pollutants emissions performance reduction and benzene content specified in paragraph (e)(1) of this section shall

apply to reformulated gasoline that is not subject to the benzene standard of §80.1230, pursuant to the provisions of §80.1235.

(ii) The toxic air pollutants emissions performance reduction and benzene content specified in paragraph (e)(1) of this section shall not apply to reformulated gasoline produced by a refinery approved under §80.1334, pursuant to §80.1334(c).

(f) * * *

(2)(i) The NOx emissions performance reduction specified in paragraph (f)(1) of this section shall no longer apply beginning January 1, 2007, except as provided in paragraph (f)(2)(ii) of this section.

(ii) For a refiner subject to the small refiner gasoline sulfur standards at §80.240, the NOx emissions performance reduction specified in paragraph (f)(1) of this section shall no longer apply beginning January 1, 2008. For a refiner subject to the gasoline sulfur standards at §80.240 that has received an extension of its small refiner gasoline sulfur standards under §80.553, the NOx emissions performance reduction specified in paragraph (f)(1) of this section shall no longer apply beginning January 1, 2011.

(3)(i) Beginning January 1, 2011, or January 1, 2015 for small refiners approved under §80.1340, the toxic air pollutants emissions performance reduction and benzene content specified in paragraph (f)(1) of this section shall apply only to reformulated gasoline that is not subject to the benzene standard of §80.1230, pursuant to the provisions of §80.1235.

(ii) The toxic air pollutants emissions performance reduction and benzene content specified in paragraph (f)(1) of this section shall not apply to reformulated gasoline produced by a refinery approved under §80.1334, pursuant to §80.1334(c).

* * * * *

5. Section 80.68 is amended as follows:

a. By redesignating paragraphs (a) through (c) as paragraphs (b) through (d), respectively.

b. By adding new paragraph (a) to read as follows:

(a)(1) Beginning January 1, 2007, the compliance surveys for NOx emissions performance under this section shall cease to be required.

(2) Beginning January 1, 2011, the compliance surveys for toxics emissions performance under this section shall cease to be required.

c. In newly designated paragraph (b)(2) revise the reference “(c)” to read “(d)”.

d. In newly designated paragraph (c) revise the reference “(a)” to read “(b)”.

e. In newly designated paragraph (c)(2)(i) revise the reference “(b)(1)” to read “(c)(1)”.

f. In newly designated paragraph (c)(2)(ii) revise the reference “(c)” to read “(d)”, revise all references “(b)(1)” to read “(c)(1)”, and revise all references “(b)(2)(i)” to read “(c)(2)(i)”.

g. In newly designated paragraph (c)(3) revise the reference “(c)” to read “(d)”.

h. In newly designated paragraph (c)(4)(i) revise the reference “(a)” to read “(b)”.

i. In newly designated paragraph (d)(1)(ii)(A) revise the reference “(c)(6)” to read “(d)(6)”.

j. In newly designated paragraph (d)(1)(ii)(B) revise the reference “(c)(6)” to read “(d)(6)”.

k. In newly designated paragraph (d)(2)(i) revise the reference “(c)(6)” to read “(d)(6)”.

l. In newly designated paragraph (d)(8)(i)(C) revise the reference “(c)(8)(i)(B)” to read “(d)(8)(i)(B)”.

m. In newly designated paragraph (d)(9)(ii)(B) revise the reference “(c)(9)(i)(B)” to read “(d)(9)(i)(B)”.

n. In newly designated paragraph (d)(10)(v) revise the reference “(c)(10)(iv)” to read “(d)(10)(iv)”.

o. In newly designated paragraph (d)(11)(ii) revise the reference “(c)(11)(i)” to read “(d)(11)(i)”.

p. In newly designated paragraph (d)(13)(v)(G) revise the reference “(c)(8)(i)” to read “(d)(8)(i)”.

Subpart E – [Amended]

6. Section 80.101 is amended by adding paragraphs (c)(3) and (c)(4) to read as follows:

§80.101 Standards applicable to refiners and importers.

* * * * *

(c) * * *

(3)(i) The NOx emissions standard specified in paragraph (b)(3)(i) of this section shall no longer apply beginning January 1, 2007, except as provided in paragraph (c)(3)(ii) of this section.

(ii) For a refiner subject to the small refiner gasoline sulfur standards at §80.240, the NOx emissions standard specified in paragraph (b)(3)(i) of this section shall no longer apply beginning January 1, 2008. For a refiner subject to the gasoline sulfur standards at §80.240 that has received an extension of its small refiner gasoline sulfur standards under §80.553, the NOx emissions standard specified in paragraph (b)(3)(i) of this section shall no longer apply beginning January 1, 2011.

(4)(i) Beginning January 1, 2011, or January 1, 2015 for small refiners approved under §80.1340, the exhaust toxics emissions standard specified in paragraph (b)(3)(i) of this section shall apply only to conventional gasoline that is not subject to the benzene standard of §80.1230, pursuant to the provisions of §80.1235.

(ii) The exhaust toxic emissions standard specified in paragraph (b)(3)(i) of this section shall not apply to conventional gasoline produced by a refinery approved under §80.1334, pursuant to §80.1334(c).

* * * * *

Subpart F – [Amended]

7. Section 80.128 is amended by revising paragraph (a) to read as follows:

§80.128 Agreed upon procedures for refiners and importers.

* * * * *

(a) Read the refiner's or importer's reports filed with EPA for the previous year as required by §§80.75, 80.83(g), 80.105, 80.990 and 80.1354.

* * * * *

Subpart J – [Amended]

8. Section 80.815 is amended by redesignating paragraph (d)(1) as paragraph (d)(1)(i) and adding paragraph (d)(1)(ii) to read as follows:

§80.815 What are the gasoline toxics performance requirements for refiners and importers?

* * * * *

(d) * * *

(1) * * *

(ii)(A) Beginning January 1, 2011, or January 1, 2015 for small refiners approved under §80.1340, the gasoline toxics performance requirements of this subpart shall apply only to gasoline that is not subject to the benzene standard of §80.1230, pursuant to the provisions of §80.1235.

(B) The gasoline toxics performance requirements of this subpart shall not apply to gasoline produced by a refinery approved under §80.1334, pursuant to §80.1334(c).

* * * * *

9. Section 80.1035 is amended by adding paragraph (h) to read as follows:

§80.1035 What are the attest engagement requirements for gasoline toxics compliance applicable to refiners and importers?

* * * * *

(h) Beginning January 1, 2011, or January 1, 2015 for small refiners approved per §80.1340, the requirements of this section shall apply only to gasoline that is not subject to the benzene standard of §80.1230, pursuant to the provisions of §80.1235.

10. Subpart L is added to read as follows:

## Subpart L – Gasoline Benzene

Sec.

80.1200-80.1219 [Reserved]

### General Information

80.1220 What are the implementation dates for the gasoline benzene program?

80.1225 Who must register with EPA under the gasoline benzene program?

### Gasoline Benzene Requirements

80.1230 What are the gasoline benzene requirements for refiners and importers?

80.1235 What gasoline is subject to the benzene requirements of this subpart?

80.1236 What requirements apply to California gasoline?

80.1238 How is a refinery's or importer's average benzene concentration determined?

80.1240 How is a refinery's or importer's compliance with the gasoline benzene requirements of this subpart determined?

### Averaging, Banking and Trading (ABT) Program

80.1270 Who may generate benzene credits under the ABT program?

80.1275 How are early benzene credits generated?

80.1280 How are refinery benzene baselines calculated?

80.1285 How does a refiner apply for a benzene baseline?

80.1290 How are standard benzene credits generated?

80.1295 How are gasoline benzene credits used?

**Hardship Provisions**

80.1334 What are the requirements for early compliance with the gasoline benzene program?

80.1335 Can a refiner seek relief from the requirements of this subpart?

80.1336 What if a refiner or importer cannot produce gasoline conforming to the requirements of this subpart?

**Small Refiner Provisions**

80.1338 What criteria must be met to qualify as a small refiner for the gasoline benzene requirements of this subpart?

80.1339 Who is not eligible for the provisions for small refiners?

80.1340 How does a refiner obtain approval as a small refiner?

80.1342 What compliance options are available to small refiners under this subpart?

80.1343 What hardship relief provisions are available only to small refiners?

80.1344 What provisions are available to a non-small refiner that acquires one or more of a small refiner's refineries?

**Sampling, Testing and Retention Requirements**

80.1347 What are the sampling and testing requirements for refiners and importers?

80.1348 What gasoline sample retention requirements apply to refiners and importers?

**Recordkeeping and Reporting Requirements**

80.1350 What records must be kept?

80.1352 What are the pre-compliance reporting requirements for the gasoline benzene program?

80.1354 What are the reporting requirements for the gasoline benzene program?

**Attest Engagements**

80.1356 What are the attest engagement requirements for gasoline benzene compliance?

**Violations and Penalties**

80.1358 What acts are prohibited under the gasoline benzene program?

80.1359 What evidence may be used to determine compliance with the prohibitions and requirements of this subpart and liability for violations of this subpart?

80.1360 Who is liable for violations under the gasoline benzene program?

80.1361 What penalties apply under the gasoline benzene program?

**Foreign Refiners**

80.1363 What are the additional requirements under this subpart for gasoline produced at foreign refineries?

## Subpart L – Gasoline Benzene

**§§80.1200-80.1219 [Reserved]**

## General Information

**§80.1220 What are the implementation dates for the gasoline benzene program?**

(a) Benzene standard. (1) For the annual averaging period beginning January 1, 2011, and for each annual averaging period thereafter, gasoline produced at each refinery of a refiner or imported by an importer, must meet the benzene standard specified in §80.1230(a), except as otherwise specifically provided for in this subpart.

(2) For the period July 1, 2012 through December 31, 2013, and for each annual averaging period thereafter, gasoline produced at each refinery of a refiner or imported by

an importer, must meet the maximum average benzene standard specified in §80.1230(b), except as otherwise specifically provided for in this subpart.

(3) Small refiners approved under §80.1340 may defer meeting the benzene standard specified in §80.1230(a) until the annual averaging period beginning January 1, 2015 and may defer meeting the benzene standard specified in §80.1230(b) until the averaging period beginning July 1, 2016, as described in §80.1342.

(b) Early credit generation. (1) Effective with the averaging period beginning June 1, 2007, a refiner for each of its refineries that has an approved benzene baseline per §80.1285 may generate early benzene credits in accordance with the provisions of §80.1275.

(2) Early benzene credits may be generated through the end of the averaging period ending December 31, 2010, or through the end of the averaging period ending December 31, 2014 for small refiners approved under §80.1340.

(c) Standard credit generation. (1) Effective with the annual averaging period beginning January 1, 2011, a refiner for any of its refineries or an importer for its imported gasoline, may generate standard benzene credits in accordance with the provisions of §80.1290.

(2) Effective with the annual averaging period beginning January 1, 2015, a small refiner approved under §80.1340, for any of its refineries, may generate standard benzene credits in accordance with the provisions of §80.1290.

**§80.1225 Who must register with EPA under the gasoline benzene program?**

(a) Refiners and importers that are registered by EPA under §80.76, §80.103, §80.190, or §80.810 are deemed to be registered for purposes of this subpart.

(b) Refiners and importers subject to the requirements in §80.1230 that are not registered by EPA under §§80.76, 80.103, 80.190 or 80.810 shall provide to EPA the information required in §80.76 by September 30, 2010, or not later than three months in advance of the first date that such person produces or imports gasoline, whichever is later.

(c) Refiners that plan to generate early credits under §80.1275 and that are not registered by EPA under §§80.76, 80.103, 80.190, or 80.810 must provide to EPA the information required in §80.76 not later than 60 days prior to the end of the first year of credit generation.

## Gasoline Benzene Requirements

### §80.1230 What are the gasoline benzene requirements for refiners and importers?

(a) Annual average benzene standard. (1) Except as specified in paragraph (c) of this section, a refinery's or importer's average gasoline benzene concentration in any annual averaging period shall not exceed 0.62 volume percent.

(2) Compliance with the standard specified in paragraph (a)(1) of this section, or creation of a deficit in accordance with paragraph (c) of this section, is determined in accordance with §80.1240(a).

(3) The annual averaging period for achieving compliance with the requirement of paragraph (a)(1) of this section is January 1 through December 31 of each calendar year

beginning January 1, 2011, or beginning January 1, 2015 for small refiners approved under §80.1340.

(4) Refinery grouping per §80.101(h) does not apply to compliance with the gasoline benzene requirement specified in this paragraph (a).

(5) Gasoline produced at foreign refineries that is subject to the gasoline benzene requirements per §80.1235 shall be included in the importer's compliance determination beginning January 1, 2011, or beginning January 1, 2015 for small foreign refiners approved under §80.1340.

(b) Maximum average benzene standard. (1) A refinery's or importer's maximum average gasoline benzene concentration in any averaging period shall not exceed 1.30 volume percent.

(2) Compliance with the standard specified in paragraph (b)(1) of this section is determined in accordance with §80.1240(b).

(3) The averaging period for achieving compliance with the requirement of paragraph (b)(1) of this section is July 1, 2012 through December 31, 2013 and each calendar year thereafter, or July 1, 2016 through December 31, 2017, and each calendar year thereafter for small refiners approved under §80.1340.

(c) Deficit carry-forward. (1) A refinery or importer creates a benzene deficit for a given averaging period when its compliance benzene value, per §80.1240(a), is greater than the benzene standard specified in paragraph (a) of this section.

(2) A refinery or importer may carry the benzene deficit forward to the calendar year following the year the benzene deficit is created but only if no deficit had been

previously carried forward to the year the deficit is created. If a refinery or importer carries forward a deficit, the following provisions apply in the second year:

(i) The refinery or importer must achieve compliance with the benzene standard specified in paragraph (a) of this section.

(ii) The refinery or importer must achieve further reductions in its gasoline benzene concentrations sufficient to offset the benzene deficit of the previous year.

(iii) Benzene credits may be used, per §80.1295, to meet the requirements of paragraphs (c)(2)(i) and (ii) of this section.

(iv) A refinery that has banked credits per §80.1295(a)(3) must use all of its banked credits to achieve compliance with the benzene standard specified in paragraph (a) of this section before creating a deficit.

(3) EPA may allow an extended period of deficit carry-forward if it grants hardship relief under §§80.1335 or 80.1336 from the annual average standard specified in paragraph (a) of this section.

**§80.1235 What gasoline is subject to the benzene requirements of this subpart**?

(a) For the purposes of determining compliance with the requirements of §80.1230, all of the following products that are produced or imported for use in the United States during a refinery's or importer's applicable compliance period are collectively "gasoline" and are to be included in a refinery's or importer's compliance determination under §80.1240, except as provided in paragraph (b) of this section:

(1) Reformulated gasoline.

(2) Conventional gasoline.

(3) Reformulated gasoline blendstock for oxygenate blending (“RBOB”).

(4) Conventional gasoline blendstock that becomes finished conventional gasoline upon the addition of oxygenate (“CBOB”).

(5) Blendstock that has been combined with finished gasoline, other blendstock, transmix, or gasoline produced from transmix to produce gasoline.

(6) Blendstock that has been combined with previously certified gasoline (“PCG”) to produce gasoline. Such blendstock must be sampled in accordance with the provisions at §80.1347(a)(5).

(b) The following products are not to be included in a refinery’s or importer’s compliance determination under §80.1240:

(1) Blendstock that has not been combined with other blendstock or finished gasoline to produce gasoline.

(2) Oxygenate added to finished gasoline, RBOB, or CBOB downstream of the refinery that produced the gasoline or import facility where the gasoline was imported.

(3) Butane added to finished gasoline, RBOB, CBOB downstream of the refinery that produced the gasoline or import facility where the gasoline was imported.

(4) Gasoline produced by separating gasoline from transmix.

(5) PCG.

(6) Gasoline produced or imported for use in Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

(7) Gasoline exported for use outside the United States.

(8) Gasoline produced by a small refiner approved under §80.1340 prior to January 1, 2015, or prior to the small refiner's first compliance period pursuant to §80.1342(a), whichever is earlier.

(9) Gasoline that is used to fuel aircraft, racing vehicles or racing boats that are used only in sanctioned racing events, provided that --

(i) 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 events;

(ii) The gasoline is completely segregated from all other gasoline throughout production, distribution and sale to the ultimate consumer; and

(iii) The gasoline is not made available for use as motor vehicle gasoline, or dispensed for use in motor vehicles, except for motor vehicles used only in sanctioned racing events.

(10) California gasoline, as defined in §80.1236.

**§80.1236 What requirements apply to California gasoline?**

(a) Definition. For purposes of this subpart, "California gasoline" means any gasoline designated by the refiner or importer as for use only in California and that is actually used in California.

(b) California gasoline exemption. California gasoline that complies with all the requirements of this section is exempt from the requirements in §80.1230.

(c) Requirements for California gasoline. The following requirements apply to California gasoline:

(1) Each batch of California gasoline must be designated as such by its refiner or importer.

(2) Designated California gasoline must be kept segregated from gasoline that is not California gasoline at all points in the distribution system.

(3) Designated California gasoline must ultimately be used in the State of California and not used elsewhere in the United States.

(4) In the case of California gasoline produced outside the State of California, the transferors and transferees must meet the product transfer document requirements under §80.81(g).

(5) Gasoline that is ultimately used in any part of the United States outside of the State of California must comply with the requirements specified in §80.1230, regardless of any designation as California gasoline.

**§80.1238 How is a refinery's or importer's average benzene concentration determined?**

(a) The average benzene concentration of gasoline produced at a refinery or imported by an importer for an applicable averaging period is calculated according to the following equation:

$$B_{avg} = \frac{\sum_{i=1}^{n}(V_i \times B_i)}{\sum_{i=1}^{n} V_i}$$

Where:

$B_{avg}$ = Average benzene concentration for the applicable averaging period (volume percent benzene).

i = Individual batch of gasoline produced at the refinery or imported during the applicable averaging period.

n = Total number of batches of gasoline produced at the refinery or imported during the applicable annual averaging period.

$V_i$ = Volume of gasoline in batch i (gallons).

$B_i$ = Benzene concentration of batch i (volume percent benzene), per § 80.46(e).

(b) A refiner or importer may include the volume of oxygenate added downstream from the refinery or import facility in the calculation specified in paragraph (a) of this section, 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) and the calculation methodologies of §80.101(g)(3).

(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 the calculation specified in paragraph (a) of this section all of the following:

(1) Gasoline that was not produced at the refinery or imported by the importer.

(2) Except as provided in paragraph (b) of this section, any blendstocks or unfinished gasoline transferred to others.

(3) Gasoline that has been included in the compliance calculations for another refinery or importer.

(4) Gasoline exempted from the standards under §80.1235(b).

**§80.1240 How is a refinery's or importer's compliance with the gasoline benzene requirements of this subpart determined?**

(a) A refinery's or importer's compliance with the annual average benzene standard at §80.1230(a) is determined as follows:

(1)(i) The compliance benzene value for a refinery or importer is:

$$CBV_y = V_y \times \left( \frac{B_{avg,y}}{100} \right) + D_{y-1} - BC - OC$$

Where:

$CBV_y$ = Compliance benzene value (gallons benzene) for year y.

$V_y$ = Gasoline volume produced or imported in year y (gallons).

$B_{avg,y}$ = Average benzene concentration in year y (volume percent benzene), calculated in accordance with §80.1238.

$D_{y-1}$ = Benzene deficit from the previous reporting period, per §80.1230(c) (gallons benzene).

BC = Banked benzene credits used to show compliance (gallons benzene).

OC = Benzene credits obtained by the refinery or importer used to show compliance (gallons benzene).

(ii) Benzene credits used in the calculation specified in paragraph (a)(1)(i) of this section must be used in accordance with the requirements at §80.1295.

(2)(i) If $CBV_y \leq V_y$ x (0.62)/100, then compliance with the benzene requirement at §80.1230(a) is achieved for calendar year y.

(ii) If $CBV_y > V_y$ x (0.62)/100, then compliance with the benzene requirement at §80.1230(a) is not achieved for calendar year y, and a deficit is created per §80.1230(c). The deficit value to be included in the following year's compliance calculation per paragraph (a) of this section is calculated as follows:

$$D_y = CBV_y - V_y \times \left(\frac{0.62}{100}\right)$$

Where:

$D_y$ = Benzene deficit created in compliance period y (gallons benzene).

(b) Compliance with the maximum average benzene standard at §80.1230(b) is achieved by a refinery or importer if the value of $B_{avg}$ calculated in accordance with §80.1238(a) is no greater 1.30 volume percent for an applicable averaging period per §80.1230(b)(3).

## Averaging, Banking and Trading (ABT) Program

**§80.1270 Who may generate benzene credits under the ABT program?**

(a) Early benzene credits. Early benzene credits are credits generated prior to 2011, or prior to 2015 if generated by a small refiner approved under §80.1340.

(1)(i) Early credits may be generated under §80.1275 by a refiner for any refinery it owns that has an approved benzene baseline under §80.1285, including a refinery of a foreign refiner that is subject to the provisions of §80.1363.

(ii) The refinery specified in paragraph (a)(1)(i) of this section must process crude oil and/or intermediate feedstocks through refinery processing units.

(iii) Early benzene credits shall be calculated separately for each refinery of a refiner.

(iv) A refinery that is approved for early compliance under §80.1334 may not generate early credits for the gasoline subject to the early compliance provisions.

(2)(i) A refinery that was shut down during the entire 2004-2005 benzene baseline period is not eligible to generate early credits under §80.1275.

(ii) A refinery not in full production, excluding normal refinery downtime, or not showing consistent or regular gasoline production activity during 2004-2005 may be eligible to generate early benzene credits under §80.1275 upon petition to and approval by EPA, pursuant to §80.1285(d).

(3) Importers may not generate early credits.

(b) Standard benzene credits. Standard benzene credits are credits generated after 2010, or after 2014 if generated by a small refiner approved under §80.1340.

(1) Unless otherwise provided for elsewhere in this subpart, standard credits may be generated under §80.1290 as follows:

(i) A refiner may generate standard credits separately for each of its refineries.

(ii) An importer may generate standard credits for all of its imported gasoline.

(2) Oxygenate blenders, butane blenders, and transmix producers may not generate standard credits.

(3) Foreign refiners may not generate standard credits.

**§80.1275 How are early benzene credits generated?**

(a) For each averaging period per paragraph (b) of this section in which a refinery plans to generate early credits, its average gasoline benzene concentration calculated according to §80.1238(a) must be at least 10% lower than its benzene baseline concentration approved under §80.1280.

(b) The early credit averaging periods are as follows:

(1) For 2007, the seven-month period from June 1, 2007 through December 31, 2007.

(2) For 2008, 2009 and 2010, the 12-month calendar year.

(3) For small refiners approved under §80.1340, the 12-month calendar years 2011, 2012, 2013, and 2014 in addition to the periods specified in paragraphs (b)(1) and (b)(2) of this section.

(c) The number of early benzene credits generated shall be calculated for each applicable averaging period as follows:

$$EC_y = \left[ \frac{B_{Base} - B_{avg,y}}{100} \right] \times V_{e,y}$$

Where:

$EC_y$ = Early credits generated in averaging period y (gallons benzene).

$B_{Base}$ = Baseline benzene concentration of the refinery (volume percent benzene), per §80.1280(a).

$B_{avg,y}$ = Average benzene concentration of gasoline produced at the refinery during averaging period y (volume percent benzene), per §80.1238.

$V_{e,y}$ = Total volume of gasoline produced at the refinery during averaging period y (gallons).

(d) A refinery that plans to generate early credits must also show that it has met all of the following requirements prior to or during the first early credit averaging period, per paragraph (b) of this section, in which it generates early credits:

(1) Since 2005, has made operational changes and/or improvements in benzene control technology to reduce gasoline benzene levels, including at least one of the following:

(i) Treating the heavy straight run naphtha entering the reformer using light naphtha splitting and/or isomerization.

(ii) Treating the reformate stream exiting the reformer using benzene extraction or benzene saturation.

(iii) Directing additional refinery streams to the reformer for treatment described paragraphs (d)(1)(i) and (ii) of this section.

(iv) Directing reformate streams to other refineries with treatment capabilities described in paragraph (d)(1)(ii) of this section.

(2) Has not included gasoline blendstock streams transferred to, from, or between refineries, except as noted in paragraph (d)(1)(iv) of this section.

(e) Early benzene credits calculated in accordance with paragraph (c) of this section shall be expressed to the nearest gallon. Fractional values shall be rounded down if less than 0.50, and rounded up if greater than or equal to 0.50.

**§80.1280 How are refinery benzene baselines calculated?**

(a) A refinery's benzene baseline is based on the refinery's 2004-2005 average gasoline benzene concentration, calculated according to the following equation:

$$B_{Base} = \frac{\sum_{i=1}^{n}(V_i \times B_i)}{\sum_{i=1}^{n} V_i}$$

Where:

$B_{Base}$ = Benzene baseline concentration (volume percent benzene).

i = Individual batch of gasoline produced at the refinery from January 1, 2004 through December 31, 2005.

n = Total number of batches of gasoline produced at the refinery from January 1, 2004 through December 31, 2005 (or the total number of batches of gasoline pursuant to §80.1285(d)).

$V_i$ = Volume of gasoline in batch i (gallons).

$B_i$ = Benzene content of batch i (volume percent benzene).

(b) A refiner for a refinery that included oxygenate blended downstream of the refinery in compliance calculations for RFG or conventional gasoline for calendar years 2004 or 2005 under §80.69 or §80.101(d)(4) must include the volume and benzene concentration of this oxygenate in the benzene baseline calculation for that refinery under paragraph (a) of this section.

**§80.1285 How does a refiner apply for a benzene baseline?**

(a) A benzene baseline application must be submitted for each refinery that plans to generate early credits under §80.1275. The application must include the information specified in paragraph (c) of this section and must be submitted to EPA at least 60 days before the first averaging period in which the refinery plans to generate early credits.

(b) For U.S. Postal delivery, the benzene baseline application shall be sent to: Attn: MSAT2 Benzene, Mail Stop 6406J, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW, Washington, DC 20460. For commercial delivery: MSAT2 Benzene, 202-343-9038, U.S. Environmental Protection Agency, 1310 L Street, NW, Washington, DC 20005.

(c) The benzene baseline application must include the following information:

(1) A listing of the names and addresses of all refineries owned by the company.

(2) The benzene baseline for gasoline produced in 2004-2005 at the refinery, calculated in accordance with §80.1280.

(3) Copies of the annual reports required under §80.75 for RFG and §80.105 for conventional gasoline.

(4) A letter signed by the president, chief operating officer, or chief executive officer, of the company, or his/her designee, stating that the information contained in the benzene 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) For a refinery that may be eligible to generate early credits under §80.1270(a)(2)(ii), a refiner may submit to EPA a benzene baseline application per the requirements of this section. The refiner must also submit information regarding the

nature and cause of the refinery's production activity that resulted in irregular or less than full production, how it affected the baseline benzene concentration, and whether and how an alternative calculation to the calculation specified in §80.1280 produces a more representative benzene baseline value. Upon consideration of the submitted information, EPA may approve a benzene baseline for such a refinery.

(e) EPA will notify the refiner of approval of the refinery's benzene baseline or any deficiencies in the application. However, except for applications submitted in accordance with paragraph (d) of this section, the refinery's benzene baseline application may be considered approved 60 days after EPA's receipt of the baseline application, subject to paragraph (f) of this section.

(f) If at any time the baseline submitted in accordance with the requirements of this section is determined to be incorrect, EPA will notify the refiner of the corrected baseline.

**§80.1290 How are standard benzene credits generated?**

(a) The standard credit averaging periods are the calendar years beginning January 1, 2011, or beginning January 1, 2015 for small refiners approved under §80.1340.

(b) [Reserved]

(c)(1) The number of standard benzene credits generated shall be calculated annually for each applicable averaging period according to the following equation:

$$SC_y = \left[ \frac{0.62 - B_{avg,\,y}}{100} \right] \times V_y$$

Where:

$SC_y$ = Standard credits generated in year y (gallons benzene).

$B_{avg,y}$ = Annual average benzene concentration for year y (volume percent benzene), per §80.1238.

$V_y$ = Total volume of gasoline produced or imported in year y (gallons).

(2) No credits shall be generated unless the value $SC_y$ is positive.

(d) Standard benzene credits calculated in accordance with paragraph (c) of this section shall be expressed to the nearest gallon. Fractional values shall be rounded down if less than 0.50, and rounded up if greater than or equal to 0.50.

**§80.1295 How are gasoline benzene credits used?**

(a) Credit use. (1) Gasoline benzene credits may be used to comply with the gasoline benzene standard of §80.1230(a) provided that --

(i) The gasoline benzene credits were generated according to §§80.1275 or 80.1290.

(ii) The recordkeeping requirements for gasoline benzene credits under §80.1350 are met.

(iii) The gasoline benzene credits are correctly reported according to §§80.1352 and 80.1354.

(iv) The conditions of this section are met.

(2) Gasoline benzene credits generated under §§80.1275 and 80.1290 may be used interchangeably in all credit use scenarios, subject to the credit life provisions specified in paragraph (c) of this section.

(3) Gasoline benzene credits may be used by a refiner or importer to comply with the gasoline benzene content standard of §80.1230(a), may be banked by a refiner or importer for future use or transfer, may be transferred to another refinery or importer within a company (intracompany trading), or may be transferred to another refiner or importer outside of the company.

(b) Credit transfers. (1) Gasoline benzene credits obtained from another refinery or importer may be used to comply with the gasoline benzene content requirement of §80.1230(a) provided the following conditions are met:

(i) The credits are generated and reported according to the requirements of this subpart, and the transferred credits have not expired, per paragraph (c) of this section.

(ii) Any credit transfer takes place no later than the last day of February following the calendar year averaging period when the credits are used.

(iii) The credit has not been transferred more than twice. The first transfer by the refinery or importer that generated the credit may only be made to a refiner or importer that intends to use the credit; if the transferee cannot use the credit, it may make the second, and final, transfer only to a refiner or importer that intends to use or to terminate the credit. In no case may a credit be transferred more than twice before being used or terminated.

(iv) The credit transferor has applied any gasoline benzene credits necessary to meet its own annual compliance requirements (including any deficit carried forward,

pursuant to §80.1230(c), if applicable) before transferring any gasoline benzene credits to any other refiner or importer.

(v) The credit transferor does not create a deficit as a result of a credit transfer.

(vi) The transferor supplies records to the transferee indicating the year the gasoline benzene credits were generated, the identity of the refiner (and refinery) or importer that generated the gasoline benzene credits, and the identity of the transferring entity if it is not the same entity that generated the gasoline benzene credits.

(2) In the case of gasoline benzene credits that have been calculated or created improperly, or that EPA has otherwise determined to be invalid, the following provisions apply:

(i) Invalid gasoline benzene credits cannot be used to achieve compliance with the gasoline benzene content requirement of §80.1230(a), regardless of the transferee's good-faith belief that the gasoline benzene credits were valid.

(ii) The refiner or importer that used the gasoline benzene credits and any transferor of the gasoline benzene credits must adjust their credit records, reports, and compliance calculations as necessary to reflect the proper gasoline benzene credits.

(iii) Any properly created gasoline benzene credits existing in the transferor's credit balance following the corrections and adjustments specified in paragraph (b)(2)(ii) of this section must first be applied to correct the invalid transfers to the transferee, before the transferor uses, trades or banks the gasoline benzene credits.

(c) Credit life. (1)(i) Early credits, per §80.1275, may be used for compliance purposes under §80.1240(a) for any of the following annual averaging periods: 2011, 2102, 2013.,

(ii) Early credits, per §80.1275, may be used for compliance purposes under §80.1240(a) by small refiners approved under §80.1340 for any of the following averaging periods: 2015, 2016, 2017.

(2)(i) Standard credits, per §80.1290, may be used for compliance purposes under §80.1240(a) within five years from the year they were generated, except as noted under paragraph (c)(2)(ii) of this section. Example: Standard credits generated during 2011 may be used to achieve compliance under §80.1240(a) for any calendar year averaging period prior to the 2017 averaging period.

(ii) Standard credits, per §80.1290, may be used for compliance purposes under §80.1240(a) within seven years from the year they were generated if traded to and ultimately used by a small refiner approved under §80.1340. Example: Standard credits generated in 2011 may be used to achieve compliance under §80.1240(a) for any calendar year averaging period prior to the 2019 averaging period if traded to and ultimately used by a small refiner approved under §80.1340.

(d) Deficit provision limitation. A refiner or importer possessing gasoline benzene credits must use all gasoline benzene credits in its possession before applying the benzene deficit provisions of §80.1230(c).

## Hardship Provisions

### §80.1334 What are the requirements for early compliance with the gasoline benzene program?

(a)(1) A refinery may comply with the benzene requirements at §80.1230 for its RFG and/or conventional gasoline (CG) prior to the 2011 compliance period if it applies for this early compliance option as specified in paragraph (b) of this section, and is approved by EPA.

(2) Only refineries that produce gasoline by processing crude and/or intermediate feedstocks through refinery processing units may apply for this early compliance option.

(b) Refiners must submit an application in order to be considered for early compliance as described in this section.

(1) Applications for early compliance as described in this section must be submitted to EPA by December 31, 2007.

(2) Applications must be sent to: U.S. EPA, NVFEL-ASD, Attn: MSAT2 Early Compliance, 2000 Traverwood Dr., Ann Arbor, MI 48105.

(3) Application must be made separately for a refinery's RFG and CG pools.

(4) The early compliance application must show that all the following criteria are met:

(i) For an RFG early compliance application --

(A) The refinery's RFG baseline value under §80.915 is greater than or equal to 30 percent reduction.

(B) The refinery's 2003 RFG annual average benzene concentration was less than or equal to 0.62 vol%.

(C) The refinery's 2003 RFG annual average sulfur concentration was less than or equal to 140 ppm.

(D) The refinery's 2003 RFG annual average MTBE concentration was greater than or equal to 6 vol%.

(ii) For a CG early compliance application --

(A) The refinery's CG baseline under §80.915 is less than or equal to 80 mg/mile.

(B) The refinery's 2003 CG annual average benzene concentration was less than or equal to 0.62 vol%.

(C) The refinery's 2003 CG annual average sulfur concentration was less than or equal to 140 ppm.

(D) The refinery's 2003 CG annual average MTBE concentration was greater than or equal to 6 vol%.

(5) In addition, the application must demonstrate that the refinery has extremely limited ability to adjust its operations in order to comply with its applicable RFG or CG toxics performance requirements under §80.815.

(6) The refiner must provide additional information as requested by EPA.

(c)(1) If approved for early compliance with the provisions of this subpart, the refinery may comply with the provisions of §80.1230 as follows:

(i) For the compliance period beginning January 1, 2007, and each annual compliance period through 2010; or

(ii) For the compliance period beginning January 1, 2008, and each annual compliance period through 2010.

(2) The refinery must notify EPA under which compliance period specified in paragraph (c)(1) of this section it will begin compliance.

(3) Beginning with the compliance period chosen pursuant to paragraph (c)(2) of this section --

(i) For early compliance approved for a refinery's RFG pool, the toxics air pollutants emissions performance requirements specified in §§80.41(e)(1) and (f)(1) and 80.815 shall not apply to the reformulated gasoline produced by the refinery.

(ii) For early compliance approved for a refinery's CG pool, the annual average exhaust toxics emissions requirements specified in §§80.101(c)(2) and 80.815 shall not apply to conventional gasoline produced by the refinery.

(4) Refineries approved for early compliance under this section may not generate early credits under §80.1275.

(d) If EPA finds that a refiner provided false or inaccurate information in its application for early compliance, the early compliance approval will be void ab initio.

**§80.1335 Can a refiner seek relief from the requirements of this subpart**?

(a) A refiner may apply for relief from the requirements specified in §80.1230(a) or (b) for a refinery, if it can show that --

(1) Unusual circumstances exist that impose extreme hardship and significantly affect the ability to comply with the gasoline benzene standards at §80.1230(a) or (b) by the applicable date(s); and

(2) It has made best efforts to comply with the requirements of this subpart.

(b) A refiner must apply for and be approved for relief under this section.

(1) An application must include the following information:

(i) A plan demonstrating how the refiner will comply with the requirements of §80.1230(a) or (b), as applicable, as expeditiously as possible. The plan shall include a showing that contracts are or will be in place for engineering and construction of benzene reduction technology, a plan for applying for and obtaining any permits necessary for construction, a description of plans to obtain necessary capital, and a detailed estimate of when the requirements of §80.1230(a) or (b), as applicable, will be met.

(ii) A detailed description of the refinery configuration and operations including, at minimum, the following information:

(A) The refinery's total reformer unit throughput capacity;

(B) The refinery's total crude capacity;

(C) Total crude capacity of any other refineries owned by the same entity;

(D) Total volume of gasoline production at the refinery;

(E) Total volume of other refinery products;

(F) Geographic location(s) where the refinery's gasoline will be sold;

(G) Detailed descriptions of efforts to obtain capital for refinery investments;

(H) Bond rating of entity that owns the refinery; and

(I) Estimated capital investment needed to comply with the requirements of this subpart.

(iii) For a hardship related to complying with the requirement at §80.1230(a), detailed descriptions of efforts to obtain credits, including the prices of credits available, but deemed uneconomical by the refiner.

(2) Applicants must also provide any other relevant information requested by EPA.

(3) An application for relief from the requirements specified in §80.1230(b) must be submitted to EPA by January 1, 2008, or by January 1, 2013 for small refiners approved under §80.1340.

(c)(1) Approval of a hardship application under this section for relief from the annual average benzene standard at §80.1230(a) shall be in the form of an extended period of deficit carry-forward, per §80.1230(c), for such period of time as EPA determines is appropriate.

(2) Approval of a hardship application under this section for relief from the maximum average benzene standard at §80.1230(b) shall be in the form of a waiver of the standard for such period of time as EPA determines is appropriate.

(3) EPA may deny any application for appropriate reasons, including unacceptable environmental impact.

(d) EPA may impose any other reasonable conditions on relief provided under this section, including rescinding, or reducing the length of, the extended deficit carry-forward period if conditions or situations change between approval of the hardship application and the end of the approved relief period.

**§80.1336 What if a refiner or importer cannot produce gasoline conforming to the requirements of this subpart?**

In extreme, unusual, and unforeseen circumstances (for example, a natural disaster or a refinery fire) that are clearly outside the control of the refiner or importer and that could not have been avoided by the exercise of prudence, diligence, and due

care, EPA may permit a refinery or importer to exceed the allowable average benzene levels specified in §80.1230(a) or (b), as applicable, if --

(a) It is in the public interest to do so;

(b) The refiner or importer exercised prudent planning and was not able to avoid the violation and has taken all reasonable steps to minimize the extent of the nonconformity;

(c) The refiner or importer can show how the requirements at §80.1230(a) or (b), as applicable, will be achieved as expeditiously as possible;

(d) The refiner or importer agrees to make up any air quality detriment associated with the nonconformity, where practicable; and

(e) The refiner or importer pays to the U.S. Treasury an amount equal to the economic benefit of the nonconformity minus the amount expended making up the air quality detriment pursuant to paragraph (d) of this section.

## Small Refiner Provisions

### §80.1338 What criteria must be met to qualify as a small refiner for the gasoline benzene requirements of this subpart?

(a) A small refiner is any person that demonstrates that it --

(1) Produced gasoline at a refinery by processing crude oil through refinery processing units from January 1, 2005 through December 31, 2005.

(2) Employed an average of no more than 1,500 people, based on the average number of employees for all pay periods from January 1, 2005 through December 31, 2005.

(3) Had a corporate average crude oil capacity less than or equal to 155,000 barrels per calendar day (bpcd) for 2005.

(4) Following the submission of a small refiner application, pursuant to §80.1340, has been approved as a small refiner for this subpart.

(b) For the purpose of determining the number of employees and the crude oil capacity under paragraph (a) of this section, the following determinations shall be observed:

(1) The refiner shall include the employees and crude oil capacity of any subsidiary companies, any parent company, subsidiaries of the parent company in which the parent has a controlling interest, and any joint venture partners.

(2) For any refiner owned by a governmental entity, the number of employees and total crude oil capacity as specified in paragraph (a) of this section shall include all employees and crude oil production of the government to which the governmental entity is a part.

(3) Any refiner owned and controlled by an Alaska Regional or Village Corporation organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601) is not considered an affiliate of such entity, or with other concerns owned by such entity, solely because of their common ownership.

(c) Notwithstanding the provisions of paragraph (a) of this section, a refiner that reactivates a refinery that it had previously operated, and that was shut down or non-

operational for the entire period between January 1, 2005 and December 31, 2005, may apply for small refiner status in accordance with the provisions of §80.1340.

**§80.1339 Who is not eligible for the provisions for small refiners?**

The following are not eligible for the hardship provisions for small refiners:

(a) A refiner with one or more refineries built after December 31, 2005.

(b) A refiner that exceeds the employee or crude oil capacity criteria under §80.1338 but that meets these criteria after December 31, 2005, regardless of whether the reduction in employees or crude capacity is due to operational changes at the refinery or a company sale or reorganization.

(c) Importers.

(d) A refiner that produce gasoline other than by processing crude oil through refinery processing units.

(e)(1) A small refiner approved under §80.1340 that subsequently ceases production of gasoline from processing crude oil through refinery processing units, employs more than 1,500 people, or exceeds the 155,000 bpcd crude oil capacity limit after December 31, 2005 as a result of merger with or acquisition of or by another entity, is disqualified as a small refiner, except that this shall not apply in the case of a merger between two previously approved small refiners. If disqualification occurs, the refiner shall notify EPA in writing no later than 20 days following this disqualifying event.

(2) Except as provided under paragraph (e)(3) of this section, any refiner whose status changes as specified in paragraph (e)(1) under this paragraph (b) shall meet the

applicable standards of §80.1230 within 30 months of the disqualifying event for all its refineries. However, such period shall not extend beyond December 31, 2014.

(3) A refiner may apply to EPA for an additional six months to comply with the standards of §80.1230 if it believes that more than 30 months will be required for the necessary engineering, permitting, construction, and start-up work to be completed. Such applications must include detailed technical information supporting the need for additional time. EPA will base its decision to approve additional time on the information provided by the refiner and on other relevant information. In no case will EPA extend the compliance date beyond December 31, 2014.

(4) During the period provided under paragraph (e)(2) of this section, and any extension provided under paragraph (e)(3) of this section, the refiner may not generate gasoline benzene credits under §80.1275 or §80.1290.

(f) A small refiner approved under §80.1340 which notifies EPA that it wishes to withdraw its small refiner status pursuant to §80.1340(g).

**§80.1340 How does a refiner obtain approval as a small refiner?**

(a) Applications for small refiner status must be submitted to EPA by December 31, 2007.

(b) For U.S. Postal delivery, applications for small refiner status must be sent to: Attn: MSAT2 Benzene, Mail Stop 6406J, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW, Washington, DC 20460. For commercial delivery: MSAT2 Benzene, 202-343-9038, U.S. Environmental Protection Agency, 1310 L Street, NW, Washington, DC 20005.

(c) The small refiner status application must contain the following information for the company seeking small refiner status, and for all subsidiary companies, all parent companies, all subsidiaries of the parent companies, and all joint venture partners:

(1) Employees. For joint ventures, the total number of employees includes the combined employee count of all corporate entities in the venture. For government-owned refiners, the total employee count includes all government employees.

(i) Pursuant to paragraph (c) of this section, a listing of each company facility and each facility's address where any employee, as specified in paragraph (a)(1) of this section, worked during the 12 months preceding January 1, 2006.

(ii) The average number of employees at each facility based upon the number of employees for each pay period for the 12 months preceding January 1, 2006.

(iii) The type of business activities carried out at each location.

(iv) In the case of a refiner that reactivates a refinery that it previously owned and operated and that was shut down or non-operational between January 1, 2005 and January 1, 2006, include the following:

(A) Pursuant to paragraph (c) of this section, a listing of each company refinery each refinery's address where any employee, as specified in paragraph (a)(1) of this section, worked since the refiner acquired or reactivated the refinery.

(B) The average number of employees at any such reactivated refinery during each calendar year since the refiner reactivated the refinery.

(C) The type of business activities carried out at each location.

(2) Crude oil capacity.

(i) The total corporate crude oil capacity of each refinery as reported to the Energy Information Administration (EIA) of the U.S. Department of Energy (DOE), for the period January 1, 2005 through December 31, 2005.

(ii) The information submitted to EIA is presumed to be correct. In cases where a company disagrees with this information, the company may petition EPA with appropriate data to correct the record when the company submits its application for small refiner status.

(3) The type of business activity carried out at each location.

(4) For each refinery, an indication of the small refiner option(s), pursuant to §80.1342, intended to be utilized at the refinery.

(5) A letter signed by the president, chief operating officer 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, and that the company owned the refinery as of January 1, 2006.

(6) Name, address, phone number, facsimile number, and e-mail address of a corporate contact person.

(d) Approval of a small refiner status application will be based on the information submitted under paragraph (c) of this section and any other relevant information.

(e) EPA will notify a refiner of approval or disapproval of small refiner status by letter.

(1) If approved, all refineries of the refiner may defer meeting the standard specified in §80.1230(a) until the annual averaging period beginning January 1, 2015,

and the standard specified in §80.1230(b) until the averaging period beginning July 1, 2016.

(2) If disapproved, all refineries of the refiner must meet the standard specified in §80.1230(a) beginning with the annual averaging period beginning January 1, 2011, and must meet the standard specified in §80.1230(b) beginning with the averaging period beginning July 1, 2012.

(f) If EPA finds that a refiner provided false or inaccurate information on its application for small refiner status, the refiner's small refiner status will be void ab initio.

(g) Prior to January 1, 2014, and upon notification to EPA, a small refiner approved per this section may withdraw its status as a small refiner. Effective on January 1 of the year following such notification, the small refiner will become subject to the standards at §80.1230.

**§80.1342 What compliance options are available to small refiners under this subpart?**

(a) A refiner that has been approved as a small refiner under §80.1340 may --

(1)(i) Defer meeting the standard specified in §80.1230(a) until the annual averaging period beginning January 1, 2015; or

(ii) Meet the standard specified in §80.1230(a) in any annual averaging period from 2011 through 2014, inclusive, provided it notifies EPA in writing no later than November 15 prior to the year in which it will produce compliant gasoline.

(2)(i) Defer meeting the standard specified in §80.1230(b) until the averaging period beginning July 1, 2016; or

(ii) Meet the standard specified in §80.1230(b) in any averaging period specified in §80.1230(b)(3) prior to the averaging period beginning July 1, 2016 provided it notifies EPA in writing no later than November 15 prior to the year in which it will produce compliant gasoline.

(b) Any refiner that makes an election under paragraphs (a)(1) or (a)(2) of this section must comply with the applicable benzene standards at §80.1230 beginning with the first averaging period subsequent to the status change.

(c) The provisions of paragraph (a) of this section shall apply separately for each of an approved small refiner's refineries.

**§80.1343 What hardship relief provisions are available only to small refiners?**

(a)(1) In the case of a small refiner approved under §80.1340 for which compliance with the requirement at §80.1230(a) would be feasible only through the purchase of credits, but for whom purchase of credits is not practically or economically feasible, EPA may approve a delay of the requirements applicable to the first compliance period for that refiner for up to two years.

(2) No delay in accordance with paragraph (a) of this section will be granted to any small refiner prior to the EPA issuing a review of the credit program.

(3) A small refiner may request one or more extensions of an approved delay if it can continue to demonstrate extreme difficulty in achieving compliance, through the use of credits, with the annual average benzene standard at §80.1230(a).

(b) In the case of a small refiner approved under §80.1340 for which compliance with the maximum average benzene requirement at §80.1230(b) is not feasible, the refiner may apply for hardship relief under §80.1335.

**§80.1344 What provisions are available to a non-small refiner that acquires one or more of a small refiner's refineries?**

(a) In the case of a refiner that is not an approved small refiner under §80.1340 and that acquires a refinery from a small refiner approved under §80.1340, the small refiner provisions of the gasoline benzene program of this subpart continue to apply to the acquired refinery for a period of up to 30 months from the date of acquisition of the refinery. In no case shall this period extend beyond December 31, 2014.

(b) A refiner may apply to EPA for up to an additional six months to comply with the standards of §80.1230 for the acquired refinery if it believes that more than 30 months would be required for the necessary engineering, permitting, construction, and start-up work to be completed. Such applications must include detailed technical information supporting the need for additional time. EPA will base a decision to approve additional time on information provided by the refiner and on other relevant information. In no case shall this period extend beyond December 31, 2014.

(c) A refiner that acquires a refinery from a small refiner approved per §80.1340 shall notify EPA in writing no later than 20 days following the acquisition.

## Sampling, Testing and Retention Requirements

**§80.1347 What are the sampling and testing requirements for refiners and importers?**

(a) Sample and test each batch of gasoline. (1) The sampling and testing requirements specified in subpart D for reformulated gasoline shall continue to apply to reformulated gasoline and shall be extended to conventional gasoline (CG) for the purpose of complying with the benzene requirements of this subpart, except as modified by paragraphs (a)(2), (a)(3) and (a)(4) of this section.

(2) Refiners and importers shall collect a representative sample from each batch of gasoline produced or imported, according to the earliest applicable date in the following schedule:

(i) Beginning January 1, 2011;

(ii) Beginning January 1, 2015 for small refiners approved under §80.1340;

(iii) Beginning January 1 of the year prior to 2015 in which a small refiner approved under §80.1340 has opted, per §80.1342(a),to begin meeting the standards at §80.1230;

(iv) Beginning June 1, 2007, for any refinery planning to generate early credits for the averaging period specified at §80.1275(b)(1);

(v) Beginning January 1 of each averaging period specified at §80.1275(b)(2) or (b)(3) for which the refinery plans to generate early credits;

(vi) Beginning January 1 of the year, per §80.1334(c)(1), in which a refinery approved for early compliance under §80.1334 opts to begin early compliance. The

provisions shall only apply to the type of gasoline, RFG or CG, for which early compliance was approved.

(3)(i) Each sample shall be tested in accordance with the methodology specified at §80.46(e) to determine its benzene concentration for compliance with the requirements of this subpart.

(ii) Independent sample analysis, under §80.65(f), is not required for conventional gasoline.

(4) Any refiner or importer may release CG prior to obtaining the test results for benzene required under paragraph (a)(1) of this section.

(5) Exclusion of previously certified gasoline.

(i) Any refiner who uses previously certified reformulated or conventional gasoline or RBOB to produce conventional gasoline at a refinery, must exclude the previously certified gasoline ("PCG") for purposes of demonstrating compliance with the benzene standards at §80.1230.

(ii) To accomplish the exclusion required in paragraph (a)(5)(i) of this section, the refiner must determine the volume and benzene content of the previously certified gasoline used at the refinery and the volume and benzene content of gasoline produced at the refinery, and use the compliance calculation procedures in paragraphs (a)(5)(iii) and (a)(5)(iv) of this section.

(iii) For each batch of previously certified gasoline that is used to produce conventional gasoline the refiner must include the volume and benzene content of the previously certified gasoline as a negative volume and a negative benzene content in the refiner's compliance calculations in accordance with the requirements at §80.1238.

(iv) For each batch of conventional gasoline produced at the refinery using previously certified gasoline, the refiner must determine the volume and benzene content and include each batch in the refinery's compliance calculations at §80.1240 without regard to the presence of previously certified gasoline in the batch.

(v) The refiner must use any previously certified gasoline that it includes as a negative batch in its compliance calculations pursuant to §80.1240 as a component in gasoline production during the annual averaging period in which the previously certified gasoline was included as a negative batch in the refiner's compliance calculations.

(b) Batch numbering. The batch numbering convention of §80.365(b) shall apply to batches of conventional gasoline beginning with earliest applicable date specified in paragraph (a)(2) of this section.

**§80.1348 What gasoline sample retention requirements apply to refiners and importers?**

Beginning with earliest applicable date specified in §80.1347(a)(2), the gasoline sample retention requirements specified in subpart H of this part for the gasoline sulfur provisions apply for the purpose of complying with the requirements of this subpart, except that in addition to including the sulfur test result as provided by §80.335(a)(4)(ii), the refiner, importer, or independent laboratory shall also include with the retained sample the test result for benzene as conducted pursuant to §80.46(e).

## Recordkeeping and Reporting Requirements

**§80.1350 What records must be kept?**

(a) General requirements. The recordkeeping requirements specified in §§80.74 and 80.104, as applicable, apply for the purpose of complying with the requirements of this subpart; however, duplicate records are not required.

(b) Additional records that refiners and importers shall keep. (1) Beginning with earliest applicable date specified in §80.1347(a)(2), any refiner for each of its refineries, and any importer for the gasoline it imports, shall keep records that include the following information, as applicable:

(i) Its compliance benzene value per §80.1240, and the calculations used to obtain that value.

(ii) Its benzene baseline value, per §80.1280, if the refinery or importer submitted a benzene baseline application to EPA per §80.1285.

(iii) The number of early benzene credits generated under §80.1275, separately by year of generation.

(iv) The number of early benzene credits obtained, separately by generating refinery and year of generation.

(v) The number of valid credits in possession of the refinery or importer at the beginning of each averaging period, separately by generating facility and year of generation.

(vi) The number of standard credits generated by the refinery or importer under §80.1290, separately by transferor (if applicable), by facility and by year of generation.

(vii) The number of credits used, separately by generating facility and year of generation.

(viii) If any credits were obtained from, or transferred to, other parties, for each other party, its name, its EPA refinery or importer registration number, and the number of credits obtained from, or transferred to, the other party, and the price per credit.

(ix) The number of credits that expired at the end of each averaging period, separately by generating facility and year of generation.

(x) The number of credits that will be carried over into a subsequent averaging period, separately by generating facility and year of generation.

(xi) Contracts or other commercial documents that establish each transfer of credits from the transferor to the transferee.

(xii) A copy of all reports submitted to EPA under §§80.1352 and 80.1354; however, duplicate records are not required.

(2)(i) Beginning July 1, 2012, any refiner for each of its refineries, and any importer for the gasoline it imports, shall include, in the records required by paragraph (b)(1) of this section, its maximum average benzene value for the period July 1, 2012 through December 31, 2013, and for each annual compliance period thereafter.

(ii) Notwithstanding the requirements specified in paragraph (b)(2)(i) of this section, beginning July 1, 2016, a small refiner approved under §80.1340, for each of its refineries, shall include, in the records required by paragraph (b)(1) of this section, its maximum average benzene value for the period July 1, 2016 through December 31, 2017, and for each annual compliance period thereafter.

(3) Records of all supporting calculations pursuant to paragraphs (b)(1) or (b)(2) of this section shall also be kept.

(c) Length of time records shall be kept. Records required in this section shall be kept for five years from the date they were created, except that records relating to credit transfers shall be kept by the transferor for five years from the date the credits were transferred, and shall be kept by the transferee for five years from the date the credits were transferred, used or terminated, whichever is later.

(d) Make records available to EPA. On request by EPA, the records specified in this section shall be provided to the Administrator. For records that are electronically generated or maintained, the equipment and software necessary to read the records shall be made available, or upon approval by EPA, electronic records shall be converted to paper documents which shall be provided to the Administrator.

**§80.1352 What are the pre-compliance reporting requirements for the gasoline benzene program?**

(a) Except as provided in paragraph (c) of this section, a refiner for each of its refineries shall submit the following information, as applicable, to EPA by June 1, 2008 and annually thereafter through June 1, 2011, or through June 1, 2015 for small refiners approved under §80.1340:

(1) Changes to the information submitted in the company's registration;

(2) Changes to the information submitted for any refinery or import facility registration;

(3) Gasoline production.

(i) An estimate of the average daily volume (in gallons) of gasoline produced at each refinery. This estimate shall include RFG, RBOB, conventional gasoline and conventional gasoline blendstock that becomes finished gasoline solely upon the addition of oxygenate but shall exclude gasoline exempted pursuant to §80.1235.

(ii) The volume estimates specified in paragraph (a)(3)(i) of this section must be provided for the periods of June 1, 2007 through December 31, 2007, and calendar years 2008 through 2015.

(4) Benzene concentration. An estimate of the average gasoline benzene concentration corresponding to the time periods specified in paragraph (a)(3)(ii) of this section.

(5) ABT Participation. For each year through 2015, the following information related to crdits shall be provided to EPA, if applicable:

(i) If the refinery is expecting to generate benzene credits per §80.1275 and/or §80.1290, the actual or estimated, as applicable, numbers of early credits and standard credits expected to be generated.

(ii) If the refinery is expecting to use benzene credits per §80.1295, the actual or estimated, as applicable, numbers of early credits and standard credits expected to be banked, transferred or used to achieve compliance in accordance with §80.1240.

(6) Information on any project schedule by quarter of known or projected completion date, by the stage of the project. See, for example, the five project phases described in EPA's June 2002 Highway Diesel Progress Review report (EPA420-R-02-016, http://www.epa.gov/otaq/regs/hd2007/420r02016.pdf): Strategic planning, Planning

and front-end engineering, Detailed engineering and permitting, Procurement and Construction, and Commissioning and startup.

(7) Basic information regarding the selected technology pathway for compliance (e.g., precursor re-routing or other technologies, revamp vs. grassroots, etc.).

(8) Whether capital commitments have been made or are projected to be made.

(b) The pre-compliance reports due in 2008 and succeeding years must provide an update of the progress in each of these areas and include actual values where available.

(c) The pre-compliance reporting requirements of this section do not apply to refineries that only produce products exempt from the requirements of this subpart per §80.1235(b).

**§80.1354 What are the reporting requirements for the gasoline benzene program?**

(a) Beginning with earliest applicable date specified in §80.1347(a)(2), any refiner for each of its refineries, and any importer for the gasoline it imports, shall submit to EPA an Annual Gasoline Benzene Report that contains the information required in this section, and such other information as EPA may require for each applicable averaging period.

(b) The Annual Gasoline Benzene Report shall contain the following information:

(1) Benzene volume percent and volume of any RFG, RBOB, and conventional gasoline, separately by batch, produced by the refinery or imported, and the sum of the volumes and the volume-weighted benzene concentration, in volume percent.

(2)(i) The annual average benzene concentration, per §80.1238.

(ii) The maximum average benzene concentration per §80.1240(b).

(3) Any benzene deficit from the previous reporting period, per §80.1230(b).

(4) The number of banked benzene credits from the previous reporting period.

(5) The number of benzene credits generated under §80.1275, if applicable.

(6) The number of benzene credits generated under §80.1290, if applicable.

(7) The number of benzene credits transferred to the refinery or importer, per §80.1295(c), and the cost of the credits, if applicable.

(8) The number of benzene credits transferred from the refinery or importer, per §80.1295(c), and the price of the credits, if applicable.

(9) The number of benzene credits terminated or expired.

(10) The compliance benzene value per §80.1240.

(11) The number of banked benzene credits.

(12) Projected credit generation through compliance year 2015.

(13) Projected credit use through compliance year 2015.

(c) EPA may require submission of additional information to verify compliance with the requirements of this subpart.

(d) The report required by paragraph (a) of this section shall be --

(1) Submitted on forms and following procedures specified by the Administrator.

(2) Submitted to EPA by the last day of February each year for the prior calendar year averaging period.

(3) Signed and certified as correct by the owner or a responsible corporate officer of the refiner or importer.

## Attest Engagements

### §80.1356 What are the attest engagement requirements for gasoline benzene compliance?

In addition to the requirements for attest engagements that apply to refiners and importers under §§80.125 through 80.130, 80.410, and 80.1030, the attest engagements for refiners and importers must include the following:

(a) EPA Early Credit Generation Baseline Years' Reports. (1) Obtain and read a copy of the refinery's or importer's annual reports and batch reports filed with EPA for 2004 and 2005 that contain gasoline benzene and gasoline volume information.

(2) Agree the yearly volumes of gasoline and benzene concentration, in volume percent and benzene gallons, reported to EPA in the reports specified in paragraph (a)(1) of this section with the inventory reconciliation analysis under §80.128.

(3) Verify that the information in the refinery's or importer's batch reports filed with EPA under §§80.75 and 80.105, and any laboratory test results, agree with the information contained in the reports specified in paragraph (a)(1) of this section.

(4) Calculate the average benzene concentration for all of the refinery's or importer's gasoline volume over 2004 and 2005 and verify that those values agree with the values reported to EPA per §80.1285.

(b) Baseline for Early Credit Generation. Take the following steps for the first attest reporting period following approval of a benzene baseline:

(1) Obtain the EPA benzene baseline approval letter for the refinery to determine the refinery's applicable benzene baseline under §80.1285.

(2) Obtain a written statement from the company representative identifying the benzene value used as the refinery's baseline and agree that number to paragraph (b)(1) of this section and to the reports to EPA.

(c) Early Credit Generation. The following procedures shall be completed for a refinery or importer that generates early benzene credits per §80.1275:

(1) Obtain the baseline benzene concentration and gasoline volume from paragraph (a)(4) of this section.

(2) Obtain the annual benzene report per §80.1354.

(3) If the benzene value under paragraph (c)(2) of this section is at least 10 percent less than the value in paragraph (c)(1) of this section, compute and report as a finding the difference according to §80.1275.

(4) Compute and report as a finding the total number of benzene credits generated by multiplying the value calculated in paragraph (c)(3) of this section by the volume of gasoline listed in the report specified in paragraph (c)(2) of this section, and agree this number with the number reported to EPA.

(d) Standard Credit Generation. The following procedures shall be completed for a refinery or importer that generates benzene credits per §80.1290:

(1) Obtain the annual average benzene value from the annual benzene report per §80.1285.

(2) If the annual average benzene value under paragraph (d)(1) of this section is less than 0.62 percent by volume, compute and report as a finding the difference according to §80.1290.

(3) Compute and report as a finding the total number of benzene credits generated by multiplying the value calculated in paragraph (d)(2) of this section by the volume of gasoline listed in the report specified in paragraph (d)(1) of this section, and agree this number with the number reported to EPA.

(e) Credits required. The following attest procedures shall be completed for refineries and importers:

(1) Obtain the annual average benzene concentration and volume from the annual benzene report per §80.1285.

(2) If the value in paragraph (e)(1) of this section is greater than 0.62 percent by volume, compute and report as a finding the difference between 0.62 percent by volume and the value in paragraph (e)(1) of this section.

(3) Compute and report as a finding the total benzene credits required by multiplying the value in paragraph (e)(2) of this section times the volume of gasoline in paragraph (e)(1) of this section, and agree this number with the report to EPA.

(4) Obtain a statement from the refiner or importer as to the portion of the deficit under paragraph (e)(3) of this section that was resolved with credits, or that was carried forward as a deficit under §80.1230(b), and agree these figures with the report to EPA.

(f) Credit purchases and sales. The following attest procedures shall be completed for a refinery or importer that is a transferor or transferee of credits during an averaging period:

(1) Obtain contracts or other documents for all credits transferred to another refinery or importer during the year being reviewed; compute and report as a finding the

number and year of creation of credits represented in these documents as being transferred; and agree these figures with the report to EPA.

(2) Obtain contracts or other documents for all credits received during the year being reviewed; compute and report as a finding the number and year of creation of credits represented in these documents as being received; and agree with the report to EPA.

(g) Credit reconciliation. The following attest procedures shall be completed each year credits were in the refiner's or importer's possession at any time during the year:

(1) Obtain the credits remaining or the credit deficit from the previous year from the refiner's or importer's report to EPA for the previous year.

(2) Compute and report as a finding the net credits remaining at the conclusion of the year being reviewed by totaling credits as follows:

(i) Credits remaining from the previous year; plus

(ii) Credits generated under paragraphs (c) and (d) of this section; plus

(iii) Credits purchased under paragraph (f) of this section; minus

(iv) Credits sold under paragraph (f) of this section; minus

(v) Credits used under paragraphs (e) of this section; minus

(vi) Credits expired; minus

(vii) Credit deficit from the previous year.

(3) Agree the credits remaining or the credit deficit at the conclusion of the year being reviewed with the report to EPA.

(4) If the refinery or importer had a credit deficit for both the previous year and the year being reviewed, report this fact as a finding.

## Violations and Penalties

### §80.1358 What acts are prohibited under the gasoline benzene program?

No person shall --

(a)(1) Produce or import gasoline subject to this subpart that does not comply with the applicable benzene standards under §80.1230.

(2) Fail to meet any other requirements of this subpart.

(b) Cause another person to commit an act in violation of paragraph (a) of this section.

### §80.1359 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 benzene standards of this subpart shall be determined based on the benzene concentration of the gasoline, measured using the methodologies specified in §80.46(e), and other allowable adjustments. Any evidence or information, including the exclusive use of such evidence or information, may be used to establish the benzene concentration of the gasoline if the evidence or information is relevant to whether the benzene concentration of the gasoline would have been in compliance with the standard if the appropriate sampling and testing methodologies 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 §80.46(e), business records, and commercial documents.

(b) Determinations of compliance with the requirements of this subpart other than the benzene standards, and determinations of liability for any violation of this subpart, may be based on information from any source or location. Such information may include, but is not limited to, business records and commercial documents.

**§80.1360 Who is liable for violations under the gasoline benzene program?**

(a) The following persons are liable for violations of prohibited acts:

(1) Any refiner or importer that violates §80.1358(a) is liable for the violation.

(2) Any person that causes another party to violate §80.1358(a) is liable for a violation of §80.1358(b).

(3) Any parent corporation is liable for any violations of this subpart that are committed by any of its wholly-owned subsidiaries.

(4) Each partner to a joint venture, or each owner of a facility owned by two or more owners, is jointly and severally liable for any violation of this subpart that occurs at the joint venture facility or a facility that is owned by the joint owners, or a facility that is committed by the joint venture operation or any of the joint owners of the facility.

(b) Any person who violates §80.1358 is liable for the violation.

**§80.1361 What penalties apply under the gasoline benzene program?**

(a) Any person liable for a violation under §80.1360 is subject to civil penalties as specified in sections 205 and 211(d) of the Clean Air Act for every day of each such violation and the amount of economic benefit or savings resulting from each violation.

(b) Any person liable under §80.1358(a) and (b) for a violation of the applicable benzene standards or causing another person to violate the requirements 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 §80.1360(b) for a failure to fulfill any requirement of credit generation, transfer, use, banking, or deficit carry-forward correction is subject to a separate violation for each and every day in the averaging period in which invalid credits are generated, banked, transferred or used.

(c) Any person liable under §80.1360(b) for failure to meet, or causing a failure to meet, a provision of this subpart is liable for a separate day of violation for each and every day such provision remains unfulfilled.

## Foreign Refiners

### §80.1363 What are the additional requirements under this subpart for gasoline produced at foreign refineries?

(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 that meets the definition of refiner under §80.2(i) for a foreign refinery.

(3) “Benzene-FRGAS” means gasoline produced at a foreign refinery that has been assigned an individual refinery benzene baseline under §80.1285, has been approved as a small refiner under §80.1340, or has been granted temporary relief under §80.1335, and that is imported into the United States.

(4) “Non-Benzene-FRGAS” means

(i) Gasoline meeting any of the conditions specified in paragraph (a)(3) of this section that is not imported into the United States.

(ii) Gasoline meeting any of the conditions specified in paragraph (a)(3) of this section during a year when the foreign refiner has opted to not participate in the Benzene-FRGAS program under paragraph (c)(3) of this section.

(iii) Gasoline produced at a foreign refinery that has not been assigned an individual refinery benzene baseline under §80.1285, or that has not been approved as a small refiner under §80.1340, or that has not been granted temporary relief under §80.1335.

(5) “Certified Benzene-FRGAS” means Benzene-FRGAS the foreign refiner intends to include in the foreign refinery's benzene compliance calculations under §80.1240 or credit calculations under §80.1275 and does include in these calculations when reported to EPA.

(7) “Non-Certified Benzene-FRGAS” means Benzene-FRGAS that is not Certified Benzene-FRGAS.

(b) Baseline for Early Credits. For any foreign refiner to obtain approval under the benzene foreign refiner program of this subpart for any refinery in order to generate early credits under §80.1275, it must apply for approval under the applicable provisions of this subpart.

(1) The refiner shall follow the procedures specified in §§80.1280 and 80.1285 to establish a baseline of the volume of gasoline that was produced at the refinery and imported into the United States during the applicable years.

(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 determinations.

(3) Where a foreign refiner submits a petition that is incomplete or inadequate to establish an accurate baseline, and the refiner fails to correct this deficiency after a request for more information, EPA will not assign an individual refinery baseline.

(c) General requirements for Benzene-FRGAS foreign refiners. A foreign refiner of a refinery that is approved under the benzene foreign refiner program of this subpart must designate each batch of gasoline produced at the foreign refinery that is exported to the United States as either Certified Benzene-FRGAS or as Non-Certified Benzene-FRGAS, except as provided in paragraph (c)(3) of this section.

(1) In the case of Certified Benzene-FRGAS, the foreign refiner must meet all requirements that apply to refiners under this subpart.

(2) In the case of Non-Certified Benzene-FRGAS, the foreign refiner shall meet all the following requirements:

(i) The designation requirements in this section;

(ii) The recordkeeping requirements in this section and in §80.1350;

(iii) The reporting requirements in this section and in §§80.1352 and 80.1354;

(iv) The product transfer document requirements in this section;

(v) The prohibitions in this section and in §80.1358; and

(vi) The independent audit requirements in this section and in §80.1356.

(3) (i) Any foreign refiner that generates early benzene credits under §80.1275 shall designate all Benzene-FRGAS as Certified Benzene-FRGAS for any year that such credits are generated.

(ii) Any foreign refiner that has been approved to produce gasoline subject to the benzene foreign refiner program for a foreign refinery under this subpart may elect to classify no gasoline imported into the United States as Benzene-FRGAS provided the foreign refiner notifies EPA of the election no later than November 1 preceding the beginning of the next compliance period.

(iii) An election under paragraph (c)(3)(ii) of this section shall be for a 12 month compliance period and apply to all gasoline that is produced by the foreign refinery that is imported into the United States, and shall remain in effect for each succeeding year unless and until the foreign refiner notifies EPA of the termination of the election. The change in election shall take effect at the beginning of the next annual compliance period.

(d) <u>Designation, product transfer documents, and foreign refiner certification.</u>

(1) Any foreign refiner of a foreign refinery that has been approved by EPA to

produce gasoline subject to the benzene foreign refiner program must designate each batch of Benzene-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 Benzene-FRGAS under paragraph (c)(3) of this section.

(2) On each occasion when any person transfers custody or title to any Benzene-FRGAS prior to its being imported into the United States, it must include the following information as part of the product transfer document information:

(i) Designation of the gasoline as Certified Benzene-FRGAS or as Non-Certified Benzene-FRGAS; and

(ii) The name and EPA refinery registration number of the refinery where the Benzene-FRGAS was produced.

(3) On each occasion when Benzene-FRGAS is loaded onto a vessel or other transportation mode for transport to the United States, the foreign refiner shall prepare a certification for each batch of the Benzene-FRGAS that meets the following requirements.

(i) The certification shall 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 Benzene-FRGAS;

(B) The identification of the gasoline as Certified Benzene-FRGAS or Non-Certified Benzene-FRGAS;

(C) The volume of Benzene-FRGAS being transported, in gallons;

(D) In the case of Certified Benzene-FRGAS:

(1) The benzene content as determined under paragraph (f) of this section, and the applicable designations stated in paragraph (d)(2)(i) of this section; and

(2) A declaration that the Benzene-FRGAS is being included in the applicable compliance calculations required by EPA under this subpart.

(ii) The certification shall be made part of the product transfer documents for the Benzene-FRGAS.

(e) Transfers of Benzene-FRGAS to non-United States markets. The foreign refiner is responsible to ensure that all gasoline classified as Benzene-FRGAS is imported into the United States. A foreign refiner may remove the Benzene-FRGAS classification, and the gasoline need not be imported into the United States, but only if:

(1) The foreign refiner excludes:

(i) The volume of gasoline from the refinery's compliance report under §80.1354; and

(ii) In the case of Certified Benzene-FRGAS, the volume of the gasoline from the compliance report under §80.1354.

(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 that Benzene-FRGAS is loaded onto a vessel for transport to the United States a foreign refiner shall 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 Benzene-FRGAS loaded onto the vessel (exclusive of any tank bottoms before 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 Benzene-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 that Certified Benzene-FRGAS is loaded onto a vessel for transport to the United States a foreign refiner shall have an independent third party:

(i) Collect a representative sample of the Certified Benzene-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) Determine the benzene content value for each compartment using the methodology as specified in §80.46(e) by one of the following:

(A) The third party analyzing each 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 Benzene-FRGAS from the refinery to the load port, and from this review determine:

(A) The refinery at which the Benzene-FRGAS was produced; and

(B) That the Benzene-FRGAS remained segregated from:

(1) Non-Benzene-FRGAS and Non-Certified Benzene-FRGAS; and

(2) Other Certified Benzene-FRGAS produced at a different refinery.

(3) The independent third party shall submit a report:

(i) To the foreign refiner containing the information required under paragraphs (f)(1) and (f)(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 (f)(2) of this section, within thirty days following the date of the independent third party's inspection. This report shall 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) <u>Comparison of load port and port of entry testing.</u>

(1)(i) Any foreign refiner and any United States importer of Certified Benzene-FRGAS shall 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 benzene content value; except as specified in paragraph (g)(1)(ii) of this section.

(ii) Where a vessel transporting Certified Benzene-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 benzene content value determined at the port of entry is higher than the benzene content 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) for the test method specified at §80.46(e).

(ii) The United States importer and the foreign refiner shall treat the gasoline as Non-Certified Benzene-FRGAS, and the foreign refiner shall exclude the gasoline volume from its gasoline volumes calculations and benzene standard designations under this subpart.

(h) Attest requirements. Refiners, for each annual compliance period, must arrange to have an attest engagement performed of the underlying documentation that forms the basis of any report required under this subpart. The attest engagement must comply with the procedures and requirements that apply to refiners under §§80.125

through 80.130, §80.1356, and other applicable attest engagement provisions, and must be submitted to the Administrator of EPA for the prior annual compliance period within the time period required under §80.130. The following additional procedures shall be carried out for any foreign refiner of Benzene-FRGAS.

(1) The inventory reconciliation analysis under §80.128(b) and the tender analysis under §80.128(c) shall include Non-Benzene-FRGAS.

(2) Obtain separate listings of all tenders of Certified Benzene-FRGAS and of Non-Certified Benzene-FRGAS, and obtain separate listings of Certified Benzene-FRGAS based on whether it is small refiner gasoline, gasoline produced through the use of credits, or other applicable designation under this subpart. 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 Benzene-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 Benzene-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 benzene content test results.

(B) Identify, and report as a finding, each occasion the load port and port of entry benzene content 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 Benzene-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 Benzene-FRGAS is stored, and pipeline activity records for any pipeline used to transport the Certified Benzene-FRGAS, prior to being loaded onto the vessel. Use these records to determine whether the Certified Benzene-FRGAS was produced at the refinery that is the subject of the attest engagement, and whether the Certified Benzene-FRGAS was mixed with any Non-Certified Benzene-FRGAS, Non-Benzene-FRGAS, or any Certified Benzene-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 Benzene-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-Benzene-FRGAS, and perform the following:

(i) Agree the total volume and benzene content 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 shall:

(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 80.130 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 shall commit to and comply with the provisions contained in this paragraph (i) as a condition to being approved as a foreign refiner under this subpart.

(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 will 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) Benzene-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, if applicable, including the volume and benzene content of gasoline; transfers of title or custody of any gasoline or blendstocks whether Benzene-FRGAS or Non-Benzene-FRGAS, produced at the foreign refinery during the period January 1, 2004 through December 31, 2005, and any work papers related to refinery baseline establishment;

(B) The volume and benzene content of Benzene-FRGAS;

(C) The proper classification of gasoline as being Benzene-FRGAS or as not being Benzene-FRGAS, or as Certified Benzene-FRGAS or as Non-Certified Benzene-FRGAS, and all other relevant designations under this subpart;

(D) Transfers of title or custody to Benzene-FRGAS;

(E) Sampling and testing of Benzene-FRGAS;

(F) Work performed and reports prepared by independent third parties and by independent auditors under the requirements of this section, 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, gasoline additives 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 shall 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 shall be 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 shall 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 participation in the benzene foreign refiner program or producing and exporting gasoline under any such program, and all other actions to comply with the requirements of this subpart relating to participation in any benzene foreign refiner program, or to establish an individual refinery gasoline benzene baseline under this subpart constitute actions or activities covered by and within the meaning of 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 the False Statements Accountability Act of 1996 (18 U.S.C. 1001) and section 113(c)(2) of the Clean Air Act (42 U.S.C. 7413).

(6) The foreign refiner, or its agents or employees, will not seek to detain or to 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) shall be signed by the owner or president of the foreign refiner business.

(8) In any case where Benzene-FRGAS produced at a foreign refinery is stored or transported by another company between the refinery and the vessel that transports the Benzene-FRGAS to the United States, the foreign refiner shall 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 shall be included in the foreign refiner's petition to participate in any benzene foreign refiner program.

(j) Sovereign immunity. By submitting a petition for participation in any benzene foreign refiner program under this subpart (and baseline, if applicable) under this section, or by producing and exporting gasoline to the United States under any such program, the foreign refiner, and 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 the False Statements Accountability Act of 1996 (18 U.S.C. 1001) and section 113(c)(2) of the Clean Air Act (42 U.S.C. 7413).

(k) Bond posting. Any foreign refiner shall meet the requirements of this paragraph (k) as a condition to approval as benzene foreign refiner under this subpart.

(1) The foreign refiner shall 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 refinery's baseline petition is submitted, the calendar year the baseline petition is submitted, and each succeeding calendar year.

(2) Bonds shall 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) Bonds posted under this paragraph (k) shall--

(i) 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 the False Statements Accountability Act of 1996 (18 U.S.C. 1001) and section 113(c)(2) of the Clean Air Act (42 U.S.C. 7413);

(ii) Be provided by a corporate surety that is listed in the United States Department of Treasury Circular 570 ``Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds"; and

(iii) Include a commitment that the bond will remain in effect for at least five years following the end of latest annual reporting period that the foreign refiner produces gasoline pursuant to the requirements of this subpart.

(4) On any occasion a foreign refiner bond is used to satisfy any judgment, the foreign refiner shall increase the bond to cover the amount used within 90 days of the date the bond is used.

(5) If the bond amount for a foreign refiner increases, the foreign refiner shall 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.

(l) [Reserved]

(m) English language reports. Any report or other document submitted to EPA by a foreign refiner shall be in English language, or shall include an English language translation.

(n) Prohibitions. (1) No person may combine Certified Benzene-FRGAS with any Non-Certified Benzene-FRGAS or Non-Benzene-FRGAS, and no person may combine Certified Benzene-FRGAS with any Certified Benzene-FRGAS produced at a different refinery, until the importer has met all the requirements of paragraph (o) of this section, 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 shall meet the following requirements:

(1) Each batch of imported gasoline shall be classified by the importer as being Benzene-FRGAS or as Non-Benzene-FRGAS, and each batch classified as Benzene-FRGAS shall be further classified as Certified Benzene-FRGAS or as Non-Certified Benzene-FRGAS.

(2) Gasoline shall be classified as Certified Benzene-FRGAS or as Non-Certified Benzene-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 Benzene-FRGAS under paragraph (g) of this section. Additionally, the importer shall comply with all requirements of this subpart applicable to importers.

(3) For each gasoline batch classified as Benzene-FRGAS, any United States importer shall perform the following procedures.

(i) In the case of both Certified and Non-Certified Benzene-FRGAS, have an independent third party:

(A) Determine the volume of gasoline in the vessel;

(B) Use the foreign refiner's Benzene-FRGAS certification to determine the name and EPA-assigned registration number of the foreign refinery that produced the Benzene-FRGAS;

(C) Determine the name and country of registration of the vessel used to transport the Benzene-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 Benzene-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) Obtain the compartment samples; and

(C) Determine the benzene content value of each compartment sample using the methodology specified at 80.46(e) by the third party analyzing the sample or by the third party observing the importer analyze the sample.

(4) Any importer shall submit reports within 30 days following the date any vessel transporting Benzene-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, and including identification of the port at which the product was offloaded.

(5) Any United States importer shall meet all other requirements of this subpart for any imported gasoline that is not classified as Certified Benzene-FRGAS under paragraph (o)(2) of this section.

(p) <u>Truck imports of Certified Benzene-FRGAS produced at a foreign refinery</u>.

(1) Any refiner whose Certified Benzene-FRGAS is transported into the United States by truck may petition EPA to use alternative procedures to meet the following requirements:

(i) Certification under paragraph (d)(5) of this section;

(ii) Load port and port of entry sampling and testing under paragraphs (f) and (g) of this section;

(iii) Attest under paragraph (h) of this section; and

(iv) Importer testing under paragraph (o)(3) of this section.

(2) These alternative procedures must ensure Certified Benzene-FRGAS remains segregated from Non-Certified Benzene-FRGAS and from Non-Benzene-FRGAS until it is imported into the United States. The petition will be evaluated based on whether it adequately addresses the following:

(i) Provisions for monitoring pipeline shipments, if applicable, from the refinery, that ensure segregation of Certified Benzene-FRGAS from that refinery from all other gasoline;

(ii) Contracts with any terminals and/or pipelines that receive and/or transport Certified Benzene-FRGAS, that prohibit the commingling of Certified Benzene-FRGAS with any of the following:

(A) Other Certified Benzene-FRGAS from other refineries.

(B) All Non-Certified Benzene-FRGAS.

(C) All Non-Benzene-FRGAS;

(iii) Procedures for obtaining and reviewing truck loading records and United States import documents for Certified Benzene-FRGAS to ensure that such gasoline is only loaded into trucks making deliveries to the United States;

(iv) 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 Benzene-FRGAS remains segregated throughout the distribution system and is only loaded into trucks for import into the United States.

(3) The petition required by this section must be submitted to EPA along with the application for temporary refiner relief individual refinery benzene standard under this subpart.

(q) Withdrawal or suspension of foreign refiner status. EPA may withdraw or suspend a foreign refiner's benzene baseline or standard approval for 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) Early use of a foreign refiner benzene baseline.

(1) A foreign refiner may begin using an individual refinery benzene baseline under this subpart before EPA has approved the baseline, provided that:

(i) A baseline petition has been submitted as required in paragraph (b) of this section;

(ii) EPA has made a provisional finding that the baseline petition is complete;

(iii) The foreign refiner has made the commitments required in paragraph (i) of this section;

(iv) The persons that will meet the independent third party and independent attest requirements for the foreign refinery have made the commitments required in paragraphs (f)(3)(iii) and (h)(7)(iii) of this section; and

(v) The foreign refiner has met the bond requirements of paragraph (k) of this section.

(2) In any case where a foreign refiner uses an individual refinery baseline before final approval under paragraph (r)(1) of this section, and the foreign refinery baseline values that ultimately are approved by EPA are more stringent than the early baseline values used by the foreign refiner, the foreign refiner shall recalculate its compliance, ab initio, using the baseline values approved by the EPA, and the foreign refiner shall be liable for any resulting violation of the requirements of this subpart.

(s) Additional requirements for petitions, reports and certificates. Any petition for approval to produce gasoline subject to the benzene foreign refiner program, any alternative procedures under paragraph (p) of this section, any report or other submission required by paragraph (c), (f)(2), or (i) of this section, and any certification under paragraph (d)(3) of this section shall be--

(1) Submitted in accordance with procedures specified by the Administrator, including use of any forms that may be 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 shall 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 L, 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 L, including 40 CFR 80.1363 apply to [insert name of foreign refiner]. Pursuant to Clean Air Act section 113(c) and 18 U.S.C. 1001, the penalty for furnishing false, incomplete or misleading information in this certification or submission is a fine of up to $10,000 U.S., and/or imprisonment for up to five years.

**PART 85 – CONTROL OF AIR POLLUTION FROM MOBILE SOURCES**

10. The authority citation for part 85 continues to read as follows:

**Authority:** 42 U.S.C. 7401-7671q.

**Subpart P–[Amended]**

11. Section 85.1515 is amended by adding paragraphs (c)(2)(vii), (c)(2)(viii), and (c)(8) to read as follows.

**§85.1515 Emission standards and test procedures applicable to imported nonconforming motor vehicles and motor vehicle engines.**

* * * * *

(c) * * *

(2) * * *

(vii) Nonconforming LDV/LLDTs originally manufactured in OP years 2009 and later must meet the evaporative emission standards in Table S09–1 in 40 CFR 86.1811–09(e). However, LDV/LLDTs originally manufactured in OP years 2009 and 2010 and imported by ICIs who qualify as small volume manufacturers as defined in 40 CFR 86.1838-01 are exempt from the LDV/LLDT evaporative emission standards in Table S09–1 in 40 CFR 86.1811–09(e), but must comply with the Tier 2 evaporative emission standards in Table S04-3 in 40 CFR 86.1811-04(e).

(viii) Nonconforming HLDTs and MDPVs originally manufactured in OP years 2010 and later must meet the evaporative emission standards in Table S09–1 in 40 CFR 86.1811– 09(e). However, HLDTs and MDPVs originally manufactured in OP years 2010 and 2011 and imported by ICIs, who qualify as small volume manufacturers as defined in 40 CFR 86.1838-01, are exempt from the HLDTs and MDPVs evaporative emission standards in Table S09–1 in 40 CFR 86.1811–09(e), but must comply with the Tier 2 evaporative emission standards in Table S04-3 in 40 CFR 86.1811-04(e).

*  *  *  *  *

(8)(i) Nonconforming LDV/LLDTs originally manufactured in OP years 2010 and later must meet the cold temperature NHMC emission standards in Table S10–1 in 40 CFR 86.1811–10(g).

(ii) Nonconforming HLDTs and MDPVs originally manufactured in OP years 2012 and later must meet the cold temperature NHMC emission standards in Table S10–1 in 40 CFR 86.1811–10(g).

(iii) ICIs, which qualify as small volume manufacturers, are exempt from the cold temperature NMHC phase-in intermediate percentage requirements described in 40 CFR 86.1811–10(g)(3). See 40 CFR 86.1811-04(k)(5)(vi) and (vii).

(iv) As an alternative to the requirements of paragraphs (c)(8)(i) and (ii) of this section, ICIs may elect to meet a cold temperature NMHC family emission level below the cold temperature NMHC fleet average standards specified in Table S10–1 of 40 CFR 86.1811–10 and bank or sell credits as permitted in 40 CFR 86.1864-10. An ICI may not

meet a higher cold temperature NMHC family emission level than the fleet average standards in Table S10-1 of 40 CFR 86.1811–10 as specified in paragraphs (c)(8)(i) and (ii) of this section, unless it demonstrates to the Administrator at the time of certification that it has obtained appropriate and sufficient NMHC credits from another manufacturer, or has generated them in a previous model year or in the current model year and not traded them to another manufacturer or used them to address other vehicles as permitted in 40 CFR 86.1864–10.

(v) Where an ICI desires to obtain a certificate of conformity using a higher cold temperature NMHC family emission level than specified in paragraphs (c)(8)(i) and (ii) of this section, but does not have sufficient credits to cover vehicles imported under such certificate, the Administrator may issue such certificate if the ICI has also obtained a certificate of conformity for vehicles certified using a cold temperature NMHC family emission level lower than that required under paragraphs (c)(8)(i) and (ii) of this section. The ICI may then import vehicles to the higher cold temperature NMHC family emission level only to the extent that it has generated sufficient credits from vehicles certified to a family emission level lower than the cold temperature NMHC fleet average standard during the same model year.

(vi) ICIs using cold temperature NMHC family emission levels higher than the cold temperature NMHC fleet average standards specified in paragraphs (c)(8)(i) and (ii) of this section must monitor their imports so that they do not import more vehicles certified to such family emission levels than their available credits can cover. ICIs must not have a credit deficit at the end of a model year and are not permitted to use the deficit carryforward provisions provided in 40 CFR 86.1864–10.

(vii) The Administrator may condition the certificates of conformity issued to ICIs as necessary to ensure that vehicles subject to this paragraph (c)(8) comply with the applicable cold temperature NMHC fleet average standard for each model year.

*  *  *  *  *

**PART 86—CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES**

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

**Authority:** 42 U.S.C. 7401-7671q.

**Subpart H–[Amended]**

13. Section 86.701-94 is amended by revising paragraph (a) to read as follows:

**§86.701-94 General applicability.**

(a) The provisions of this subpart apply to: 1994 through 2003 model year Otto-cycle and diesel light-duty vehicles; 1994 through 2003 model year Otto-cycle and diesel light-duty trucks; and 1994 and later model year Otto-cycle and diesel heavy-duty engines; and 2001 and later model year Otto-cycle heavy-duty vehicles and engines

certified under the provisions of subpart S of this part. The provisions of subpart B of this part apply to this subpart. The provisions of §86.1811-04(a)(5) and (p) apply to 2004 and later model year light-duty vehicles, light-duty trucks, and medium duty passenger vehicles.

* * * * *

**Subpart S–[Amended]**

14. Section 86.1803-01 is amended by revising the definition of "Banking" and adding the definition for "Fleet average cold temperature NMHC standard" in alphabetical order to read as follows:

**§86.1803-01 Definitions.**

* * * * *

*Banking* means one of the following:

(1) The retention of $NO_X$ emission credits for complete heavy-duty vehicles by the manufacturer generating the emission credits, for use in future model year certification programs as permitted by regulation.

(2) The retention of cold temperature non-methane hydrocarbon (NMHC) emission credits for light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles by the manufacturer generating the emission credits, for use in future model year certification programs as permitted by regulation.

*  *  *  *  *

*Fleet average cold temperature NMHC standard* means, for light-duty vehicles, light-duty trucks and medium-duty passenger vehicles, an NMHC cold temperature standard imposed over an individual manufacturer's total 50-State U.S. sales (or a fraction of total U.S. sales during phase-in years), as "U.S. sales" is defined to include all national sales, including points-of-first sale in California, of a given model year. Manufacturers determine their compliance with such a standard by averaging, on a sales-weighted basis, the individual NMHC "Family Emission Limits" (FEL – as defined in this subpart) to which light-duty vehicles, light-duty trucks and medium-duty passenger vehicles were certified and sold for that model year.

*  *  *  *  *

15. Section 86.1805-04 is amended by adding paragraph (g) to read as follows:

**§86.1805-04 Useful life.**

*  *  *  *  *

(g) Where cold temperature NMHC standards are applicable, the useful life requirement for compliance with the cold temperature NMHC standard only is as follows:

(1) For LDV/LLDTs, 10 years or 120,000 miles, whichever occurs first.

(2) For HLDT/MDPVs, 11 years or 120,000 miles, whichever occurs first.

16. A new §86.1809-10 is added to Subpart S to read as follows:

**§86.1809-10 Prohibition of defeat devices.**

(a) No new light-duty vehicle, light-duty truck, medium-duty passenger vehicle, or complete heavy-duty vehicle shall be equipped with a defeat device.

(b) The Administrator may test or require testing on any vehicle at a designated location, using driving cycles and conditions that may reasonably be expected to be encountered in normal operation and use, for the purposes of investigating a potential defeat device.

(c) For cold temperature CO and cold temperature NMHC emission control, the Administrator will use a guideline to determine the appropriateness of the CO and NMHC emission control at ambient temperatures between 25 °F (the upper bound of the temperatue test range) and 68 °F (the lower bound of the FTP range). The guideline for CO emission congruity across the intermediate temperature range is the linear

interpolation between the CO standard applicable at 25 °F and the CO standard applicable at 68 °F. The guideline for NMHC emission congruity across the intermediate temperature range is the linear interpolation between the NMHC FEL pass limit (e.g. 0.3499 g/mi for a 0.3 g/mi FEL) applicable at 20 °F and the Tier 2 NMOG standard to which the vehicle was certified at 68 °F, where the intermediate temperature NMHC level is rounded to the nearest hundredth for comparison to the interpolated line. For vehicles that exceed this CO emissions guideline or this NMHC emissions guideline upon intermediate temperature cold testing:

(1) If the CO emission level is greater than the 20 °F emission standard, the vehicle will automatically be considered to be equipped with a defeat device without further investigation. If the intermediate temperature NMHC emission level, rounded to the nearest hundredth, is greater than the 20 °F FEL pass limit, the vehicle will be presumed to have a defeat device unless the manufacturer provides evidence to EPA's satisfaction that the cause of the test result in question is not due to a defeat device.

(2) If the CO emission level does not exceed the 20 °F emission standard, the Administrator may investigate the vehicle design for the presence of a defeat device under paragraph (d) of this section. If the intermediate temperature NMHC emission level, rounded to the nearest hundredth, does not exceed the 20 °F FEL pass limit the Administrator may investigate the vehicle design for the presence of a defeat device under paragraph (d) of this section.

(d) The following provisions apply for vehicle designs designated by the Administrator to be investigated for possible defeat devices:

(1) The manufacturer must show to the satisfaction of the Administrator that the vehicle design does not incorporate strategies that unnecessarily reduce emission control effectiveness exhibited during the Federal Test Procedure or Supplemental Federal Test Procedure (FTP or SFTP) when the vehicle is operated under conditions that may reasonably be expected to be encountered in normal operation and use.

(2) The following information requirements apply:

(i) Upon request by the Administrator, the manufacturer must provide an explanation containing detailed information regarding test programs, engineering evaluations, design specifications, calibrations, on-board computer algorithms, and design strategies incorporated for operation both during and outside of the Federal emission test procedure.

(ii) For purposes of investigations of possible cold temperature CO or cold temperature NMHC defeat devices under this paragraph (d), the manufacturer must provide an explanation to show, to the satisfaction of the Administrator, that CO emissions and NMHC emissions are reasonably controlled in reference to the linear guideline across the intermediate temperature range.

(e) For each test group of Tier 2 LDV/LLDTs and HLDT/MDPVs and interim non-Tier 2 LDV/LLDTs and HLDT/MDPVs 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 °F. For diesel vehicles, the engineering evaluation must also include particulate emissions.

17. A new §86.1810-09 is added to Subpart S to read as follows:

**§86.1810-09 General standards; increase in emissions; unsafe condition; waivers.**

Section 86.1810-09 includes text that specifies requirements that differ from §86.1810-01. Where a paragraph in §86.1810-01 is identical and applicable to §86.1810-09, this may be indicated by specifying the corresponding paragraph and the statement "[Reserved]. For guidance see §86.1810-01." Where a corresponding paragraph of §86.1810-01 is not applicable, this is indicated by the statement "[Reserved]." This section applies to model year 2009 and later light-duty vehicles and light-duty trucks fueled by gasoline, diesel, methanol, ethanol, natural gas and liquefied petroleum gas fuels. This section also applies to MDPVs and complete heavy-duty vehicles certified according to the provisions of this subpart. Multi-fueled vehicles (including dual-fueled and flexible-fueled vehicles) must comply with all requirements established for each consumed fuel (or blend of fuels in the case of flexible fueled vehicles). The standards of this subpart apply to both certification and in-use vehicles unless otherwise indicated. 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 vehicles.

(a) through (e) [Reserved]. For guidance see §86.1810-01.

(f) *Altitude requirements*. (1) All emission standards apply at low altitude conditions and at high altitude conditions, except for supplemental exhaust emission standards, cold temperature NMHC emission standards, and the evaporative emission standards as described in §86.1811-09(e). Supplemental exhaust emission standards, as described in §86.1811-04(f), apply only at low altitude conditions. Cold temperature NMHC emission standards, as described in §86.1811-10(g), apply only at low altitude conditions. Tier 2 evaporative emission standards apply at high altitude conditions as specified in §86.1810-01(f) and (j), and §86.1811-04(e).

(2) For vehicles that comply with the cold temperature NMHC standards, manufacturers must submit an engineering evaluation indicating that common calibration approaches are utilized at high altitudes. Any deviation from low altitude emission control practices must be included in the auxiliary emission control device (AECD) descriptions submitted at certification. Any AECD specific to high altitude must require engineering emission data for EPA evaluation to quantify any emission impact and validity of the AECD.

(g) through (p) [Reserved]. For guidance see §86.1810-01.

18. Section 86.1811-04 is amended by adding paragraphs (k)(5)(iv) through (vii) and (q)(1)(vi) through (ix) to read as follows:

**§86.1811-04 Emission standards for light-duty vehicles, light-duty trucks and medium-duty passenger vehicles.**

***  *  *  *  ***

(k) *  *  *

(5) *  *  *

(iv) Vehicles produced by small volume manufacturers, as defined in §86.1838-01, are exempt from the LDV/LLDT evaporative emissions standards in Table S09-1 of §86.1811-09(e) for model years 2009 and 2010, but must comply with the Tier 2 evaporative emission standards in Table S04-3 in paragraph (e)(1) of this section for model years 2009 and 2010.

(v) Vehicles produced by small volume manufacturers, as defined in §86.1838-01, are exempt from the HLDT/MDPV evaporative emissions standards in Table S09-1 of §86.1811-09(e) for model years 2010 and 2011, but must comply with the Tier 2 evaporative emission standards in Table S04-3 in paragraph (e)(1) of this section for model years 2010 and 2011.

(vi) Small volume manufacturers, as defined in §86.1838-01, are exempt from the LDV/LLDT cold temperature NMHC phase-in requirements in Table S10-1 of §86.1811-10(g) for model years 2010, 2011, and 2012, but must comply with the 100% requirement for 2013 and later model years for cold temperature NMHC standards.

(vii) Small volume manufacturers, as defined in §86.1838-01, are exempt from the HLDT/MDPV cold temperature NMHC phase-in requirements in Table S10-1 of

§86.1811-10(g) for model years 2012, 2013, and 2014, but must comply with the 100% requirement for 2015 and later model years for cold temperature NMHC standards.

*  *  *  *  *

(q)  *  *  *

(1)  *  *  *

(vi) Defer compliance with the LDV/LLDT evaporative emissions standards in Table S09-1 of §86.1811-09(e) until 2013, and defer 100% compliance with the LDV/LLDT evaporative emissions standards in Table S09-2 of §86.1811-09(e) until 2016. (The hardship relief may be extended one additional model year -- two model years total.)

(vii) Defer compliance with the HLDT/MDPV evaporative emissions standards in Table S09-1 of §86.1811-09(e) until 2014, and defer 100% compliance with the HLDT/MDPV evaporative emissions standards in Table S09-2 of §86.1811-09(e) until 2016. (The hardship relief may be extended one additional model year -- two model years total.)

(viii) Defer 100% compliance with the LDV/LLDT cold temperature NMHC standards in Table S10-X of §86.1811-10(g) until 2015. (The hardship relief may be extended one additional model year -- two model years total.)

(ix) Defer 100% compliance with the HLDT/MDPV cold temperature NMHC standards in Table S10-X of §86.1811-10(g) until 2017. (The hardship relief may be extended one additional model year -- two model years total.)

* * * * *

19. A new §86.1811-09 is added to Subpart S to read as follows:

**§86.1811-09 Emission standards for light-duty vehicles, light-duty trucks and medium-duty passenger vehicles.**

Section 86.1811-09 includes text that specifies requirements that differ from §86.1811-04. Where a paragraph in §86.1811-04 is identical and applicable to §86.1811-09, this may be indicated by specifying the corresponding paragraph and the statement "[Reserved]. For guidance see §86.1811-04." Where a corresponding paragraph of §86.1811-04 is not applicable, this is indicated by the statement "[Reserved]."

(a) *Applicability*. (1) This section contains regulations implementing emission standards for all LDVs, LDTs and MDPVs. This section applies to 2009 and later model year LDVs, LDTs and MDPVs fueled by gasoline, diesel, methanol, ethanol, natural gas and liquefied petroleum gas fuels, except as noted. Additionally, this section applies to hybrid electric vehicles (HEVs) and zero emission vehicles (ZEVs). Unless otherwise specified, multi-fueled vehicles must comply with all requirements established for each consumed fuel.

(2) through (4) [Reserved]. For guidance see §86.1811-04.

(5) The exhaust emission standards and evaporative emission standards of this section apply equally to certification and in-use LDVs, LDTs and MDPVs, unless otherwise specified. See paragraph (t) of this section for interim evaporative emission in-use standards that are different than the certification evaporative emission standards specified in paragraph (e) of this section.

(b) through (d) [Reserved]. For guidance see §86.1811-04.

(e) *Evaporative emission standards*. Evaporative emissions from gasoline-fueled, natural gas-fueled, liquefied petroleum gas-fueled, ethanol-fueled and methanol-fueled vehicles must not exceed the standards in this paragraph (e). The standards apply equally to certification and in-use vehicles.

(1) *Diurnal-plus-hot soak evaporative hydrocarbon standards*. (i) Hydrocarbons for LDV/LLDTs, HLDTs and MDPVs that are gasoline-fueled, dedicated natural gas-fueled, dedicated liquefied petroleum gas-fueled, dedicated ethanol-fueled, dedicated methanol-fueled and multi-fueled vehicles when operating on gasoline must not exceed the diurnal plus hot soak standards shown in Table S09–1 for the full three diurnal test sequence and for the supplemental two diurnal test sequence. The standards apply

equally to certification and in-use vehicles, except as otherwise specified in paragraph (t) of this section. Table S09–1 follows:

TABLE S09–1.—LIGHT-DUTY DIURNAL PLUS HOT SOAK EVAPORATIVE EMISSION STANDARDS

[grams per test]

| Vehicle category | Model Year | 3 day diurnal+hot soak | Supplemental 2 day diurnal+hot soak |
|---|---|---|---|
| LDVs…..... | 2009 | 0.50 | 0.65 |
| LLDTs……. | 2009 | 0.65 | 0.85 |
| HLDTs ……... | 2010 | 0.90 | 1.15 |
| MDPVs …….. | 2010 | 1.00 | 1.25 |

(ii) Hydrocarbons for LDV/LLDTs, HLDTs and MDPVs that are multi-fueled vehicles operating on non-gasoline fuel must not exceed the diurnal plus hot soak standards shown in Table S09–2 for the full three diurnal test sequence and for the supplemental two diurnal test sequence. The standards apply equally to certification and in-use vehicles except as otherwise specified in paragraph (t) of this section. Table S09–2 follows:

TABLE S09–2.—LIGHT-DUTY DIURNAL PLUS HOT SOAK EVAPORATIVE EMISSION STANDARDS: NON-GASOLINE PORTION OF MULTI-FUELED VEHICLES

[grams per test]

| Vehicle category | 3 day diurnal+hot soak | Supplemental 2 day diurnal+hot soak |
|---|---|---|
| LDVs…..... | 0.50 | 0.65 |
| LLDTs……. | 0.65 | 0.85 |
| HLDTs ……... | 0.90 | 1.15 |
| MDPVs …….. | 1.00 | 1.25 |

(iii) For multi-fueled vehicles operating on non-gasoline fuel, manufacturers must comply with the phase-in requirements in Table S09-3 of this paragraph for the evaporative emission requirements specified in Table S09-2 of this section. Phase-in schedules are grouped together for LDV/LLDTs and HLDT/MDPVs. These requirements specify the minimum percentage of the manufacturer's LDV/LLDT/HLDT/MDPV 50-State sales, by model year, that must meet the requirements for their full useful lives. Table S09–3 follows:

TABLE S09–3.—PHASE-IN PERCENTAGES FOR LIGHT-DUTY DIURNAL PLUS HOT SOAK EVAPORATIVE EMISSION STANDARDS: NON-GASOLINE PORTION OF MULTI-FUELED VEHICLES

| Model year | Percentage of vehicles that must meet evaporative emission requirements |
|---|---|
| 2012……... | 30 |
| 2013……... | 60 |
| 2014 and subsequent……. | 100 |

(2) through (6) [Reserved]. For guidance see §86.1811-04.

(7) In cases where vehicles are certified to evaporative emission standards in Tables S09-1 and S09-2 of this section, the Administrator may accept evaporative emissions data for low altitude testing in accordance with California test conditions and test procedures (in lieu of the evaporative emission test condition and test procedure requirements of subpart B of this part).

(f) through (s) [Reserved]. For guidance see §86.1811-04.

(t) *Evaporative emission in-use standards*. (1) For LDVs and LLDTs certified prior to the 2012 model year, the Tier 2 LDV/LLDT evaporative emissions standards in Table S04-3 of §86.1811-04(e) shall apply to in-use vehicles for only the first three model years after an evaporative family is first certified to the LDV/LLDT evaporative emission standards in Table S09-1 of paragraph (e) of this section, as shown in Table S09-4. For example, evaporative families first certified to the LDV/LLDT standards in Table S09-1 in the 2011 model year must meet the Tier 2 LDV/LLDT evaporative emission standards (Table S04-3) in-use for 2011, 2012, and 2013 model year vehicles (applying Tier 2 standards in-use is limited to the first three years after introduction of a vehicle).

(2) For HLDTs and MDPVs certified prior to the 2013 model year, the Tier 2 HLDT/MDPV evaporative emissions standards in Table S04-3 of §86.1811-04(e) shall apply to in-use vehicles for only the first three model years after an evaporative family is first certified to the HLDT/MDPV evaporative emission standards in Table S09-1 of paragraph (e) of this section, as shown in Table S09-5. For example, evaporative families first certified to the HLDT/MDPV standards in Table S09-1 in the 2012 model year must meet the Tier 2 HLDT/MDPV evaporative emission standards (Table S04-3) in-use for 2012, 2013, and 2014 model year vehicles (applying Tier 2 standards in-use is limited to the first three years after introduction of a vehicle).

TABLE S09-4--SCHEDULE FOR IN-USE LDV/LLDT DIURNAL PLUS HOT SOAK EVAPORATIVE EMISSION STANDARDS

| Model Year of Introduction | 2009 | 2010 | 2011 |
|---|---|---|---|
| Models Years That Tier 2 Standards Apply to In-use Vehicles | 2009<br>2010<br>2011 | 2010<br>2011<br>2012 | 2011<br>2012<br>2013 |

TABLE S09-5--SCHEDULE FOR IN-USE HLDT/MDPV DIURNAL PLUS HOT SOAK EVAPORATIVE EMISSION STANDARDS

| Model Year of Introduction | 2010 | 2011 | 2012 |
|---|---|---|---|
| Models Years That Tier 2 Standards Apply to In-use Vehicles | 2010<br>2011<br>2012 | 2011<br>2012<br>2013 | 2012<br>2013<br>2014 |

20. A new §86.1811-10 is added to Subpart S to read as follows:

**§86.1811-10 Emission standards for light-duty vehicles, light-duty trucks and medium-duty passenger vehicles.**

Section 86.1811-10 includes text that specifies requirements that differ from §86.1811-04 and §86.1811-09. Where a paragraph in §86.1811-04 or §86.1811-09 is identical and applicable to §86.1811-10, this may be indicated by specifying the corresponding paragraph and the statement "[Reserved]. For guidance see §86.1811-04" or "[Reserved]. For guidance see §86.1811-09." Where a corresponding paragraph of §86.1811-04 or §86.1811-09 is not applicable, this is indicated by the statement "[Reserved]."

(a) [Reserved]. For guidance see §86.1811-09.

(b) through (d) [Reserved]. For guidance see §86.1811-04.

(e) [Reserved]. For guidance see §86.1811-09.

(f) [Reserved]. For guidance see §86.1811-04.

(g) *Cold temperature exhaust emission standards.* (1) Cold temperature CO standards. These cold temperature CO standards are applicable only to gasoline fueled LDV/Ts and MDPVs. Cold temperature CO exhaust emission standards apply over a useful life of 50,000 miles or 5 years (whichever occurs first) as follows:

(i) For LDVs and LDT1s, the standard is 10.0 grams per mile CO.

(ii) For LDT2s, LDT3s and LDT4s, and MDPVs, the standard is 12.5 grams per mile CO.

(iii) These standards do not apply to interim non-Tier 2 MDPVs.

(2) *Cold temperature NMHC standards*. Full useful life fleet average cold temperature NMHC standards are applicable only to gasoline fueled LDV/LLDTs and HLDT/MDPVs, and apply equally to certification and in-use except as otherwise specified in paragraph (u) of this section for in-use standards for applicable phase-in models. Testing with other fuels such as E85, or testing on diesel vehicles, is not required. Multi-fuel, bi-fuel or dual-fuel vehicles must comply with requirements using gasoline only. For LDV/LLDTs, the useful life is 120,000 miles or 10 years, whichever comes first. For HLDT/MDPVs, the useful life is 120,000 miles or 11 years, whichever comes first. There is not an intermediate useful life standard for cold temperature NMHC standards.

(i) The standards are shown in the following table:

Table S10-1 - Fleet Average Cold Temperature NMHC Full Useful Life Exhaust Emission Standards

| Vehicle Weight Category | Cold Temperature NMHC Sales-Weighted Fleet Average Standard (grams/mile) |
|---|---|
| LDVs & LLDTs (≤ 6,000 lbs GVWR) | 0.3 |

| | |
|---|---|
| HLDTs (>6,000 – 8,500 lbs GVWR) & MDPVs (>8,500 – 10,000 lbs GVWR) | 0.5 |

(ii) The manufacturer must calculate its fleet average cold temperature NMHC emission level(s) as described in §86.1864-10(m).

(iii) During a phase-in year, the manufacturer must comply with the fleet average standards for the required phase-in percentage for that year as specified in paragraph (g)(3) of this section, or for the alternate phase-in percentage as permitted under paragraph (g)(4) of this section.

(iv) For model years prior to 2010 (LDV/LLDTs) and 2012 (HLDT/MDPVs), where the manufacturer desires to bank early NMHC credits as permitted under §86.1864-10(o)(5), the manufacturer must achieve a fleet average standard below the applicable standard. Manufacturers must determine compliance with the cold temperature NMHC fleet average standard according to §86.1864-10(o).

(3) *Phase-in of the cold temperature NMHC standards*. Except as permitted in §86.1811-04(k)(5)(vi) and (vii) regarding small volume manufacturers, manufacturers must comply with the phase-in requirements in Tables S10-2 and S10-3. Separate phase-in schedules are provided for LDV/LLDTs and for HLDT/MDPVs. These requirements specify the minimum percentage of the manufacturer's LDV/LLDT and HLDT/MDPV 50-State sales, by model year, that must meet the fleet average cold temperature NMHC standard for their full useful lives. LDVs and LLDTs must be grouped together to determine compliance with these phase-in requirements, and HLDTs and MDPVs must also be grouped together to determine compliance with these phase-in requirements. Tables S10-2 and S10-3 follow:

Table S10-2 - Phase-in Percentages for LDV/LLDT cold temperature NMHC requirements

| Model Year | Percentage of LDV/LLDTs that must meet requirement |
|---|---|
| 2010 | 25 |
| 2011 | 50 |
| 2012 | 75 |
| 2013 and subsequent | 100 |

Table S10-3 - Phase-in Percentages for HLDT/MDPV cold temperature NMHC requirements

| Model Year | Percentage of HLDT/MDPVs that must meet requirement |
|---|---|
| 2012 | 25 |
| 2013 | 50 |
| 2014 | 75 |
| 2015 and subsequent | 100 |

(4) *Alternate phase-in schedules for cold temperature NMHC standards*. (i) Manufacturers may apply for alternate phase-in schedules that would still result in 100% phase-in by 2013 and 2015, respectively, for LDV/LLDTs and HLDT/MDPVs. An alternate phase-in schedule submitted by a manufacturer is subject to EPA approval. The alternate phase-in will not be used to delay full implementation past the last year of the primary phase-in schedule (2013 for LDV/LLDTs, 2015 for HLDT/MDPVs). An alternate phase-in schedule will be acceptable if it satisfies the following conditions (where API = Anticipated Phase-In percentage for the referenced model year):

LDV/LLDTs:

$(6\times API_{2008}) + (5\times API_{2009}) + (4\times API_{2010}) + (3\times API_{2011}) + (2\times API_{2012}) + (1\times API_{2013}) \geq 500\%$, and $(6\times API_{2008}) + (5\times API_{2009}) + (4\times API_{2010}) \geq 100\%$

HLDT/MDPVs:

$(6\times API_{2010}) + (5\times API_{2011}) + (4\times API_{2012}) + (3\times API_{2013}) + (2\times API_{2014}) + (1\times API_{2015}) \geq 500\%$, and $(6\times API_{2010}) + (5\times API_{2011}) + (4\times API_{2012}) \geq 100\%$,

or

$(6\times API_{2010}) + (5\times API_{2011}) + (4\times API_{2012}) + (3\times API_{2013}) + (2\times API_{2014}) + (1\times API_{2015}) \geq 600\%$

(ii)(A) For LDV/LLDTs, if the sum of products in paragraph (4)(i) is greater than or equal to 500%, which is the sum of products from the primary phase-in schedule (4×25% + 3×50% + 2×75% + 1×100% = 500%), then the alternate phase-in schedule is acceptable, except as prohibited in paragraphs (g)(4)(i) and (iii) of this section. In addition, manufacturers electing to use an alternate phase-in schedule for compliance with the cold temperature NMHC exhaust emission standards must ensure that the sum of products is at least 100% for model years 2010 and earlier for LDV/LLDTs. For example, a phase-in schedule for LDV/LLDTs of 5/10/10/45/80/100 that begins in 2008 would calculate as (6×5%) + (5×10%) + (4×10%) = 120% and would be acceptable for 2008-2010. The full phase-in would calculate as (6×5%) + (5×10%) + (4×10%) + (3×45%) + (2×80%) + (1×100%) = 515% and would be acceptable for 2008-2013.

(B) For HLDT/MDPVs, if the sum of products in paragraph (4)(i) is greater than or equal to 500%, which is the sum of products from the primary phase-in schedule (4×25% + 3×50% + 2×75% + 1×100% = 500%), then the alternate phase-in schedule is acceptable, except as prohibited in paragraphs (g)(4)(i) and (iii) of this section. In addition, manufacturers electing to use an alternate phase-in schedule for compliance with the cold temperature NMHC exhaust emission standards must ensure that the sum of products is at least 100% for model years 2012 and earlier for HLDT/MDPVs. Alternately, if the sum of products is greater than or equal to 600%, then the alternate phase-in schedule is acceptable, except as prohibited in paragraphs (g)(4)(i) and (iii) of this section. If the sum of products is greater than or equal to 600%, then there are no requirements on the sum of products for model years 2012 and earlier.

(iii) Under an alternate phase-in schedule, the projected phase-in percentage is not binding for a given model year, provided the sums of the actual phase-in percentages that occur meet the appropriate total sums as required in the equations of paragraph (g)(4)(i) of this section, and provided that 100% actual compliance is reached for the appropriate model year, either 2013 for LDV/LLDTs or 2015 for HLDT/MDPVs.

(5) Manufacturers must determine compliance with required phase-in schedules as follows:

(i) Manufacturers must submit information showing compliance with all phase-in requirements of this section with their Part I applications as required by §86.1844(d)(13).

(ii) A manufacturer electing to use any alternate phase-in schedule permitted under this section must provide in its Application for Certification for the first year in which it intends to use such a schedule, and in each succeeding year during the phase-in, the intended phase-in percentages for that model year and the remaining phase-in years along with the intended final sum of those percentages as described in paragraph (g)(4)(i) of this section. This information may be included with the information required under §86.1844-01(d)(13). In its year end annual reports, as required under §86.1844-01(e)(4), the manufacturer must include sufficient information so that the Administrator can verify compliance with the alternate phase-in schedule established under paragraph (g)(4)(i) of this section.

(6)(i) Sales percentages for the purpose of determining compliance with the phase-in of the cold temperature NMHC requirements must be based upon projected 50-State sales of LDV/LLDTs and HLDT/MDPVs of the applicable model year by the manufacturer to the point of first sale. Such sales percentages must be rounded to the nearest 0.1 percent.

(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. 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 HLDT/MDPVs sold in all 50 U.S. States.

(f) through (s) [Reserved]. For guidance see §86.1811-04.

(t) [Reserved]. For guidance see §86.1811-09.

(u) *Cold temperature NMHC exhaust emission in-use standards for applicable phase-in models*. An interim full useful life in-use compliance standard is calculated by adding 0.1 g/mi to the FEL to which each test group is newly certified, and applies to that test group only for the model years shown in Tables S10-4 and S10-5. Otherwise, the in-use standard is the certification standard from paragraph (g)(2) of this section. The standards apply for purposes of in-use testing only and does not apply to certification or Selective Enforcement Auditing. Tables S10-4 and S10-5 follow:

Table S10-4 - In-use Standards for applicable phase-in LDV/LLDTs

| Model Year of Introduction | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| Models years that the interim in-use standard is available | 2008<br>2009<br>2010<br>2011 | 2009<br>2010<br>2011<br>2012 | 2010<br>2011<br>2012<br>2013 | 2011<br>2012<br>2013 | 2012<br>2013<br>2014 | 2013<br>2014 |

Table S10-5 - In-use Standards for applicable phase-in HLDT/MDPVs

| Model Year of Introduction | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Models years that the interim in-use standard is available | 2010<br>2011<br>2012<br>2013 | 2011<br>2012<br>2013<br>2014 | 2012<br>2013<br>2014<br>2015 | 2013<br>2014<br>2015 | 2014<br>2015<br>2016 | 2015<br>2016 |

21. Section 86.1823-01 is amended by revising paragraph (a)(3)(i)(C) to read as follows:

**§86.1823-01 Durability demonstration procedures for exhaust emissions.**

* * * * *

(a) * * *

(3) * * *

(i) * * *

(C) The DF calculated by these procedures will be used for determining compliance with FTP exhaust emission standards, SFTP exhaust emission standards, cold temperature NMHC emission standards, and cold temperature CO emission standards. At the manufacturer's option and using procedures approved by the Administrator, a separate DF may be calculated exclusively using cold temperature CO test data to determine compliance with cold temperature CO emission standards. Similarly, at the manufacturer's option and using procedures approved by the Administrator, a separate DF may be calculated exclusively using cold temperature NMHC test data to determine compliance with cold temperature NMHC emission standards. For determining compliance with full useful life cold temperature NMHC emission standards, the 68-86

°F 120,000 mile full useful life NMOG DF may be used. Also at the manufacturer's option and using procedures approved by the Administrator, a separate DF may be calculated exclusively using US06 and/or air conditioning (SC03) test data to determine compliance with the SFTP emission standards.

* * * * *

22. Section 86.1827-01 is amended by revising paragraph (a)(5) to read as follows:

**§86.1827-01 Test group determination.**

* * * * *

(a) * * *

(5) Subject to the same emission standards (or FEL in the case of cold temperature NMHC standards), except that a manufacturer may request to group vehicles into the same test group as vehicles subject to more stringent standards, so long as all the vehicles within the test group are certified to the most stringent standards applicable to any vehicle within that test group. Light-duty trucks subject to the same emission standards as light-duty vehicles, with the exception of the light-duty truck idle CO standard and/or total HC standard, may be included in the same test group.

*  *  *  *  *

23. A new §86.1828-10 is added to Subpart S to read as follows:

**§86.1828-10 Emission data vehicle selection.**

Section 86.1828-10 includes text that specifies requirements that differ from §86.1828-01. Where a paragraph in §86.1828-01 is identical and applicable to §86.1828-10, this may be indicated by specifying the corresponding paragraph and the statement "[Reserved]. For guidance see §86.1828-01." Where a corresponding paragraph of §86.1828-01 is not applicable, this is indicated by the statement "[Reserved]."

(a) through (f) [Reserved]. For guidance see §86.1828-01.

(g) *Cold temperature NMHC testing*. For cold temperature NMHC exhaust emission compliance for each durability group, the manufacturer must select the vehicle expected to emit the highest NMHC emissions at 20 °F on candidate in-use vehicles from the test vehicles specified in §86.1828-01(a). When the expected worst-case cold temperature NMHC vehicle is also the expected worst-case cold temperature CO vehicle as selected in paragraph (c) of this section, then cold testing is required only for that vehicle; otherwise, testing is required for both the worst-case cold temperature CO vehicle and the worst-case cold temperature NMHC vehicle.

24. Section 86.1829-01 is amended by revising paragraph (b)(3) to read as follows:

**§86.1829-01 Durability and emission testing requirements; waivers.**

* * * * *

(b) * * *

(3) *Cold temperature CO and cold temperature NMHC Testing*. The manufacturer must test one EDV in each durability group for cold temperature CO and cold temperature NMHC exhaust emission compliance in accordance with the test procedures in subpart C of this part or with alternative procedures approved in advance by the Administrator. The selection of which EDV and test group within the durability group will be tested for cold temperature CO and cold temperature NMHC compliance will be determined under the provisions of §86.1828-10(c) and (g).

*** * * * ***

25. Section 86.1844-01 is amended by revising paragraph (d)(11) to read as follows:

**§86.1844-01 Information requirements: application for certification and submittal of information upon request.**

* * * * *

(d) * * *

(11) A list of all auxiliary emission control devices (AECD) installed on any applicable vehicles, including a justification for each AECD, the parameters they sense and control, a detailed justification of each AECD which results in a reduction in effectiveness of the emission control system, and rationale for why the AECD is not a defeat device as defined under §§86.1809-01 and 86.1809-10. For any AECD uniquely used at high altitudes, EPA may request engineering emission data to quantify any emission impact and validity of the AECD. For any AECD uniquely used on multi-fuel vehicles when operated on fuels other than gasoline, EPA may request engineering emission data to quantify any emission impact and validity of the AECD.

* * * * *

26. A new §86.1848-10 is added to Subpart S to read as follows:

**§86.1848-10 Certification.**

Section 86.1848-10 includes text that specifies requirements that differ from §86.1848-01. Where a paragraph in §86.1848-01 is identical and applicable to §86.1848-10, this may be indicated by specifying the corresponding paragraph and the statement "[Reserved]. For guidance see §86.1848-01." Where a corresponding paragraph of §86.1848-01 is not applicable, this is indicated by the statement "[Reserved]."

(a) through (b) [Reserved]. For guidance see §86.1848-01.

(c) The following conditions apply to all certificates:

(1) The manufacturer must supply all required information according to the provisions of §§86.1843-01 and 86.1844-01.

(2) The manufacturer must comply with all certification and in-use emission standards contained in subparts S and H of this part both during and after model year production.

(3) The manufacturer must comply with all implementation schedules sales percentages as required in §86.1810 or elsewhere in this part. Failure to meet a required implementation schedule sales percentage will be considered to be a failure to satisfy a condition upon which the certificate was issued and any vehicles or trucks sold in violation of the implementation schedule are not be covered by the certificate.

(4) For incomplete light-duty trucks and incomplete heavy-duty vehicles, a certificate covers only those new motor vehicles that, when completed by having the

primary load-carrying device or container attached, conform to the maximum curb weight and frontal area limitations described in the application for certification as required in §86.1844-01.

(5) The manufacturer must meet the in-use testing and reporting requirements contained in §§86.1845-01, 86.1846-01, and 86.1847-01, as applicable. Failure to meet the in-use testing or reporting requirements shall be considered a failure to satisfy a condition upon which the certificate was issued. A vehicle or truck is considered to be covered by the certificate only if the manufacturer fulfills this condition upon which the certificate was issued.

(6) Vehicles are covered by a certificate of conformity only if they are in all material respects as described in the manufacturer's application for certification (Part I and Part II).

(7) For Tier 2 and interim non-Tier 2 vehicles, 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. 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. For recall and warranty purposes, vehicles 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 vehicles.

(i) Failure to meet the fleet average $NO_X$ requirements of 0.07g/mi, 0.3 g/mi or 0.2 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 vehicles 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 vehicles 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 vehicles 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).

(8) For LDV/LLDTs and HLDT/MDPVs, all certificates of conformity issued are conditional upon compliance with all provisions of §§86.1811-10 and 86.1864-10 both during and after model year production. The manufacturer bears 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. For recall and warranty purposes, vehicles 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 vehicles.

(i) Failure to meet the fleet average cold temperature NMHC requirements will be considered a failure to satisfy the terms and conditions upon which the certificate(s) was

(were) issued and the vehicles sold in violation of the fleet average NMHC standard will not be covered by the certificate(s).

(ii) Failure to comply fully with the prohibition against selling credits that are not generated or that are not available, as specified in §86.1864-10, will be considered a failure to satisfy the terms and conditions upon which the certificate(s) was (were) issued and the vehicles 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 §86.1811-10 will be considered a failure to satisfy the terms and conditions upon which the certificate(s) was (were) issued and the vehicles sold that do not comply with cold temperature NMHC requirements, up to the number needed to comply, will not be covered by the certificate(s).

(d) through (i) [Reserved]. For guidance see §86.1848-01.

27. A new §86.1864-10 is added to Subpart S to read as follows:

**§86.1864-10 How to comply with the fleet average cold temperature NMHC standards.**

(a) *Applicability*. Cold temperature NMHC exhaust emission standards apply to the following vehicles, subject to the phase-in requirements in §86.1811-10(g)(3) and (4):

(1) 2010 and later model year LDV/LLDTs.

(2) 2012 and later model year HLDT/MDPVs.

(3) Aftermarket conversion systems as defined in 40 CFR 85.502, including conversion of MDPVs.

(4) Vehicles imported by ICIs as defined in 40 CFR 85.1502.

(b) *Useful life requirements.* Full useful life requirements for cold temperature NMHC standards are defined in §86.1805-04(g). There is not an intermediate useful life standard for cold temperature NMHC standards.

(c) *Altitude*. Altitude requirements for cold temperature NMHC standards are provided in §86.1810-09(f).

(d) *Small volume manufacturer certification procedures*. Certification procedures for small volume manufacturers are provided in §86.1838-01.

(e) *Cold temperature NMHC standards*. Fleet average cold temperature NMHC standards are provided in §86.1811-10(g)(2).

(f) *Phase*-in. Phase-in of the cold temperature NMHC standards are provided in §86.1811-10(g)(3) and (4).

(g) *Phase-in flexibilities for small volume manufacturers*. Phase-in flexibilities for small volume manufacturer compliance with the cold temperature NMHC standards are provided in §86.1811-04(k)(5).

(h) *Hardship provisions for small volume manufacturers*. Hardship provisions for small volume manufacturers related to the cold temperature NMHC standards are provided in §86.1811-04(q)(1).

(i) *In-use standards for applicable phase-in models*. In-use cold temperature NMHC standards for applicable phase-in models are provided in §86.1811-10(u).

(j) *Durability procedures and method of determining deterioration factors (DFs)*. The durability data vehicle selection procedures of §86.1822-01 and the durability demonstration procedures of §86.1823-06 apply for cold temperature NMHC standards. For determining compliance with full useful life cold temperature NMHC emission standards, the 68-86 °F, 120,000 mile full useful life NMOG DF may be used.

(k) *Vehicle test procedure*. (1) The test procedure for demonstrating compliance with cold temperature NMHC standards is contained in subpart C of this part. With prior EPA approval, alternative testing procedures may be used, as specified in §86.106-96(a), provided cold temperature NMHC emissions test results are equivalent or superior.

(2) Testing of all LDVs, LDTs and MDPVs to determine compliance with cold temperature NMHC exhaust emission standards set forth in this section must be on a loaded vehicle weight (LVW) basis, as defined in §86.1803-01.

(3) Testing for the purpose of providing certification data is required only at low altitude conditions and only for vehicles that can operate on gasoline, except as requested in §§86.1810-09(f) and 86.1844-01(d)(11). If hardware and software emission control strategies used during low altitude condition testing are not used similarly across all altitudes for in-use operation, the manufacturer must include a statement in the application for certification, in accordance with §§86.1844-01(d)(11) and 86.1810-09(f), stating what the different strategies are and why they are used. If hardware and software emission control strategies used during testing with gasoline are not used similarly with all fuels that can be used in multi-fuel vehicles, the manufacturer will include a statement

in the application for certification, in accordance with §§86.1844-01(d)(11) and 86.1810-09(f), stating what the different strategies are and why they are used. For example, unless a manufacturer states otherwise, air pumps used to control emissions on dedicated gasoline vehicles or multi-fuel vehicles during low altitude conditions must also be used to control emissions at high altitude conditions, and software used to control emissions or closed loop operation must also operate similarly at low and high altitude conditions and similarly when multi-fueled vehicles are operated on gasoline and alternate fuels. These examples are for illustrative purposes only; similar strategies would apply to other currently used emission control technologies and/or emerging or future technologies.

(l) *Emission data vehicle (EDV) selection*. Provisions for selecting the appropriate EDV for the cold temperature NMHC standards are provided in §§86.1828-10(g) and 86.1829-01(b)(3).

(m) *Calculating the fleet average cold temperature NMHC standard.* Manufacturers must compute separate sales-weighted fleet average cold temperature NMHC emissions at the end of the model year for LDV/LLDTs and HLDT/MDPVs, using actual sales, and certifying test groups to FELs, as defined in §86.1803-01. The FEL becomes the standard for each test group, and every test group can have a different FEL. The certification resolution for the FEL will be 0.1 grams/mile. LDVs and LLDTs must be grouped together when calculating the fleet average, and HLDTs and MDPVs must also be grouped together to determine the fleet average. Manufacturers must compute the sales-weighted cold temperature NMHC fleet averages using the following equation, rounded to the nearest 0.1 grams/mile:

Fleet average cold temperature NMHC exhaust emissions (grams/mile) =

$\sum(N \times FEL) \div$ Total number of vehicles sold of the applicable weight category (i.e., either LDV + LLDTs, or HLDT + MDPVs)

Where:

N = The number of LDVs and LLDTs, or HLDTs and MDPVs, sold within the applicable FEL, based on vehicles counted to the point of first sale.

FEL = Family Emission Limit (grams/mile).

(n) *Certification compliance and enforcement requirements for cold temperature NMHC standards*. (1) Compliance and enforcement requirements are provided in §86.1864-10 and §86.1848-10(c)(8).

(2) The certificate issued for each test group requires all vehicles within that test group to meet the emission standard or FEL to which the vehicles were certified.

(3) Each manufacturer must comply with the applicable cold temperature NMHC fleet average standard on a sales-weighted average basis, at the end of each model year, using the procedure described in paragraph (m) of this section.

(4) During a phase-in year, the manufacturer must comply with the applicable cold temperature NMHC fleet average standard for the required phase-in percentage for that year as specified in §86.1811-10(g)(3) or (4).

(5) Manufacturers must compute separate cold temperature NMHC fleet averages for LDV/LLDTs and HLDT/MDPVs. The sales-weighted cold temperature NMHC fleet averages must be compared with the applicable fleet average standard.

(6) Each manufacturer must comply on an annual basis with the fleet average standards as follows:

(i) Manufacturers must report in their annual reports to the Agency that they met the relevant corporate average standard by showing that their sales-weighted average cold temperature NMHC emissions of LDV/LLDTs and HLDT/MDPVs, as applicable, are at or below the applicable fleet average standard;

(ii) If the sales-weighted average is above the applicable fleet average standard, manufacturers must obtain and apply sufficient NMHC credits as permitted under paragraph (o)(8) of this section. A manufacturer must show via the use of credits that they have offset any exceedence of the corporate average standard. Manufacturers must also include their credit balances or deficits.

(iii) If a manufacturer fails to meet the corporate average cold temperature NMHC standard for two consecutive years, the vehicles causing the corporate average exceedence will be considered not covered by the certificate of conformity (see paragraph (o)(8) of this section). A manufacturer will be subject to penalties on an individual-vehicle basis for sale of vehicles not covered by a certificate.

(iv) EPA will review each manufacturer's sales to designate the vehicles that caused the exceedence of the corporate average standard. EPA will designate as nonconforming those vehicles in test groups with the highest certification emission values first, continuing until reaching a number of vehicles equal to the calculated number of noncomplying vehicles as determined above. In a group where only a portion of vehicles would be deemed nonconforming, EPA will determine the actual nonconforming vehicles by counting backwards from the last vehicle produced in that test group. Manufacturers will be liable for penalties for each vehicle sold that is not covered by a certificate.

(o) *Requirements for the cold temperature NMHC averaging, banking and trading (ABT) program.* (1) Manufacturers must average the cold temperature NMHC emissions of their vehicles and comply with the cold temperature NMHC fleet average corporate standard. Manufacturers may generate credits during and after the phase-in period. Manufacturers may generate credits prior to the phase-in periods as described in paragraph (o)(5) of this section. A manufacturer whose cold temperature NMHC fleet average emissions exceed the applicable standard must complete the calculation in paragraph (o)(4) of this section to determine the size of its NMHC credit deficit. A manufacturer whose cold temperature NMHC fleet average emissions are less than the applicable standard must complete the calculation in paragraph (o)(4) of this section to generate NMHC credits.

(2) There are no property rights associated with NMHC 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.

(3) Each manufacturer must comply with the reporting and recordkeeping requirements of paragraph (p) of this section for NMHC credits, including early credits. The averaging, banking and trading program is enforceable through the certificate of conformity that allows the manufacturer to introduce any regulated vehicles into commerce.

(4) Credits are earned on the last day of the model year. Manufacturers must calculate, for a given model year, the number of credits or debits it has generated according to the following equation, rounded to the nearest 0.1 grams/mile:

NMHC Credits or Debits = (Cold Temperature NMHC Standard – Manufacturer's Sales-Weighted Fleet Average Cold Temperature NMHC Emissions) × (Total Number of Vehicles Sold)

Where:

Cold Temperature NMHC Standard = 0.3 grams/mile for LDV/LLDTs or 0.5 grams/mile for HLDT/MDPV, per §86.1811-10(g)(2).

Manufacturer's Sales-Weighted Fleet Average Cold Temperature NMHC Emissions = average calculated according to paragraph (m) of this section.

Total Number of Vehicles Sold = Total 50-State sales based on the point of first sale.

(5) The following provisions apply for early banking:

(i) Manufacturers may certify LDV/LLDTs to the cold temperature NMHC exhaust standards in §86.1811-10(g)(2) for model years 2008-2009 to bank credits for use in the 2010 and later model years. Manufacturers may certify HLDT/MDPVs to the cold temperature NMHC exhaust standards in §86.1811-10(g)(2) for model years 2010-2011 to bank credits for use in the 2012 and later model years.

(ii) This process is referred to as "early banking" and the resultant credits are referred to as "early credits." To bank early credits, a manufacturer must comply with all exhaust emission standards and requirements applicable to LDV/LLDTs and/or HLDT/MDPVs. To generate early credits, a manufacturer must separately compute the sales-weighted cold temperature NMHC average of the LDV/LLDTs and HLDT/MDPVs it certifies to the exhaust requirements and separately compute credits using the calculations in paragraph (o)(4) of this section. Early HLDT/MDPV credits may not be applied to LDV/LLDTs before the 2010 model year. Early LDV/LLDT credits may not be applied to HLDT/ MDPV before the 2012 model year.

(6) NMHC credits are not subject to any discount or expiration date except as required under the deficit carryforward provisions of paragraph (o)(8) of this section. There is no discounting of unused credits. NMHC credits have unlimited lives, subject to the limitations of paragraph (o)(2) of this section.

(7) Credits may be used as follows:

(i) Credits generated and calculated according to the method in paragraph (o)(4) of this section may be used only to offset deficits accrued with respect to the standard in §86.1811-10(g)(2). Credits may be banked and used in a future model year in which a manufacturer's average cold temperature NMHC level exceeds the applicable standard. Credits may be exchanged between the LDT/LLDT and HLDT/MDPV fleets of a given manufacturer. Credits may also be traded to another manufacturer according to the provisions in paragraph (o)(9) of this section. 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.

(ii) The use of credits shall not be permitted to address Selective Enforcement Auditing or in-use testing failures. The enforcement of the averaging standard occurs through the vehicle's certificate of conformity. A manufacturer's certificate of conformity is conditioned upon compliance with the averaging provisions. The certificate will be void ab initio if a manufacturer fails to meet the corporate average standard and does not obtain appropriate credits to cover its shortfalls in that model year or in the subsequent model year (see deficit carryforward provision in paragraph (o)(8) of this section). Manufacturers must track their certification levels and sales unless they produce only vehicles certified to cold temperature NMHC levels below the standard and do not plan to bank credits.

(8) The following provisions apply if debits are accrued:

(i) If a manufacturer calculates that it has negative credits (also called "debits" or a "credit deficit") for a given model year, it may carry that deficit forward into the next model year. Such a carry-forward may only occur after the manufacturer exhausts any

supply of banked credits. At the end of that next model year, the deficit must be covered with an appropriate number of credits that the manufacturer generates or purchases. Any remaining deficit is subject to an enforcement action, as described in this paragraph (o)(8). Manufacturers are not permitted to have a credit deficit for two consecutive years.

(ii) If debits are not offset within the specified time period, the number of vehicles not meeting the fleet average cold temperature NMHC standards (and therefore not covered by the certificate) must be calculated by dividing the total amount of debits for the model year by the fleet average cold temperature NMHC standard applicable for the model year in which the debits were first incurred.

(iii) EPA will determine the number of vehicles for which the condition on the certificate was not satisfied by designating vehicles in those test groups with the highest certification cold temperature NMHC emission values first and continuing until reaching a number of vehicles equal to the calculated number of noncomplying vehicles as determined above. If this calculation determines that only a portion of vehicles in a test group contribute to the debit situation, then EPA will designate actual vehicles in that test group as not covered by the certificate, starting with the last vehicle produced and counting backwards.

(iv)(A) If a manufacturer ceases production of LDV/LLDTs and HLDT/MDPVs, 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 a violation of paragraph (o)(8)(i) of this section and may subject the manufacturer to an enforcement action for sale of vehicles not covered by a certificate, pursuant to paragraphs (o)(8)(ii) and (iii) of this section.

(B) If a manufacturer is purchased by, merges with, or otherwise combines with another manufacturer, the controlling entity is responsible for offsetting any debits outstanding within the required time period. Any failure to offset the debits will be considered a violation of paragraph (o)(8)(i) of this section and may subject the manufacturer to an enforcement action for sale of vehicles not covered by a certificate, pursuant to paragraphs (o)(8)(ii) and (iii) of this section.

(v) For purposes of calculating the statute of limitations, a violation of the requirements of paragraph (o)(8)(i) of this section, a failure to satisfy the conditions upon which a certificate(s) was issued and hence a sale of vehicles not covered by the certificate, all occur upon the expiration of the deadline for offsetting debits specified in paragraph (o)(8)(i) of this section.

(9) The following provisions apply to NMHC credit trading:

(i) EPA may reject NMHC credit trades if the involved manufacturers fail to submit the credit trade notification in the annual report. A manufacturer may not sell credits that are not available for sale pursuant to the provisions in paragraphs (o)(7)(i) of this section.

(ii) In the event of a negative credit balance resulting from a transaction that a manufacturer could not cover by the reporting deadline for the model year in which the trade occurred, 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.

(iii) A manufacturer may only trade credits that it has generated pursuant to paragraph (o)(4) of this section or acquired from another party.

(p) *Maintenance of records and submittal of information relevant to compliance with fleet average cold temperature NMHC standards*. (1) *Maintenance of records*. (i) Manufacturers producing any light-duty vehicles, light-duty trucks, or medium-duty passenger vehicles subject to the provisions in this subpart must establish, maintain, and retain all the following information in adequately organized records for each model year:

(A) Model year.

(B) Applicable fleet average cold temperature NMHC standards.

(C) Fleet average cold temperature NMHC value.

(D) All values used in calculating the fleet average cold temperature NMHC value.

(ii) Manufacturers producing any light-duty vehicles, light-duty trucks, or medium-duty passenger vehicles subject to the provisions in this subpart must establish, maintain, and retain all the following information in adequately organized records for each LDV/T or MDPV subject to this subpart:

(A) Model year.

(B) Applicable fleet average cold temperature NMHC standard.

(C) EPA test group.

(D) Assembly plant.

(E) Vehicle identification number.

(F) Cold temperature NMHC FEL to which the LDV, LDT, or MDPV is certified.

(G) Information on the point of first sale, including the purchaser, city, and state.

(iii) Manufacturers must retain all required records for a period of eight years from the due date for the annual report. Records may be stored in any format and on any

media, as long as manufacturers can promptly send EPA organized, written records in English if we ask for them. Manufacturers must keep records readily available as EPA may review them at any time.

(iv) The Administrator may require the manufacturer to retain additional records or submit information not specifically required by this section.

(v) Pursuant to a request made by the Administrator, the manufacturer must submit to the Administrator the information that the manufacturer is required to retain.

(vi) EPA may void ab initio a certificate of conformity for vehicles 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.

(2) *Reporting*. (i) Each covered manufacturer must submit an annual report. The annual report must contain for each applicable cold temperature NMHC standard, the calculated fleet average cold temperature NMHC value, all values required to calculate the cold temperature NMHC emissions value, the number of credits generated or debits incurred, all the values required to calculate the credits or debits, the resulting balance of credits or debits, and sufficient information to show compliance with all phase-in or alternate phase-in requirements

(ii) For each applicable fleet average cold temperature NMHC 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 all of the following:

(A) Name of credit provider.

(B) Name of credit recipient.

(C) Date the trade occurred.

(D) Quantity of credits traded.

(E) Model year in which the credits were earned.

(iii) Unless a manufacturer reports the data required by this section in the annual production report required under §86.1844-01(e), a manufacturer must submit an annual report for each model year after production ends for all affected vehicles 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, Compliance and Innovative Strategies Division, U.S. Environmental Protection Agency, 2000 Traverwood, Ann Arbor, Michigan 48105.

(iv) Failure by a manufacturer to submit the annual report in the specified time period for all vehicles subject to the provisions in this section is a violation of section 203(a)(1) of the Clean Air Act (42 U.S.C. 7522 (a)(1)) for each applicable vehicle produced by that manufacturer.

(v) 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 traded, and will adjust erroneous debits. In the case of traded erroneous credits, EPA must adjust the selling manufacturer's credit balance to reflect the sale of such credits and any resulting credit deficit.

(3) *Notice of opportunity for hearing*. Any revoking of the certificate under paragraph (p)(1)(vi) of this section will be made only after EPA has offered the affected

manufacturer an opportunity for a hearing conducted in accordance with §86.614-84 for light-duty vehicles or §86.1014-84 for light-duty trucks and, if a manufacturer requests such a hearing, will be made only after an initial decision by the Presiding Officer.