

A Summary

**TRANSPORTATION
PROGRAMS AND
PROVISIONS**

of the

Clean

Air

Act

Amendments of 1990



U.S. Department
of Transportation

Federal Highway
Administration

Moving America
To jobs... To homes... To market



**FEDERAL HIGHWAY ADMINISTRATOR
THOMAS D. LARSON'S MESSAGE:**



Americans want mobility and clean air. For the first 60 years of the 20th century, the Nation's road builders concentrated on mobility, on opening up America, with construction of the Interstate System as embodiment of this goal.

Throughout this period, Federal-aid highway acts were the primary legislative driving force. Beginning in the 1960's, however, non-highway legislation has played an increasingly important role in developing our Nation's transportation program. The National Environmental Policy Act of 1969, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, and many others created a new awareness of the role of the road within the context of social, economic, and environmental concerns. Now, with enactment of the Clean Air Act Amendments of 1990 (CAAA), transportation planners have been challenged again, this time to maintain the Nation's mobility while enhancing our air quality.

The CAAA may have a greater effect on the Nation's transportation over the next 20 to 30 years than any of the non-highway laws enacted since the 1960's. More than a decade in the making, the CAAA recast the planning function to ensure that, in areas experiencing air quality problems, transportation planning is geared to improved air quality as well as mobility. State and local officials have been challenged by the

CAAA to find ways to reduce emissions from the vehicle fleet, to develop projects and programs that will alter driving patterns to reduce the number of single-occupant vehicles, and to make alternatives such as transit and bicycles an increasingly important part of the transportation network. For all nonattainment areas, the CAAA, with the tough political decisions they force government to make, are a strong incentive to expand efforts to reach attainment as expeditiously as possible.

To make the CAAA work, officials must understand their complex requirements. They involve rigorous planning, complex computer modeling, difficult choices, and changes in the way every traveler thinks about his or her mobility—as well as a complex new terminology. In preparing this brochure, our goals have been to make the law understandable and to do so in a way that explains how the CAAA affect transportation decision making.

Fortunately, the CAAA were followed by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). Under the ISTEA, our restructured surface transportation programs give State and local officials the tools to adapt their plans to the requirements of the CAAA. Together, the CAAA and the ISTEA provide us with the means to help achieve BOTH mobility and clean air.

CONTENTS

Message from the Administrator	1
Overview	5
Title I - Transportation Provisions for Attainment and Maintenance of the National Ambient Air Quality Standards	7
Transportation Provisions for Ozone Nonattainment Areas	8
Transportation Provisions for Carbon Monoxide Nonattainment Areas	10
Transportation Provisions for Small Particulate Matter Nonattainment Areas	11
Conformity	12
Transportation Planning Procedures	15
Sanctions	17
Title II - Transportation Provisions for Mobile Source Emissions	19
Vehicle Emissions Standards	19
Fuel Requirements	21
Clean-Fuel and Vehicle Requirements	23
Conclusion	23
List of Contacts	25
Glossary	28

A SUMMARY OF THE TRANSPORTATION PROGRAMS AND PROVISIONS

LIST OF TABLES AND FIGURES

Table I	NAAQS Classifications for Ozone	9
Table II	Ozone Nonattainment Areas: Requirements for Defining Ozone Emissions Problem	T-1
Table III	Ozone Nonattainment Areas: Requirements for Reducing Ozone Emissions	T-2
Table IV	NAAQS Classifications for CO	10
Table V	CO Nonattainment Areas: Requirements for Defining CO Emissions Problem	T-3
Table VI	CO Nonattainment Areas: Requirements for Reducing CO Emissions	T-3
Table VII	PM ₁₀ Nonattainment Areas	T-4
Figure I	HC Emission Standards for Light-Duty Vehicles and Trucks (1967-1994)	19
Figure II	CO Emission Standards for Light-Duty Vehicles and Trucks (1967-1994)	20
Figure III	NOx Emission Standards for Light-Duty Vehicles and Trucks (1967-1994)	20

Pages T-1 through T-4 appear at rear of brochure

OVERVIEW

To achieve the goals of the Clean Air Act Amendments of 1990 (CAAA), State and local officials must first understand the requirements for transportation plans, programs, and projects. The Federal Highway Administration (FHWA) has prepared this brochure to explain in detail Title I of the CAAA, and selected parts of Title II. Technical terms are highlighted and defined throughout this document. For easy reference, the terms are again defined in the glossary.

Title I establishes criteria for attaining and maintaining the *National Ambient Air Quality Standards (NAAQS)*. These are Federal standards, developed by the Environmental Protection Agency (EPA), that set allowable concentrations and exposure limits for various pollutants. Subsequent to the passage of the CAAA, the EPA released the nonattainment area designations and boundaries for the following pollutants:

- ozone (O₃)
- carbon monoxide (CO)
- small particulate matter (PM₁₀)

A *nonattainment* area is a geographic region of the United States that the EPA has designated as not meeting the NAAQS. Depending on the severity of the air quality problem, officials in each nonattainment area must take specified actions within a set time frame to reduce emissions and attain the NAAQS. The actions become more numerous and more stringent as the air quality problem gets worse. Title I also provides the following:

- a requirement that transportation plans, programs, and projects conform with the State Implementation Plan (SIP) for attaining the NAAQS;

- a requirement for greater integration of transportation and air quality planning procedures in order to address air quality concerns;
- the conditions under which EPA can impose sanctions, including the loss of Federal-aid highway funds.

Under Title II, the CAAA identify actions for reducing emissions from mobile sources, such as motor vehicles. State and local officials may not be responsible for these actions; many of the requirements apply to manufacturers of vehicles and fuels. Familiarity with these measures is important, however, because reducing mobile source emissions through technological improvements is important in attaining the NAAQS.

Persons responsible for developing, adopting, or implementing transportation plans, programs, and projects must understand how the CAAA affect their work. State and local officials not directly involved in transportation or attaining and maintaining air quality standards may also wish to read this brochure, and use it as an aid to decision-making.

TITLE I

TRANSPORTATION PROVISIONS FOR ATTAINMENT AND MAINTENANCE OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS

The NAAQS ensure that certain pollutants do not exceed specified levels more than once a year. The threshold for each pollutant ensures protection for even the most sensitive groups of the population. Areas with levels that violate the standard are designated as nonattainment areas for whichever pollutants are involved.

Nonattainment areas must reduce the emissions from the source causing the pollution. There are three types of sources:

Mobile sources - Mobile sources include motor vehicles, aircraft, seagoing vessels, and other transportation modes. The mobile source related pollutants of greatest concern are CO, transportation hydrocarbons (HC), nitrogen oxides (NO_x), and PM₁₀.

Stationary sources - Stationary sources are relatively large, fixed sources of emissions (i.e., chemical process industries, petroleum refining and petrochemical operations, or wood processing).

Area Sources - Area sources are small stationary and non-transportation pollution sources that are too small and or numerous to be included as stationary sources but may collectively contribute significantly to air pollution (i.e., dry cleaners).

Included in Title I are transportation provisions with attainment dates for defining and reducing the emissions problem. The provisions and attainment dates vary according to the type of pollutant and level of severity.

This brochure will describe only mobile source provisions of the CAAA. In practice, however, a mix of measures and tradeoffs between controls on mobile, stationary, and area sources will be required to reach the NAAQS.

The requirements are designed as a step process. Missing an attainment date causes an area to be “bumped up” to a more stringent classification, thus taking on the added responsibilities for that class. For example, if a nonattainment area’s classification is raised from ‘moderate’ to ‘serious’ for ozone, it is responsible for all actions mandated by the CAAA for ‘moderate’ areas, and also must take on the additional responsibilities listed for ‘serious’ areas.

The following section explains the transportation-related requirements for ozone, CO, and PM₁₀ nonattainment areas.

TRANSPORTATION PROVISIONS FOR OZONE NONATTAINMENT AREAS

Ozone is a colorless gas with a pungent odor and is associated with smog or haze conditions. Although the ozone in the upper atmosphere protects us from harmful ultraviolet rays, high ground-level concentrations of ozone produce an unhealthy environment.

Ozone is not a direct emission from transportation sources. It is a secondary pollutant formed when precursor emissions, HC and NO_x, react in the presence of sunlight. Because of these complex relationships, understanding and controlling ozone formation requires understanding of all HC and NO_x emissions within the region and cannot be controlled based on individual projects or facilities.

Transportation hydrocarbons constitute approximately 40% of man made sources. Those emitted from motor vehicles form a colorless, gaseous compound originating from evaporation and the incomplete combustion of fuels. Nitric oxide (NO) and nitrogen dioxide (NO₂) are

collectively referred to as oxides of nitrogen (NO_x). NO forms during high-temperature combustion processes. NO₂ forms when NO further reacts in the atmosphere.

Ozone nonattainment areas are classified according to the second highest hourly level of ozone in the air on a yearly basis. Ozone levels are measured in *parts per million (ppm)*. As shown in Table I, areas with worse problems are given more time to attain the NAAQS.

Table I
NAAQS CLASSIFICATIONS FOR OZONE

CLASSIFICATION	1-HOUR CONCENTRATION (ppm)	ATTAINMENT DATE
MARGINAL	0.121 up to 0.138	11/15/93
MODERATE	0.138 up to 0.160	11/15/96
SERIOUS	0.160 up to 0.180	11/15/99
SEVERE 1	0.180 up to 0.190	11/15/2005
SEVERE 2	0.190 up to 0.280	11/15/2007
EXTREME	0.280 and above	11/15/2010

The requirements for defining and reducing the ozone precursor emissions problem increase with each worsening classification. These requirements must be included in the *State Implementation Plan (SIP)*, a plan mandated by the CAAA that contains procedures to monitor, control, maintain, and enforce compliance with the NAAQS.

Table II (See page T-1 at back of brochure) explains how areas in different classifications must **define** the emissions problem by revising the SIP to include an *emissions inventory* and an *emissions budget* for HC. An emissions inventory is a complete list of mobile, stationary, and area sources and the amounts of pollutant emissions within a specific area and time interval. An emissions budget, or emission reduction targets, identifies the allowable emissions levels needed to achieve the NAAQS for all sources. The emissions levels are used for meeting emission reduction milestones, attainment, or maintenance demonstrations.

Table III (See page T-2 at back of brochure) explains how these areas must **eliminate** the problem, bringing emissions in line with the emissions budget and into compliance with the NAAQS. States must also ensure that previous commitments in existing SIPs are being met. If a nonattainment area is classified as moderate or above, the State must revise the SIP to include transportation-related measures, as listed in the CAAA, to reduce mobile source emissions by the milestones in the emissions budget.

TRANSPORTATION PROVISIONS FOR CO NONATTAINMENT AREAS

Carbon monoxide is a colorless, odorless, tasteless gas formed in large part by incomplete combustion of fuel. Fuel combustion activities (i.e., transportation, industrial processes, space heating, etc.) are the major sources of CO. High concentrations of CO can develop near these combustion sources. Therefore, facility specific, or “hotspot” analysis is often used to identify potential CO problems.

Areas designated as nonattainment for CO are classified according to the severity of their CO problem. Pollution concentrations are measured in parts per million (ppm). As shown in Table IV, areas with worse problems are given more time to attain the NAAQS.

Table IV
NAAQS CLASSIFICATIONS FOR CO

CLASSIFICATION	8-HOUR CONCENTRATION (ppm)	ATTAINMENT DATE
SERIOUS	16.5 and above	12/31/2000

The requirements for defining and reducing the CO emission problem increase with each worsening classification. These requirements must be included in the SIP. Table V (See page T-3 at back of brochure) explains how areas in different classifications must **define** the emissions problem

by revising the SIP to include an emissions inventory and an emissions budget, or emission reduction targets, for CO.

Table VI (See page T-3 at back of brochure) shows how these areas must **eliminate** the problem, bringing emissions in line with the emissions budget and into compliance with the NAAQS. States must revise the SIP to include transportation-related measures, as listed in the CAAA, to reduce mobile source emissions by the milestones in the emissions budget.

TRANSPORTATION PROVISIONS FOR SMALL PARTICULATE MATTER NONATTAINMENT AREAS

Particulate matter (PM) is any material that exists as a solid or liquid in the atmosphere. It may be in the form of fly ash, soot, dust, fumes, etc. The sources of PM are still being defined; however, from a transportation standpoint, particulate matter can be caused by tailpipe emissions, and dust from paved and unpaved roads.

Small particulate matter which is less than 10 microns in size is referred to as PM₁₀. A micron is one millionth of a meter. Particulate matter this size is too small to be filtered by the nose and lungs; thus, allowable concentration levels of PM₁₀ are specified for the NAAQS. There is no clear consensus yet as to whether PM₁₀ is an areawide or hot spot problem.

Areas designated as nonattainment for PM₁₀ are classified according to its weight in the air. Pollution concentrations are measured in micrograms per cubic meter (ug/m³). Initially, all areas with an average 24 hour measure over 150 ug/m³, or an average annual measure over 50 ug/m³ are classified as moderate areas. The EPA may reclassify any of those areas to a serious status if they cannot reach attainment.

The requirements for defining and reducing the PM₁₀ problem increase with each worsening classification. Table VII (See page T-4 at back of brochure) shows the requirements for PM₁₀ nonattainment areas.

CONFORMITY

What is conformity?

Conformity is a determination made by metropolitan planning organizations (MPOs) and the U.S. DOT that transportation plans and programs in nonattainment areas meet the “purpose” of the SIP, which is reducing pollutant emissions to meet the NAAQS¹.

The transportation program, otherwise known as the *transportation improvement program (TIP)*, is composed of transportation projects drawn from a conforming *transportation plan*. Specifically, the transportation plan and program must contribute to reducing motor vehicle emissions. Only transportation projects that are federally funded or approved must meet the conformity requirements, but all regionally significant projects, including nonfederally funded ones, must be included in the plan and TIP conformity analysis.

According to the CAAA, transportation plans and programs cannot:

- Create new NAAQS violations
- Increase the frequency or severity of existing NAAQS violations
- Delay attainment of the NAAQS

Who makes the conformity determination?

The MPO and U.S. DOT have an affirmative responsibility to ensure that the transportation plan and program within the metropolitan area boundaries conform to the SIP. Conformity determinations for projects within and outside of these boundaries are the responsibility of the U.S. DOT and the project sponsor.

¹ Any Federal activity (funded, approved, permitted, etc.) undertaken by Federal agencies, other than the FHWA and the FTA, are governed by separate conformity regulations, which are presently being developed by the EPA.

How often is the conformity determination made?

Conformity determinations are to be made no less than every 3 years or as changes are made to plans, programs, and projects. Certain events, such as SIP revisions that establish or revise a transportation-related emissions budget, or add or delete *Transportation Control Measures (TCMs)* will also trigger a new conformity determination. This schedule may be subject to change once the conformity regulations are promulgated by the EPA.

What help is available to an MPO to ensure its transportation plan and program conform to the SIP?

The EPA and U.S. DOT are working together to write conformity regulations which lay out the criteria for acceptable transportation plans and programs.

Until these regulations are available, conformity determinations for transportation plans, programs, and projects will be based on the DOT/EPA Interim Conformity Guidance, issued on June 7, 1991, and summarized below:

Transportation Plans and Programs

- The transportation plan and program must use the most recent estimates of mobile source emissions.
- The transportation plan and program must provide for expeditious implementation of TCMs in the SIP.
- The transportation plans and programs of MPOs for areas designated nonattainment for ozone or CO must contribute to annual emissions reductions.

Transportation Projects

- Transportation projects must come from a conforming transportation plan and program.
- CO nonattainment areas must show a reduction in the number and severity of CO

violations in the area substantially affected by the project.

Once the conformity regulations are available, an MPO's transportation plan and program must meet the criteria in the new regulations in order to conform to the SIP. The CAAA's conformity requirements are summarized below:

- Emissions expected to result from the transportation plan and program must be consistent with the scheduled emissions budget in the SIP.
- The transportation program must provide for timely implementation of TCMs consistent with the schedule in the SIP.
- Transportation projects must meet three requirements:
 - Projects must come from a conforming transportation plan and program.
 - The design concept and scope of the project that was in place at the time of the conformity finding must be maintained throughout implementation. The design concept and scope refer to the number and types of roadway lanes, degree of access control, etc.
 - Project design concept and scope had to be sufficiently defined to determine emissions at the time of the conformity determination for the transportation program.

or, if these three criteria cannot be met,

- Demonstrate that the project emissions, when considered with the emissions projected for the conforming transportation plan and program, do not cause the plans and programs to exceed the emissions budget in the SIP.

Other procedures and criteria that will be addressed by the conformity regulations are:

- Consultation procedures to be undertaken by the MPO, State transportation and air

quality agencies, and the DOT before the conformity determination is made;

- Frequency for making conformity determinations;
- How conformity determinations will be made with respect to maintenance plans.

Once the conformity regulations are available, each State has one year to revise its SIP to include conformity procedures and criteria based on those established in the regulations. It will be important for State and local transportation and air quality officials to work together in the development of these procedures.

What happens if a transportation plan, program, or project does not meet the conformity requirements?

If a transportation plan, program, or project does not meet conformity requirements, transportation officials have the following options:

- Modify the plan, program, or project to offset the emissions;
- Work with the appropriate State agency to modify the SIP to offset the plan, program, or project emissions;
- If the above is not accomplished, the plan, program, or project cannot advance. This can affect transit as well as highway projects.

TRANSPORTATION PLANNING PROCEDURES

SIP Provisions

The CAAA attempt to integrate transportation and air quality planning through the SIP. The SIP should be a realistic document, with input from those responsible for development as well as implementation.

SIPs are to be prepared by a State-certified organization known as the Lead Planning

Organization (LPO). States may certify organizations that were in place before the CAAA. However, if the State is designating a new LPO, it must include elected officials of local governments, the State air quality and transportation planning agencies, MPOs, and any other organizations responsible for developing or implementing the SIP.

Preparation of the SIP must be coordinated with the continuing, cooperative, and comprehensive urban transportation planning process.

EPA GUIDANCE

The CAAA mandate that the EPA, in consultation with the U.S. DOT, provide guidance to government officials on selected requirements in the act. The following guidance is available:

- Guidance for Vehicle Miles Traveled, Federal Register, Thursday, March 19, 1992, Vol. 57, No. 54;
- Guidance for Transportation Control Measures, Federal Register, Friday, May 29, 1992, Vol. 57, No. 104;
- Transportation/Air Quality Planning Guidelines, EPA document 420/R-92-001, July 1992, NTIS #PB92-201458.

REPORT TO CONGRESS

The U.S. DOT and EPA must submit a report to Congress by January 1, 1993, and every three years thereafter. The report is to contain the results of reviews of State and local air quality-related transportation programs, including the adequacy of funding for transportation projects identified in the SIP. This provision gives Congress the ability to monitor efforts to implement the transportation-related provisions of the CAAA, and to determine if the transportation budgets and programs are meeting the goals and objectives of the Act.

SANCTIONS

What are sanctions?

Sanctions are measures the EPA can, and in some cases must, enforce upon portions of the State, or the entire State in some circumstances, to ensure that SIP creation and implementation follow requirements of the CAAA. This is important to the transportation sector because there is not necessarily a direct causal relationship between the pollutant source and the sanction that is applied. For example, highway sanctions can be applied for SIP deficiencies for stationary as well as mobile sources.

The CAAA require the EPA to make a determination of SIP deficiency well in advance of possible sanctions. The CAAA authorize two types of mandatory sanctions, one affecting mobile sources of air pollution and one affecting stationary sources. They are:

- Withholding of Federal highway funds except for exempted projects listed in the CAAA, including those that EPA finds would improve air quality and discourage single occupancy vehicles, and safety projects whose principal purpose is to improve safety by significantly reducing or avoiding accidents.
- Two-to-one emissions offsets for major stationary sources (i.e., if an area is under sanctions, each ton of emissions created by a new stationary source must be offset by a 2 ton reduction through additional control measures on existing stationary sources).

In addition, there are several types of discretionary sanctions that the EPA has the authority to impose, such as withholding grants for air pollution planning.

What are the reasons for which the EPA can enforce sanctions?

Sanctions may be implemented by the EPA for these deficiencies:

- Failure to submit a SIP or a portion of a SIP;
- Disapproval of a SIP by the EPA;
- Failure to implement the provisions in an approved SIP;
- Failure to submit any other provisions required by the CAAA.

How are the sanctions applied?

If, 18 months after the EPA's determination, a deficiency has not been corrected, one of the two mandatory sanctions must be applied. Both types of sanctions can be applied if the EPA determines a lack of good faith by the State in correcting the problem. There is no rule to determine which sanction should be used at any one time. However, it is likely that highway sanctions will be heavily relied upon at this stage to implement the CAAA. **If, after 6 additional months, the deficiency is still not corrected, both of the mandatory sanctions must be applied.** At this point, the EPA is required to create a Federal Implementation Plan (FIP) which replaces the SIP.

Sanctions are essentially limited to nonattainment areas when failures occur, but can be applied statewide in certain circumstances. However, if a deficiency is the responsibility of one or more political subdivisions, sanctions cannot be applied on a statewide basis during the first 24 months following an EPA finding to the State of the respective SIP deficiency. The EPA must issue a rule that establishes the criteria that must be considered when making these determinations.

How are sanctions removed?

The State or local agency responsible for a deficiency must correct that deficiency before sanctions can be removed by the EPA.

TITLE II

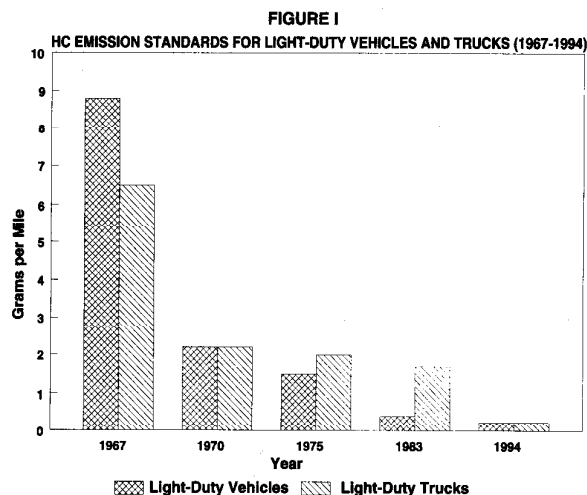
TRANSPORTATION PROVISIONS FOR MOBILE SOURCE EMISSIONS

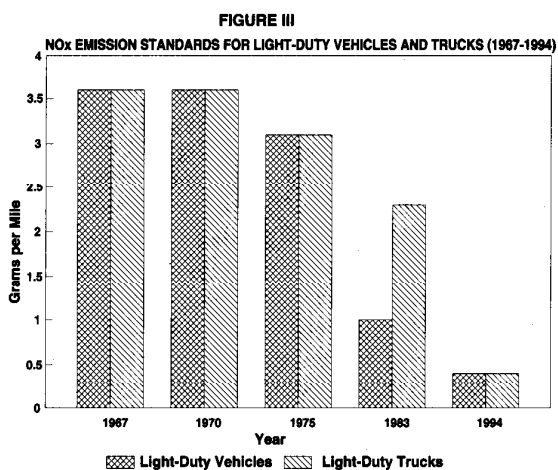
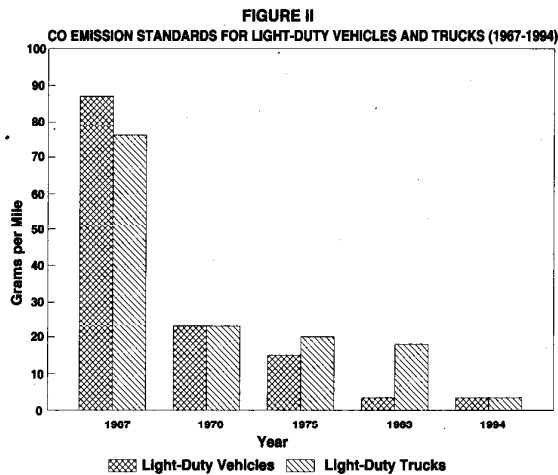
Title II of the CAAA identifies actions to be taken for reducing emissions from mobile sources. Only a portion of the measures contained in the CAAA are presented in this brochure, and even these are not necessarily the responsibility of State or local officials. The requirements are for automobile and gasoline manufacturers, but are mentioned so that State and local officials will be familiar with some of the transportation-related measures being taken to reduce emissions.

VEHICLE EMISSIONS STANDARDS

Cars and Light-Duty Trucks Under 6,000 Gross Vehicle Weight Rating (GVWR)

Tailpipe emission standards will become stricter, affecting 40% of new vehicles sold nationwide in 1994, increasing to 100% of new vehicles sold by 1996. The EPA has the authority to require additional reductions if needed. Figures I, II, and III show the reductions in mobile source emissions for light-duty vehicles and trucks attained since 1967, and those anticipated in 1994.





Heavy-Duty Trucks

The EPA may revise any existing standards concerning air pollutants emitted from heavy-duty vehicles, taking costs into account. In addition, for model year 1998 and after, NOx emissions may not exceed 4.0 grams per brake horse power hour (gbh).

Urban Buses

Urban transit buses, traditionally run on diesel fuel, emit soot and other small particulate (PM₁₀)

into the air, even when properly tuned. The CAAA establish a much more stringent particulate emissions standard for urban buses. This tailpipe standard is being phased in from 1991 to 1994. The final standard taking effect in 1994 may be relaxed a small degree by the EPA, but there is no question that new diesel buses will be significantly cleaner than pre-1991 models.

The new particulate standard also has been the incentive for bus manufacturers to develop alternative-fueled engines that emit low levels of particulate.

The CAAA also give the EPA the authority to institute an emissions testing program for buses to ensure that the new particulate standard is met over the useful life of the vehicles. If the testing program reveals that buses cannot continue to meet the strict standard, the EPA can mandate that subsequent bus purchases in the larger urban areas (greater than 750,000 population) be alternative-fueled vehicles.

Carbon Monoxide Emissions at Cold Temperatures

At cold temperatures, tail pipe emissions of CO increase significantly. The CAAA identify measures automakers must take to reduce these emissions.

Phase I - The EPA is to promulgate regulations by November 15, 1991 to reduce emissions of CO from light-duty vehicles and light-duty trucks. This will be phased-in gradually for automobiles beginning in 1994.

Phase II - If, as of June 1, 1997, six or more nonattainment areas have a CO design value of 9.5 ppm or greater, emissions for light-duty vehicles and light-duty trucks must be lowered further.

FUEL REQUIREMENTS

Fuel Volatility

Fuel volatility refers to the rate at which fuel evaporates. Gasoline manufacturers must see

that *Reid Vapor Pressure (RVP)* is lowered to 9.0 pounds per square inch (psi) during the summer months. Lower RVP is required in some warmer areas.

Reformulated Gasoline

Reformulated gasoline is specifically developed to reduce undesirable emissions. It contains a different mix of ingredients than conventional gasoline.

Compared with baseline gasoline, reformulated gasoline must reduce emissions of HC and toxic air pollutants 15% by 1995, and 20-25% by 2000. Oxygen content is increased, benzene content is reduced, and heavy metals such as lead and manganese are eliminated.

Beginning in 1995, reformulated gasoline will be mandated in the worst ozone areas, which include the following nine cities: Baltimore, Chicago, Hartford, Houston, Los Angeles, Milwaukee, New York City, Philadelphia, and San Diego. Officials of any nonattainment area may "opt-in" to the reformulated gasoline program.

Oxygenated Gasoline

In cold weather, gasoline does not vaporize fully and thus burns poorly. *Oxygenated gasoline* is enriched with oxygen-bearing liquids to reduce CO production by permitting more complete combustion. Therefore, beginning November, 1992, gasoline oxygen content is increased during the winter months in the 39 areas with a CO design value above 9.5 ppm having a motor vehicle-related CO problem.

Low-sulfur Diesel Fuel

Diesel fuel sulfur content is now specified in the law. Fuel used in the certification of 1991-1993 model year heavy-duty diesel vehicles will have a sulfur content of .10% by weight and, after October 1, 1993, the maximum sulfur content will drop to .05% by weight.

CLEAN FUEL AND VEHICLE REQUIREMENTS

A clean fuel is defined as any fuel, such as reformulated gasoline, diesel, natural gas, or electricity, that meets the clean fuel requirements and standards.

California Tailpipe Emission Standards

The California Air Resources Board (CARB) may, upon EPA approval, adopt more stringent tailpipe emission standards that can be adopted by other States nationwide.

California Clean Fuel Vehicle Pilot Test Program

The EPA must promulgate regulations by November 15, 1992, establishing requirements for clean-fuel vehicles to be produced, sold, and distributed in California.

Each year, beginning in 1996, automakers must provide 150,000 clean-fuel vehicles for sale in California; by 1999, this number must rise to 300,000. The tighter emission limits can be met with any combination of vehicle technology and cleaner fuels. California is required to revise its SIP by November 15, 1992, to ensure the clean fuels are produced and distributed.

States in nonattainment for ozone and classified as serious and above can opt into the program, with certain restrictions.

CONCLUSION

The transportation community faces many challenges ahead in providing for a safe and efficient transportation system, reducing congestion levels, and controlling mobile source emissions. To meet these challenges, transportation and air quality officials need to establish new partnerships and cooperative approaches for identifying innovative solutions to transportation and air quality problems.

State and local planning and air quality officials will need to coordinate early in the development of land use plans and transportation alternatives to ensure that air quality concerns are adequately considered. This early coordination is important because local land use decisions will often dictate the transportation systems that are needed in major metropolitan areas. It is also especially important that State and local transportation and air quality officials coordinate early and continuously during the transportation system planning and SIP development processes. It is at this stage in the overall transportation development process that air quality considerations can be most effectively evaluated.

The CAAA place a heavy burden on the transportation community for improving air quality in nonattainment areas. The transportation-related provisions in the legislation will change the processes for developing transportation plans, programs, and projects; and will require greater emphasis on demand management strategies, and operational improvements for the existing transportation infrastructure.

LIST OF CONTACTS

For questions on the provisions summarized in this brochure, or for additional brochures, contact FHWA's Noise and Air Quality Branch or the FHWA Regional Air Quality Specialist for your State.

FHWA, Noise and Air Quality Branch, Washington, D.C. 202-366-4836

FHWA Regional Air Quality Specialists:

Region I 518-472-4253

Connecticut
Maine
Massachusetts
New Hampshire
New Jersey
New York
Rhode Island
Vermont
Puerto Rico

Region III 410-962-3744

Delaware
Maryland
Pennsylvania
Virginia
West Virginia
District of Columbia

Region IV 404-347-4499

Alabama
Florida
Georgia
Kentucky
Mississippi
North Carolina
South Carolina
Tennessee

Region V 708-206-3244

Illinois
Indiana
Michigan
Minnesota
Ohio
Wisconsin

Region X 503-326-2061

Alaska
Idaho
Oregon
Washington

Region VI 817-334-3235

Arkansas
Louisiana
New Mexico
Oklahoma
Texas

Region VII 816-926-5236

Iowa
Kansas
Missouri
Nebraska

Region VIII 303-969-6712

Colorado
Montana
North Dakota
South Dakota
Utah
Wyoming

Region IX 415-744-3823

Arizona
California
Hawaii
Nevada

GLOSSARY

Area source - Small stationary and non-transportation pollution sources that are too small and/or numerous to be included as point sources but may collectively contribute significantly to air pollution (i.e., dry cleaners).

Inspection and Maintenance Program (I/M) - An emissions testing and inspection program implemented by states in nonattainment areas to ensure that the catalytic or other emissions control devices on in-use vehicles are properly maintained.

Carbon monoxide (CO) - A colorless, odorless, tasteless gas formed in large part by incomplete combustion of fuel. Human activities (i.e., transportation or industrial processes) are largely the source for CO contamination.

Emissions budget - The part of the State Implementation Plan (SIP) that identifies the allowable emissions levels, mandated by the National Ambient Air Quality Standards (NAAQS), for certain pollutants emitted from mobile, stationary, and area sources. The emissions levels are used for meeting emission reduction milestones, attainment, or maintenance demonstrations.

Emissions inventory - A complete list of sources and amounts of pollutant emissions within a specific area and time interval.

Mobile source - Mobile sources include motor vehicles, aircraft, seagoing vessels, and other transportation modes. The mobile source related pollutants are carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x), and small particulate matter (PM₁₀).

National Ambient Air Quality Standards (NAAQS) - Federal standards that set allowable concentrations and exposure limits for various pollutants. The EPA developed the standard in response to a requirement of the CAAA.

Nonattainment area - A geographic region of the United States that the EPA has designated as not meeting the NAAQS.

Oxygenated gasoline - Gasoline enriched with oxygen bearing liquids to reduce CO production by permitting more complete combustion.

Ozone (O₃) - Ozone is a colorless gas with a sweet odor. Ozone is not a direct emission from transportation sources. It is a secondary pollutant formed when HC and NO_x combine in the presence of sunlight. The ozone is associated with smog or haze conditions. Although the ozone in the upper atmosphere protects us from harmful ultraviolet rays, ground level ozone produces an unhealthy environment in which to live. Ozone is created by human and natural sources.

Particulate matter (PM) - Any material that exists as solid or liquid in the atmosphere. Particulate matter may be in the form of fly ash, soot, dust, fog, fumes, etc.

Parts per million (ppm) - A measure of air pollutant concentrations.

Reformulated gasoline - Gasoline specifically developed to reduce undesirable combustion products.

Reid Vapor Pressure (RVP) - A measure of fuel volatility.

Small particulate matter (PM₁₀) - Particulate matter which is less than 10 microns in size. A micron is one millionth of a meter. Particulate matter this size is too small to be filtered by the nose and lungs.

Stage II Vapor Recovery Program - This program is designed to reduce HC emissions during refueling operations.

State Implementation Plan (SIP) - A plan mandated by the CAAA that contains procedures to monitor, control, maintain, and enforce compliance with the NAAQS.

Stationary source - Relatively large, fixed sources of emissions (ie., chemical process industries, petroleum refining and petrochemical operations, or wood processing).

Transportation control measures (TCMs) - Any measure in a SIP directed toward reducing emissions of air pollutants from transportation sources by improving traffic flow, reducing congestion, or reducing vehicle use.

Transportation Hydrocarbons (HC) - Colorless gaseous compounds originating from evaporation and the incomplete combustion of fossil fuels.

Transportation Improvement Program (TIP) - Also known as a transportation program, a TIP is a program of transportation projects drawn from or consistent with the transportation plan and developed pursuant to Title 23, U.S.C. (United States Code) and the Federal Transit Act.

Transportation Plan - This is a long-range plan that identifies facilities that should function as an integrated metropolitan transportation system, and developed pursuant to Title 23 U.S.C. (United States Code) and the Federal Transit Act. It gives emphasis to those facilities that serve important national and regional transportation functions, and includes a financial plan that demonstrates how the long-range plan can be implemented.

Vehicle miles traveled (VMT) - The sum of distances traveled by all motor vehicles in a specified region.

Table II
 OZONE NONATTAINMENT AREAS:
 REQUIREMENTS FOR DEFINING OZONE EMISSIONS PROBLEM

SERIOUS; SEVERE 1 & 2; EXTREME

MARGINAL

Ozone Emissions Inventory

Submit a 1990 emissions inventory by November 15, 1992 of all hydrocarbon sources, including mobile, stationary, and area sources, and revise every three years thereafter until attainment.

Ozone Emissions Reduction Targets

After the 1990 baseline emissions inventory is submitted in 1992, the State has 1 year, until November 15, 1993, to revise the SIP to show the control strategies that will reduce hydrocarbon baseline emissions 15% over the first 6 years following enactment (1990-1996). This reduction, referred to as reasonable further progress (RFP), should come from mobile, stationary and area sources by using a mixture of control strategies for all sources.

MODERATE

Emissions reductions from the following measures are not creditable toward the 15% reductions:

- EPA regulations related to vehicle exhaust or evaporative emissions control systems promulgated by January 1, 1990;
- EPA regulations related to controls on *Reid Vapor Pressure (RVP)*, a measure of fuel volatility, prior to enactment or required by the CAAA;
- measures to correct deficiencies in existing SIPs and *inspection and maintenance programs (I/M)*.

The 15% reduction must accommodate any population growth resulting in vehicle miles traveled (VMT) growth in the region, and can only be based on measures that go beyond those noted above, thus eliminating credit for the most effective control strategies. States can take credit for new CAAA measures, such as *reformulated gasoline*, new vehicle exhaust standards or evaporative controls. The latter two, however, may not reduce emissions significantly by 1996. State and local officials must be willing to go beyond current controls to achieve emission credit or reduce emission-producing activities. Achieving the 15% reductions without counting the above control strategies will be most challenging.

By November 15, 1994, demonstrate a reduction of 3% on average each year after 1996 until attainment under the selected control strategies. In addition to the demonstration, the State must make an air quality attainment demonstration using photochemical dispersion modeling or any other analytical method approved by the EPA.

By November 15, 1996, and every third year thereafter, show that the current aggregate vehicle mileage, aggregate vehicle emissions, and congestion levels are consistent with those projections used for the area's demonstration of attainment. If current levels exceed projected levels, the State must submit a SIP revision within 18 months that includes strategies to reduce emissions to the original projected levels.

Note: Requirements are cumulative. For example, Moderate areas must also fulfill Marginal area requirements.

Table III
OZONE NONATTAINMENT AREAS:
REQUIREMENTS FOR REDUCING OZONE EMISSIONS

EXTREME	SEVERE 1 & 2	MARGINAL	<p><u>Existing SIP Commitments</u> - Implement current SIP commitments; correct SIP deficiencies.</p> <p><u>Basic Inspection and Maintenance Program (I/M)</u> - The basic I/M program should be revised to meet the requirements in the SIP, or EPA guidance, whichever is more stringent, if such a program were required before enactment of the CAAA.</p>
		SEVERE	<p>MODERATE</p> <p><u>Basic Inspection and Maintenance Program</u> - The SIP is required to be revised to include a basic I/M program, regardless of whether such a program was required before the CAAA.</p> <p><u>Stage II Vapor Recovery Program</u> - Submit a Stage II vapor recovery program by November 15, 1992, that is designed to reduce emissions from refueling at retail fuel outlets for facilities that sell more than 10,000 gallons/month (50,000 gallons/month for independent small businesses).</p> <p><u>Contingency Measures</u> - Contingency provisions in the form of transportation control measures (TCMs), or other measures, must be provided for in the 1993 SIP submittal. Transportation control measures are directed toward reducing emissions by improving traffic flow, reducing congestion, or reducing vehicle use. These measures will take effect without further action by the State or the EPA at any point that the State fails to meet the 15% emission reduction targets required by 1996, fails to attain the NAAQS target date, or, in the case of areas designated serious and above, fails to meet the 3% annual emissions reductions required after 1996.</p> <p><u>Enhanced Inspection and Maintenance Program</u> - Submit an enhanced I/M program by November 15, 1992, which meets all of EPA's requirements for enhanced I/M.</p> <p><u>Clean-Fuel Fleet Program</u> - Areas with a 1980 population of 250,000 or more must revise the SIP by May 15, 1994, to contain a clean-fuel vehicle program for centrally fueled fleets of 10 or more vehicles. The SIP must include programs to ensure the effectiveness of the clean-fuel fleet program.</p> <p><u>Vehicle Miles Traveled (VMT) Limitations</u> - <i>Vehicle miles traveled</i> is the sum of distances traveled by all motor vehicles in a specified region. Submit specific transportation control strategies and measures by November 15, 1992, for implementation to offset growth in emissions from growth in VMT or number of trips.</p> <p><u>Employer Trip Reduction</u> - By November, 1992, submit a SIP revision detailing employer trip reduction (ETR) program for employers of 100 or more employees. The ETR program must be designed to increase the average passenger occupancy by not less than 25% above the average vehicle occupancy for the area. Employer compliance plans are due 2 years after SIP submittal. These plans should "convincingly demonstrate" compliance 4 years after SIP submittal.</p> <p><u>Reformulated Gasoline</u> - Beginning in 1995, reformulated gasoline will be mandated in the worst ozone areas, which include the following nine cities: Baltimore, Chicago, Hartford (CT), Houston, Los Angeles, Milwaukee, New York City, Philadelphia, and San Diego. Officials of any nonattainment area may "opt-in" to the reformulated gasoline program.</p> <p>Measures for Heavy-Duty Vehicles - Extreme areas may submit additional measures to reduce the use of high-polluting or heavy-duty vehicles during peak traffic hours.</p>

Note: Requirements are cumulative. For example, Moderate areas must also fulfill Marginal area requirements.

Table V
CO NONATTAINMENT AREAS:
REQUIREMENTS FOR DEFINING CO EMISSIONS PROBLEM

SERIOUS	MODERATE ≥ 12.7 ppm	MODERATE < 12.7 ppm	Carbon Monoxide Emissions Inventory
	Submit a 1990 emissions inventory and control plan by November 15, 1992, of all CO emissions, including mobile, stationary, and area sources, and revise every three years thereafter until attainment.		
MODERATE ≥ 12.7 ppm		Carbon Monoxide Emission Reduction Targets	
<p>Attainment Demonstration - By November 15, 1992, demonstrate that attainment will be reached by the December 31, 1995 deadline. Also, provide provisions in the SIP for annual emission reductions necessary for reaching attainment.</p> <p>Attainment Demonstration - By November 15, 2000, demonstrate that attainment will be reached by the December 31, 2000 deadline. Also, provide provisions in the SIP for annual emission reductions necessary for reaching attainment.</p>			

Table VI
CO NONATTAINMENT AREAS:
REQUIREMENTS FOR REDUCING CO EMISSIONS

SERIOUS	MODERATE ≥ 12.7 ppm	MODERATE < 12.7 ppm	<p>Oxygenated Gasoline - Areas with a design value of 9.5 ppm or above must submit a revision, by November 15, 1992, requiring gasoline with no less than 2.7% oxygen content in the nonattainment area during the winter months.</p> <p>Basic Inspection and Maintenance Program (I/M) - The SIP is required to be revised to include a basic I/M program, if such a program were required before enactment.</p>
	<p>Enhanced Inspection and Maintenance Program - Submit provisions for an enhanced I/M program by November 15, 1992, which meet all of EPA's requirements for such a program.</p> <p>VMT Forecast - Revise the SIP by November 15, 1992, to include an annual VMT forecast until attainment. Reports shall contain annual updates of the VMT forecasts and estimates of actual VMT levels.</p> <p>Contingency Measures - Contingency provisions in the form of TCMs or other measures must be identified in the 1992 SIP submittal to implement specific measures if any estimate of VMT exceeds predicted levels or the area fails to attain the NAAQS. These measures take effect without further action by the State or the EPA.</p> <p>Clean-Fuel Fleet Program - Areas having a design value at or above 16 ppm and a 1990 population of 250,000 or more must revise the SIP by May 15, 1994, to contain a clean-fuel vehicle program for centrally fueled fleets of 10 or more vehicles. The SIP must include provisions to ensure the effectiveness of the program.</p> <p>Vehicle Miles Traveled Limitations - Submit specific transportation control strategies by November 15, 1992, for implementation to offset growth in emissions from growth in VMT or number of trips.</p>		

Note: Requirements are cumulative. For example, Moderate (≥ 12.7 ppm) areas must also meet requirements for Moderate (< 12.7 ppm) areas.

Table VII
PM₁₀ NONATTAINMENT AREAS

SERIOUS	<u>SIP Submittal</u> - Submit a SIP by November 15, 1991, demonstrating attainment of the NAAQS by December 31, 1994.
	<u>Milestones</u> - Meet quantitative milestones in the SIP which are to be achieved every 3 years.
	<u>SIP Submittal</u> - Submit a SIP no later than 4 years after reclassification of the area to serious. The SIP must demonstrate attainment of the NAAQS by no later than the 10th calendar year after the area's reclassification.

Note: Requirements are cumulative. Serious areas must also fulfill Moderate area requirements.

Publication Number: FHWA-PD-92-023
HEP-41/10/92 (40M) QE
