

The Senate Interim Committee on Natural Resources



**Interim Report
to the 77th Legislature**

***The Challenge of Meeting Federal
Air Quality Standards***

November 2000

TEXAS SENATE NATURAL RESOURCES COMMITTEE

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November 1, 2000

The Honorable Rick Perry
Lieutenant Governor of Texas
Members of the Texas Senate
Texas State Capitol
Austin, Texas 78701

Dear Governor Perry and Fellow Members:

The Committee on Natural Resources of the Seventy-Sixth Legislature hereby submits its interim report including findings and recommendations for consideration by the Seventy-Seventh Legislature.

Respectfully submitted,

A handwritten signature in cursive script that reads "Buster Brown".

Senator J.E. "Buster" Brown, Chair

A handwritten signature in cursive script that reads "Ken Armbrister".

Senator Ken Armbrister, Vice-Chair

A handwritten signature in cursive script that reads "Gonzalo Barrientos".

Senator Gonzalo Barrientos

A handwritten signature in cursive script that reads "Teel Bivins".

Senator Teel Bivins

A handwritten signature in cursive script that reads "Bill Ratliff".

Senator Bill Ratliff

A handwritten signature in cursive script that reads "Tom Haywood".

Senator Tom Haywood

A handwritten signature in cursive script that reads "Eddie Lucio".

Senator Eddie Lucio

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INTRODUCTION

Few environmental issues have attracted as much attention recently, both locally and nationally, as Texas, and particularly Houston, air quality. Attaining the national air quality standard for ozone has been and will be one of Texas' most difficult challenges in the upcoming years. However, lost in much of the rhetoric is the fact that Texas has made great progress recently in reducing air contaminant emissions and improving air quality. With the exception of El Paso, which has unique challenges due to the mountains surrounding it and Ciudad Juárez, Texas meets every national ambient air quality standard except for ozone. According to the EPA's National Air Quality and Emissions Trends Report¹, the air quality trend for Texas cities is positive in almost every category for which they keep data. The only negative trends cited are for nitrogen dioxide in Austin-San Marcos and Dallas, an area that has been addressed extensively by the TNRCC in recent months.

Nonetheless, the challenge remains to bring all of Texas into attainment with the national ozone standard while maintaining the vibrant economy that Texas has enjoyed in recent years. This goal can best be achieved by forging a true partnership between state, local, and federal government, industry, and concerned public. Effective implementation plans will require flexibility, innovation, and a commitment by all parties toward the ultimate goal of clean, healthy air for all Texans.

¹ *National Air Quality and Emissions Trends Report*; EPA Office of Air Quality Standards and Practices; 1998 (<http://www.epa.gov/oar/aqtrnd98>)

INTERIM CHARGE

The Senate Interim Committee on Natural Resources was charged by Lieutenant Governor Rick Perry with studying the challenges Texas faces in meeting federal air quality standards under the Clean Air Act, and the implications of non-attainment on future economic growth. The Committee shall assess the impact that federal vehicle, fuel, engine, aircraft and other standards have on the state's ability to meet the Clean Air Act requirements. The Committee shall also study the connection between air quality and such related issues as transportation conformity and funding.

The interim committee held public hearings in Austin, San Antonio, Houston, Dallas, El Paso, and Corpus Christi to receive testimony from interested parties on this subject.

BACKGROUND

NATIONAL AMBIENT AIR QUALITY STANDARDS

Title I of the Federal Clean Air Act (FCAA) directs the EPA to establish national standards for commonly occurring air pollutants that pose threats to public health. These National Ambient Air Quality Standards (NAAQS) constitute national levels for acceptable concentrations of six specific pollutants in outdoor air:

- ground-level ozone (smog)
- particulate matter
- lead
- nitrogen dioxide
- sulfur dioxide
- carbon monoxide

These six pollutants are called “criteria pollutants.” Once an area has violated a criteria pollutant air quality standard or been determined to contribute to ambient air quality in a nearby area that violates the standard, the EPA can designate the area as “nonattainment” for that pollutant.

In November 1990, the United States Congress approved the first major changes to the FCAA since 1977, the 1990 federal Clean Air Act Amendments (1990 CAAA). The 1990 CAAA added provisions that addressed concerns associated with hazardous air pollutants, acid rain, and stratospheric (upper-level) ozone. In addition the 1990 CAAA substantially changed the method by which states were to address attainment of the air quality standards for criteria pollutants, especially ground-level ozone.

Ground-level ozone

Ozone, an unstable blue gas with a pungent odor, is a naturally-occurring form of oxygen. While the oxygen molecule most prevalent in air consists of two oxygen atoms, the ozone molecule is made up of three oxygen atoms. Ozone is normally found in high concentrations in the stratosphere where it shields the Earth against ultraviolet rays from the sun. Ozone can be found at ground level during lightning storms and near arcing electrical motors. Ground-level ozone is also the major component of smog.

Ozone is generally not emitted directly into the air, but is formed through complex chemical reactions between nitrogen oxides (NO_x)² and volatile organic compounds (VOC)³, in the presence of high temperatures and

² Nitrogen oxides (NO_x) includes both nitric oxide and nitrogen dioxide. NO_x forms when fuel is burned at high temperatures. Two major source of NO_x emissions are transportation and industrial sources such as electric utility and industrial boilers.

³ Volatile organic compounds (VOC) are carbon compounds that substantially contribute to the formation of ozone. Some carbon compounds, such as carbon monoxide, carbon dioxide, methane, ethane, and acetone, that have been determined to make a negligible contribution to the formation of ozone are excluded from the definition of VOC. VOC are emitted from sources as diverse as

(continued...)

sunlight. Because ozone formation is stimulated by sunlight and temperature, peak ozone levels occur typically during hot, dry, and stagnant summertime conditions.

High levels of ozone have been shown to cause adverse short-term physical effects, such as coughing, wheezing, tightness in the chest, and reduced lung capacity, in some individuals. These effects are more problematic for children, asthmatics, and the elderly.

One-Hour Standard

The current standard for ozone, established by the EPA, is based on the average of readings taken over one-hour periods. An area violates this standard when the highest one-hour reading of the day at any one monitor equals or exceeds 125 parts per billion (ppb)⁴ more than three times during any consecutive three-year period.

Prior to the 1990 CAAA, areas were designated simply as attainment, nonattainment, or unclassifiable⁵ with respect to the one-hour ozone standard. However, the 1990 CAAA required areas to be further categorized according to severity, as determined by the “design value⁶” for that area:

³ (...continued)

autos, refiners, chemical plants, dry cleaners, paint shops and other sources using solvents. VOC are also produced by natural sources such as pine and oak trees.

⁴ The actual ozone standard is 0.12 parts per million (ppm). However, air quality monitors typically measure ozone in parts per billion (ppb). Because of rounding when converting from ppb to ppm, 125 is the equivalent standard when expressed in ppb.

⁵ Areas are unclassifiable when insufficient data is available to determine whether the area meets an ambient air quality standard.

⁶ Because the one-hour standard allows three exceedances during a three-year period, the design value is generally the fourth highest one-hour daily monitored ozone level in a given three-year period. The 1990 Clean Air Act Amendments required that ozone nonattainment areas be classified on the basis of the design value at the time the Amendments were passed, so the 1987-89 period was generally used for classification. See *Ozone and Carbon Monoxide Design Value Calculations*; EPA memo from William G. Laxton, Director; Technical Support Division; 18 June 1990 (<http://www.epa.gov/airprog/oar/oaqps/greenbk/ozone1hr/may98/laxton.html>)

Classification	Design Value Range	Attainment Date
Extreme	≤0.280 ppm	November 2010
Severe 17	0.190 to 0.280 ppm	November 2007
Severe 15	0.180 to 0.190 ppm	November 2005
Serious	0.160 to 0.180 ppm	November 1999
Moderate	0.138 to 0.160 ppm	November 1996
Marginal	0.121 to 0.138 ppm	November 1993
Section 185A ⁷		not applicable
Incomplete/no data ⁸		not applicable

Areas with more severe classifications had additional requirements, but also were granted additional time to attain the standard. On 6 November 1991, the EPA designated four areas in Texas as nonattainment of the 1-hour ozone standard: Houston-Galveston-Brazoria, Dallas-Fort Worth, Beaumont-Port Arthur, and El Paso.⁹ These areas will be discussed in detail later in this report.

The Proposed Eight-Hour Ozone Standard

In July 1997, the EPA adopted a new air quality standard for ozone (along with a new particulate matter standard). The new ozone standard is based on the average value of readings taken over eight-hour periods. An area violates this standard when the three-year average of the fourth-highest daily maximum eight-hour ozone concentrations equals or exceeds 85 ppb¹⁰. An example provided by the TNRCC¹¹ makes this calculation clearer:

⁷ Sec. 185A areas (previously called “transitional”) are those areas that were designated nonattainment as of November 1990, but did not violate the ozone standard during the 1987-1989 classification period.

⁸ Incomplete/no data areas are those that were designated nonattainment as of November 1990 and for which insufficient data was available to determine if the area was in compliance with the ozone standard.

⁹ 56 Federal Register 56694 (6 November 1991)

¹⁰ The actual eight-hour ozone standard is 0.08 ppm. However, air quality monitors typically measure ozone in parts per billion (ppb). Because of rounding when converting from ppb to ppm, 85 is the equivalent standard expressed in ppb.

¹¹ *The State Implementation Plan in Texas*; TNRCC

Daily High Readings	Year			3-Year Average
	1997	1998	1999	
Highest	96	91	103	NA
2 nd highest	91	85	97	NA
3 rd highest	90	82	97	NA
4 th highest	87	81	96	88

The three-year average of the fourth-highest daily maximum eight-hour ozone concentration for this example is 88, so this area would be out of compliance with the eight-hour standard.

A panel of the Clean Air Scientific Advisory Committee¹² (CASAC) of EPA’s Science Advisory Board was not convinced that the proposed eight-hour standard would lead to improved health. The panel concluded that ozone (as a surrogate for photochemical oxidants) should be controlled and that an eight-hour standard is more appropriate than a one-hour standard. However, in regard to the proposed eight-hour standard, the panel concluded “that there is no ‘bright line’ which distinguishes any of the proposed standards (either the level or the number of allowable exceedances) as being significantly more protective of public health.” Most members advised against lowering the ozone standard, concluding that it would provide only marginal public health benefits.¹³

The American Trucking Associations filed a lawsuit in December 1998 which challenged the new ozone standard, and on 14 May 1999, a three-judge panel of the Court of Appeals for the District of Columbia Circuit left the new ozone standard in place, but determined that the EPA may not enforce that standard. The Court held that EPA had arbitrarily set the new standard using an unconstitutional interpretation of its FCAA authority. In June 1999, the EPA filed a petition to have key aspects of the case reheard but the circuit court denied this request. The EPA appealed this decision to the Supreme Court, who agreed on 22 May 2000 to review the appeals court ruling. On 30 May 2000 the Supreme Court further agreed to also consider whether the EPA must weigh the costs as well as the benefits of the proposed regulations.

EPA’s original plan calls for designations of eight-hour areas in 2000, SIP submittals by 2003, and attainment of the eight-hour standard by 2007. Although the EPA may not enforce the eight-hour standard, the EPA believes it is required by law to proceed with the designation of eight-hour ozone nonattainment areas. The TNRCC has taken the position that proceeding with any eight-hour designations is inappropriate until the court's questions have been fully resolved. Designation as an ozone nonattainment area could have transportation conformity consequences that appear to constitute enforcement of the standard.

¹² CASAC is a group of experts from academia and industry whose advice EPA is required to seek under the Clean Air Act.

¹³ Clean Air Scientific Advisory Committee closure letter to EPA Administrator Carol Browner on the primary standard portion of the OAQPS Staff Paper for Ozone (November 30, 1995) (<http://www.epa.gov/science1/casac02.pdf>)

EPA guidance suggests that nonattainment areas should follow the boundaries of the corresponding metropolitan statistical area (MSA).¹⁴ The following six areas in Texas have exceeded the eight-hour ozone standard and are expected to be designated nonattainment:

Metropolitan Area	Metropolitan Statistical Area (MSA) counties	Counties currently in nonattainment of the one-hour ozone standard	One-hour ozone attainment counties with a monitored exceedance of the eight-hour ozone standard	One-hour ozone attainment counties that do not have a monitored exceedance of the eight-hour ozone standard
Austin	Bastrop, Caldwell, Hays, Travis, Williamson		Travis	Bastrop, Caldwell, Hays, Williamson
Beaumont-Port Arthur	Hardin, Jefferson, Orange	Hardin, Jefferson, Orange		
Dallas-Fort Worth	Collin, Dallas, Denton, Ellis, Henderson, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Tarrant	Collin, Dallas, Denton, Tarrant	Ellis	Henderson, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall
Houston-Galveston-Brazoria	Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller	Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller		
Longview-Tyler	Gregg, Harrison, Smith, Upshur		Gregg, Smith	Harrison, Upshur
San Antonio	Bexar, Comal, Guadalupe, Wilson		Bexar	Comal, Guadalupe, Wilson

The TNRCC has been exploring ways to proceed with nonattainment designation without subjecting the area to enforcement issues, such as transportation conformity. Possible mechanisms include:

1. Accelerated Attainment Agreement (AAA): This proposal would delay the effective date of certain nonattainment designations contingent upon the development of an early local air quality improvement plan. Local entities in Austin, Tyler/Longview, and San Antonio have endorsed this approach. The TNRCC will continue to work with local entities and pursue approaches to improve the air quality in

¹⁴ An area, defined in terms of entire counties, with a city of at least 50,000 population or with a urbanized area of at least 50,000 with a total metropolitan population of at least 100,000. In addition to the county containing the main city, additional counties are included if they are socially and economically integrated with the central county.

Texas so that it meets the federal ozone standards at the earliest possible date.

2. Unclassifiable areas: designating as “unclassifiable” those counties that are in attainment of the one-hour ozone standard but which marginally violate the eight-hour standard¹⁵. The unclassifiable designation would be based in part on the uncertain status of the eight-hour standard. Integral to the justification for this approach is the assertion that federal, state, and regional regulations already in place will improve air quality in these areas and that the local areas will commit to any additional controls necessary to assure that the eight-hour standard is attained. The TNRCC would require these areas to develop specific plans to improve air quality earlier than would be required by the FCAA.

In March 2000 the EPA announced that governors must recommend by the end of June 2000 areas that should be designated as nonattainment. The EPA would then formally designate eight-hour nonattainment areas no sooner than early 2001. However, the federal appropriations bill for fiscal year 2001 may prohibit the EPA from designating nonattainment areas before the Supreme Court rules on the issue or 15 June 2001, whichever comes first.¹⁶

On 31 May 2000 the TNRCC recommended that:

- all current one-hour nonattainment areas that also violate the eight-hour standard (Dallas-Fort Worth, Beaumont-Port Arthur, and Houston-Galveston) be designated “nonattainment” for the eight-hour standard;
- areas currently in attainment of the one-hour standard but in violation of the eight-hour standard (Austin, San Antonio and Longview-Tyler-Marshall) be designated “unclassifiable” under the eight-hour standard; and
- counties surrounding the Dallas-Fort Worth Metroplex, and which have already agreed to implement early pollution controls, such as vehicle emissions testing programs, be designated “unclassifiable” under the eight-hour standard.

The recommendations were sent to Governor George W. Bush, who submitted them to the EPA. Early feedback from the EPA indicates that the EPA may not accept the nonclassifiable designations.

¹⁵ The TNRCC defines an area that “marginally” violates the eight-hour standard as one that has monitored values within 15-20% of the standard.

¹⁶ H.R. 4635 Conference Report; 106th Congress, House of Representatives; Report 106–988; October 18, 2000

Particulate matter

The pollutant regulated as “particulate matter” is a complex mixture of solid and liquid particles suspended in the atmosphere. Particulate matter includes materials typically associated with particulate, such as dust, dirt, soot and smoke. But it also includes tiny condensed liquid droplets from gases such as sulfur dioxide (SO₂) and VOC from industrial and natural sources. Particulate matter in its various forms is emitted from such sources as factories, power plants, cars, construction activity, fires, and natural windblown dust.

The major health effects from breathing unsafe levels of particulate matter include acute respiratory symptoms, aggravated asthma; decreased lung function and chronic bronchitis. The elderly, children, asthmatics, and adults with preexisting heart or lung disease are most at risk for suffering these health effects. Particulate matter is also linked to environmental effects such as the impairment of visibility and damage to outdoor materials.

Unlike the other pollutants for which national air quality standards were established, particulate matter is not a specific substance. The nature of “particulate matter” in Amarillo, Texas varies significantly from that of Washington, D.C. A single national standard for particulate matter may not be appropriate:

“Creation of a national ambient air quality standard for particulate matter is a problem that differs from that of most of the major pollutants. For individual chemicals such as carbon monoxide or lead, a single nationwide standard can be defended as logical. In contrast, the composition of airborne particulate matter varies from place to place and includes thousands of entities that differ in size, surfaces, and toxicity. The composition of PM 2.5 also changes with the seasons.”¹⁷

Existing PM₁₀ standards

The EPA first set annual and 24-hour standards for particulate matter in 1971. These standards were for “total suspended particulate.” Since July 1987¹⁸, however, the EPA has regulated particulate matter as PM₁₀, which includes only those particles with an aerodynamic diameter smaller than ten micrometers, about one-seventh the width of a human hair. These smaller particles are likely responsible for most of the adverse health effects of particulate matter because of their ability to reach the thoracic or lower regions of the respiratory tract.

El Paso is the only PM₁₀ nonattainment area in Texas.

¹⁷ *Airborne Particulate Matter*; Philip H Abelson; Science Magazine; September 11, 1998

¹⁸ 52 Federal Register 24663 (1 July 1987)

Proposed PM_{2.5} standard

In July 1997¹⁹, the EPA adopted a new air quality standard for particle matter with an aerodynamic diameter smaller than 2.5 micrometers. to focus on smaller particles. As with the eight-hour ozone standard, a consensus on the necessity for the PM_{2.5} standard has not been reached. Only four of the 21 members of CASAC supported EPA's proposed PM_{2.5} standard. The board concluded:

“In summary, a case can be made for concern for health effects associated with particulate matter. However, information presented in the CD [Criteria Document] does not provide a basis to select the agent or agents which need to be regulated nor does it provide a basis for predicting the health benefits of any control strategies. The Panel urges that sufficient time be given to allow EPA staff to make the necessary changes in the CD [Criteria Document] so that the CASAC can come to closure on a document of acceptable scientific quality for regulatory decision-making.”²⁰

The American Trucking Associations filed a lawsuit challenging both the eight-hour ozone standard and the new particulate matter standard. In May 1999, a three-judge panel of the Court of Appeals for the District of Columbia Circuit declared the PM_{2.5} rules unenforceable. The Court held that EPA had arbitrarily set the new standards using an unconstitutional interpretation of its Clean Air Act authority. In June 1999, the EPA filed a petition to have key aspects of the case reheard but the circuit court denied this request. The EPA appealed this decision to the Supreme Court, who agreed on 22 May 2000 to review the appeals court ruling.

According to the original schedule, areas will be designated as attainment or nonattainment with the PM_{2.5} standard once the EPA has received three years of monitored data (2002–2004). This timeline is subject to change pending the outcome of the litigation. Preliminary monitoring data indicate that the Houston/Galveston and Dallas/Fort Worth areas may have difficulty meeting the new PM_{2.5} standard.

Lead²¹

Lead is a metal that occurs naturally in soil, rocks, water, and food. People can be exposed to lead in a variety of ways, including inhalation and ingestion of food, water, soil or dust. Normally, most of the lead to which humans are exposed is ingested in food and only a small fraction comes from breathing air that contains lead. However, because lead particles in the air are so small, as much as half of the lead that is inhaled is retained in the body.

¹⁹ 62 Federal Register 38711 (18 July 1997)

²⁰ Clean Air Scientific Advisory Committee closure letter to EPA Administrator Carol Browner on the OAQPS Staff Paper for Air Quality Criteria for Particulate Matter. (August 31, 1995), p. 4. (<http://www.epa.gov/science1/casl9505.pdf>)

²¹ *Lead Information, Activities and Data*; TNRCC; <http://www.tnrcc.state.tx.us/air/monops/lessons/leadinfo.html>

Lead is classified as a hazardous substance. Exposure to excessive levels of lead can adversely affect mental development and performance, kidney function, and blood chemistry. Young children are particularly at risk due to increased sensitivity of young tissues and organs.

The primary sources of lead in Texas and the United States have been emissions from lead smelters, battery plants, and from automobiles burning gasoline with lead additives. Since the early 1920's, lead had been blended with gasoline to boost octane levels and to protect exhaust valve seats from excessive wear. Transportation sources alone historically contributed about 80 percent of the annual emissions on a national basis.

When it was determined that lead levels in the United States were too high and might contribute to health problems, environmental agencies took steps to eliminate some lead, such as phasing out leaded gasoline, removing lead from soldered cans, and requiring emission controls on major lead pollution sources. The EPA issued the first reduction standards in 1973, which gradually reduced the allowable lead content of gasoline from 2-3 grams per gallon to one tenth of a gram per gallon by 1986. Effective January 1996, the FCAA completely banned the sale of leaded fuel for use in on-road vehicles, although leaded fuel continued to be sold for some off-road uses. These measures have successfully reduced ambient concentrations of lead in Texas, which currently has no lead nonattainment areas.²²

Nitrogen dioxide

Nitrogen dioxide is a brownish, reactive gas that is present in all urban atmospheres. Nitrogen dioxide can irritate the lungs and lower resistance to respiratory infections, which can lead to bronchitis and pneumonia. Nitrogen dioxide is regulated directly through the national ambient standard for nitrogen dioxide and indirectly as a component of NO_x, a precursor to ozone. All areas of Texas are in attainment of the nitrogen dioxide air quality standards.

²² The air quality standard for lead requires that the average ambient concentration during any calendar quarter not exceed 1.5 micrograms per cubic meter.

Sulfur dioxide

Sulfur dioxide (SO₂) is formed when fuel containing sulfur (such as coal and oil) is burned and during metal smelting and other industrial processes.²³ In Texas, the major source of sulfur dioxide is coal-fired power plants. Other significant industrial sources from the 1997 TNRCC emissions inventory include petroleum refineries, chemical plants, oil & gas production facilities, and cement kilns. High concentrations of SO₂ can affect breathing and may aggravate existing respiratory and cardiovascular disease. Sensitive populations include asthmatics, individuals with bronchitis or emphysema, children and the elderly. SO₂ is considered a primary contributor to acid deposition (acid rain) and PM_{2.5}. In addition, sulfur compounds in the air can contribute to visibility impairment in large parts of the country.

Texas has no SO₂ nonattainment areas, but two counties (Harris and Milam) are designated by the EPA as “unclassified,” and controls have been implemented to ensure that the areas do not become SO₂ nonattainment areas.

Carbon monoxide

Carbon monoxide is a colorless, odorless and poisonous gas produced by incomplete burning of carbon in fuels. When carbon monoxide enters the bloodstream, it reduces the delivery of oxygen to the body's organs and tissues. Health threats are most serious for those who suffer from cardiovascular disease, particularly those with angina or peripheral vascular disease. Exposure to elevated carbon monoxide levels can cause impairment of visual perception, manual dexterity, learning ability and performance of complex tasks.

Motor vehicle emissions are the primary source (77% nationwide) of ambient carbon monoxide levels in most areas and carbon monoxide is generally seen at its highest levels during the cold weather months. Thus, the focus of carbon monoxide monitoring has been on traffic oriented sites in urban areas where the main source of carbon monoxide is motor vehicle exhaust. Other major carbon monoxide sources are wood-burning stoves, incinerators and industrial sources.²⁴

The federal air quality standard for carbon monoxide is 9 ppm averaged over eight hours.²⁵ An area is in violation if the standard is exceeded more than once per year during nonoverlapping eight-hour periods. An area will be in nonattainment of the standard if it violates the standard during two consecutive years.

²³ Some of this information came from the EPA's Website: Six Principal Pollutants - Sulfur Dioxide (SO₂) at <http://www.epa.gov/oar/aqtrnd97/brochure/so2.html>.

²⁴ *Criteria Pollutants: Carbon Monoxide*; EPA Region 5 – Air and Radiation; <http://www.epa.gov/reg5oair/emission/critpllt.htm#co>

²⁵ Due to mathematical rounding, the standard is exceeded when a monitor reaches or exceeds 9.5 ppm.

A portion of El Paso County is the only carbon monoxide nonattainment area in Texas.

REGIONAL HAZE

Particulate matter, sulfates (formed from sulfur dioxide emissions), and other pollutants, both natural and anthropogenic, can form hazes that obscure scenic views. The anthropogenic activities that the EPA considers contributors to regional haze are primarily combustion-related, such as electric power generation, internal combustion engines, and agricultural burning. Natural sources include wildfires and wind-blown soil. According to the EPA,²⁶ virtually all of the nation's parks and wilderness areas are subject to some degree of regional haze visibility impairment.

In Texas, haze is a concern in Big Bend National Park and Guadalupe Mountains National Park. According to the TNRCC²⁷ visibility at Big Bend can still exceed 100 miles on clear days, but these days are becoming more and more rare. About six percent of the time, the visibility is less than thirty miles. The average visual range at Big Bend is about 66 miles, while the average visual range at the Grand Canyon is about 93 miles. Air quality monitors at Big Bend have recorded higher sulfate concentrations than air quality monitors at any other park in the western United States. Less is known about visibility impairment trends at the Guadalupe Mountains National Park because air quality monitors were not installed until about 1993. Data collected since that time also show a trend toward decreased visibility.

The EPA promulgated regulations in 1980 that addressed improving visibility at national areas across the country if the impairment can be "reasonably attributed" to one or a small group of sources. However, until recently the primary focus has been on activities such as collecting data and improving monitoring and modeling techniques. The Committee on Haze in National Parks and Wilderness Areas, formed in 1990 by the National Academy of Sciences, issued a report²⁸ on regional haze in 1993. This report concluded that:

- To accomplish statutory goals on visibility, emissions of pollutants that cause visibility impairment must be limited.
- Visibility programs must take large geographic areas into consideration because the visibility problem is regional.

²⁶ Testimony of John S. Seitz, Director Office of Air Quality Planning and Standards, Office of Air and Radiation, U.S. Environmental Protection Agency, before the Subcommittee on Forests and Public Land Management of the Committee on Energy and Natural Resources United States Senate, 28 October 1997.

²⁷ *Blurry Big Bend*; Natural Outlook; Winter 1999;
<http://www.tnrcc.state.tx.us/admin/topdoc/pd/020/99-01/bigbend.html>

²⁸ *Protecting Visibility in National Parks and Wilderness Areas*; Committee on Haze in National Parks and Wilderness Areas, Board on Environmental Studies and Toxicology, Commission on Geosciences, Environment, and Resources; National Academy Press; Washington, D.C., 1993

- Many sources must be considered simultaneously for visibility improvement.
- Visibility policy and control strategies may need to be different in the East and West.
- Improving visibility in Class I areas will also improve visibility in other areas.
- Visibility improvements will help alleviate other air quality problems.
- A long-term program is required to achieve the national visibility goal.
- Current scientific knowledge is adequate and controls are available for improving and protecting visibility, however, continued national progress requires a greater commitment toward atmospheric research, monitoring, and emission control research and development.

In response to new regional haze requirements in the 1990 FCAA²⁹, the EPA established the Grand Canyon Visibility Transport Commission in 1991, which issued a final report in June 1996.³⁰ From the Executive Summary of this commissions final report: “The Commission conducted an extensive review of scientific, technical, and other information with assistance from a range of governmental, business, tribal, and environmental interests. It developed more comprehensive databases, and new computer modules to analyze these data and model future air quality. The Commission significantly advanced understanding of regional haze, but limitations and uncertainties remain. The PAC has developed a set of emissions management recommendations for the Commission with a full understanding of progress and limitations in available knowledge. These recommendations are aimed at protecting clear days and reducing dirty days at national parks and wilderness areas on the Colorado Plateau.”

This committee’s primary recommendations include:

- Air pollution prevention and reduction of per capita pollution is a high priority for the Commission. The Commission recommends policies based on energy conservation, increased energy efficiency and promotion of the use of renewable resources for energy production.
- Clean air corridors are key sources of clear air at Class I areas³¹, and the Commission recommends careful tracking of emissions growth that may affect air quality in these corridors.

²⁹ 42 U.S.C. §7492

³⁰ *Proposed Recommendations of the Grand Canyon Visibility Transport Commission*; May 1996 (<http://www.nmia.com/gcvtc/final.html>)

³¹ Class I areas are those areas defined by the United States Congress that are afforded the greatest degree of air quality protection. Class I areas are deemed to have special natural, scenic, or historic value. See 40 CFR Part 81Subpart D

- For stationary sources, the Commission recommends closely monitoring the impacts of current requirements under the Clean Air Act and ongoing source attribution studies. Regional targets for SO₂ emissions from stationary sources will be set, starting in 2000. If these targets are exceeded, this would trigger a regulatory program, probably including a regional cap and market-based trading. During the next year, participants in the Commission's process will develop a detailed plan for an emissions cap and market trading program.
- The Commission's research and modeling show that a host of identified sources adjacent to parks and wilderness areas, including large urban areas, have significant visibility impacts. However, the Commission lacks sufficient data regarding the visibility impacts of emissions from some areas in and near parks and wilderness areas. In general, the models used by the Commission are not readily applicable to such areas. Pending further studies of these areas, the Commission recommends that local, state, tribal, federal, and private parties cooperatively develop strategies, expand data collection, and improve modeling for reducing or preventing visibility impairment in areas within and adjacent to parks and wilderness areas.
- The Commission recognizes that mobile source emissions are projected to decrease through about 2005 due to improved control technologies. The Commission recommends capping emissions at the lowest level achieved and establishing a regional emissions budget, and also endorses national strategies aimed at further reducing tailpipe emissions, including the so-called 49-state low emission vehicle, or 49-state LEV.
- The Commission recognizes that fire plays a significant role in visibility on the Plateau. In fact, land managers propose aggressive prescribed fire programs aimed at correcting the buildup of biomass due to decades of fire suppression. Therefore, prescribed fire and wildfire levels are projected to increase significantly during the studied period. The Commission recommends the implementation of programs to minimize emissions and visibility impacts from prescribed fire, as well as to educate the public.

The EPA published notice of adopted regional haze rules in July 1997³², establishing a regional haze program in conjunction with the PM_{2.5} proposal. The EPA's goal is to restore visibility to "background" (pre-industrial) levels within 60 years in more than 150 significant natural areas across the country, including Big Bend National Park and Guadalupe Mountains National Park. The regional haze rule requires "States to establish goals for improving visibility in national parks and wilderness areas and to develop long-term strategies for reducing emissions of air pollutants that cause visibility impairment."³³ Because of transport, the rule would apply to industrial sources and motor vehicles in every state, whether or not that state contains one of the protected areas. States will have to determine whether to require emission reductions from twenty-six industry groups, including coal-fired power plants, paper plants, and oil refineries.

³² 64 Federal Register 35714 (Thursday, 1 July 1999)

³³ *Final Regional Haze Regulations for Protection of Visibility in National Parks and Wilderness Areas*; EPA Fact Sheet; 2 June 1999 (<http://www.epa.gov/air/vis/facts.pdf>)

The rule requires the states, in coordination with the Environmental Protection Agency, the National Park Service, U.S. Fish and Wildlife Service, the U.S. Forest Service, and other interested parties, to develop and implement air quality protection plans to reduce the pollution that causes visibility impairment. The first State plans for regional haze are due in the 2003-2008 timeframe

STATE IMPLEMENTATION PLAN ELEMENTS

Under the FCAA, any state in which one or more areas do not meet federal air quality standards must develop a plan that shows how each area will reduce emissions of air pollutants to meet the standards.³⁴ Taken together, these plans represent the state implementation plan, or SIP, for that state. The SIP sets forth the technical and regulatory process for demonstrating and maintaining attainment. The necessary emission reductions specified for each area are obtained by a combination of federal, state, and local actions.

Texas has only one SIP, so later submissions to the EPA are considered revisions to that single comprehensive plan. Revisions are necessary when new federal or state requirements are mandated, when enhancements to available data allow the TNRCC to improve modeling, when a specific area's attainment status changes, or when further requirements are deemed necessary for attainment. Revisions are typically prepared area-by-area; hence, the reference to "the Houston SIP," "the DFW SIP," and so forth.

When a SIP revision has been developed, it goes through the TNRCC's formal rulemaking process, including public meetings, hearings, review of public comments, and adoption. This process takes about six months. After the TNRCC adopts a SIP revision, the Governor submits it to the EPA, which reviews it and decides whether to approve it. SIP approval authority has been delegated to the EPA regions, however they have SIP guidelines to ensure consistency across the country. Once approved by the EPA, the SIP revision is legally binding and enforceable under both state and federal law.

In addition to the categorization of ozone nonattainment areas, the 1990 CAAA added many new requirements for ozone non-attainment areas. For example, for areas classified as moderate or worse, states were required to:³⁵

- submit by November 1993 a "Rate of Progress" SIP revision describing how the states would achieve a 15% reduction in anthropogenic VOC emissions by November 1996;
- implement rules for existing VOC sources requiring "reasonably available control technology";
- submit by November 1992 a SIP revision requiring gasoline vapor recovery equipment at all gasoline stations;
- submit immediately a SIP revision that includes a schedule for the implementation of a vehicle inspection and maintenance program; and
- enact more stringent new source review permitting requirements.

In addition to these requirements, for ozone nonattainment areas classified as serious or worse, states were required to:

- submit by May 1991 a plan for enhanced ambient air monitoring for ozone, NO_x and VOC;

³⁴ 40 Code of Federal Regulations Part 51.12

³⁵ 42 U.S.C. §7511a

- submit by November 1994 an attainment demonstration based on modeling and a Rate of Progress SIP revision that describes how the state will achieve, beginning in November 1996, additional 3% per annum VOC emission reductions³⁶ averaged over three -year periods until the area reaches its mandated attainment date;
- submit by November 1992 a SIP revision providing for an enhanced vehicle inspection and maintenance program to reduce VOC and NOx emissions from motor vehicles;
- submit by May 1994 a SIP revision providing for a clean-fuel vehicle program;
- submit by May 1996 and each third year thereafter a SIP revision demonstrating whether current aggregate vehicle mileage, aggregate vehicle emissions, congestion levels, and other relevant parameters are consistent with those used for the area's attainment demonstration;
- enact more stringent new source review permitting requirements; and
- provide for addition contingency measures to be implemented if the area fails to meet any applicable milestone under the 1990 CAAA.

In addition, for ozone nonattainment areas classified as severe or worse, states were required to:

- submit by May 1992 a SIP revision that identifies and adopts transportation control strategies and transportation control measures to offset any growth in emissions;
- enact more stringent new source review permitting requirements; and
- provide that, if the area fails to attain the ozone standard by November 2007, each major stationary VOC source located in the area shall pay a penalty fee to the State for each calendar year beginning after the attainment date, until the area is redesignated as an attainment area for ozone.

The emission reduction plans are all “net of growth,” meaning that the states must compensate for any emission increases due to growth and provide for contingency reductions in case prescribed reductions do not reach the reduction goals.

In March 1995, Mary Nichols, EPA Assistant Administrator for Air and Radiation, issued a memo³⁷ outlining an alternative approach intended to provide more flexibility to the states in achieving the ozone standard. The memo acknowledges that states were having difficulty meeting the mandates, especially those states affected by factors beyond their control, such as transport of ozone and ozone precursors. The alternative approach provided a two-phase program. Phase I³⁸ was intended to continue progress in reducing local emission levels

³⁶ Up to 2.7% of the 3% emission reductions could be from NOx reductions, provided that the state demonstrate through modeling that NOx reductions would be beneficial toward the reduction of ambient ozone concentrations. This substitution provision recognized that NOx controls may effectively reduce ozone in some areas and allowed the states some flexibility to design strategies that are appropriate for each particular area.

³⁷ *Ozone Attainment Demonstrations*, memo from Mary D Nichols, EPA Assistant Administrator for Air and Radiation, 2 March 1995 (<http://www.epa.gov/ttn/oarpg/t1/memoranda/ozondemo.pdf>)

³⁸ Phase I required that the states submit a SIP revision by December 1995 that included the following (continued...)

of VOC and/or NO_x. Then the states would be allowed time to address issues such as modeling and the transport of ozone and its precursor pollutants before submitting Phase II³⁹, in which states would draw upon the results of this effort and design a plan to bring the area into attainment.

BUMP-UP

Each nonattainment area is given a deadline for attaining the standards. The 1990 Clean Air Act Amendments specify that an area be “bumped up” to the next higher classification for failing to attain the standard by the required deadline. To announce this “bump up,” the EPA would publish a notice in the *Federal Register* within six months following the required attainment date. The area would then have to implement the prescribed requirements for the new classification, as well as submit a new SIP.

This “bump-up” provision does not apply to the new eight-hour ozone standard. Under this standard, an area that does not attain this standard by the deadline would have to start the planning process all over again, producing a modified SIP based on a new emissions inventory, new photochemical modeling, and new control measures.

SANCTIONS

The FCAA⁴⁰ requires the EPA to impose sanctions on an area if one of these events occurs.

- The state fails to submit a SIP that contains all required elements.
- The EPA does not approve a SIP.
- The state fails to implement a required SIP program.

Two types of sanctions can be used under the FCAA:

A two-to-one industrial growth offset for new or modified stationary sources: this sanction requires a company that is constructing a new or modifying an existing facility over a certain size to reduce emissions in the area by two tons for every new ton the new/modified facility will emit.

³⁸ (...continued)
elements: 1) Control strategies to achieve VOC and/or NO_x reductions in the amount of 3% per year for the years 1997, 1998, and 1999; 2) modeling showing the effect of previously-adopted control strategies; 3) a demonstration that the state has met the VOC emission reduction requirements of the FCAA Amendments; and 4) a detailed plan and schedule for Phase II.

³⁹ Phase II required, after a 2-year assessment of a regional control strategy, states to submit modeling and an attainment plan by mid-1997.

⁴⁰ 42 U.S.C. §7509(a)

Cutoff of federal highway funds: this sanction prohibits the U.S. Department of Transportation from approving or funding all but a few specific types of transportation projects in the nonattainment area. Many projects funded under the federal-aid highway program would be stopped by this sanction.

The FCAA gives the EPA discretion on when and how to apply these sanctions. For example, the EPA may apply sanctions to one or more specific areas, or statewide. At EPA's discretion, one of the sanctions would begin eighteen months after the triggering event, and the other sanction six months later. Currently, the EPA implements the offsets sanction after eighteen months and the highway sanctions after twenty-four months.⁴¹ The sanctions would not be imposed if the EPA determines that the state had corrected the deficiency before the applicable "sanctions clock" expires.

IMPOSITION OF A FEDERAL IMPLEMENTATION PLAN

If the EPA identifies a deficiency in the SIP and the state does not show due progress in correcting that deficiency, the FCAA⁴² requires the EPA to issue a federal implementation plan (FIP) for the area no later than two years after the finding. A 24-month "FIP clock" is started on an area when the EPA determines that a required SIP submission is inadequate. If the state fails to correct the deficiency within the 24-month period, the EPA can adopt a FIP and take over enforcing the FCAA for that area.

TRANSPORTATION CONFORMITY

Transportation conformity requires nonattainment areas to demonstrate that transportation activities will not cause or contribute to violations of any federal air quality standard, increase the frequency or severity of existing violations, or delay the timely attainment of any standard.⁴³ Under the FCAA, metropolitan planning organizations⁴⁴ cannot approve any transportation project, program, or plan unless it conforms to an approved SIP. EPA, with assistance from the United States Department of Transportation, promulgated the first transportation conformity rules in November 1993.⁴⁵

Various penalties can be imposed on areas that are out of compliance with transportation conformity requirements (known as a "transportation conformity lapse"). For example, EPA can bump a region up into

⁴¹ 40 CFR 52.31(d)

⁴² 42 U.S.C. §7410(c)

⁴³ 42 U.S.C. §7506(c)

⁴⁴ Metropolitan Planning Organizations (MPOs) are the organizational entities designated by law with lead responsibility for developing transportation plans and programs for urbanized areas with populations of 50,000 or more.

⁴⁵ 40 C.F.R. Part 93

the next level of nonattainment or the United States Department of Transportation can withhold federal highway funds. If federal highway funds are withheld, only projects already authorized by the federal government⁴⁶, that increase safety, or that reduce air emissions are allowed to proceed. Planning must stop on all other projects. Federal transportation funding is not withheld from the state or the specific area; however, the area is limited as to how it can spend this funding. These restrictions are lifted once the area in question demonstrates transportation conformity.

Demonstrating transportation conformity is an elaborate process that can take from 12 to 30 months. Metropolitan planning organizations, the TNRCC, the Texas Department of Transportation, the Texas Transportation Institute, the Environmental Protection Agency, the Federal Highway Administration, and the Federal Transit Administration each have responsibilities that are related to this process:

- Metropolitan planning organizations are responsible for developing transportation plans demonstrating that each plan achieves transportation conformity. To develop transportation plans, the metropolitan planning organizations must have access to data related to travel demand and estimated vehicle emissions. The Texas Department of Transportation is responsible for these activities in areas that do not have a metropolitan planning organization.
- The TNRCC must develop a “motor vehicle emissions budget” in conjunction with the state implementation plan (SIP). This motor vehicle emissions budget must be less than the estimated on-road emissions of cars, trucks, and other mobile sources for 1990. To be in compliance, transportation projects must not cause emissions from these sources to exceed this budget.
- The Texas Department of Transportation and Texas Transportation Institute carry out computer modeling to produce data related to travel demand and estimated vehicle emissions.

Transportation conformity must be demonstrated every time there is a new or revised metropolitan transportation plan or transportation improvement program, unless the revision merely adds or deletes exempt projects. Transportation conformity must also be demonstrated within eighteen months of the date of:

- the state’s initial submission of a control strategy SIP or maintenance plan that establishes a motor vehicle emissions budget;
- EPA approval of a control strategy SIP revision or maintenance plan that establishes or revises a motor vehicle emissions budget or adds, deletes or changes traffic control measures; or
- EPA promulgation of an implementation plan that establishes or revises a motor vehicle emissions

⁴⁶ Federal authorization for highway projects comes as a letter of authorization (known as the “federal funding agreement”) from the Federal Highway Administration to the Texas Department of Transportation.

budget or adds, deletes or changes traffic control measures.

A “transportation conformity lapse” occurs when an area cannot demonstrate transportation conformity within the specified time period. During a transportation conformity lapse, only certain highway projects are allowed to proceed.

These projects are:

- regionally significant added capacity projects that have received a funding commitment prior to the lapse;
- non-regionally significant projects;
- exempt projects (maintenance, safety, some mass transit); and
- transportation control measures in an approved SIP (if applicable).

Implementation and planning activities (such as design and right-of-way acquisition) for all other projects are not allowed during a lapse period, which further delays affected projects. These restrictions are lifted once the area in question demonstrates transportation conformity.

In November 1995,⁴⁷ the EPA published notice of the adoption of a provision to the transportation conformity rule which established a grace period before which transportation plan and program conformity must be determined in newly-designated nonattainment areas. In response to a Sierra Club challenge, the U.S. Court of Appeals for the District of Columbia⁴⁸ overturned that provision. Consequently, new nonattainment areas must be able to demonstrate that the transportation projects contained in their Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP) will not further degrade air quality.⁴⁹ This means that areas that were in attainment of the one-hour ozone standard but are designated by the EPA as nonattainment for the eight-hour ozone standard will be in a transportation conformity lapse immediately upon designation. The TNRCC is working with TxDOT, the Texas Transportation Institute, the Federal Highway Administration, and the EPA to minimize the duration of this potential lapse.

GENERAL CONFORMITY

⁴⁷ 60 Federal Register 57179 (14 November 1995)

⁴⁸ *Sierra Club v. EPA, et al.*, 129 F.3d 137 (D.C. Cir. 1997))

⁴⁹ *Testimony to the Senate State Affairs and Committee on Natural Resources Joint Hearing on Air Quality*; Janet Kennison, Administrator for the San Antonio-Bexar County Metropolitan Planning Organization; 21 March 2000

General conformity requires nonattainment areas to demonstrate that any federally-supported activity (not covered under transportation conformity) will not cause or contribute to violations of any federal air quality standard, increase the frequency or severity of existing violations, or delay the timely attainment of any standard.⁵⁰ Under the FCAA, federal agencies and departments cannot approve, support, or fund any project, program, or plan unless it conforms to an approved SIP. Typically, general conformity affects the construction of airports or port facilities, but other projects that use federal funds or require federal permits could also be affected.

To successfully demonstrate general conformity, the TNRCC works with local interests in each nonattainment area to develop accurate inventories of current off-road emissions from sources such as airplanes, seaport fuel-transfer facilities, and military equipment. Using the information from these inventories, the TNRCC then updates the relevant portions of the SIP.

REDESIGNATION TO ATTAINMENT

The FCAA⁵¹ allows the EPA Administrator to redesignate an area from “nonattainment” to “attainment” for any national ambient air quality standard. However, the obligations under the FCAA are significantly different for an area that has been redesignated from nonattainment to attainment than for an area that has always been “attainment.”

Once the State determines that air quality monitoring data show that an area is in compliance with the standard, it can petition the EPA to redesignate the area to attainment. This petition must include a SIP revision that provides for the maintenance of the air quality standard for at least ten years after the redesignation. Eight years after redesignation as an attainment area, the State must submit an additional SIP revision for maintaining the air quality standard for ten years after the expiration of the initial ten-year maintenance period. The maintenance plan shall contain:

- any additional measures necessary to ensure that the area stays in attainment;
- any contingency provisions the EPA deems necessary to assure that the State will promptly correct any violation of the air quality standard which occurs after redesignation to attainment;
- a requirement that the State will continue all control measures which were contained in the SIP for that area before redesignation to attainment.⁵²

⁵⁰ 42 U.S.C. §7506(c)

⁵¹ 42 U.S.C. §7407(d)(3)(E)

⁵² Specifically, 42 U.S.C. §7407(d)(3)(E)(iii) requires that “the Administrator determine[s] that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting
(continued...)

The EPA may not redesignate a nonattainment area (or portion thereof) to attainment unless:

1. the EPA determines that the area has attained the air quality standard;
2. the EPA has fully approved the applicable state implementation plan (SIP);
3. the EPA determines that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable SIP and applicable Federal air pollutant control regulations and other permanent and enforceable reductions (known as the anti-backsliding provision). However, new source review permitting provisions revert to the same requirements for all attainment areas;
4. the EPA has fully approved a maintenance plan for the area; and
5. the State has met all of the SIP requirements.

⁵² (...continued)

from implementation of the applicable implementation plan and applicable Federal air pollutant control regulations and other permanent and enforceable reductions;”

CONTROL MEASURES

FUEL STANDARDS

Onroad and offroad mobile emissions account for a large percentage of NOx emissions in Texas, ranging from 14% of all NOx emissions in the Tyler-Longview-Marshall area to 83% in the Dallas-Fort Worth area. The type of gasoline and diesel used to power these engines can have a significant impact on NOx emissions, as well as VOC and carbon monoxide emissions.

Gasoline

Oxygenated fuel additives

An oxygenated fuel additive (oxygenate) is any substance which, when added to gasoline, increases the oxygen content of that gasoline. Oxygenates are blended with gasoline to enhance the octane of conventional gasoline and to improve the emission properties. The most common oxygenates being used today are methyl tertiary-butyl ether (MTBE) and ethanol. Other less-common oxygenates include ethyl tertiary-butyl ether (ETBE), tertiary-amyl methyl ether (TAME), diisopropyl ether (DIPE), and tertiary-butyl alcohol (TBA).

MTBE was first blended in gasoline in 1979 to replace lead and to increase octane.⁵³ Oxygenates came into wider use in the 1990s when the Clean Air Act Amendments of 1990 mandated the use of oxygenates in gasoline for use in areas that violate the carbon monoxide air quality standard⁵⁴ and federal reformulated gasoline⁵⁵ for use in some areas that violate the ozone air quality standard.

“Soon after these programs were initiated, anecdotal reports of acute health symptoms were received by health authorities in various areas of the country. Such health concerns were not anticipated but have subsequently focused attention on possible health risks associated with using oxygenated gasoline. These health concerns have been joined by complaints of reduced fuel economy and engine performance, as well as the detection of low levels of MTBE in some samples of ground water.”⁵⁶

⁵³ Testimony of Ben Sebree, Texas Oil & Gas Association, before the Texas Senate Natural Resources Committee, Corpus Christi, Texas, 29 June 2000

⁵⁴ 42 U.S.C.A. §7545(m)

⁵⁵ 42 U.S.C.A. §7545(k)

⁵⁶ Interagency Assessment of Oxygenated Fuels, National Science and Technology Council, June 1997

Oxygenated gasoline

Oxygenated gasoline reduces carbon monoxide emissions by increasing the combustion efficiency (i.e., the gasoline burns more completely). The 1990 CAAA require that gasoline sold in carbon monoxide nonattainment areas contain at least 2.7% oxygen. Typically, oxygenated gasoline contains about 15% MTBE or about 7.5% ethanol. Ambient concentrations of carbon monoxide are generally higher during cooler weather, so oxygenated gasoline is usually required only during the winter months. Since 1992 only oxygenated gasoline can be sold in El Paso County, the only carbon monoxide nonattainment area in Texas, from October through March.

Federal reformulated gasoline

The 1990 FCAA amendments⁵⁷ required the EPA to issue regulations for "reformulated gasoline" (RFG), the intent of which is to reduce vehicle emissions of ozone-forming and toxic air pollutants.⁵⁸ RFG differs from most conventional gasolines in that RFG:

- has lower levels of certain compounds (e.g., benzene, aromatics, and heavy metals);
- will not evaporate as easily during the summer as conventional gasoline, which reduces the amount of ozone-forming VOCs released into the atmosphere; and
- contains more oxygenates.

Ten metropolitan areas⁵⁹ in the United States which are classified as extreme or severe ozone nonattainment areas, including Houston-Galveston-Brazoria, are required to use RFG. Several other areas which exceed the ozone standard, including Dallas-Fort Worth, have voluntarily chosen to use RFG. The RFG program was implemented in two phases: Phase I was conducted from 1995 through 1999. Phase I, which represents 30% of the gasoline sold in the United States, was required to reduce VOC and toxic air pollutant emissions by 15%. Phase II, which began January 2000, is required to reduce VOC emissions by 27%, toxic air pollutants by 22%, and NO_x emissions by 6%. RFG also provides some carbon monoxide emission reductions because of the oxygenates requirement.

As more areas require RFG and other types of specialized gasoline, temporary supply shortages will likely occur. All-time record high gasoline prices in Saint Louis in May 2000 were blamed in part on the lack of

⁵⁷ 42 U.S.C.A. § 7545(k)

⁵⁸ "Toxic air pollutants" means the aggregate emissions of benzene; 1,3 butadiene; polycyclic organic matter (POM); acetaldehyde; and formaldehyde.

⁵⁹ RFG is required in Los Angeles, San Diego, Hartford, New York, Philadelphia, Chicago, Baltimore, Houston, Milwaukee, and Sacramento.

reformulated gasoline available for sale in the area.⁶⁰ Petroleum industry analyst Trilby Lundberg, publisher of the Lundberg Survey of 10,000 gas stations, said on 11 June 2000, “We are in a nightmare of patchwork-quilt environmental regulations which wreak havoc with gasoline supply and price stability. The wide variety of regulations affecting formulas has created wide price disparities around the country and made distribution of gasoline more problematic.”⁶¹

A 5 June 2000 internal Department of Energy memo to Energy Secretary Bill Richardson from the agency’s acting policy director, Melanie Kenderdine,⁶² agreed that limited RFG supply contributed to record gasoline prices in the Chicago and Milwaukee areas. The memo states that: “The Milwaukee (and Chicago area) supply situation is further affected by, among other things, an RFG formulation specific to the area that is more difficult to produce, lower gasoline inventories relative to the rest of the country, high regional demand, and limited transportation links.”

The supply situation will likely stabilize once refineries have time to adapt to the new requirements. However, this situation demonstrates the need for consistent national, as opposed to regional, gasoline standards.

A 1999 National Academy of Sciences study⁶³ concluded that RFG likely had a marginal and decreasing role in reducing ambient ozone concentrations: “According to EPA estimates for 1997, emissions of VOCs from on-road gasoline-fueled motor vehicles contributed about 26% to the total inventory of VOC emissions from all sources. Correspondingly, on-road vehicles contributed 22% to the inventory for NOx, and 56% for carbon monoxide (CO). These contributions are projected to continue to shrink in the coming years. If correct, this would imply that the potential impact of using RFG on near-ground ozone concentration will decrease with time. In fact, air-quality models suggest that implementation of the RFG program reduces peak ozone concentrations by only a few percent. Even if the relative contribution of motor vehicles to the current inventory of ozone precursor emissions from all sources has been underestimated (which, historically, has often been the case), the reduction in peak ozone from the RFG program would still likely be less than 10% at most. Although long-term trends in peak ozone in the United States appear to be downward, it is not certain that any part of these trends can be significantly attributed to the use of RFG.”

⁶⁰ Doug Moore, *Gasoline Prices Hit All-time High Here*, Saint Louis Post-Dispatch, 20 May 2000

⁶¹ Associated Press, *Gas Prices Jump Nearly 9 Cents in Three Weeks*, 11 June 2000

⁶² Patrice Hill, *Memo blames EPA for gas price increases*, Washington Times, 14 July 2000

⁶³ page 4, *Ozone-Forming Potential of Reformulated Gasoline*, National Academy Press, Washington, D.C., 1999

Low Reid Vapor Pressure gasoline

States may adopt low Reid Vapor Pressure (RVP)⁶⁴ gasoline requirements that are more stringent than the federal RVP requirements under certain circumstances. Low RVP gasoline is an effective means of reducing VOC emissions because it lowers the evaporation rate, but low-RVP gasoline has little or no effect on NOx emissions. The adoption process for low RVP gasoline is more complicated than state adoption of RFG because the state must support their request with modeling or technical analysis through a SIP revision. RFG opt-in requires only a request from the Governor to the EPA.

In May 1994 the TNRCC adopted rules requiring low-RVP gasoline be sold in El Paso County be sold from June 1 to September 15, beginning June 1996.⁶⁵ In June 1999 the TNRCC adopted rules requiring low-RVP gasoline with a sulfur cap for 95 eastern and central Texas counties,⁶⁶ to be sold from May to October, beginning in 2000. This gasoline will have a lower RVP than conventional gasoline, and roughly the same RVP as the summer gasoline sold within the Dallas-Fort Worth and Houston-Galveston-Brazoria areas. This fuel is estimated to reduce evaporative emissions from automobiles, off-highway gasoline powered equipment, and all gasoline storage and transfer operations. The TNRCC estimates that evaporative VOC emissions from automobiles will be reduced by at least 14%.

The 1999 Academy of Sciences study agreed that lowering the RVP of gasoline was effective in lowering vehicle emissions: “In addition to minimum oxygen content, the RFG program requires gasoline blends to have a number of other characteristics that are intended to produce lower emissions. Major contributors to decreased emissions appear to be lowering the Reid Vapor Pressure (RVP) of the fuel, which helps depress evaporative emissions of VOC, and lowering the concentration of sulfur in the fuel, which prevents poisoning of a vehicle’s catalytic converter by sulfur.”⁶⁷

With the increasing controversy over the MTBE additive, the TNRCC amended the rules in April 2000 to require that the amount of MTBE used did not increase as a result of the new low RVP gasoline.

⁶⁴ Reid Vapor Pressure is the constrained vapor pressure of a fuel at 100E F.

⁶⁵ 19 Texas Register 3746 (13 May 1994)

⁶⁶ These rules required that, starting 1 May 2000, the RVP of gasoline sold from May 1st through October 1st not exceed 7.8 psi. The rules capped the sulfur content at 150 ppm per gallon of gasoline, starting January 1, 2004.

⁶⁷ pp 6-7, *Ozone-Forming Potential of Reformulated Gasoline*, National Academy Press, Washington, D.C., 1999

Low Sulfur Gasoline

Another technique for reducing emissions from gasoline- and diesel-fired engines is to limit the amount of sulfur in the fuel. Sulfur in gasoline inhibits the performance of catalytic converters, which have been used since the 1970's to reduce VOC, carbon monoxide and NOx emissions from gasoline-fueled vehicles. Automobile manufacturers have argued that the sulfur content of gasoline must be lowered in order for them to produce lower-emitting vehicles. NOx emissions in particular are significantly impacted by the sulfur content of gasoline. Reducing the sulfur in gasoline significantly will likely require a substantial investment in new refinery equipment and increase operating costs, increasing the cost of a gallon of gasoline by up to eight cents.

As mentioned previously, the 1999 Academy of Sciences study concluded that lowering the sulfur content of gasoline, along with lowering the RVP, was effective in reducing vehicle emissions.

Concurrent with the adoption of low-RVP gasoline requirements in June 1999, the TNRCC adopted a sulfur cap for gasoline sold in 95 eastern and central Texas counties. This gasoline could contain no more than 150 ppm sulfur, beginning 1 January 2004. However, in December 1999, as part of the Tier II national low emission vehicle standards, the EPA finalized rulemaking⁶⁸ for a national low-sulfur gasoline that would go into effect on the same date as the TNRCC rules. This national low-sulfur gasoline, which will be phased in from 2004 to 2007, will have an average sulfur content of 30 ppm and a cap of 80 ppm. Since the national standard starts the same time as the proposed state low sulfur standard would have started, is more stringent than the proposed state standard, and will result in even greater emission reductions, the TNRCC repealed their sulfur cap in April 2000.

On 10 July 2000, Koch Petroleum Group announced a voluntary commitment to introduce a 150-ppm sulfur gasoline for the 2001 summer season to the markets served by its Corpus Christi, Texas, refinery, which includes Austin, Corpus Christi, Waco and San Antonio.⁶⁹ According to EPA data, the sulfur content of this gasoline will be more than 50% lower than the current national average of 307 ppm.

⁶⁸ 65 Federal Register 6698 (10 February 2000)

⁶⁹ "Koch to announce intent to reduce sulfur by half"; Andrea Jares; Corpus Christi Caller-Times; 10 July 2000

Diesel

As with gasoline, several changes to diesel fuel quality and composition can affect emissions. The sulfur content can be limited to protect the high-efficiency catalytic converters that will be required by engines to comply with strict emission standards. Reducing the aromatic hydrocarbon content of diesel and increasing the cetane rating (similar to the octane rating for gasoline) are other changes that may decrease NOx emissions from diesel-fueled engines. The federal regulations governing the quality of diesel fuel used for onroad vehicles⁷⁰ limit sulfur content to 500 ppm, and the producer to choose between meeting a minimum cetane number of 40 or a maximum aromatic hydrocarbon content of 35% by volume. The EPA does not currently regulate the quality of diesel fuel used for nonroad equipment.

In June 2000,⁷¹ the EPA published a proposal that, beginning in June 2006, diesel fuel sold nationwide would contain no more than 15 ppm sulfur, a 97% reduction from the current sulfur cap of 500 ppm. This proposal was made concurrent with proposed emission standards for heavy-duty engines and vehicles. As with gasoline, the proposed diesel sulfur standards are intended to protect the high-efficiency catalytic converters that will be required by engines to comply with new emission standards. The EPA intends to adopt this standard by the end of 2000.

In April 2000 the TNRCC adopted rules for the nine-county Dallas-Fort Worth area to require that, beginning May 2002, diesel fuel sold in the area contain no more than 500 ppm sulfur, no more than 10% aromatics, and have a cetane number of 48 or greater.⁷² In August 2000 the TNRCC proposed to expand these requirements statewide for on-road use and to the entire east and central Texas area for offroad use.⁷³ Furthermore, the proposal would further restrict the sulfur content of fuel sold in east and central Texas to 30 ppm beginning May 2004 and to 15 ppm beginning May 2006.

Other innovative options exist for reducing emissions from diesel-fueled equipment. The Port of Houston tested Lubrizol Corporation's LubriNOx diesel/water emulsion product for three months and reported a 25% reduction in NOx emissions and 50% reduction in particulate matter emissions relative to conventional diesel fuel. PuriNOx requires little or no modifications of existing diesel engines or fuel tanks. Its chief technical limitation appears to be a possible power loss of up to 20%, which approximately five percent of the existing fleet applications may not be able to tolerate.

TNRCC also proposed rules in August 2000 for the eight-county Houston-Galveston-Brazoria area that would require certain fuel distributors to make a diesel emulsion blend available along with or in place of regular diesel fuel, beginning May 2004.⁷⁴ The fuel distributors would make the diesel emulsion fuel available

⁷⁰ 40 CFR§80.29 (Controls and Prohibitions on Diesel Fuel Quality)

⁷¹ 65 Federal Register 35430 (2 June 2000)

⁷² 25 Texas Register 4030 (5 May 2000)

⁷³ 25 Texas Register 8169 (25 August 2000)

to all on-road heavy-duty diesels, which are defined as being greater than 10,000 pounds and all non-road engines rated over 175 nominal hp.

VEHICLE STANDARDS

Passenger cars and light/medium trucks

The EPA has adopted comprehensive regulations⁷⁵ under Title II of the FCAA to control emissions from new motor vehicles and motor vehicle engines. The first national tailpipe emission standards for cars and light duty trucks were effective in 1975.⁷⁶ Since then, the standards have been strengthened several times and the coverage expanded to include heavier-duty trucks.

The 1990 CAAA required EPA to assess the air-quality need, cost effectiveness, and feasibility of tighter tailpipe emission standards for the 2004 model year and beyond.⁷⁷ The FCAA precludes the EPA from adopting more stringent standards before the 2004 model year. This report⁷⁸, was issued to Congress in 1998. The Tier Two Report concluded that tighter tailpipe emission standards were necessary, feasible, and cost-effective. The EPA also concluded that gasoline sulfur reductions are needed to enable the full performance of low emission-control devices. As a result of this study, in February 2000 the EPA published notice of the adopted Tier 2 standards for vehicles beginning with model year 2004, along with a requirement for lower sulfur-content gasoline.⁷⁹

The following table summarizes the history of federal tailpipe standards for NOx emissions:

⁷⁴ 25 TexReg 8196 (25 August 2000)

⁷⁵ 40 Code of Federal Regulations Part 86

⁷⁶ A History of Reducing Tailpipe Emissions; EPA Region 5 - Air and Radiation; 3 May 1999 (<http://www.epa.gov/region5/air/mobile/history.htm>)

⁷⁷ 42 U.S.C. §7521(i)

⁷⁸ *Tier 2 Report to Congress*; United States Environmental Protection Agency Air and Radiation; EPA420-R-98-008; July 1998 (<http://www.epa.gov/oms/regs/ld-hwy/tier-2/t2rptfin.pdf>)

⁷⁹ 65 Federal Register 6698 (10 February 2000)

Summary of NOx Tailpipe Standards for Gasoline-Powered Vehicles

Effective Year	Action	NOx standard (grams per mile)		
		Automobiles	Light Trucks ⁸⁰	Medium Trucks ⁸¹
1975	1970 FCAA	3.1	3.1	-----
1977 - 1979	1977 FCAA	2.0	2.3	-----
1981	1977 FCAA amendment	1.0	-----	-----
1988	EPA rules	-----	1.2	1.7
1994	1990 FCAA amendment - Tier One	0.6		1.53
2001	1998 Voluntary Agreement For Cleaner Cars (NLEV) ⁸²	0.3	0.5	-----
2004 - 2007	Tier Two	0.07		0.2
2008 - 2009	Tier Two	-----		0.07
2005				

California Low-Emission Vehicle

Under the FCAA⁸³, states are prohibited from adopting or enforcing any new vehicle emission standard other than federal programs except for states that had in effect prior to March 30, 1966, programs that were at least as stringent as the federal program. Basically this means that Texas can either use the federal program or adopt the California low-emission vehicle (CalLEV) program.

The CalLEV program has been adopted in two stages. CalLEV I was adopted in 1990-1991 for light- and medium-duty vehicles and generally became applicable for the 1994 model year. The California Air Resources Board (CARB) adopted CalLEV II in 1998, which will generally become applicable for the 2004 model year. CalLEV II has three general requirements:

1. increasingly more stringent tailpipe emission standards for several categories of low-emission vehicles (shown below);

⁸⁰ Includes sport-utility vehicles, minivans, and trucks less than 6000 pounds

⁸¹ Includes sport-utility vehicles, vans, and trucks between 6000 and 8500 pounds

⁸² Federal Register: January 7, 1998 (Volume 63, Number 4); [Page 925-987]

⁸³ 42 U.S.C.A. § 7543

2. a requirement for each manufacturer to phase-in a progressively cleaner mix of vehicles from year to year with a credit trading option; and
3. a requirement that a specified percentage of passenger cars and lighter light-duty trucks be zero-emission vehicles (ZEVs).

The CalLEV II program has the following vehicle categories:

Passenger cars/light-duty trucks	Medium-duty vehicles
Transitional Low-Emission Vehicle (TLEV)	Low-Emission Vehicle (LEV)
Low-Emission Vehicle (LEV)	Ultra Low-Emission Vehicle (ULEV)
Ultra Low-Emission Vehicle (ULEV)	Super Ultra Low-Emission Vehicle (SULEV)
Zero-Emission Vehicle (ZEV)	Zero-Emission Vehicle (ZEV)

Each category has progressively more stringent standards for exhaust emissions of nonmethane organic gas⁸⁴ (NMOG), an ozone precursor. Standards are also specified for NOx and carbon monoxide.

CalLEV II requires that 10% of the passenger cars and lightest light-duty trucks produced by each of the seven largest manufacturers be ZEVs, starting with model-year 2003. The program allows partial ZEV credit for vehicles that are significantly cleaner than otherwise required but that do not qualify as a ZEV.

A major difference between CalLEV II and federal Tier II are the evaporative standards, which dictate the maximum rate at which organic compounds can evaporate from the vehicle's fuel system.⁸⁵ The current federal evaporative standards are similar to the current California standards, but the CalLEV II standards are generally more stringent than comparable federal Tier II standards.

⁸⁴ Non-Methane Organic Gases or NMOG means the total mass of oxygenated and non-oxygenated hydrocarbon emissions. (Title 13, California Code of Regulations, Section 1960.1(g)(1))

⁸⁵ CalLEV II classifies evaporative emissions into three types — running loss, hot soak, and diurnal emissions. Running loss emissions occur when the vehicle is driven. Hot soak emissions occur immediately after a fully-warmed up vehicle is stationary with the engine turned off. Diurnal emissions occur when a vehicle is parked and are caused by daily ambient temperature changes. Most of these emissions result during increasing ambient temperatures which cause an expansion of the vapor in the fuel tank.

Federal Tier II versus CalLEV II

In December 1999, the TNRCC proposed adopting the CalLEV standards for vehicles sold in Texas beginning with model year 2004.⁸⁶ This proposal was vigorously opposed by the major automobile manufacturers and car dealers. In May 2000, the three largest America-based automobile manufacturers agreed to apply the CalLEV II evaporative standards to vehicles sold in Texas, beginning with model year 2004. This addressed the TNRCC's major justification for adopting CalLEV II over Federal Tier II. On 31 May 2000 the TNRCC decided to not adopt the CalLEV program for Texas, but rather to rely on the national Tier II program enhanced by the automakers agreement to apply the CalLEV evaporative standards, in effect making this hybrid standard the most environmentally stringent standard in the United States.

Heavy-duty trucks and buses

The diesel engine is ubiquitous in the American economy, used by freight trucks, buses, construction equipment, farm equipment, and other industrial uses. Diesel engines have also been increasingly used by lighter-duty vehicles in recent years. The diesel engine is a major source of NOx and particulate matter. The EPA estimates that by 2007 heavy-duty trucks and buses will account for as much as thirty percent of NOx emissions from transportation sources and fourteen percent of particulate matter emissions.

In October 1997⁸⁷ the EPA adopted rules for NOx and VOC emission standards for heavy-duty diesel engines intended for highway operation (trucks and buses), beginning with the 2004 model year. Emissions from engines complying with these standards will emit approximately 50% less NOx and VOC. The EPA estimated that engines meeting the new standard will dominate the fleet by 2020, long after the 2007 compliance date for severe ozone nonattainment areas such as Houston-Galveston-Brazoria. Because the economic and technical feasibility of this standard was called into question during the rule comment period, the EPA committed to review and report on the appropriateness of this standard.

In June 2000,⁸⁸ the EPA published notice of a proposal for more stringent emission standards for heavy-duty highway diesel engines that would be phased in between 2007 and 2010. These proposed standards would reduce NOx and VOC emissions from trucks and buses by 95 percent beyond current levels, and particulate matter emissions by 90 percent beyond current levels. Because these standards are based on the use of high-efficiency catalytic converters which are damaged by sulfur, this proposal was concurrent with a proposal to reduce the sulfur content of diesel fuel by June 2006. The proposal also covers heavy-duty gasoline engines. The EPA intends to adopt these standards by the end of 2000.

⁸⁶ 24 Texas Register 11924 (31 December 1999)

⁸⁷ 62 Federal Register 54693 (21 October 1997)

⁸⁸ 65 Federal Register 35430 (2 June 2000)

In October 2000, the EPA published noticed that they had taken the following actions:⁸⁹

1. Reaffirmed as both necessary and feasible the October 1997 standard for on-road heavy-duty diesel engines beginning with model year 2004;
2. Proposed more stringent emissions standards for heavy-duty gasoline-fueled engines and vehicles. Vehicles in this category include large full size pick-up trucks, full size cargo and passenger vans, and the largest sport utility vehicles. The proposed NOx and VOC emission standards are approximately 75 percent lower than current standards; and
3. Proposed to include heavy models of gasoline and diesel-fueled sport-utility vehicles and similar heavy-duty vehicles used primarily for personal transportation in the Federal Tier 2 program.

OTHER MEASURES

Construction Equipment Operating Restriction

One of the ozone control strategies being considered by the TNRCC for both the DFW (rules adopted in April 2000⁹⁰) and HGB (rules proposed in August 2000⁹¹) areas is a restriction on the use of non-road, heavy-duty diesel equipment⁹² during the early- to mid-morning hours (e.g., 6:00 a.m through 10:00 a.m.). While this control strategy refers to “construction equipment,” it also affects other equipment, such as bulldozers used at sanitary landfills, non-road cranes used for demolition, and rubber tire loaders used in manufacturing operations. Agriculture equipment is generally not included. The construction equipment operating restriction does not reduce NOx emissions – it shifts them to a different time of day. However, this shift will lower NOx emissions during the time of day when the computer model predicts that they contribute the most to ozone formation.

Lawn Service Equipment Operating Restrictions

⁸⁹ 65 Federal Register 59896 (6 October 2000)

⁹⁰ 25 Texas Register 4080 (5 May 2000)

⁹¹ 25 Texas Register 8240 (25 August 2000)

⁹² Construction equipment includes pavers, paving equipment, plate compactors, rollers, scrapers, surfacing equipment, signal boards/light plants, trenchers, bore/drill rigs, excavators, concrete/industrial saws, cement and mortar mixers, cranes, graders, off-highway trucks, crushing/processing equipment, rough terrain forklifts, rubber tire loaders, rubber tire tractors/dozers, tractors/loaders/backhoes, crawler tractors/dozers, skid steer loaders, off-highway tractors, and dumpsters/tenders.

In August 2000, the TNRCC proposed⁹³ a restriction on the use of handheld and non-handheld spark-ignition lawn and garden service equipment that operate below 25 horsepower. Some examples of the affected equipment are gasoline-fueled lawnmowers, lawn tractors, tillers, small generators, trimmers, edgers, chainsaws, leaf blowers, and shredders. The proposed rules would restrict the use of this equipment from 6:00 a.m. through noon from April 1 through October 31. The reasoning behind these rules is the same as for the construction equipment operating restrictions – the computer model predicts that this restriction will reduce NOx emissions during the time of day when they contribute the most to ozone formation.

Airport Ground Support Equipment

In a 1999 report for the EPA, Sierra Research estimated that total emissions from airport activities comprise on the order of 2-3 percent of total manmade emissions in a typical metropolitan area.⁹⁴ Airports include three groups of mobile emission sources: aircraft, ground access vehicles, and ground support equipment. The EPA previously estimated that aircraft engines account for approximately 45% of total air pollutant emissions from airport operations, ground access vehicles account for another 45%, and ground support equipment make up the remaining 10%.⁹⁵ Other studies suggest that ground support equipment is responsible for 15-20% of airport-related NOx and 10-15% of airport-related VOC.

The FCAA prevents states from adopting standards for air emissions from aircraft⁹⁶. Other federal regulations cover most ground access vehicles, which include passenger automobiles, courtesy vehicles, taxicabs, rental cars, and buses.

Airport ground support equipment is made up of a variety of vehicles and equipment necessary to service aircraft during ground-based operations, including cargo loading and unloading, passenger loading and unloading, potable water storage, lavatory waste tank drainage, aircraft refueling, engine and fuselage examination and maintenance, and food and beverage catering. The majority of ground support equipment engines are “uncontrolled” from an emission perspective, because they have not been designed for low emissions.⁹⁷ Techniques for reducing emissions from ground support equipment include conversion to natural gas, installation of catalytic converters, and replacement with electric equipment.

⁹³ 25 Texas Register 8216 (25 August 2000)

⁹⁴ *Technical Support for Development of Airport Ground Support Equipment Emission Reductions*; United States Environmental Protection Agency Air and Radiation (EPA420-R-99-007; May 1999)

⁹⁵ 62 Federal Register 25358 (8 May 1997)

⁹⁶ 42 U.S.C. §7573

⁹⁷ *Technical Support for Development of Airport Ground Support Equipment Emission Reductions*; United States Environmental Protection Agency Air and Radiation (EPA420-R-99-007; May 1999)

In April 2000 the TNRCC adopted rules⁹⁸ requiring airports in the DFW ozone nonattainment area to reduce NOx emissions from ground support equipment by a total of 90% in stages from 2003 through 2005. The Air Transport Association of America sued the TNRCC in state district court over these rules on several grounds, primarily that the FCAA prohibits states from adopting standards for ground support equipment⁹⁹. The TNRCC subsequently proposed similar rules for airports in the Houston-Galveston-Brazoria area.¹⁰⁰

As an alternative to the proposed rules and the possible federal preemption from seeking reductions from ground support equipment, the TNRCC has been pursuing equivalent voluntary agreements with the major airlines that serve the DFW and HGB areas: Southwest Airlines, Continental Airlines, and American Airlines.¹⁰¹

Marine Engines

In December 1999 the EPA published notice of NOx and particulate matter emission standards for new large marine diesel engines,¹⁰² as required by the FCAA.¹⁰³ Commercial marine vessels affected by this rule include fishing boats, tug and towboats, dredgers, coastal and Great Lakes cargo vessels, and ocean-going vessels. The new standards take effect starting between 2004 and 2007, depending on the size of the engine. According to the EPA, emissions from marine diesel engines account for about 4.4 percent of total mobile source NOx emissions nationwide and about 1 percent of PM emissions. The EPA expects the new emission standards to lead to a 24 percent reduction in NOx emissions and a 12 percent reduction in PM emissions in 2030 when the program is fully phased-in. For heavily-populated areas surrounding commercial ports, such as the Texas Gulf Coast nonattainment areas, the benefits of these reductions will come long after the federally-mandated 2007 attainment date for the one-hour ozone standard.

Railroad Locomotives

Railroad locomotives are one of the air pollution sources that the FCAA places strictly under federal control. According to the EPA, unregulated locomotives contribute almost five percent of total nationwide NOx emissions, making locomotives one of the largest unregulated sources of NOx emissions. In response to a

⁹⁸ 25 Texas Register 4046 (5 May 2000)

⁹⁹ 42 U.S.C. §7543(e)

¹⁰⁰ 25 Texas Register 8222 (25 August 2000)

¹⁰¹ *TNRCC, Airlines Reach Agreement on Houston Clean Air Plan*, TNRCC press release, 6 October 2000 (<http://www.tnrcc.state.tx.us/exec/media/press/10-00airline.html>)

¹⁰² 64 Federal Register 73300 (29 December 1999)

¹⁰³ 42 U.S.C. Section 7547

mandate in the 1990 CAAA, the EPA adopted standards for locomotives in December 1997.¹⁰⁴ These standards, to be staged in beginning in 2000, specify hydrocarbon, carbon monoxide, NOx, and particulate matter limits for new and rebuilt locomotives.

According to the EPA, these new standards will reduce NOx emissions from locomotives by 60% by the 2040, with 41% of the reductions coming by 2010. The EPA did not estimate how many NOx reductions would occur by 2007, the year that Houston-Galveston-Brazoria is required to be in compliance with the federal ozone standard. These standards required no reductions by the mandated attainment dates for serious, moderate, and marginal ozone nonattainment areas.

¹⁰⁴ 63 Federal Register 18978 (16 April 1998)

AREA ANALYSIS

REGIONAL STRATEGY

In recent years the focus for controlling ozone pollution in some areas has been shifting from local controls only to a mix of regional and local controls. This new strategy is in response to an increasing body of evidence that the transport of ozone and ozone precursors, such as nitrogen oxides, into an area can significantly hinder achievement of the ozone standard. The regional approach to ozone control took force in 1995 with the formation of the Ozone Transport Assessment Group (OTAG), a partnership between the U.S. EPA, the Environmental Council of the States, and various industry and environmental groups. OTAG undertook the most comprehensive attempt ever undertaken to understand and quantify the transport of ozone. Besides OTAG, several other activities have led to and support the regional concept for ozone control in eastern Texas:

- the development of regional photochemical modeling;
- the Coastal Oxidant Assessment for Southeast Texas (COAST) project, in which the TNRCC and its contractor (Environ, Inc.) performed regional-scale modeling;
- additional regional-scale modeling performed by the University of Texas in support of the Houston-Galveston-Brazoria and Dallas-Fort Worth nonattainment area SIPs;
- the deployment of intensive aircraft monitoring by Baylor University; and
- the smoke and haze episodes from fires in Central America during the summer of 1998 helped reinforce the fact that air pollution is capable of traveling hundreds of miles.

Texas was not included in OTAG's call for mandatory NO_x reductions because emissions from Texas were demonstrated to not make a significant contribution to ozone nonattainment in downwind states. However, both the TNRCC and OTAG studies suggest that regional air pollution throughout eastern Texas should be considered when addressing air quality in Texas' ozone nonattainment areas.

In July 1998 the EPA issued a guidance memorandum¹⁰⁵ that would allow areas that demonstrate that they are affected by transport to extend their ozone compliance date without being bumped up to a higher nonattainment classification. This guidance document reinforced the TNRCC's regional approach and provided possible regulatory relief for the Beaumont-Port Arthur and Dallas-Fort Worth ozone nonattainment areas. The state has subsequently argued that both of these areas are affected by transport from Houston and therefore should not be required to attain the ozone standard before Houston-Galveston-Brazoria's attainment date of November 2007 (see the Beaumont-Port Arthur area analysis on page 49, Houston Galveston area analysis on page 70, and the Dallas-Fort Worth area analysis on page 56 for more information). If the EPA approves both transport demonstrations, the ozone attainment strategy for all of eastern Texas, including Houston-Galveston-Brazoria, Dallas-Fort Worth, Beaumont-Port Arthur, and any additional eight-hour ozone nonattainment areas, will be on a coordinated time line.

¹⁰⁵ *Guidance on Extension of Attainment Dates for Downwind Transport Areas*; EPA guidance document; 17 July 1998 (<http://www.epa.gov/ttn/oarpg/t1/memoranda/bumpupg.html>)

In April 2000 the State submitted a SIP revision to the EPA that contained several control measures that applied either state-wide or in the east and central parts of Texas. Control measures included in this SIP revision include:

Vapor Recovery for Gasoline Stations: In June 1999 the TNRCC adopted rules that require gasoline stations in 95 counties in the eastern and central parts of Texas to install “Stage I” gasoline vapor recovery controls. These controls are intended to reduce the VOC vapors that are emitted during the filling of gasoline storage tanks at gasoline stations by tank-trucks.

Cleaner Gasoline: In June 1999 the TNRCC adopted rules requiring low-RVP gasoline with a sulfur cap for 95 eastern and central Texas counties, but has since repealed the sulfur requirement in deference to recently adopted federal standards. The low-RVP gasoline is sold from May to October, beginning in the year 2000.

Permitting Grandfathered Sources: The TNRCC, at the direction of Senate Bill 766 passed during the 76th legislative session in 1999, developed a voluntary emissions reduction plan for the permitting of existing “grandfathered” sources, which are those that existed in 1971 and have not been modified and permitted since then. At the same time, at the direction of Senate Bill 7, the TNRCC developed a mandatory permitting program for grandfathered power plants requiring a statewide NO_x reduction of 50% and sulfur dioxide reductions of 25%, beginning in May 2003. Both of these programs were adopted by the TNRCC in December 1999.

NO_x Point Source Reductions: In April 2000 the TNRCC adopted rules to establish NO_x reductions at power plants and cement kilns located in the 95 counties in eastern and central Texas. Permitted power plants are expected to reduce NO_x emissions by about 50 percent, and cement kilns by about 30 percent, beginning in 2003.

Natural-Gas Water Heaters: The April 2000 the TNRCC adopted a new statewide standard for cleaner-burning natural gas water heaters.

Cleaner Diesel Fuel: In August 2000, the TNRCC proposed new standards for diesel fuel to be phased in beginning May 2002. If adopted, these rules would require cleaner diesel fuel for all on-highway sales statewide and off-highway sales in the 95 counties in eastern and central Texas.

Low-Sulfur Gasoline: In August 2000, the TNRCC proposed new sulfur standards for gasoline, beginning May 2004, for the 95 counties in eastern and central Texas.

California Spark-Ignition Engines: In August 2000, the TNRCC proposed rules that would require manufacturers, beginning May 2004, to certify all large engines of a certain type under California standards. The proposed rule would exempt some agriculture and construction equipment, recreational equipment, stationary engines, marine vessels, and equipment on tracks. The proposed rule would apply to equipment sold statewide.

Residential and Commercial Air Conditioners: In August 2000, the TNRCC proposed rules that would require new air conditions sold in the 95 counties in eastern and central Texas, beginning January 2002, to reduce ozone by at least 70% and retain a minimum ozone reduction efficiency of 50% for 15 years.

See Attachment A for TNRCC's summary of rules adopted in April 2000 and Attachment B for a summary of rules proposed in August 2000.

Summary of Recent Actions Relevant for the Regional Area

November 1990	United States Congress passes the 1990 FCAA Amendments
November 1991	EPA designates nonattainment areas
1993 - 1994	TNRCC gathers emissions data for the COAST project, an intensive 1993 field study
December 1995	Attainment date for moderate carbon monoxide nonattainment areas
November 1996	One-hour ozone attainment deadline for moderate nonattainment areas
January 1997	Attainment deadline for the lead standard.
July 1997	EPA promulgates the eight-hour ozone and PM _{2.5} standards
July 1998	EPA issues "Guidance on Extension of Attainment Dates for Downwind Transport Areas"
November 1999	Attainment date for serious ozone nonattainment areas
March 2000	EPA issues guidance for states to use in recommending areas to be designated as attainment and nonattainment for the eight-hour ozone standard
April 2000	TNRCC submits SIP revision which include several regional rule packages.
August 2000	TNRCC proposes several regional rule packages.
First half 2001	EPA scheduled to designate eight-hour ozone nonattainment areas
2002–2004	States will collect PM _{2.5} ambient monitoring data (pending resolution of litigation)

Early 2003	TNRCC will propose an attainment demonstration for the eight-hour ozone standard (pending resolution of litigation)
Summer 2003	TNRCC will adopt an attainment demonstration for the eight-hour ozone standard (pending resolution of litigation)
May 2004	Deadline for the TNRCC to perform a mid-course review for attainment of the one-hour ozone standard and to perform modeling of mobile source emissions
May 2005	Deadline for the TNRCC to implement any rules necessary for attainment of the eight-hour ozone standard (pending resolution of litigation)
November 2007	Attainment deadline for severe one-hour ozone nonattainment areas
December 2007	Attainment deadline for areas in nonattainment of the eight-hour ozone standard but in attainment of the one-hour ozone standard (pending resolution of litigation)
December 2010	Attainment deadline for areas in nonattainment of the eight-hour ozone standard which are designated severe 15 nonattainment areas for the one-hour ozone standard (pending resolution of litigation)
December 2012	Attainment deadline for areas in nonattainment of the eight-hour ozone standard which are designated severe 17 nonattainment areas for the one-hour ozone standard (pending resolution of litigation)
2015	Attainment deadline for PM _{2.5} nonattainment areas (pending resolution of litigation)

AUSTIN

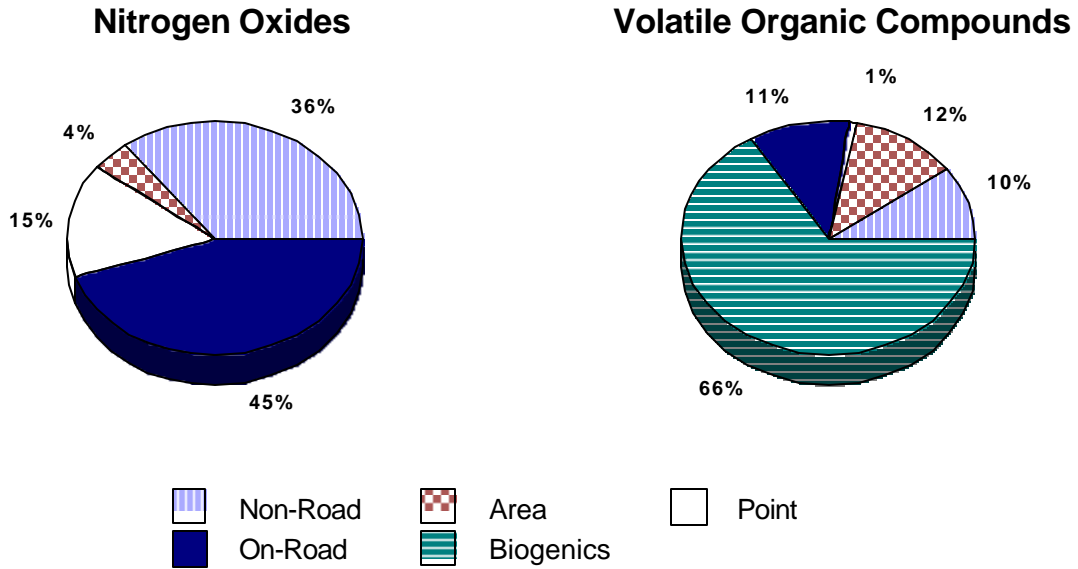
The Austin area is currently in compliance with the one-hour ozone standard, but has exceeded the new eight-hour standard. In May 2000, the TNRCC recommended that Austin, along with San Antonio and Longview-Tyler-Marshall receive an "unclassifiable" designation under the eight-hour ozone standard. That recommendation was based on the uncertainty of the court challenge to the eight-hour standard, ozone-reduction measures already in place in central and eastern Texas, and new clean air plans for Dallas-Fort Worth, Beaumont-Port Arthur and Houston-Galveston. In addition, the Austin area, consisting of Bastrop, Caldwell, Hays, Travis and Williamson Counties, would be required to develop specific plans to improve air quality earlier than would be required by the federal Clean Air Act. The governor submitted these recommendations for eight-hour nonattainment designations to the EPA, who has indicated that they may not approve them.

The TNRCC has taken several measures with respect to the one-hour ozone standard that will benefit the

Austin area's efforts to attain the eight-hour ozone standard (see the Regional Strategy analysis on page 43 for more information).

The 1996 Emissions Inventory for the Austin area shows the following percentage breakdown of NOx and VOC sources:

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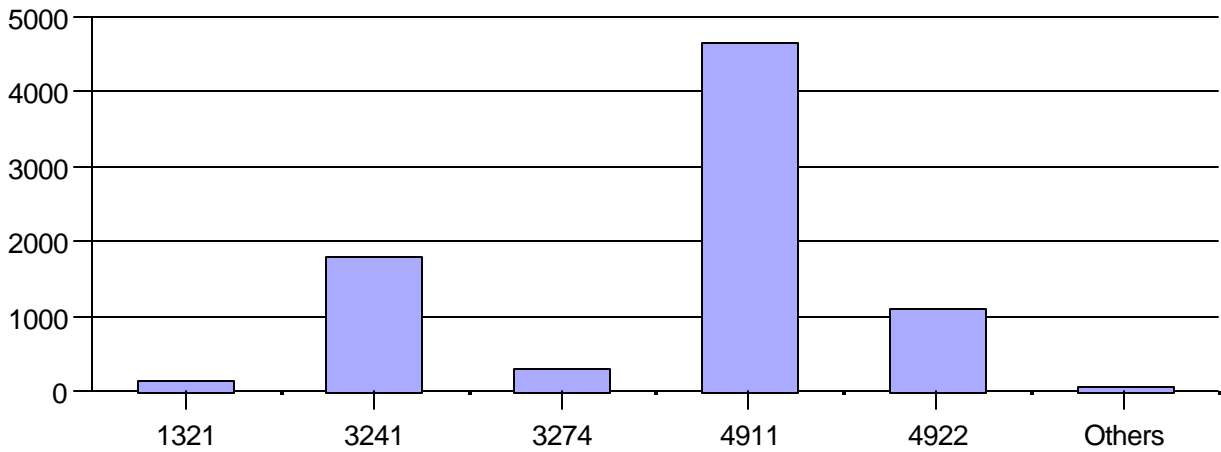


ons Inventory for the Austin five-county area shows the following industry group distribution of NOx point source emissions:

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Point Source NOx Emissions by SIC Code

Tons reported to the TNRCC for 1997

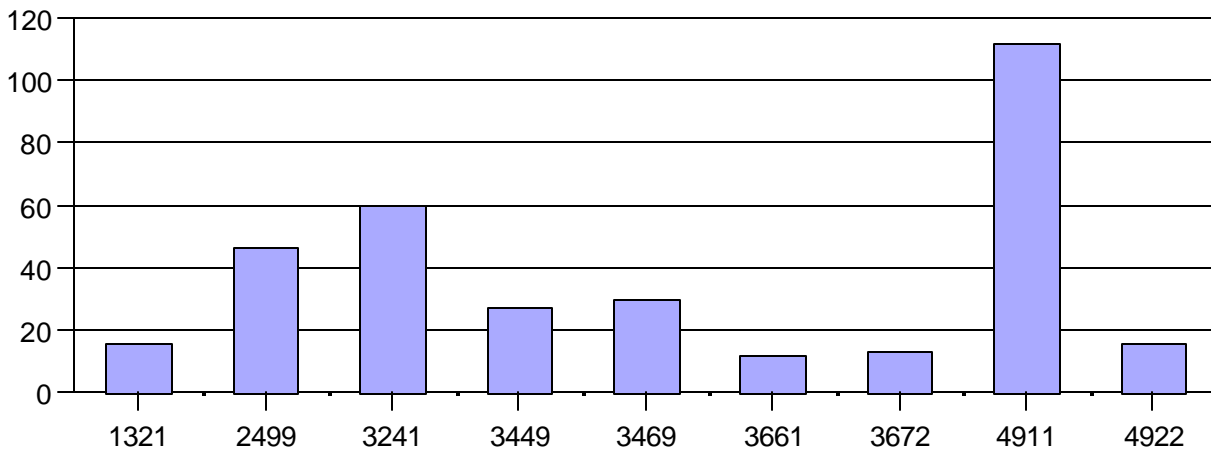


sions Inventory for the Austin five-county area shows the following industry group distribution of VOC point source emissions:

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Point Source VOC Emissions by SIC Code

Tons reported to the TNRCC for 1997

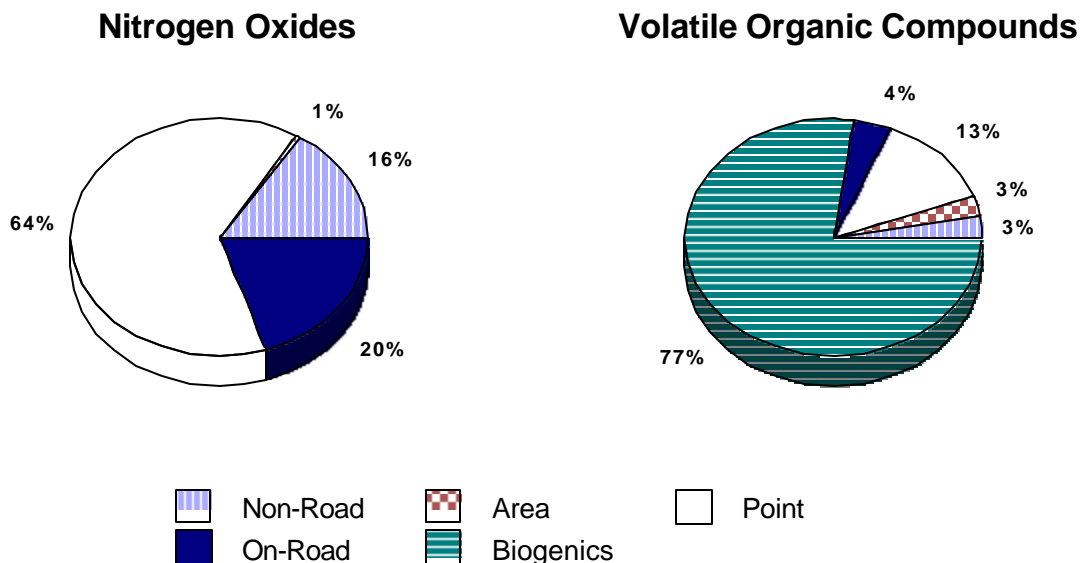


1321	Natural Gas Liquids
2499	Wood Products
3241	Cement, Hydraulic
3274	Lime (stone, clay, glass, and concrete products)
3449	Miscellaneous Structural Metal Work
3469	Metal Stampings
3661	Telephone and Telegraph Apparatus
3672	Printed Circuit Boards
4911	Electric Services
4922	Natural Gas Transmission

BEAUMONT-PORT ARTHUR

In November 1991¹⁰⁶, in accordance with the 1990 CAAA¹⁰⁷, the EPA classified the Beaumont-Port Arthur (BPA) area, which includes Hardin, Jefferson, and Orange Counties, as a serious nonattainment area for the one-hour ozone standard. For technical reasons the area was reclassified to a moderate nonattainment effective 3 June 1996.¹⁰⁸ The BPA area did not attain the standard by the November 1996 deadline for moderate nonattainment areas. However, in April 1999¹⁰⁹ the EPA proposed that, rather than bumping BPA to a serious nonattainment area, the state be allowed to submit a SIP revision demonstrating that BPA is affected by ozone transport from the Houston-Galveston-Brazoria area. The state submitted this SIP revision to the EPA in April 2000, who has not yet made a decision regarding approval. Also included in the April 2000 SIP revision were adopted rules specifying NOx emission limits for electric utility boilers, industrial boilers, and industrial process heaters that will result in approximately 40% reductions.¹¹⁰

The 1996 Emissions Inventory for the Beaumont-Port Arthur area shows the following percentage breakdown of NOx and VOC sources:



The 1997 TNRCC Emissions Inventory for the Beaumont-Port Arthur ozone nonattainment area shows the following industry group distribution of NOx point source emissions:

¹⁰⁶ 56 Federal Register 56694 (6 November 1991)

¹⁰⁷ 42 U.S.C. §7407(d)(1)(C) and 42 U.S.C. §7511(a)

¹⁰⁸ 61 Federal Register 15596 (2 April 1996)

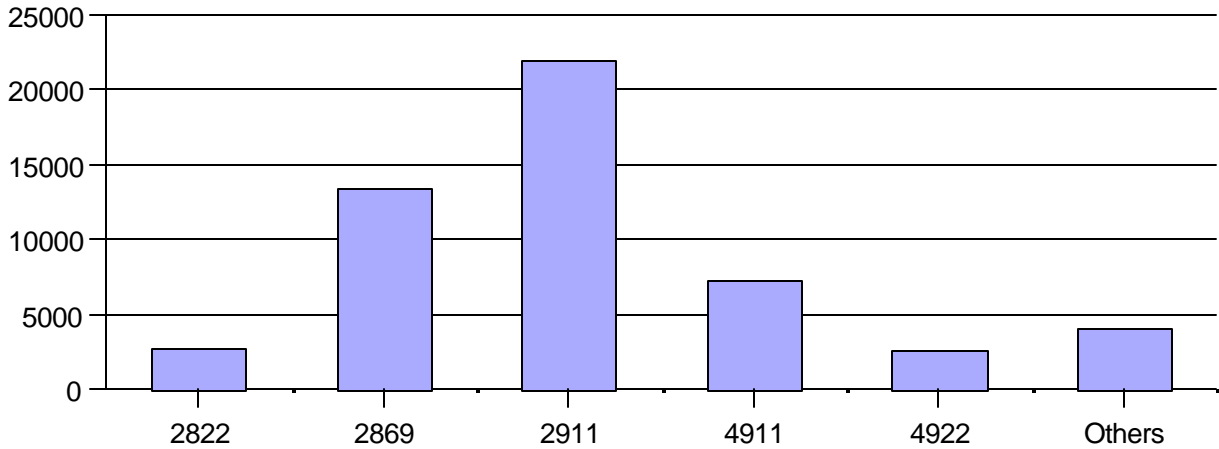
¹⁰⁹ 64 Federal Register 18865 (16 April 1999)

¹¹⁰ 25 Texas Register 4140 (5 May 2000)

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Point Source NOx Emissions by SIC Code

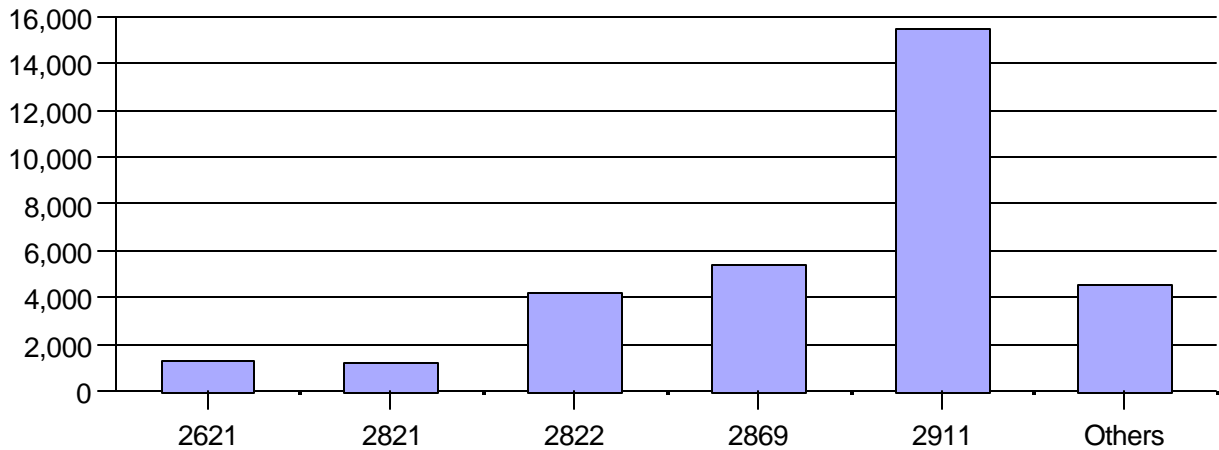
Tons reported to the TNRCC for 1997



ns Inventory for the Beaumont-Port Arthur ozone nonattainment area shows the following industry group distribution of VOC point source emissions:

Point Source VOC Emissions by SIC Code

Tons reported to the TNRCC for 1997



<u>SIC Code</u>	<u>Description</u>
2621	Paper Mills
2821	Plastics Materials, Synthetic Resins, and Nonvulcanizable Elastomers
2822	Synthetic Rubber (Vulcanizable Elastomers)
2869	Industrial Organic Chemicals
2911	Petroleum Refining
4911	Electric Services
4922	Natural Gas Transmission
Others	All other SIC codes combined

Summary of Recent Actions Relevant to the Beaumont-Port Arthur Area

November 1990	United States Congress passes the 1990 FCAA Amendments
November 1991	EPA designates Beaumont-Port Arthur a serious nonattainment area for the one-hour ozone standard
November 1993	Texas submits a SIP revision demonstrating how the Beaumont-Port Arthur area will achieve most of the 15% reduction in anthropogenic VOC emissions (Rate of Progress) reductions
May 1994	Texas submits a SIP revision demonstrating how the Beaumont-Port Arthur area will achieve the remainder of the 15% reduction in anthropogenic VOC emissions (Rate of Progress) reductions and contingency measures for additional reductions
August 1994	Texas submits modeling demonstrating that NOx reductions in the Beaumont -Port Arthur area might increase ozone concentrations and requested a section 182(f) exemption from federal NOx requirements
November 1994	Texas submits a SIP revision demonstrating how the Beaumont-Port Arthur area will achieve the 3% annual VOC emission reductions for the years 1997-1999.
January 1995	Texas submits a SIP revision containing the rules necessary to meet the 3% annual VOC emission reductions for the years 1997-1999 and modeling demonstrating progress toward attainment.
April 1995	EPA grants a temporary Section 182(f) exemption from all federal NOx requirements until 31 December 1996 for Houston-Galveston-Brazoria and Beaumont-Port Arthur.
January 1996	Texas submits additional Rate-of-Progress requirements to the EPA.

March 1996	State requests a one-year extension to the section 182(f) exemption from federal NOx control requirements.
April 1996	EPA reclassifies Beaumont-Port Arthur as a moderate nonattainment area for the one-hour ozone standard, effective 3 June 1996 ¹¹¹
August 1996	Texas submits a SIP revision making changes to the 15% Rate of Progress plan
November 1996	Attainment deadline for moderate nonattainment areas
May 1997	EPA grants limited approval of VOC control measures ¹¹²
May 1997	EPA extends the temporary 182(f) NOx exemption until 31 December 1997. ¹¹³
February 1998	EPA approves the 15% Rate-of Progress plan and motor vehicle emissions budget for the Beaumont-Port Arthur area ¹¹⁴
February 1998	The temporary 182(f) NOx exemption expires, effective 10 February 1998 ¹¹⁵
July 1998	EPA issues “Guidance on Extension of Attainment Dates for Downwind Transport Areas”
April 1999	EPA publishes notice that Beaumont-Port Arthur has failed to achieve the one-hour ozone standard by the deadline for moderate nonattainment areas but proposes to extend the nonattainment deadline provided that Texas demonstrates by 15 November 1999 that Beaumont-Port Arthur is affected by transport from the Houston-Galveston-Brazoria area ¹¹⁶
November 1999	Attainment deadline for serious nonattainment areas. State submits transport demonstration to the EPA.
April 2000	TNRCC submits SIP revision for the Beaumont–Port Arthur area including modeling demonstrating transport from Houston-Galveston-Brazoria and controls on NOx

¹¹¹ 61 Federal Register 14496 (April 2, 1996)

¹¹² 62 Federal Register 27964 (22 May 1997)

¹¹³ 62 Federal Register 28344 (23 November 1997)

¹¹⁴ 63 Federal Register 6659 (10 February 1998)

¹¹⁵ 63 Federal Register 7071 (12 February 1998)

¹¹⁶ 64 Federal Register 18864 (16 April 1999)

point sources.

CORPUS CHRISTI

The Corpus Christi area, which includes Nueces and San Patricio Counties, is currently in attainment of all federal air quality standards, including the proposed eight-hour ozone standard. In reaction to almost violating the one-hour ozone standard in 1995, Corpus Christi entered into an agreement with the EPA in July 1996 to establish the area as a flexible attainment region (FAR). The FAR approach allows areas to take specific ozone-reducing measures and allows time for those measures to improve air quality before the area is designated as nonattainment. Under the FAR, the area effectively used voluntary control measures to help the area remain in attainment. Local authorities voluntarily took the following VOC emission-reduction actions to cut ozone levels:

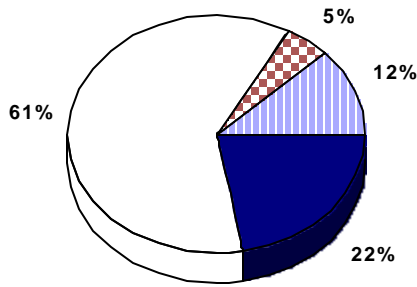
- the use of low Reid vapor pressure gasoline from May through September;
- the installation of vapor recovery and control systems at marine fuel transfer and loading facilities;
- the rescheduling of uncontrolled loading activities on ozone action days until evening or until another day;
- a pollution prevention program that targeted small and large businesses—for example, by promoting the use of vapor recovery systems for gasoline pumps;
- promotion of alternative fuels through the Clean Cities Program of the U.S. Department of Energy; and
- a local refiner's promotion of the use of reformulated gasoline in large vehicle fleets and for retail sale to the public.

Like most of the Texas gulf coast, the maximum monitored ozone concentrations for Corpus Christi during the summer of 1999 were higher than in recent years. The area has not had an exceedance of the one-hour standard since 1995, but air quality moved closer to the proposed eight-hour ozone standard because of these higher ozone readings. Therefore, the area plans to not only continue the voluntary VOC emission controls, but also proposes to extend the period during which low-vapor pressure gasoline is used. In addition, the TNRCC has taken several measures with respect to the one-hour ozone standard that will benefit the Corpus Christi area's efforts to remain in compliance with the ozone standard (see the Regional Strategy analysis on page 43 for more information).

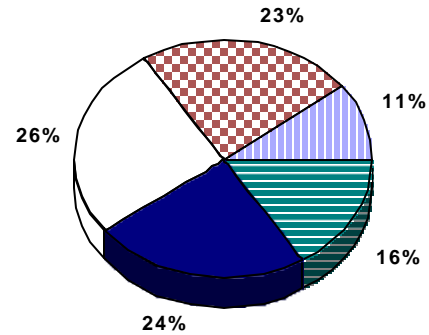
The 1996 Emissions Inventory for the Corpus Christi area shows the following percentage breakdown of NO_x and VOC sources:

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Nitrogen Oxides



Volatile Organic Compounds

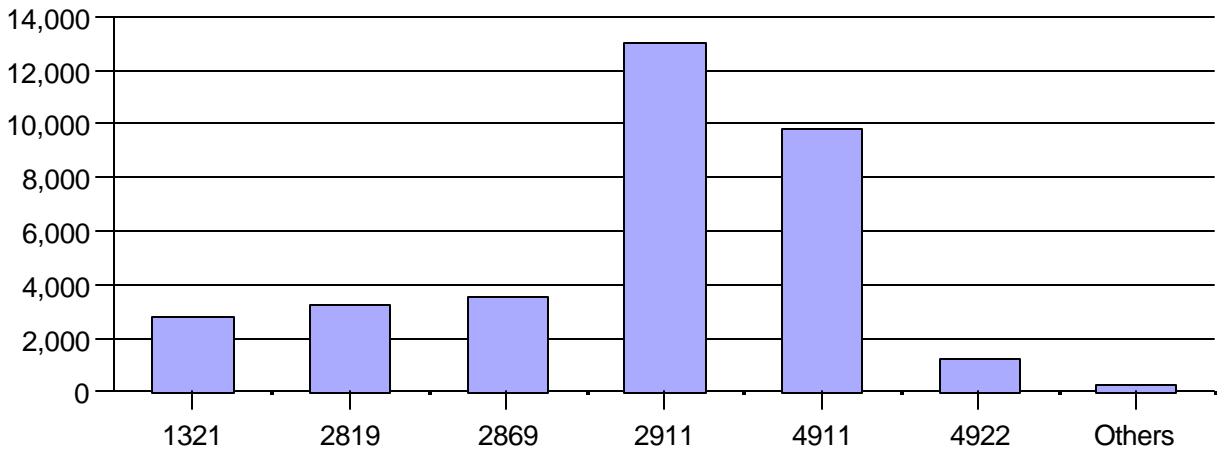


ons Inventory for the two-county Corpus Christi area shows the following industry group distribution of NOx point source emissions:

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Point Source NOx Emissions by SIC Code

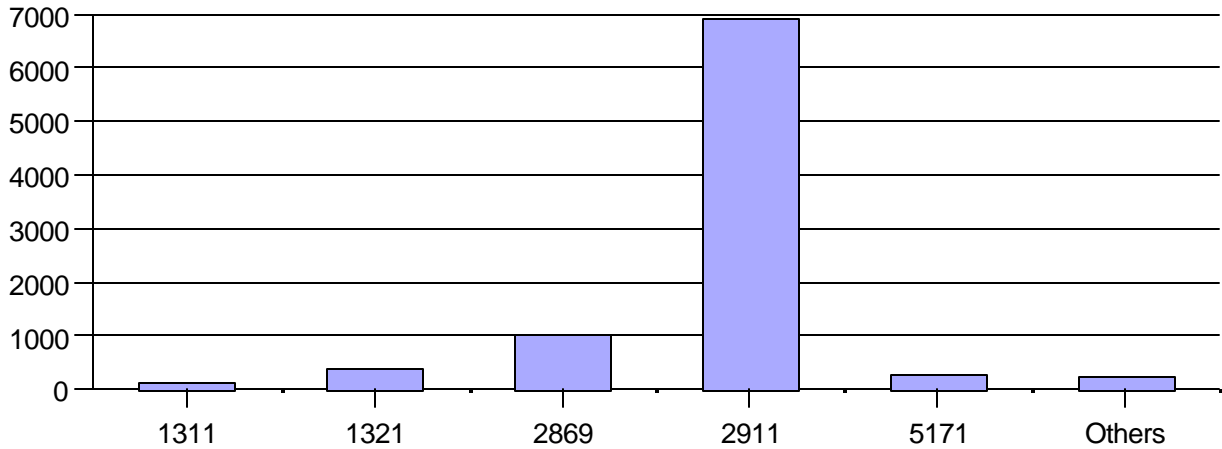
Tons reported to the TNRCC for 1997



ons Inventory for the two-county Corpus Christi area shows the following industry group distribution of VOC point source emissions:

Point Source VOC Emissions by SIC Code

Tons reported to the TNRCC for 1997



1311	Crude Petroleum and Natural Gas
1321	Natural Gas Liquids
2819	Industrial Inorganic Chemicals
2869	Industrial Organic Chemicals
2911	Petroleum Refining
4911	Electric Services
4922	Natural Gas Transmission
5171	Petroleum Bulk stations and Terminals
Others	All other SIC codes combined

DALLAS-FORT WORTH

- Dallas, Tarrant, Denton, and Collin Counties in the Dallas-Fort Worth (DFW) area are currently in nonattainment of the one-hour ozone standard.
- The DFW area will likely be in nonattainment of the eight-hour ozone standard, should that standard be reinstated.
- Preliminary monitoring data indicate that the DFW area is marginal with respect to the new PM_{2.5} standard, should that standard be reinstated.
- A portion of Collin County was previously in nonattainment of the lead standard, however the EPA redesignated the area as attainment of this standard in October 1999.

One-hour ozone standard

In November 1991¹¹⁷ the DFW area was classified as a moderate nonattainment area for the one-hour ozone standard in accordance with the 1990 CAAA.¹¹⁸ DFW was reclassified (“bumped up”) to serious in February 1998¹¹⁹ for failing to attain the standard by the 15 November 1996 deadline for moderate areas. This bump up was based on monitored ozone concentrations from 1994, 1995 and 1996. The DFW area also failed to attain the standard by the November 15, 1999 deadline for serious nonattainment areas, based on ambient air data from 1997, 1998 and 1999.

As a result of the reclassification to serious, the EPA required that a new SIP demonstrating attainment of the ozone standard in DFW be submitted by March 1999. Texas submitted the revision in March 1999, but in June 1999¹²⁰ the EPA published notice of their finding that this SIP revision was not approvable because it failed to include all of the necessary elements:

1. The attainment demonstration was incomplete because the included model results did not demonstrate that the SIP will result in attainment no later than 15 November 1999; and
2. The Rate-of-Progress Plan was incomplete because it did not demonstrate emission reductions of at least three percent-per-year, after accounting for growth, during the 1997 to 1999 period.

As a result of this EPA action, a “sanctions clock” and a “federal implementation plan (FIP) clock” were started for the DFW area effective 13 May 1999. The TNRCC adopted followup SIP revisions in October 1999 and April 2000 to correct the deficiencies. The “sanctions clock” was turned off in June 2000 when the EPA declared the April 2000 SIP revision administratively complete. The “FIP clock” will be turned off when the EPA approves that SIP revision, which is anticipated by December 2000.

Mounting technical data (e.g., modeling and airplane monitoring data) suggest that NO_x reductions in the region and the Houston-Galveston-Brazoria area, as well as local reductions, are a necessary and integral component in the strategy for DFW’s attainment of the one-hour ozone standard. Control strategy options for the SIP revision were developed by a group consisting of local elected officials and business leaders, known as the North Texas Clean Air Steering Committee. The April 2000 SIP revision contains a modeling demonstration which shows that the air quality in the DFW area is at times influenced by the Houston-Galveston-Brazoria area. This demonstration, if approved by EPA, would allow EPA to determine that the DFW area should not be bumped up to the “severe” classification. It would also allow DFW to have until no later than 15 November 2007, the deadline for Houston-Galveston-Brazoria, to attain the one-hour ozone

¹¹⁷ 56 Federal Register 56694 (6 November 1991)

¹¹⁸ 42 U.S.C. §7407(d)(1)(C) and 42 U.S.C. §7511(a)

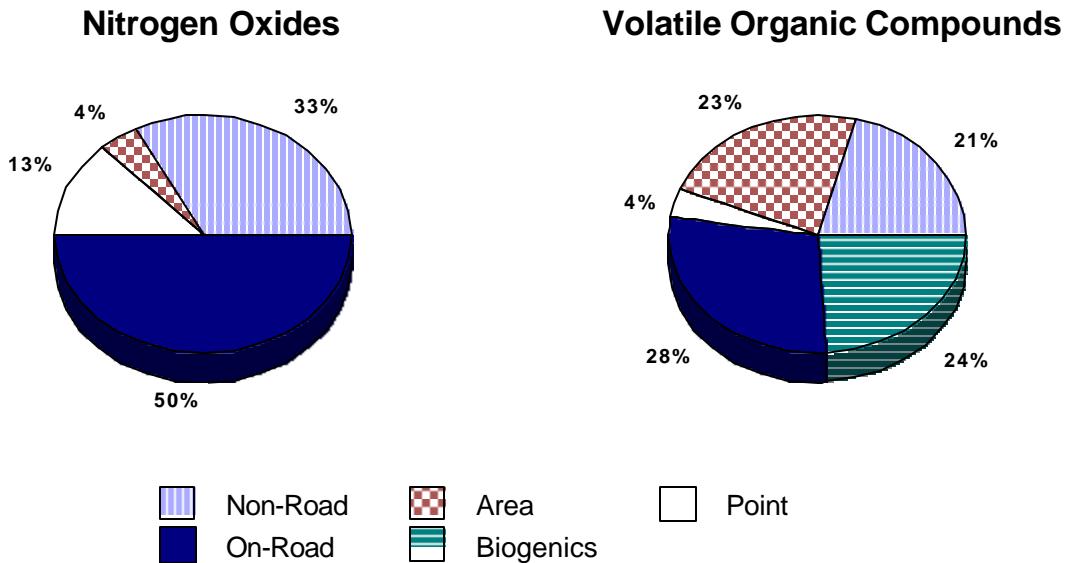
¹¹⁹ 63 Federal Register 8128 (18 February 1998)

¹²⁰ 64 Federal Register 29570 (2 June 1999)

standard. In October 1999 the EPA indicated that they would approve the extension to 2007 provided that the April 2000 SIP revision is submitted on time and is approvable. The April 2000 SIP revision proposal also includes a “weight-of-evidence” argument which consists of several elements which, taken together, form a compelling argument that attainment will be achieved by 2007. See Attachment A and Attachment B for a list of control measures that were included with the April 2000 SIP revision and the August 2000 TNRCC proposal.

The latest emissions inventory for the Dallas/Ft. Worth area shows the following breakdown of NOx and VOC emissions:

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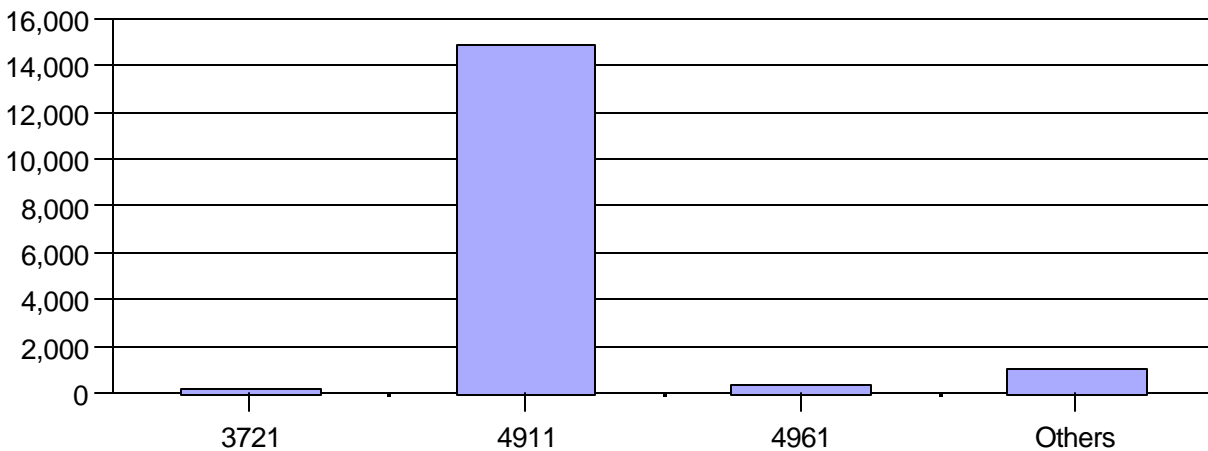


ons Inventory for the Dallas-Fort Worth ozone nonattainment area shows the following industry group distribution of NOx point source emissions:

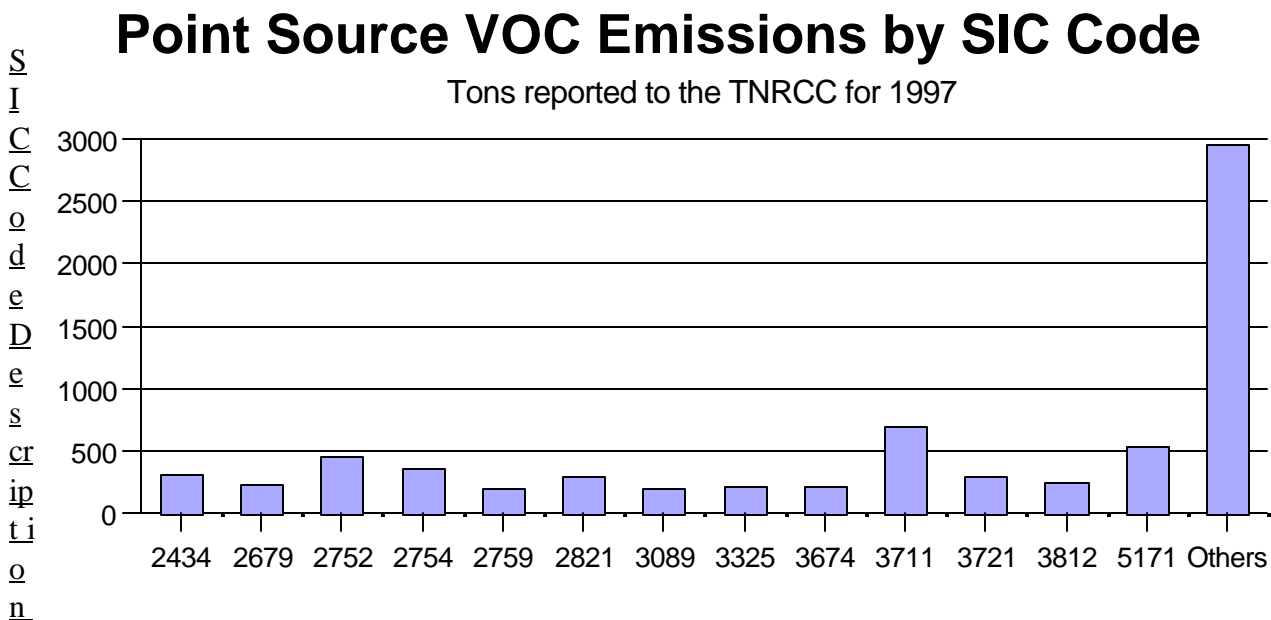
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Point Source NOx Emissions by SIC Code

Tons reported to the TNRCC for 1997



issions Inventory for the Dallas-Fort Worth ozone nonattainment area shows the following industry group distribution of VOC point source emissions:



2434	Wood Kitchen Cabinets
2679	Converted Paper and Paperboard Products
2752	Commercial Printing, Lithographic
2754	Commercial Printing, Gravure
2759	Commercial Printing
2821	Plastics Materials, Synthetic Resins, and Nonvulcanizable Elastomers
3089	Plastics Products
3325	Steel Foundries
3674	Semiconductors and Related Devices
3711	Motor Vehicles and Passenger Car Bodies
3721	Aircraft
3812	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical
4911	Electric Services
4961	Steam and Air-Conditioning Supply
5171	Petroleum Bulk stations and Terminals
Others	All other SIC codes combined

Lead standard

Frisco, Texas, located in Collin County, is the home of a lead smelter and lead oxide manufacturing facility. Monitors near this plant measured ambient lead concentrations exceeding the lead standard in 1985, 1989 and 1990. In November 1991, the EPA published notice¹²¹ that the portion of Collin County surrounding the facility was being designated as nonattainment for the federal lead standard effective 6 January 1992. The FCAA required this area to attain the standard by 6 January 1997.

Measures outlined by the Texas Air Control Board in a June 1993 site-specific SIP revision were successful in bringing the area into attainment of the lead standard. In July 1999 the TNRCC adopted a SIP revision which petitioned the EPA to redesignate the area to attainment for the lead standard. The revision also provides a maintenance plan¹²² for the area to ensure continued compliance and a commitment by the commission to keep the existing monitoring network in place until the end of the maintenance period. The EPA approved the redesignation in October 1999.¹²³

Summary of Recent Actions Relevant to the Dallas-Fort Worth Area

November 1990	United States Congress passes the 1990 FCAA Amendments
November 1991	EPA designates Dallas-Fort Worth a moderate nonattainment area for the one-hour ozone standard
November 1991	EPA publishes notice that it has designated a portion of Collin County as nonattainment for the lead standard, effective 6 January 1992 ¹²⁴
July 1993	Texas submits a SIP revision for the lead standard for a portion of Collin County
November 1993	Texas submits a SIP revision demonstrating how the Dallas-Fort Worth area will achieve most of the 15% Rate of Progress reductions
May 1994	Texas submits a SIP revision demonstrating how the Dallas-Fort Worth area will achieve the remainder of the 15% Rate of Progress reductions and contingency measures for additional reductions

¹²¹ 57 Federal Register 56694 (6 November 1991)

¹²² Maintenance areas are those areas that have violated NAAQS in the past but are currently in attainment and are implementing plans to stay in attainment.

¹²³ 64 Federal Register 55421 (13 October 1999)

¹²⁴ 57 Federal Register 56694 (6 November 1991)

September 1994	Texas submitted a SIP revision demonstrating attainment with the one-hour ozone standard for the Dallas-Fort Worth and El Paso areas.
November 1994	EPA publishes notice that it has conditionally approved a section 182(f) exemption from NO _x control requirements for Dallas-Fort Worth based upon Texas' demonstration that the Dallas-Fort Worth area would attain the one-hour ozone standard without implementing the NO _x controls required under section 182(f). ¹²⁵
November 1994	EPA publishes notice that it has approved the lead SIP for a portion of Collin County ¹²⁶
August 1996	Texas submitted a SIP revision making changes to the 15% Rate of Progress plan
November 1996	One-hour ozone attainment deadline for moderate nonattainment areas (the Dallas-Fort Worth area fails to attain the standard)
January 1997	Attainment deadline for the lead standard.
May 1997	EPA grants limited approval of part of Texas' 15% Rate of Progress plan. ¹²⁷
July 1997	EPA promulgates the eight-hour ozone and PM _{2.5} standards
February 1998	EPA reclassified ("bumped up") Dallas-Fort Worth as a serious nonattainment area failing to attain the one-hour ozone standard by the November 1996 deadline for moderate areas. The reclassification is based on monitored data from 1994 through 1996 and is effective 20 March 1998. ¹²⁸
July 1998	EPA issues "Guidance on Extension of Attainment Dates for Downwind Transport Areas"
November 1998	EPA grants conditional interim approval of the 15% Rate-of-Progress plan and motor vehicle emissions budget for Dallas-Fort Worth, El Paso, and Houston-Galveston-Brazoria ¹²⁹

¹²⁵ 59 Federal Register (28 November 1994)

¹²⁶ 59 Federal Register 60905 (29 November 1994)

¹²⁷ 62 Federal Register 27964 (22 May 1997)

¹²⁸ 63 Federal Register 8128 (18 February 1998)

¹²⁹ 63 Federal Register 62943 (10 November 1998)

March 1999	Texas submits a SIP revision to address new requirements based on the reclassification to a serious nonattainment area for the one-hour ozone standard, including 3% average annual emission reduction requirements for 1997-1999. NOx reduction requirements are included in this SIP because modeling predicts that NOx reductions will be beneficial.
April 1999	EPA publishes notice that it has rescinded the 182(f) exemption from NOx control requirements for the Dallas-Fort Worth based on Texas' demonstration that NOx reductions will help the area attain the ozone standard ¹³⁰
June 1999	EPA publishes notice of their finding that Texas had failed to submit a required SIP for the Dallas-Fort Worth area, effective 13 May 1999 ¹³¹
October 1999	EPA publishes notice that it has redesignated Collin county to attainment for the lead standard ¹³²
October 1999	TNRCC submits a SIP revision correcting some of the deficiencies in the March 1999 SIP revision for the one-hour ozone standard.
November 1999	Attainment deadline for serious nonattainment areas. Texas submits transport demonstration to the EPA.
April 2000	TNRCC submits a SIP revision correcting the remainder of the deficiencies in the March 1999 SIP revision for the one-hour ozone standard.
June 2000	EPA declares the April 2000 SIP revision administratively complete, effectively turning off the "sanctions clock."
December 2000	Estimated date for EPA approval of the April 2000 SIP revision for the one-hour ozone standard.
Early 2001	EPA scheduled to designate eight-hour ozone nonattainment areas
May 2001	The "FIP clock" for the DFW area will expire.
2002–2004	States will collect PM _{2.5} ambient monitoring data

¹³⁰ 64 Federal Register 19283 (20 April 1999)

¹³¹ 64 Federal Register 29570 (2 June 1999)

¹³² 64 Federal Register 55421 (13 October 1999)

Early 2003	TNRCC will propose an attainment demonstration for the eight-hour ozone standard (pending resolution of litigation)
Summer 2003	TNRCC will adopt an attainment demonstration for the eight-hour ozone standard (pending resolution of litigation)
May 2004	Deadline for the TNRCC to perform a mid-course review for attainment of the one-hour ozone standard and to perform modeling of mobile source emissions
May 2005	Deadline for the TNRCC to implement any rules necessary for attainment of the eight-hour ozone standard (pending resolution of litigation)
December 2007	Attainment deadline for eight-hour ozone nonattainment areas (pending resolution of litigation)
2015	Attainment deadline for PM _{2.5} nonattainment areas (pending resolution of litigation)

EL PASO

Parts of El Paso have not met the ambient air quality standards for three of the six pollutants for which the EPA has established national standards: ground-level ozone, carbon monoxide, and particulate matter.

La Paz Agreement

The proximity of El Paso, Ciudad Juárez, and the surrounding mountains create a common air basin within which elevated concentrations of some pollutants frequently occur. In October 1989, the U.S. and Mexican governments signed Annex V to the 1983 U.S. - Mexico Environmental Agreement (“La Paz Agreement”). Annex V formed the foundation for cooperation between the two governments for studying and attempting to resolve the air pollution problems in the El Paso/Juárez basin. Studies have focused on gathering comprehensive air quality, meteorological, and emissions data, as well as dispersion modeling. The Integrated Environmental Plan for the U.S. - Mexican Border, signed by President Bush in January 1992, continues the cooperation between the two countries. Planned programs for the El Paso/Juárez basin will involve the U.S. EPA, the Mexican Ministry of Environment, Natural Resources and Fisheries, the TNRCC, and the El Paso City-County Health District.

Section 179B of the FCAA

Section 179B of the FCAA, relating to International Border Areas, would exempt an area from certain provisions of the FCAA if the State establishes to the EPA's satisfaction that the state implementation plan would be adequate to attain a national ambient air quality standard by the attainment date, were it not for emissions emanating from outside of the United States. The TNRCC has submitted to the EPA information that demonstrates that El Paso would be in attainment of all three standards were it not for emissions from Mexico. The EPA has approved the demonstration for the particulate matter standard, and has not yet acted on the demonstrations for the one-hour ozone and carbon monoxide standards.

Ozone standards

In November 1991¹³³ the El Paso area was classified as a serious nonattainment area for the one-hour ozone standard in accordance with the 1990 CAAA.¹³⁴ As mentioned previously, the TNRCC has submitted to the EPA information that demonstrates that El Paso should fall under Section 179B for the one-hour ozone standard. If the EPA agrees with this demonstration, El Paso would be exempt from certain enforcement provisions for failing to attain the one-hour ozone standard by the November 15, 1999 deadline for serious ozone nonattainment areas.

The EPA has already granted El Paso an exemption from NOx reduction requirements because the TNRCC demonstrated that those reductions were not necessary for attainment of the one-hour ozone standard. The TNRCC is awaiting modeling results from a recent EPA-supported study of the entire El Paso/Juárez area carried out under the La Paz Agreement. If these modeling results indicate that NOx reductions in El Paso would reduce ambient ozone levels, then the TNRCC will cooperate with the EPA and Mexican authorities to implement appropriate NOx controls.

El Paso is the only area in Texas that is in nonattainment of the one-hour ozone standard but currently in attainment with the new eight-hour standard.

The 1997 TNRCC Emissions Inventory for El Paso County shows the following industry group distribution of NOx point source emissions:

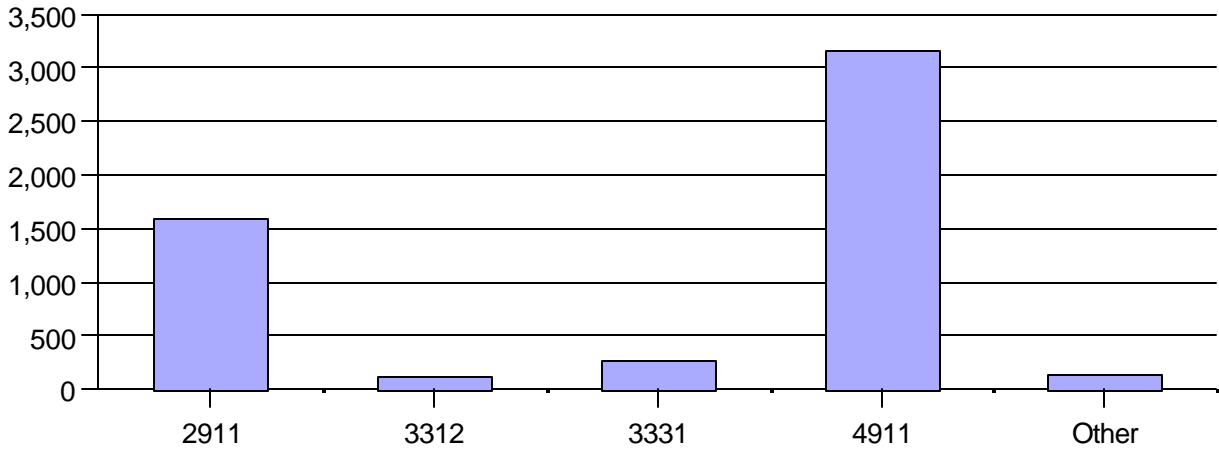
¹³³ 56 Federal Register 56694 (6 November 1991)

¹³⁴ Sections 107(d)(1)(C) and 181(a) of the Act

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Point Source NOx Emissions by SIC Code

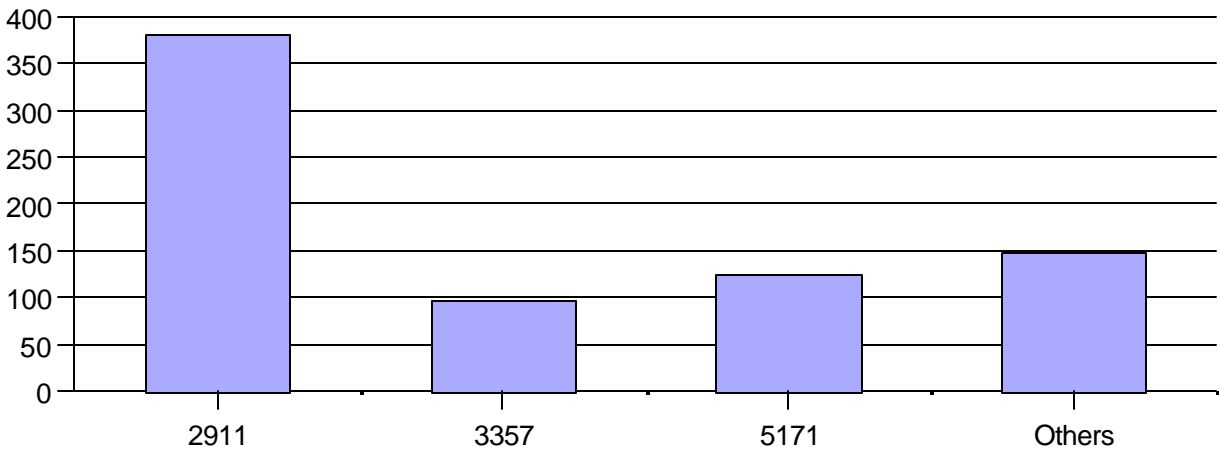
Tons reported to the TNRCC for 1997



ons Inventory for El Paso County shows the following industry group distribution of VOC point source emissions:

Point Source VOC Emissions by SIC Code

Tons reported to the TNRCC for 1997

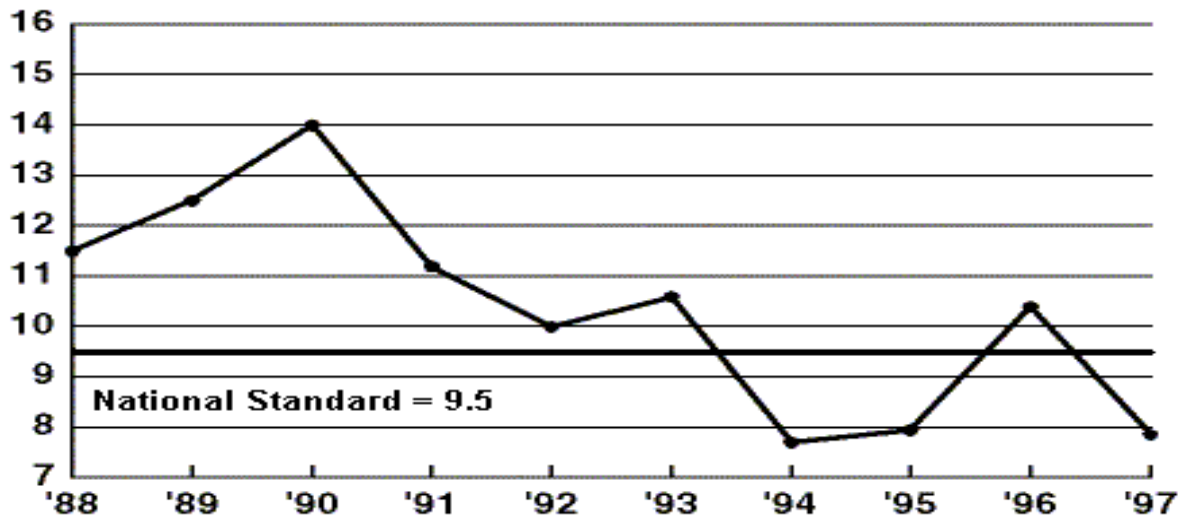


<u>SIC Code</u>	<u>Description</u>
2911	Petroleum Refining
3312	Steel Works, Blast Furnaces (Including Coke Ovens), and Rolling Mills
3331	Primary Smelting and Refining of Copper
3357	Drawing and Insulating of Nonferrous Wire
4911	Electric Services
5171	Petroleum Bulk stations and Terminals
Others	All other SIC codes combined

Carbon monoxide standard

The Federal Clean Air Act (FCAA) Amendments of 1990 classified carbon monoxide nonattainment areas as either “moderate” or “serious” based on the severity of the problem. A portion of El Paso is classified as a moderate carbon monoxide nonattainment area. This is the only area in Texas that does not meet the carbon monoxide standard. Carbon monoxide is produced by the incomplete combustion of fuels, mainly in cars and trucks. To reduce carbon monoxide emissions, the TNRCC has implemented the use of oxygenated gasoline and a vehicle inspection and maintenance program. These controls have resulted in measurable reductions in ambient carbon monoxide levels, as illustrated by the following chart, obtained from the TNRCC Website¹³⁵:

El Paso 2nd-Highest 8-Hour Maximum Carbon Monoxide Measurements
Measurements in parts per million



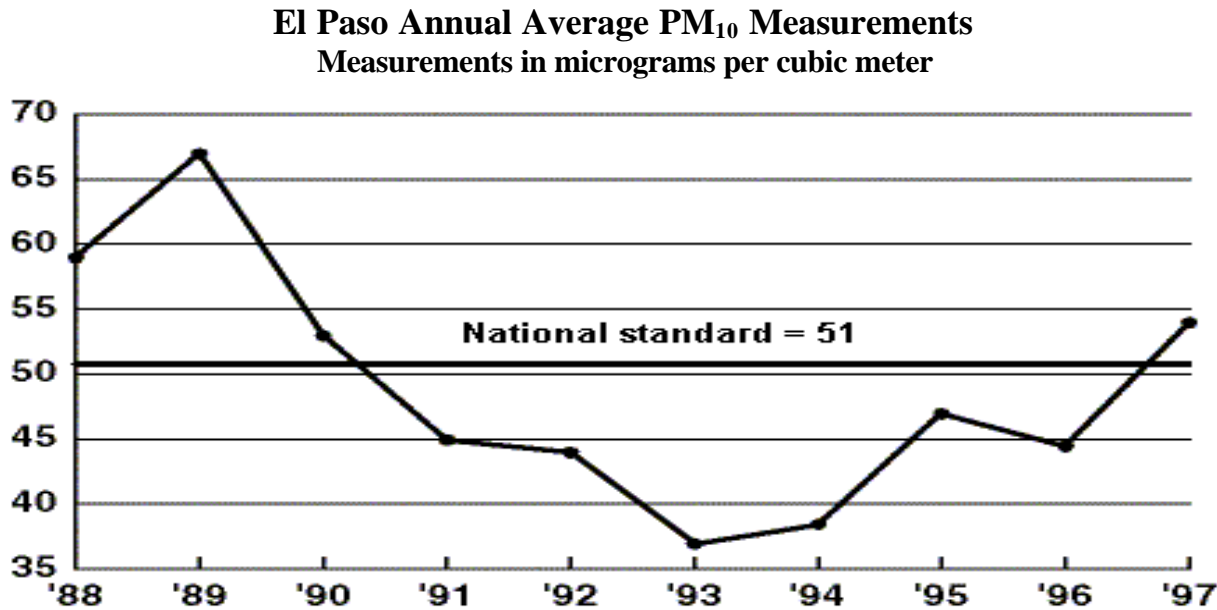
The chart plots the second-highest reading because an area can exceed the standard once each calendar year without violating the standard.

¹³⁵ <http://www.tnrcc.state.tx.us/air/monops/elpc.html>

As mentioned previously, the TNRCC has submitted to the EPA information that demonstrates that El Paso should fall under Section 179B for carbon monoxide. If the EPA agrees with this demonstration, El Paso would be exempt from certain enforcement provisions for failing to attain the carbon monoxide standard by the December 1999 deadline for moderate carbon monoxide nonattainment areas.

Particulate matter standard

El Paso is the only city in Texas that does not meet the national standard for particulate matter (PM₁₀). Sources of PM₁₀ include street sand, road dust, grinding operations, agricultural operations, and volcanoes. The EPA has approved the TNRCC's section 179B demonstration for PM₁₀ in the El Paso area. The following chart, obtained from the TNRCC Website¹³⁶, shows annual PM₁₀ monitoring results from 1988 through 1997:



Preliminary monitoring data indicate that the El Paso area will be in compliance with the new PM_{2.5} standard.

¹³⁶ <http://www.tnrcc.state.tx.us/air/monops/elppm10.html>

Lead standard

The ambient air concentration of lead in El Paso in the 1970's and early 1980's exceeded the acceptable levels established by the EPA. However, leaded gasoline was phased out beginning in 1973 and a lead smelting operation in El Paso shutdown in 1985. El Paso has met the national lead standard since 1986.

Summary of Recent Actions Relevant to the El Paso Area

1983	U.S. and Mexico sign the La Paz Agreement
October 1989	U.S. and Mexico sign Annex V to the La Paz Agreement
November 1990	Congress passes the 1990 FCAA Amendments
October 1991	City of El Paso implements an oxygenated fuels program
November 1991	EPA designates El Paso a serious nonattainment area for the one-hour ozone standard, a moderate nonattainment area for the carbon monoxide and PM ₁₀ standards. ¹³⁷
1992	TNRCC submits a SIP revision for El Paso carbon monoxide
November 1993	Texas submits a SIP revision demonstrating how the El Paso area will achieve most of the 15% Rate of Progress reductions for the one-hour ozone standard
May 1994	Texas submits a SIP revision demonstrating how the El Paso area will achieve the remainder of the 15% Rate of Progress reductions and contingency measures for additional reductions
September 1994	TNRCC submits a SIP revision for El Paso demonstrating attainment with the one-hour ozone standard by 1996

¹³⁷ 56 Federal Register (6 November 1991)

November 1994	EPA publishes notice that it has conditionally approved a section 182(f) exemption from NOx control requirements for El Paso based upon Texas' demonstration that the El Paso area would attain the one-hour ozone standard without implementing the NOx controls required under section 182(f) were it not for emissions from Mexico. ¹³⁸
September 1995	TNRCC submits a SIP revision for El Paso carbon monoxide
December 1995	Attainment date for moderate carbon monoxide nonattainment areas
July 1996	TNRCC submits SIP revision demonstrating that El Paso would be in compliance with the particulate matter and one-hour ozone standards were it not for emissions from Mexico
August 1996	Texas submits a SIP revision making changes to the 15% Rate of Progress plan and petitions the EPA to grant El Paso exemptions under Section 179B of the FCAA
January 1997	TNRCC initiates vehicle emissions inspection and maintenance program for El Paso County
November 1998	EPA grants conditional interim approval of the 15% Rate-of-Progress plan and motor vehicle emissions budget for Dallas-Fort Worth, El Paso, and Houston-Galveston-Brazoria ¹³⁹
November 1999	Attainment date for serious ozone nonattainment areas
2001	Results expected from the basin-wide ozone modeling conducted by the EPA in accordance with the La Paz Agreement

¹³⁸ 59 Federal Register (28 November 1994)

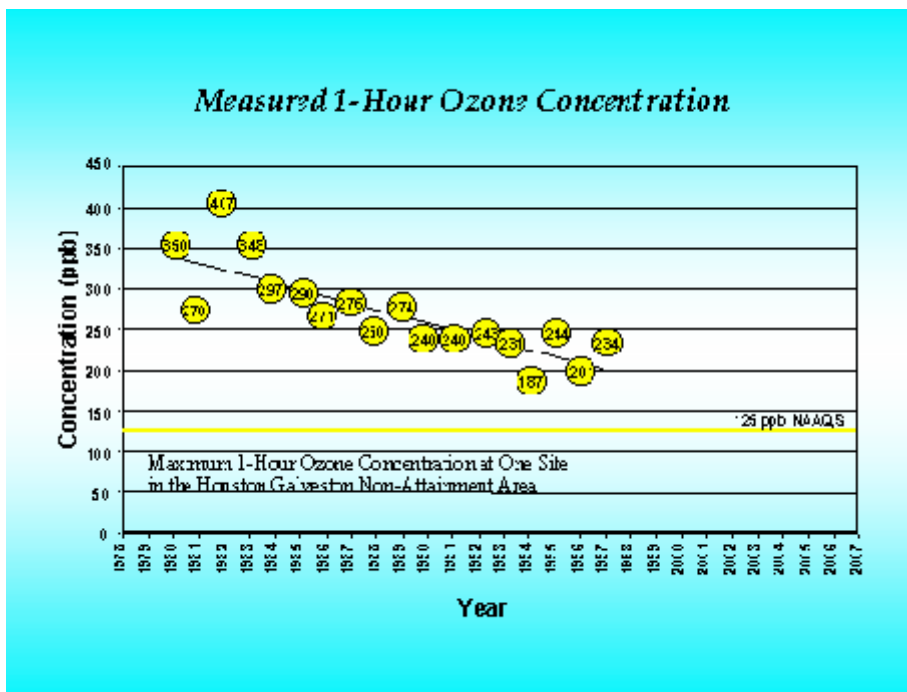
¹³⁹ 63 Federal Register 62943 (10 November 1998)

HOUSTON-GALVESTON-BRAZORIA

The Houston-Galveston-Brazoria (HGB) area is classified as a severe-17 nonattainment area for the one-hour ozone standard, and will likely be in nonattainment of the eight-hour ozone and may have difficulty achieving the PM_{2.5} standards, should those standards be reinstated.

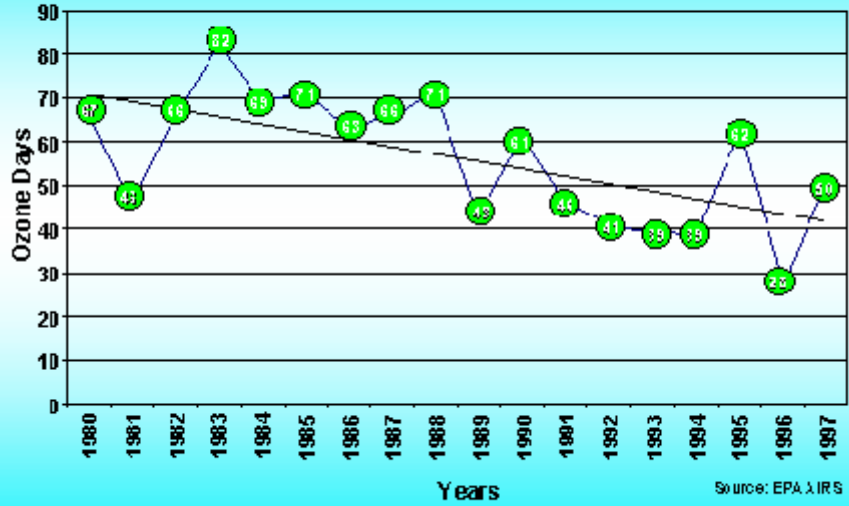
Like most of the Texas gulf coast, the maximum monitored ozone concentrations for HGB during the summer of 1999 were higher than in recent years. Houston in particular has been in the spotlight because, by some measures, the severity of Houston's ozone pollution surpassed that of Los Angeles during the summer of 1999. This discussion often ignores the fact that Houston has experienced a steady decline in the number of ozone exceedance days, but at a slower rate than Los Angeles:

“Notwithstanding the increased number ozone exceedances and peak levels of ozone in 1999, the Greater Houston region has experienced on average a 40 percent decrease in the number of ozone exceedance days since the early 1970s. This success has been the result of significant reductions in VOCs. Industry has lead the way by reducing VOCs by more than 80 percent while VOCs from automobiles have been reduced by 90 percent as a result of cleaner burning fuels and engines. All these emission reductions have occurred during a period in which overall manufacturing has nearly doubled, the region's population has doubled and the number of miles driven each day has tripled.”¹⁴⁰

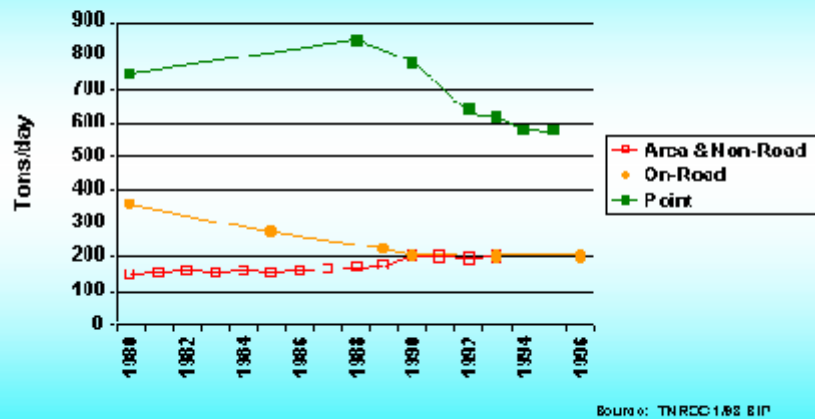


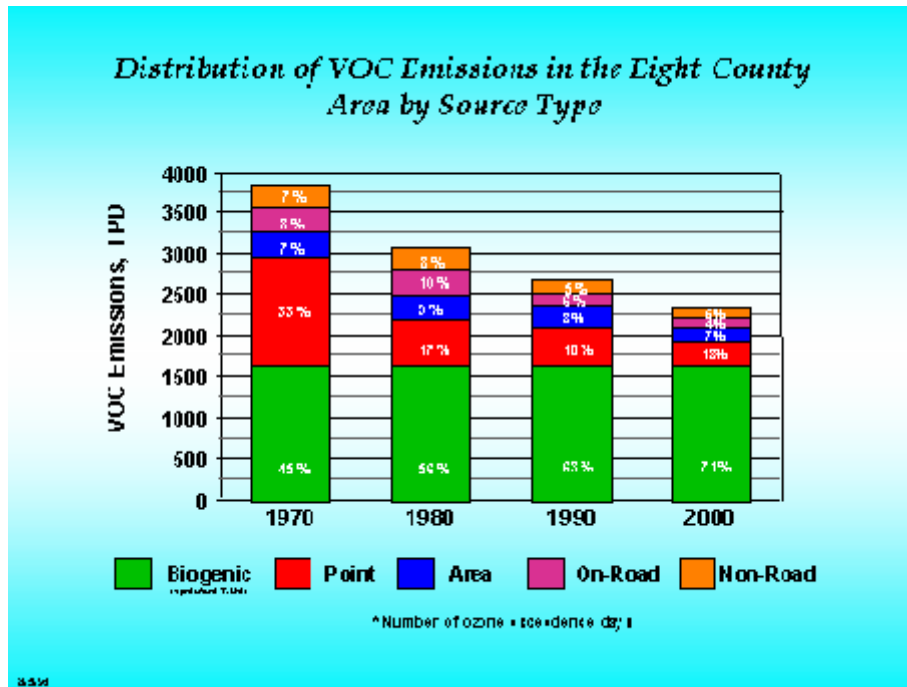
¹⁴⁰ *Cleaner Air for the Greater Houston Area*, Greater Houston Partnership; Houston, Texas; 2000 (www.houston.org). The graphics were taken from the *The Challenge* slide presentation at <http://www.houston.org/cleanair/cleanair/sld001.htm>

Maximum Number of Days Ozone Exceeded 0.12 at Any Site Houston/Galveston Non-Attainment Area



NO_x Emissions in the Houston Area





Further, Los Angeles is out of compliance with the ozone, particulate matter, and carbon monoxide standards, while Houston is out of compliance with only the ozone standard.

Ozone standards

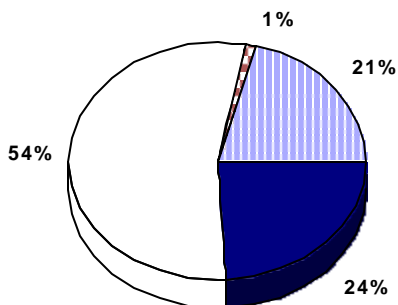
In November 1991¹⁴¹ the EPA classified the HGB area, which includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties, as a severe-17 nonattainment area for the one-hour ozone standard in accordance with the 1990 CAAA. As a severe-17 nonattainment area, HGB is required to attain the standard by 15 November 2007.

The HGB area has also exceeded the new eight-hour ozone standard. In June, Governor Bush recommended to the EPA that HGB be designated as nonattainment for the eight-hour ozone standard.

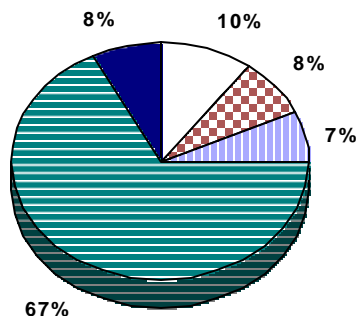
The 1996 Emissions Inventory for the Houston-Galveston-Brazoria area shows the following percentage breakdown of NOx and VOC sources:

¹⁴¹ 56 Federal Register 56694 (November 6, 1991)

Nitrogen Oxides



Volatile Organic Compounds

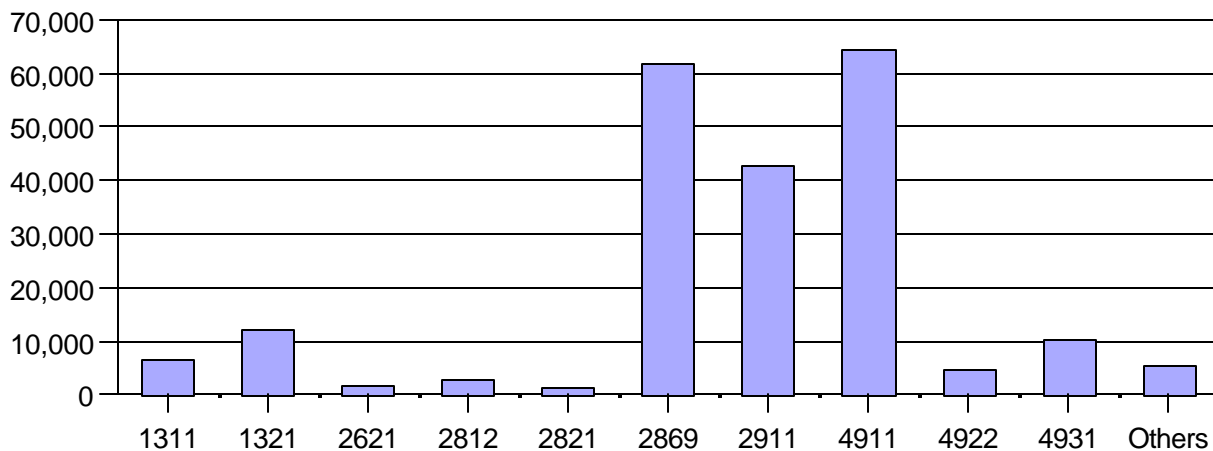


The 1997 TNRCC Emissions Inventory for the Houston-Galveston-Brazoria ozone nonattainment area shows the following industry group distribution of NOx point source emissions:

Point Source NOx Emissions by SIC Code

Tons reported to the TNRCC for 1997

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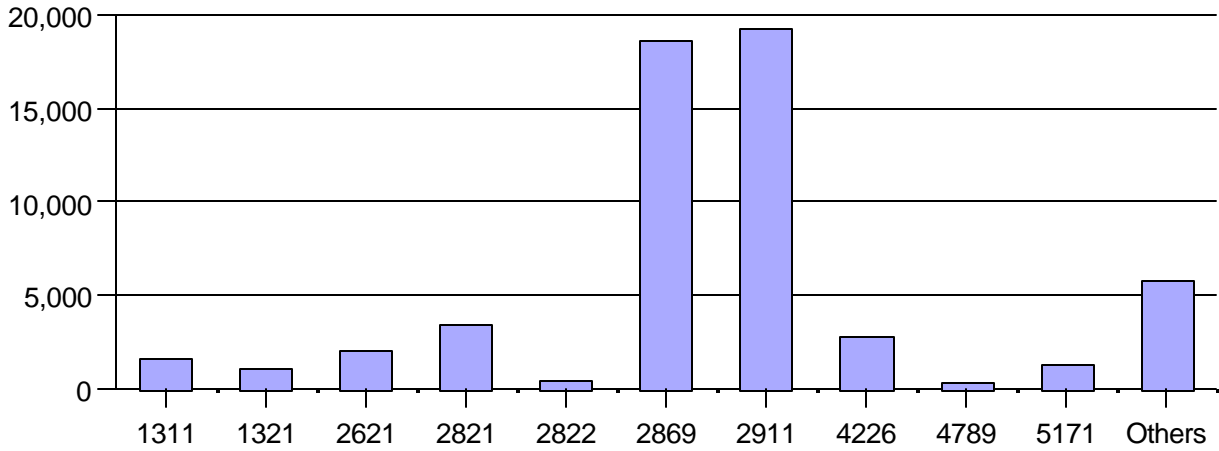


sions Inventory for the Houston-Galveston-Brazoria ozone nonattainment area shows the following industry group distribution of VOC point source emissions:

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Point Source VOC Emissions by SIC Code

Tons reported to the TNRCC for 1997



1311	Crude Petroleum and Natural Gas
1321	Natural Gas Liquids
2621	Paper Mills
2812	Alkalies and Chlorine
2821	Plastics Materials, Synthetic Resins, and Nonvulcanizable Elastomers
2822	Synthetic Rubber (Vulcanizable Elastomers)
2869	Industrial Organic Chemicals
2911	Petroleum Refining
4226	Special Warehousing and Storage
4789	Transportation Services
4911	Electric Services
4922	Natural Gas Transmission
4931	Electric and Other Services Combined
5171	Petroleum Bulk stations and Terminals
Others	All other SIC codes combined

Summary of Recent Actions Relevant to the Houston-Galveston-Brazoria area

November 1990	Congress passes the 1990 FCAA Amendments
November 1991	EPA designates Houston-Galveston-Brazoria as a severe-17 nonattainment area for the one-hour ozone standard

November 1993	Texas submits a SIP revision demonstrating how the Houston-Galveston-Brazoria area will achieve most of the 15% Rate of Progress reductions
1993 - 1994	TNRCC gathers emissions data for the COAST project, an intensive 1993 field study
May 1994	Texas submits a SIP revision demonstrating how the Houston-Galveston-Brazoria area will achieve the remainder of the 15% Rate of Progress reductions and contingency measures for additional reductions
August 1994	Texas submits modeling demonstrating that NOx reductions required by the 1990 CAAA would increase ozone concentrations in the Houston-Galveston-Brazoria area and requesting a section 182(f) exemption from federal NOx requirements
November 1994	Texas submits a SIP revision demonstrating how the Houston-Galveston-Brazoria area will achieve the 3% annual VOC emission reductions for the years 1997-1999.
January 1995	Texas submits a SIP revision containing the rules necessary to meet the 3% annual VOC emission reductions for the years 1997-1999 and modeling demonstrating progress toward attainment.
April 1995	EPA grants a temporary Section 182(f) exemption from all federal NOx requirements until 31 December 1996 for Houston-Galveston-Brazoria and Beaumont-Port Arthur. ¹⁴²
March 1996	State requests a one-year extension to the section 182(f) exemption from federal NOx control requirements.
August 1996	Texas submits a SIP revision making changes to the 15% Rate of Progress plan
May 1997	EPA grants limited approval of part of Texas' 15% Rate-of-Progress plan. ¹⁴³
May 1997	EPA extends the temporary 182(f) NOx exemption until 31 December 1997. ¹⁴⁴
July 1997	EPA promulgates the eight-hour ozone standard

¹⁴² Exemption under 42 U.S.C. §7511a(f)

¹⁴³ 62 Federal Register 27964 (22 November 1997)

¹⁴⁴ 62 Federal Register 28344 (23 November 1997)

February 1998	The temporary 182(f) NOx exemption expires, effective 10 February 1998 ¹⁴⁵
May 1998	TNRCC submits a SIP revision proposal for the one-hour ozone standard which includes modeling, an estimate of necessary VOC and NOx reductions, and possible control strategies
July 1998	EPA issues “Guidance on Extension of Attainment Dates for Downwind Transport Areas”
October 1998	EPA published notice ¹⁴⁶ that the SIP revision submitted in May 1998 could not be approved until specific control strategies were modeled to demonstrate attainment of the standard.
November 1998	EPA grants conditional interim approval of the 15% Rate-of-Progress plan and motor vehicle emissions budget for Dallas-Fort Worth, El Paso, and Houston-Galveston-Brazoria ¹⁴⁷
March 1999	EPA publishes notice that the May 1998 SIP revision constituted an “initial SIP submission” and, therefore, a new transportation conformity demonstration must be submitted within eighteen months (by November 1999). The Houston-Galveston-Brazoria Area Council had not anticipated this determination and had yet not begun the conformity analysis process.
October 1999	TNRCC submits a SIP revision proposal which includes modeling of specific control strategies, quantification of necessary NOx reductions, a 2007 mobile source budget, and specific source categories for possible control
November 1999	Texas submits a SIP revision correcting deficiencies in the October 1999 SIP revisions. However, the modeling included in this SIP revision indicates that additional NOx reductions are required to bring the area into compliance with the one-hour ozone standard. The EPA requires the TNRCC to quantify the shortfall of NOx reductions needed to reach attainment and to list and quantify potential control measures to meet the shortfall of NOx reductions needed for attainment.

¹⁴⁵ 63 Federal Register 7071 (12 February 1998)

¹⁴⁶ 64 Federal Register 58011 (28 October 1999)

¹⁴⁷ 63 Federal Register 62943 (10 November 1998)

December 1999	EPA publishes notice that the motor vehicle emissions budget from the SIP submitted in May 1998 was deficient. This finding triggered a transportation conformity lapse effective November 1999 ¹⁴⁸
June 2000	EPA publishes notice that the motor vehicle emissions budget in the October 1999 SIP submission was adequate, thus ending the transportation conformity lapse. ¹⁴⁹
April 2000	TNRCC submits a SIP revision which contains a list of potential control measures (known as the “gap list”) to address the NOx reduction shortfall identified in the October 1999 SIP revision
March 2000	EPA issues guidance for states to use in recommending areas to be designated as attainment and nonattainment for the eight-hour ozone standard
August 2000	TNRCC proposes rules for one-hour ozone attainment demonstration
December 2000	Deadline for TNRCC to adopt the majority of the rules necessary to attain the one-hour ozone standard and to submit a rate-of-progress analysis to the EPA
Early 2001	EPA scheduled to designate eight-hour ozone nonattainment areas
July 2001	Deadline for TNRCC to adopt the remainder of the rules necessary to attain the one-hour ozone standard
October 2001	EPA must either fully approve the Houston-Galveston-Brazoria attainment SIP or propose an FIP
2002–2004	States will collect PM _{2.5} ambient monitoring data (pending resolution of litigation)
Early 2003	TNRCC will propose an attainment demonstration for the eight-hour ozone standard (pending resolution of litigation)
Summer 2003	TNRCC will adopt an attainment demonstration for the eight-hour ozone standard (pending resolution of litigation)
May 2004	Deadline for the TNRCC to perform a mid-course review for attainment of the one-hour ozone standard and to perform modeling of mobile source emissions

¹⁴⁸ 64 Federal Register 68352 (7 December 1999)

¹⁴⁹ 65 Federal Register 37368 (14 June 1999)

May 2005	Deadline for the TNRCC to implement any rules necessary for attainment of the eight-hour ozone standard (pending resolution of litigation)
November 2007	Attainment deadline for severe one-hour ozone nonattainment areas
December 2007	Attainment deadline for eight-hour ozone nonattainment areas (pending resolution of litigation)
2015	Attainment deadline for PM _{2.5} nonattainment areas (pending resolution of litigation)

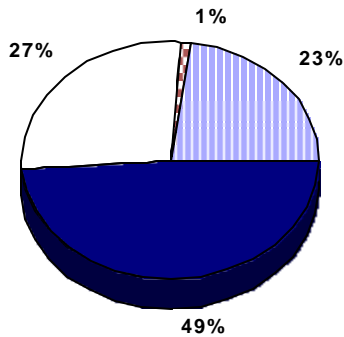
SAN ANTONIO

The San Antonio area is currently in compliance with the one-hour ozone standard, but has exceeded the new eight-hour standard. In May 2000, the TNRCC recommended that San Antonio, along with Austin and Longview-Tyler-Marshall receive an "unclassifiable" designation under the eight-hour ozone standard. That recommendation was based on the uncertainty of the court challenge to the eight-hour standard, ozone-reduction measures already in place in central and eastern Texas, and new clean air plans for Dallas-Fort Worth, Beaumont-Port Arthur and Houston-Galveston. In addition, San Antonio area, consisting of Bexar, Comal, Guadalupe, and Wilson Counties, would be required to develop specific plans to improve air quality earlier than would be required by the federal Clean Air Act. The governor submitted these recommendations for eight-hour nonattainment designations to the EPA, who has indicated that they may not approve them.

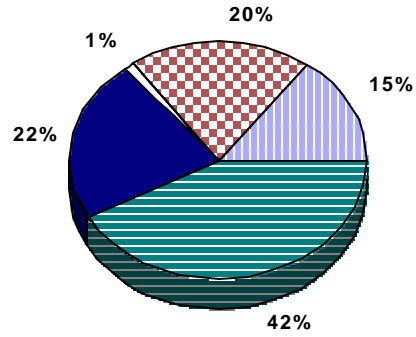
The TNRCC has taken several measures with respect to the one-hour ozone standard that will benefit the San Antonio area's efforts to attain the eight-hour ozone standard (see the Regional Strategy analysis on page 43 for more information).

The 1996 Emissions Inventory for the four-county San Antonio area shows the following percentage breakdown of NO_x and VOC sources:

Nitrogen Oxides



Volatile Organic Compounds

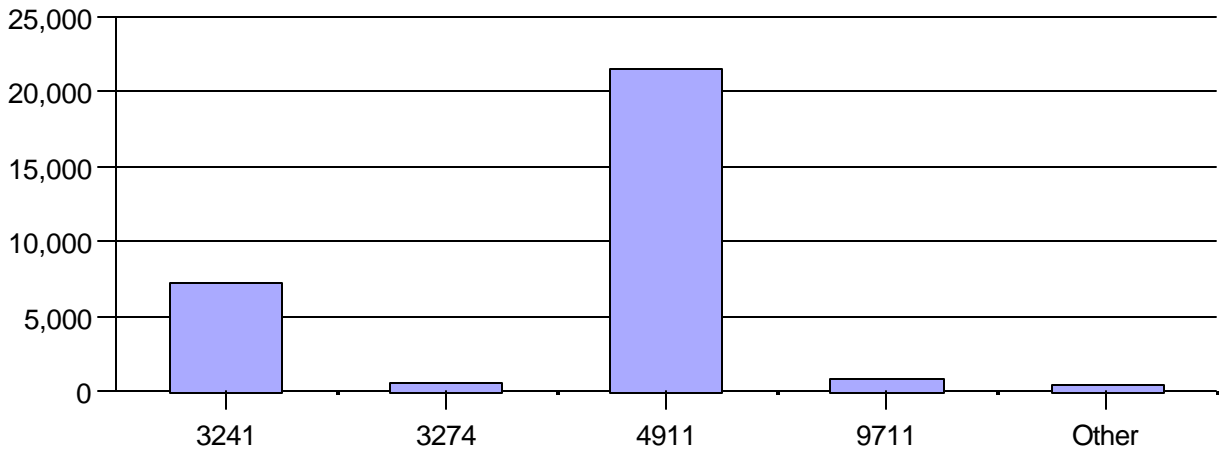


The 1997 TNRCC Emissions Inventory for the four-county San Antonio area shows the following industry group distribution of NO_x point source emissions:

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Point Source NO_x Emissions by SIC Code

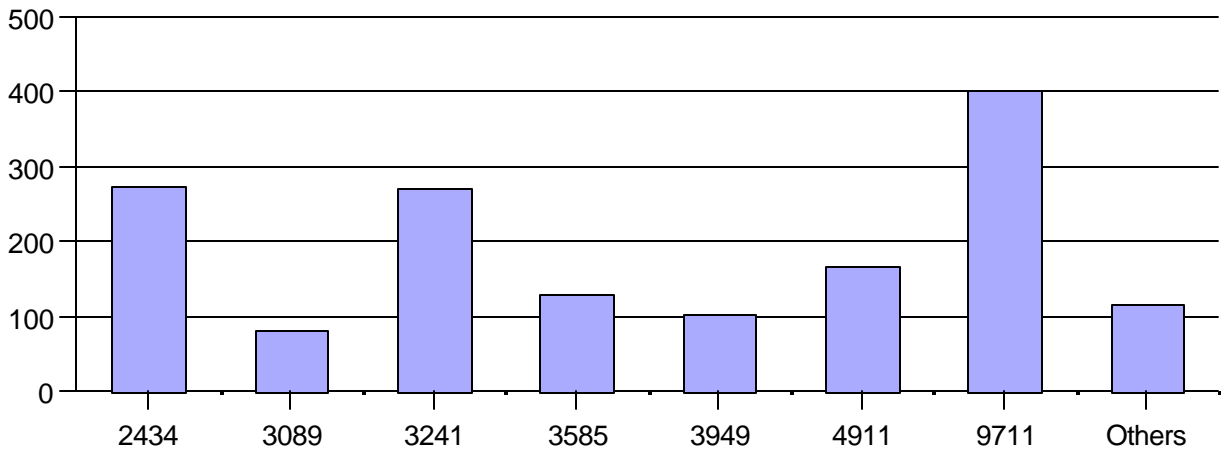
Tons reported to the TNRCC for 1997



ons Inventory for the four-county San Antonio area shows the following industry group distribution of VOC point source emissions:

Point Source VOC Emissions by SIC Code

Tons reported to the TNRCC for 1997



2434	Wood Kitchen Cabinets
3089	Plastics Products
3241	Cement, Hydraulic
3274	Lime (stone, clay, glass, and concrete products)
3585	Air-Conditioning and Warm Air Heating Equipment and Commercial and
3949	Sporting and Athletic Goods
4911	Electric Services
9711	National Security
Others	All other SIC codes combined

TYLER-LONGVIEW-MARSHALL

The Tyler-Marshall-Longview region, consisting of Gregg, Harrison, Rusk, Smith and Upshur Counties, is currently in attainment of all federal standards for all criteria pollutants, but the situation regarding the ozone standards requires some additional explanation.

Ozone standards

Gregg County was classified as nonattainment for the one-hour standard from 1977 through 1990. However, monitoring data indicated that Gregg County was in attainment of the standard when the 1990 CAAA were passed, so the entire Tyler-Longview-Marshall area was designated as attainment in November 1991. Recognizing the challenges the area faced in maintaining the area's attainment status, local governments and

industries within the five-county area formed in 1994 a voluntary cooperative association known as Northeast Texas Air Care (NETAC). NETAC began establishing programs to enhance public awareness and to reduce emissions of ozone precursors (VOC and NO_x).

During the summer of 1995, an air quality monitor in Gregg County recorded four exceedances of the one-hour ozone standard. This authorized the EPA to designate the county as nonattainment for the one-hour standard. However, to avoid this designation and the accompanying restrictions, the East Texas Council of Governments (ETCOG), NETAC, and the TNRCC worked with the EPA to establish the five-county area as a flexible attainment region (FAR). The EPA approved the Northeast Texas Flexible Attainment Region agreement in September 1996. The FAR agreement will expire in September 2001 but can be extended if all parties agree. EPA may designate the area as nonattainment, regardless of whether a FAR agreement is in place.

The FAR agreement defines a detailed plan to improve air quality and formalizes each agency's roles and responsibilities. Under the FAR agreement, industry, utilities, and local governments in the five-county area will undertake actions intended to improve air quality in the area. The FAR approach allows time for the control program to work prior to EPA issuing a call for a SIP revision or nonattainment redesignation.

Under the FAR agreement, control measures were implemented immediately and enforced through Agreed Orders. The TNRCC submitted a SIP revision to EPA addressing the exceedances of the ozone standard at the Gregg County monitor. The SIP contained Agreed Orders from four companies in the Northeast Texas region that agreed to be subject to the implementation of enforceable emission reduction measures.

During the summer of 1998 the Gregg County monitor recorded five subsequent exceedances of the 1-hour ozone standard. As a result of these exceedances, the FAR Agreement requires that contingency measures be implemented. As outlined in the FAR Action Plan under Part B Contingent Measures, in the event of a subsequent violation the SIP must be revised to include quantifiable and enforceable control measures. Through the use of an Agreed Order with Eastman Chemical Company, these measures are being included in the SIP to make them federally enforceable.

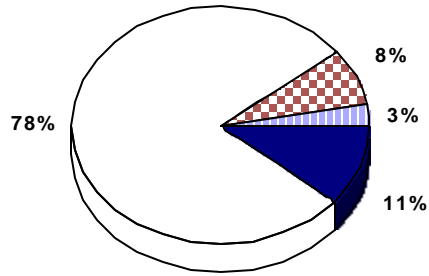
In August 2000, the area violated the proposed eight-hour standard ozone standard. In addition, a monitor in Tyler recorded one exceedance of the one-hour ozone standard, the only one ever recorded in Tyler.

Businesses, industry, and governments have taken steps to reduce ozone regionwide, particularly on predicted high-ozone days. Eastman Chemical Co. and power plant operators Texas Utilities Inc. and Central and Southwest Services Co. voluntarily instituted measures this year to reduce their nitrogen oxides (NO_x) emissions by a total of 3,451 tons per year. In addition, the TNRCC has taken several measures with respect to the one-hour ozone standard that will benefit the Austin area's efforts to attain the eight-hour ozone standard (see the Regional Strategy analysis on page 43 for more information).

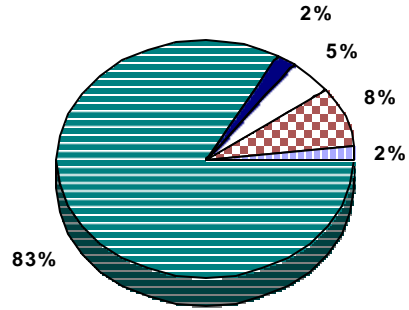
The 1996 Emissions Inventory for the Tyler-Longview-Marshall area shows the following percentage breakdown of NO_x and VOC sources:

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Nitrogen Oxides



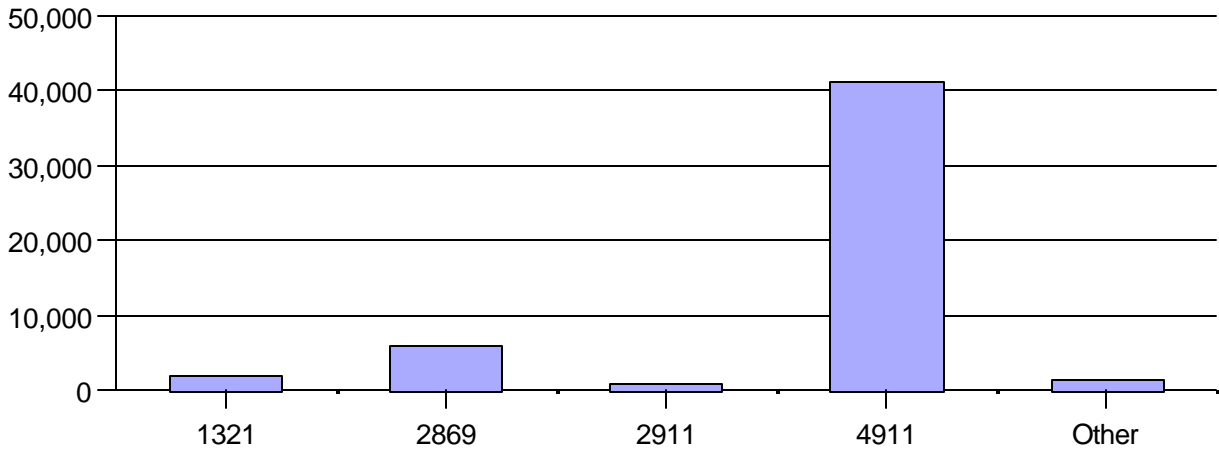
Volatile Organic Compounds



sions Inventory for the five-county Tyler-Longview-Marshall area shows the following industry group distribution of NOx point source emissions:

Point Source NOx Emissions by SIC Code

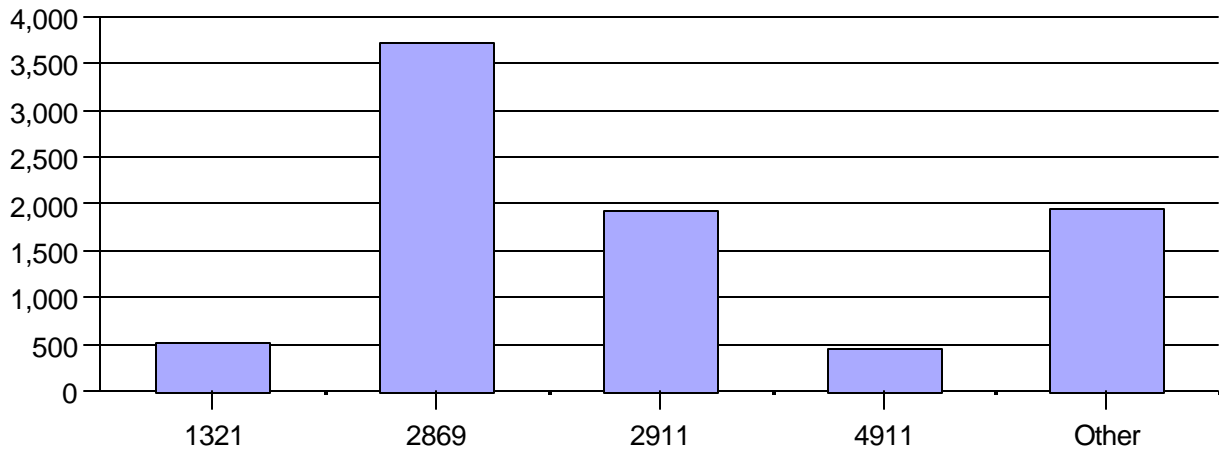
Tons reported to the TNRCC for 1997



sions Inventory for the five-county Tyler-Longview-Marshall area shows the following industry group distribution of VOC point source emissions:

Point Source VOC Emissions by SIC Code

Tons reported to the TNRCC for 1997



1321	Natural Gas Liquids
2869	Industrial Organic Chemicals
2911	Petroleum Refining
4911	Electric Services
Others	All other SIC codes combined

Summary of Recent Actions Relevant to the Tyler-Longview-Marshall Area

November 1990	Congress passes the 1990 FCAA Amendments
November 1991	EPA designates Tyler-Longview-Marshall as an attainment area for the one-hour ozone standard
1994	Northeast Texas Air Care (NETAC) is formed
Summer 1995	Gregg County violates the one-hour ozone standard
September 1996	The EPA approves the Northeast Texas Flexible Attainment Region agreement
March 1996	The NETAC Policy Committee, composed of elected officials and senior management from both local government and industry, is formed to coordinate and oversee the development of the FAR agreement and to provide a more organized and comprehensive approach to improving air quality

1996-97	ETCOG receives a grant from the TNRCC to conduct an air quality study for the region. This study, conducted by the University of Texas at Austin and Pollution Solutions, provided an emissions inventory and air monitoring information and analysis for our region.
1998-99	TNRCC provides funds to expand upon the 1996-97 study to undertake additional emissions inventory, air monitoring work, and modeling. This work was done by ENVIRON, with the University of Texas at Austin and Pollution Solutions serving as subcontractors
Summer 1998	The Gregg County ambient air monitor records five exceedances of the one-hour ozone standard
March 1999	Additional grant funds were allocated to ETCOG for an additional monitoring site and for further regional scale modeling
June 1999	State submits a SIP revision which makes federally enforceable certain voluntary emission reduction commitments made by Norit Americas, Inc.; La Gloria Oil and Gas Company; Eastman Chemical Company, Texas Eastman Division; and ARCO Permian
August 2000	The Tyler-Longview-Marshall area violated the proposed eight-hour standard ozone standard, and a monitor in Tyler recorded the only exceedance of the one-hour ozone standard ever recorded in Tyler
2000-01	ETCOG is expected to receive funds for continued modeling, analysis, and research
September 2001	The Northeast Texas Flexible Attainment Region agreement will expire unless all parties agree to an extension

VICTORIA

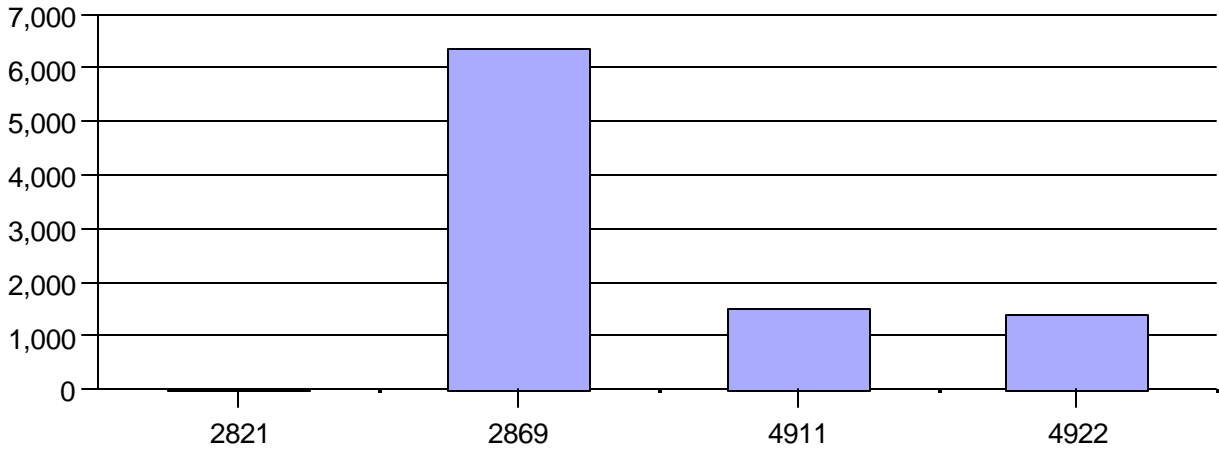
Victoria County (Victoria) is currently in attainment of all federal air quality standards. Victoria was designated as a nonattainment area for the one-hour ozone standard from March 1978 through March 1995, but is currently in attainment. TNRCC has taken several measures with respect to the one-hour ozone standard that will help Victoria maintain attainment of the ozone standard (see the Regional Strategy analysis on page 43 for more information).

The 1997 TNRCC Emissions Inventory for Victoria County shows the following industry group distribution of NOx point source emissions:

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Point Source NOx Emissions by SIC Code

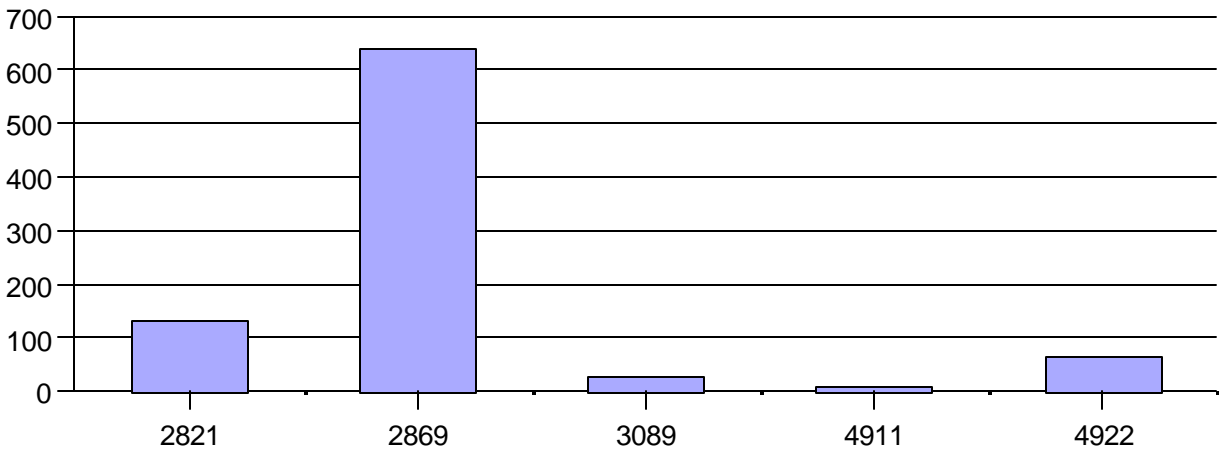
Tons reported to the TNRCC for 1997



ons Inventory for Victoria County shows the following industry group distribution of VOC point source emissions:

Point Source VOC Emissions by SIC Code

Tons reported to the TNRCC for 1997



<u>SIC Code</u>	<u>Description</u>
2821	Plastics Materials, Synthetic Resins, and Nonvulcanizable Elastomers
2869	Industrial Organic Chemicals
3089	Plastics Products
4911	Electric Services
4922	Natural Gas Transmission

Summary of Recent Actions Relevant to the Victoria Area

March 1978	EPA designates Victoria as a nonattainment area for the one-hour ozone standard
April 1979	Texas submits a SIP revision for attainment of the one-hour ozone standard in Victoria
March 1980	EPA approves the one-hour ozone SIP for Victoria ¹⁵⁰
August 1984	EPA approves revision to the one-hour ozone SIP for Victoria ¹⁵¹
November 1990	United States Congress passes the 1990 FCAA Amendments
November 1991	EPA designates Victoria as nonattainment/incomplete data for the one-hour ozone standard because Texas had not yet collected the required three years of data necessary to petition for redesignation to attainment
May 1994	Texas petitions EPA to exempt Victoria county from NOx requirements under the transportation conformity rule ¹⁵² .
July 1994	Texas submits a maintenance plan and a request to redesignate Victoria to attainment for the one-hour ozone standard. ¹⁵³ The redesignation request is based on 36 months of air quality data collected from May 1991 through May 1994.

¹⁵⁰ 45 Federal Register 19244

¹⁵¹ 49 Federal Register 32190

¹⁵² 60 Federal Register 5864(31 January 1995)

¹⁵³ 60 Federal Register 12454 (7 March 1995)

January 1995 EPA exempts Victoria County from NOx requirements under the transportation conformity rule¹⁵⁴, effective on March 2, 1995.

March 1995 EPA approves the ozone maintenance plan for Victoria and redesignates Victoria County to attainment for the one-hour ozone standard.

¹⁵⁴ 60 Federal Register 5864 (31 January 1995)

FINDINGS

FEDERAL

Timely Implementation of Federal Standards

The FCAA places many sources of air pollution, such as fuels and engines, rightfully under the control of the federal government. Nationwide environmental standards for fuels (gasoline and diesel) and engines are necessary to prevent states from establishing barriers to interstate commerce and from creating supply and distribution problems, with accompanying shortages and/or price excursions. Besides gasoline and diesel fuel standards, sources under federal control include automobiles and trucks, diesel equipment, aircraft, airport ground equipment, marine vessels, and locomotives.

In many metropolitan areas, attainment of air quality standards relies not only on the development of stringent local and state control measures, but also on the implementation of federal controls. Unfortunately, many of these federal measures will not be available until the 2004 timeframe and beyond. Because of slow commercial fleet turnover, the federally-mandated attainment date for the federal air quality standards (e.g., 2007 for Houston-Galveston-Brazoria) will arrive long before the majority of air quality benefits from control of these federal sources. This will prevent states from bringing some areas into timely attainment of the standards. Furthermore, states may be forced to implement unpopular and/or costly control measures to make up for these dilatory federal emission reductions.

In light of the 1999 National Academy of Sciences study¹⁵⁵ which concluded that federal reformulated gasoline had a marginal and decreasing role in reducing ambient ozone concentrations, the EPA should set one reasonable standard for cleaner gasoline (lower RVP and sulfur content) and one standard for oxygenated gasoline for improved carbon monoxide emissions.

¹⁵⁵ *Ozone-Forming Potential of Reformulated Gasoline*, National Academy Press, Washington, D.C., 1999; p 4

State Implementation Plan

The goal of the FCAA should be for areas to attain clean air standards rather than to burden states and local areas with unnecessary and unproductive administrative details. Recent SIP activities in Texas highlight how complicated and resource-intensive the SIP process is. Further, the overly-prescriptive 1990 CAAA requirements do not generally acknowledge that conditions and sources vary significantly from area to area. Within Texas alone, the air quality situation in El Paso is significantly different from that in Dallas-Fort Worth, which is significantly different from that in Houston-Galveston-Brazoria. To the EPA's credit, they have allowed the states some flexibility in recent years. One example is the March 1995 memo from Mary Nichols allowing areas that demonstrate they are affected by ozone transport additional time to comply with the one-hour ozone standard.¹⁵⁶ In addition, the EPA has indicated that the implementation process for the eight-hour ozone standard will "be carried out to maximize common sense, flexibility and cost effectiveness."¹⁵⁷

However, the current rigorous SIP procedures consume significant state resources and leave little flexibility for states to address problems of local concern. Even with the very stringent measures the TNRCC adopted April 2000 and proposed in August 2000, the EPA has indicated in a letter to the TNRCC Executive Director that they are not satisfied and that more may be required:

".. it appears that the proposed plan may not achieve enough progress to achieve clean air attainment with the national health-based ozone standard. We would like to work with you to find ways to address the remaining shortfall. In addition, the plan needs to adequately address a series of modeling and related issues, including providing additional documentation of emissions, developing better emission credit calculations, and refining the estimated shortfall based on updated modeling."¹⁵⁸

Once all reasonable control measures have been taken, additional controls, modeling, and other administrative SIP activities, should not be required until results from the reasonable steps can be measured. The command and control structure of the current SIP process stifles innovation and inhibits States from implementing performance-based control strategies that may be more effective than measures required by the EPA.

¹⁵⁶ *Ozone Attainment Demonstrations*, memo from Mary D Nichols, EPA Assistant Administrator for Air and Radiation, 2 March 1995 (<http://www.epa.gov/ttn/oarpg/t1/memoranda/ozondemo.pdf>)

¹⁵⁷ *Proposed Implementation Guidance for the Revised Ozone and Particulate Matter (PM) National Ambient Air Quality Standards (NAAQS) and the Regional Haze Program*; memo from John S. Seitz, Director, Office of Air Quality Planning and Standards to Regional Office Air Division Directors; November 17, 1998 (http://www.epa.gov/ttn/oarpg/t1/memoranda/ig_11fn.pdf)

¹⁵⁸ 25 September 2000 letter from Carl E. Edlund, P.E, Director of Multimedia Planning and Permitting Division, EPA Region VI, to Jeffrey A. Saitas, Executive Director of the TNRCC

STATE

Incentive Fund for Cleaner Vehicles and Equipment

California has implemented a successful program, called the Carl Moyer Program, which provides grants for the incremental capital cost of heavy-duty vehicles and equipment that are cleaner than state or federal standards require.¹⁵⁹ Private companies or public agencies that operate heavy-duty engines may apply for grants under this program. The program has been funding projects such as:

- the purchase of new natural gas transit and school buses;
- purchase of new natural gas and dual-fuel trucks;
- purchase of electric forklifts instead of internal combustion forklifts; and
- replacement of old diesel engines with newer diesel engines in marine vessels, agricultural pumps, and other off-road equipment.

The California Air Resources Board estimates that projects funded in the first year of the program resulted in NOx emission reductions of four tons per day at an average cost of below \$3000 per ton of NOx reduced. At the current funding rate, the NOx emission reductions could reach as high as 15 to 20 tons per day by 2005.

A similar program could be effective in Texas as well. Onroad and offroad engines account for a significant percentage of NOx emissions in nonattainment areas. A Carl Moyer type incentive program could be used to offset some of the more unsustainable pollution measures, such as uncertain equipment retrofits or the construction ban. Funding for the program could come from a state-wide fee (e.g., an additional drivers license, car registration, or vehicle inspections fee), a tax on diesel fuel, or from industries who would receive credit for reductions needed at their facilities.

Lifestyle/behavior mandates

As demonstrated in California, lifestyle/behavior mandates are rarely effective at improving air quality. Worse yet, these measures are often expensive, negatively impact quality of life, and cause public resentment and loss of support for clean air programs. The TNRCC and TxDOT have included several such measures in recent air quality rule proposals, including speed limit reductions and lawn service equipment operating restrictions. The TNRCC and TxDOT had to make some difficult choices in order to comply with federal mandates and made these choices with reservations. These choices were made necessary by the rigorous command-and-control nature of the SIP process.

¹⁵⁹ *The Carl Moyer Program Status Report*; California Environmental Protection Agency Air Resources Board; 29 December 1999 (<http://www.arb.ca.gov/msprog/moyer/cmpupdate.pdf>)

Construction Equipment Restrictions

Some of the compelling arguments against construction equipment restrictions include:

- working in the hottest part of the day will increase the risk of heat-induced illnesses and fatigue, heightening the risk of accidents;
- the restrictions will have a disproportionate impact on small and minority businesses with limited resources;
- increased length of construction time due to decreased productivity during nighttime operation;¹⁶⁰
- visibility and depth perception are reduced in the darker evening and nighttime hours, increasing risk of accidents;
- family life for all construction employees will be disrupted as employees will be forced to work extended or adjusted hours;
- the restriction will be difficult to enforce;
- the restriction affects not just the primary targets, but supporting industries as well, which causes a ripple effect that increases compliance costs;
- the restriction will conflict with municipal and contractual restrictions/ordinances on hours of operation and noise;
- the quality of the finished projects will suffer due to impaired night visibility and worker fatigue; and
- this strategy has not been implemented or attempted anywhere else in the United States.

A voluntary, education-based construction equipment program can be implemented with guidelines that companies can agree to follow in return for being endorsed as a “clean air company.” Many of the construction equipment restrictions can be observed by companies without disrupting project schedules and placing construction workers at risk by shifting work to hot afternoons or evenings. A voluntary program would allow construction companies to determine when to make exceptions to the guidelines.

Local fuel standards

Area-specific (“boutique”) fuels makes storage, distribution, and production scheduling more difficult and increases the potential for temporary supply disruptions and price excursions. Refiners and distributors have less flexibility to move supplies around the nation to respond to local or regional shortages. The excursion of gasoline prices in the midwest during the summer of 2000 is a prime example of the main problem with boutique fuels.

Council on Environmental Technology

¹⁶⁰ *Activities and emissions associated with highway construction projects : case studies in Dallas/Fort Worth, Texas*; Texas Transportation Institute April 1998

New technology and innovative solutions are required in order for Texas and industry to economically comply with the stringent requirements of the FCAA, and other environmental programs such as the Clean Water Act.

While a great deal of research is ongoing at companies and universities across Texas, the path from research to a creditable emission reduction program is often unclear and arduous. Texas should take a leadership role in creating a favorable climate for the development of pollution-control technologies by creating a council on environmental technology.

This Texas Council on Environmental Technology (TCET), consisting of learned, accomplished and academically appropriate representatives of major universities in Texas, will:

- recommend legislative action necessary to properly enable the TCET to perform;
- establish a dialogue with EPA and TNRCC to ensure recognition of the work of TCET;
- pursue grant money from EPA for funding the operation of TCET;
- develop procedures to expedite the process by which the TNRCC and the EPA give recognition of and credit for new, innovative and creative technological advancements that demonstrate real and quantifiable reductions; and
- establish a clearing house of university and private research into emission reduction and source reduction technologies.

School opening shift

Empirical observations indicate that delaying the start of the school year until after the Labor Day weekend will be beneficial in the state's efforts to reduce ozone concentrations. This benefit would come from two main sources: 1) reduced electricity consumption by schools during August and 2) shifting the increased traffic associated with the first few days of school from August to September. Staggering the starting times for schools would also be beneficial in reducing traffic congestion.

Comprehensive cap and trade for pollutants of regional concern

For pollutants of regional concern such as NO_x and sulfur dioxide, properly implemented cap and trade programs, such as that required by Senate Bill 7, can be very effective at reducing emissions more quickly and efficiently than traditional command-and-control regulations. Cap and trade programs work because they give businesses greater flexibility to make the most cost-effective reductions and create a financial incentive (the value of the allowances) to reduce emissions beyond levels required by regulation.

A cap and trade program requires a company to measure and report emissions and to comply with allowance banking and trading requirements. An effective program must have as few additional requirements as possible. The goal of the program should be to reduce emissions of the target pollutants and not to specify how and where those reductions should occur.

Current TNRCC SIP regulations typically specify an emission rate limit for each individual piece of equipment. Under a cap and trade system, a plant-wide limit (cap) would be established for each participating plant. The cap may be fixed or reduced periodically to allow for gradual implementation of standards. Each year the company would receive a set of allowances representing the number of tons of pollutant that plant is allowed to emit, in total, for the year. The company decides how to make the necessary reductions to stay within their cap. At the end of the year, allowances are deducted based on the number of tons of emissions for the year. Companies that are able to reduce emissions more than required can trade excess allowances to other companies or use those allowances in subsequent years. Companies that need more time to make reductions or find that the required reductions are too expensive can purchase excess allowances from other companies.

For example, suppose a plant is assigned a cap of 1000 tons for a certain year. At the beginning of the year, the company is given 1000 allowances. Over the course of the year, the company emitted 950 tons of that pollutant. 950 allowances are deducted, leaving the company 50 allowances to use in subsequent years or to trade to other companies.

An effective cap and trade program should:

1. Replace all existing state and, to the extent possible, federal requirements for that pollutant. For example, the program should replace state permit and existing SIP requirements. The number of allowances allocated for a specific unit should meet all federal permitting and other requirements.
2. Companies should be allowed to bank allowances for use in subsequent years. This creates an incentive to over-control because the company can be assured the excess allowances will have value in subsequent years. The stringent emission limits in the ozone nonattainment areas make excessive banking of allowances unlikely.
3. The state should limit any additional control requirements, such as short-term (daily or 30-day) emission requirements. Such additional requirements drastically reduce the effectiveness of the cap and trade program. The stringent emission reductions necessary to demonstrate attainment in the ozone nonattainment areas limit a company's ability to increase emissions during summer months at the expense of other parts of the year.

Energy efficiency retrofits

While building codes could be used to address energy conservation measures for new buildings, the existing inventory of residential and commercial buildings represents a very large potential for energy savings. Energy savings directly results in lower NO_x emissions through reduced electricity demand at power plants and less on-site natural gas combustion. This potential could be tapped through a Carl Moyer-type program that provides funds for energy conservation methods at existing buildings.

While energy savings will be realized immediately from such measures as window replacement, more efficient

air conditioners, and increased or better insulation, the up-front capital cost of these improvements can be a deterrent. For example, replacing existing single-pane, non-coated window panes with low-emissivity panes can reduce the energy used for heating/air conditioning by 20-30%. However, the cost of installing these windows represents an investment that will not be recovered for several years. This disincentive can be removed by providing funding for approved energy conservation projects.

A similar concept could be applied to new construction that goes above and beyond building code requirements. For example, builders or purchasers of buildings that were more energy-efficient than required by building codes could receive a rebate based on the projected NO_x savings over a ten-year period.

RECOMMENDATIONS

FEDERAL

Timely Implementation of Federal Standards

The EPA should more expeditiously promulgate fuel and equipment standards that are scientifically and economically justified.

The EPA should extend the federal ambient air quality attainment dates until the benefits of federal controls have been realized for areas that demonstrate that they would achieve the standard in a timely manner were it not for excess emissions from under- or uncontrolled sources under federal control, such as gasoline and diesel engines, aircraft, marine vessels, and railroad locomotives.

Interstate and international trucking

The EPA should address issues regarding interstate and, especially, international trucking, including engine standards, cleaner fuels, and truck inspection and maintenance.

Scientifically justified air quality standards

The setting of air quality standards can be a politically-charged issue that has dramatic economic effects. To the extent possible, politics and legal maneuvering should be removed from the process. An objective representative of the scientific community, such as the National Academy of Sciences, should either approve any new air quality standards or at minimum establish guidelines for the use of epidemiological evidence in establishing air quality (and other environmental) standards.

State Implementation Plan

The states should be allowed more autonomy in resolving local air quality issues, with the EPA assuming an advisory and resource role. A concept similar to the flexible attainment region or accelerated attainment area should either replace the SIP process entirely or, at minimum, be used for borderline areas, both those areas nearing nonattainment and those just over the standards. These areas should have full authority to address their local problem without being subject to the rigors of a SIP revision and the 20-year maintenance period once attainment is reached.

STATE

Sources Under Federal Control

Pass a resolution calling for the federal government to reduce emissions from the sources under their control by the same percentage and on the same schedule that Texas is reducing emissions from the sources under state control.

Incentive Programs

Establish an incentive fund for cleaner vehicles and equipment, similar to the Carl Moyer program in California, to cover the incremental cost, on a competitive basis, of on- and off-road mobile pollution control projects that achieve the most cost-effective NO_x reductions.

Establish an incentive program to pursue SIP credits and to provide funding for energy conservation and efficiency at existing buildings. The program should be coordinated through any existing Public Utility Commission of Texas and utility efficiency programs.

Establish an incentive program to reward builders and/or purchasers for new construction that goes above and beyond building code requirements through, for example, an “energy star” system that rates buildings according to energy efficiency.

Successful incentive programs can be alternatives to programs such as:

- construction equipment restrictions
- local engine retrofit requirements
- lawn service equipment operating restrictions (which can be continued as a voluntary ozone action day item)
- reduced speed limits

Building code standards

Pass legislation necessary to allow the PUC or TNRCC to establish building code standards to promote electricity conservation.

School opening shift

In nonattainment and near-nonattainment areas of the state, school districts should consider shifting the beginning of school until after the Labor Day weekend to reduce mobile emissions and to conserve energy by reducing the electricity consumed in school buildings during the hottest part of the year.

Comprehensive cap and trade for pollutants of regional concern

Establish a comprehensive cap and trade program for pollutants of regional concern, such as nitrogen oxides and sulfur dioxide, that would fulfill all state and, to the extent possible, federal emission requirements. This comprehensive program should be structured much like the cap and trade program required under Senate Bill 7, however the EPA may require that the individual nonattainment areas be established as separate trading regions. Because the control requirements of Senate Bill 7 have been largely superseded by SIP requirements, the SB7 program can be expanded to comply with this recommendation.

GLOSSARY

attainment area: An area considered to have air quality as good as or better than the National Ambient Air Quality Standards as defined in the Federal Clean Air Act. An area may be an attainment area for one pollutant and a nonattainment area for others.

clean fuels: Blends and/or substitutes for gasoline fuels. These include compressed natural gas, methanol, ethanol, and others.

enhanced inspection and maintenance (enhanced I&M): An automobile inspection and maintenance program that includes, as a minimum, increases in coverage of vehicle types and model years, tighter stringency of inspections and management practices intended to improve effectiveness. This may also include annual, computerized, or centralized inspections; under-the-hood inspections to detect tampering with pollution control equipment; and increased repair waiver cost. The purpose of enhanced I&M is to reduce automobile emissions by ensuring that cars are running properly.

federal implementation plan (FIP): Under current law, a federally implemented plan to achieve attainment of an air quality standard, used when a state is unable to develop an adequate plan.

inspection and maintenance (I&M): A program providing for periodic inspections of motor vehicles to ensure that emissions of specified pollutants are not exceeding established limitations.

intermodal: The ability to connect, and connections between, modes of transportation.

low-NO_x burners: One of several combustion technologies used to reduce emissions of NO_x.

Metropolitan Planning Organization (MPO): The organizational entity designated by law with lead responsibility for developing transportation plans and programs for urbanized areas with populations of 50,000 or more. MPOs are established by agreement of the Governor and units of general purpose local government which together represent 75 percent of the affected population of an urbanized area.

Metropolitan statistical area (MSA): According to the United States Census Bureau, an area qualifies for recognition as an MSA in one of two ways: if there is a city of at least 50,000 population, or a Census Bureau-defined urbanized area of at least 50,000 with a total metropolitan population of at least 100,000 (75,000 in New England). Except in the New England States, an MSA is defined in terms of entire counties. In addition to the county containing the main city, additional counties are included in an MSA if they are socially and economically integrated with the central county. An MSA may contain more than one city of 50,000 population and may cross State lines.

Metropolitan Transportation Plan (MTP): a transportation plan, required by the Intermodal Surface Transportation Efficiency Act, required for all urban areas with population over 50,000. The MTP must address at least a twenty-year planning horizon and include short-range and long-range strategies leading to

the development of an integrated intermodal transportation system that facilitates the efficient movement of people and goods. The Transportation Efficiency Act for the 21st Century recommends that the MTP identify projected transportation demands through analysis of land use and demographic trends; specify congestion management strategies; inventory auto, rail, aviation, pedestrian and bicycle facilities; to preserve and maximize the existing transportation system; to consider air quality (if required) to reflect a multimodal approach; to consider local comprehensive land use plans and other community goals and objectives; and to include a financial plan indicating financial constraint. Nonattainment or maintenance areas are required to update their MTP every three years.

motor vehicle emissions budget (MVEB): That portion of the total allowable emissions of any criteria pollutant or its precursors in an area allocated by the SIP to highway and transit vehicles. The MVEB is used for meeting reasonable further progress milestones, attainment, or maintenance demonstrations for any criteria pollutant or its precursors.

National Ambient Air Quality Standards (NAAQS): Federal standards that set allowable concentrations and exposure limits for various pollutants. The EPA has established national ambient air quality standards for six air pollutants: ground-level ozone, particulate matter, lead, nitrogen dioxide, sulfur dioxide, and carbon monoxide. These six pollutants are called “criteria pollutants.”

nonattainment area: A geographic region of the United States that the EPA has designated as not meeting the National Ambient Air Quality Standards.

NO_x (nitrogen oxides): Chemical compounds containing nitrogen and oxygen; these compounds react with volatile organic compounds in the presence of heat and sunlight to form ozone. Nationwide, approximately 45 percent of NO_x emissions come from mobile sources, 35 percent from electric utilities, and 15 percent from industrial fuel combustion.

onboard controls: Devices placed on vehicles to capture gasoline vapor during refueling and then route the vapors to the engine when the vehicle is started so that they can be efficiently burned.

oxygenated fuels: Gasoline that has been blended with alcohols or ethers that contain oxygen in order to reduce carbon monoxide and other emissions.

ozone: A compound consisting of three oxygen atoms, which is the primary constituent of smog. Ozone is formed through chemical reactions in the atmosphere involving volatile organic compounds, nitrogen oxides, and sunlight. In the lower levels of the atmosphere, ozone can initiate damage to the lungs as well as damage to trees, crops, and materials.

PM₁₀: Solid or liquid matter suspended in the atmosphere and over 10 micrometers in diameter.

PM_{2.5}: Solid or liquid matter suspended in the atmosphere and over 2.5 micrometers in diameter.

reasonably available control technology (RACT): An emission limitation on existing sources in nonattainment areas, defined by the EPA in a control techniques guideline (CTG) and adopted and implemented by states.

reformulated gasoline: Gasoline with a different composition from conventional gasoline (e.g., lower aromatics content) and that results in the production of lower levels of air pollutants.

sanctions: Actions taken against a state or local government by the federal government for failure to plan or to implement a SIP. Examples include withholding of highway funds and a ban on construction of new sources.

stage II controls: Systems placed on service station gasoline pumps to control and capture gasoline vapors during automobile refueling.

state implementation plan (SIP): a plan required by the Federal Clean Air Act, prepared by the state and submitted to the EPA for approval, that addresses each pollutant for which the State fails to meet a national ambient air quality standard and which contains procedures to monitor, control, maintain, and enforce compliance with those standards.

sulfur dioxide (SO₂): A heavy, pungent, colorless air pollutant formed primarily by the combustion of fossil fuels.

transportation control measures (TCMs): Actions to adjust traffic patterns (for example, bus lanes or right turn on red laws) or reduce vehicle use (for example, by promoting ride-sharing or telecommuting programs or by providing bicycle facilities or high-occupancy vehicle lanes) to reduce air pollutant emissions.

Transportation Improvement Program (TIP): a three-year list of transportation projects, taken from or consistent with the MTP, which is ready to be implemented.

vehicle miles traveled (VMT): A measure of both the volume and extent of motor vehicle operation; the total number of vehicle miles traveled within a specified geographical area (whether the entire country or a smaller area) over a given period of time.

volatile organic compounds (VOCs): A group of chemicals that react in the atmosphere with nitrogen oxides in the presence of heat and sunlight to form ozone; does not include methane and other compounds determined by the EPA to have negligible photochemical reactivity. Examples of VOCs include gasoline fumes and oil-based paints.

ACRONYMS AND ABBREVIATIONS

AAA	Accelerated Attainment Agreement
BPA	Beaumont–Port Arthur
CAAA	Clean Air Act amendments
CalLEV	California low-emission vehicle
CASAC	Clean Air Scientific Advisory Committee
CFR	Code of Federal Regulations
CO	carbon monoxide
COAST	Coastal Oxidant Assessment for Southeast Texas
DFW	Dallas–Fort Worth
DIPE	diisopropyl ether
EPA	United States Environmental Protection Agency
ETBE	ethyl tertiary-butyl ether
ETCOG	East Texas Council of Governments
FAR	flexible attainment region
FCAA	Federal Clean Air Act
FIP	federal implementation plan
HGB	Houston-Galveston-Brazoria
I&M	inspection and maintenance (for automobile exhaust systems)
LEV	low-emission vehicle
MOA	memorandum of agreement
MPO	metropolitan planning organization
MSA	metropolitan statistical area
MTBE	methyl tertiary-butyl ether
MVEB	motor vehicle emissions budget
NAAQS	National Ambient Air Quality Standards
NETAC	Northeast Texas Air Care
NLEV	national low emissions vehicle
NMOC	nonmethane organic compound
NMOG	nonmethane organic gas
NO _x	nitrogen oxides
OAQPS	Office of Air Quality Planning and Standards
OTAG	Ozone Transport Assessment Group
PAC	public advisory committee
PM	particulate matter
PM ₁₀	particle matter with aerodynamic diameter smaller than 10 micrometers
PM _{2.5}	particle matter with aerodynamic diameter smaller than 2.5 micrometers
POM	polycyclic organic matter
ppb	parts per billion
ppm	parts per million
RACT	reasonably available control technology

RFG	reformulated gasoline
ROP	rate-of-progress
RVP	Reid vapor pressure
SIC	Standard Industrial Classification (code)
SIP	state implementation plan
SO ₂	sulfur dioxide
SULEV	super ultra low-emission vehicle
TAME	tertiary-amyl methyl ether
TBA	tertiary-butyl alcohol
TCM	transportation control measures
TLEV	transitional low-emission vehicle
TNRCC	Texas Natural Resource Conservation Commission
TxDOT	Texas Department of Transportation
UAM	urban airshed model
ULEV	ultra low-emission vehicle
USCA	United States Code Annotated
VMT	vehicle miles traveled
VOC	volatile organic compounds
ZEV	zero emission vehicle

Attachment A

Clean Air Rules and Plans Adopted on April 19, 2000

On April 19, 2000 the TNRCC adopted amendments to 30 TAC Chapters 114 and 117 and to the State Implementation Plan (SIP). These revisions serve as the required next step in the attainment demonstration planning process for the Beaumont/Port Arthur (BPA), Dallas/Fort Worth (DFW), and Houston/Galveston (HGA) ozone nonattainment areas. The complete package includes the following elements.

For the BPA area, the SIP revision contains adopted rules specifying oxides of nitrogen (NO_x) emission limits for electric utility boilers, industrial boilers, and industrial process heaters, and a modeling demonstration regarding transport from the HGA area.

For the DFW area, the SIP revision includes photochemical modeling of specific control strategies, a modeling demonstration regarding transport from the HGA area, a 2007 mobile source budget for transportation conformity, control strategies (i.e., rule packages) developed by the state involving controls on stationary sources, and control strategies selected by the North Texas Clean Air Steering Committee.

The HGA SIP narrative includes enforceable commitments required by the United States Environmental Protection Agency/Natural Resources Defense Council settlement to make the Houston/Galveston attainment demonstration complete.

The Regional Reduction Strategy includes support for the current national low emission vehicle program, cleaner burning gasoline and stage I vapor recovery, voluntary involvement in the permitting of grandfathered facilities, and NO_x reductions from major stationary sources.

Staff also revised the Inspection/Maintenance (I/M) SIP to modify the vehicle I/M program as one element of the control strategy to reduce emissions of ozone precursor compounds necessary for the counties included in the DFW, El Paso, and HGA ozone nonattainment areas to be able to demonstrate attainment with the national ambient air quality standards for ozone.

Links to each of the SIP narratives and rule packages can be found in the following table:

Rule Log Number	Short Title	Rule Description	Area Affected
1999-046-117-AI/ 1999-049-117-AI	Cement Kilns/ Regional Utilities	These amendments specify an emission rate limit of 0.14 pound of nitrogen oxides (NO _x) per million British thermal units for utility sources in the East/Central Texas area. Chapter 117 has also been modified to allow utility NO _x compliance through new utility emission trading rules in Chapter 101 being developed in response to Senate Bill 7. These new cap-and-trade rules are expected to be the most attractive compliance option for most affected sources. In addition, these rules implement NO _x reductions at non-utility point sources in the eastern half of Texas.	East/Central Texas ¹

Rule Log Number	Short Title	Rule Description	Area Affected
1999-055-SIP-AI	DFW SIP	This revision to the SIP contains the following elements: 1) photochemical modeling of specific control strategies and future state and national rules for attainment of the 1-hour ozone standard in the DFW area by the attainment deadline of November 15, 2007; 2) a modeling demonstration that shows that the air quality in the DFW area is influenced at times by transport from the HGA area; 3) identification of the level of reductions of VOC and NOx emissions necessary to attain the 1-hour ozone standard by 2007; 4) control strategies developed by the state involving controls on stationary sources; 5) control strategies selected by the NCTCOG North Texas Clean Air Steering Committee; and 6) a 2007 mobile source budget for transportation conformity.	Four core DFW counties ²
1999-055-SIP-AI	HGA SIP	This revision to the SIP includes the enforceable commitments required by the U.S. Environmental Protection Agency/Natural Resources Defense Council settlement to make the Houston/Galveston attainment demonstration complete.	Eight HGA counties ³
1999-055-SIP-AI	Regional Strategy SIP	This revision to the SIP includes the following components: support for the NLEV program, cleaner burning gasoline and stage I vapor recovery, voluntary involvement in the permitting of grandfathered facilities, and NOx reductions from major stationary sources.	East/Central Texas ¹
1999-055A-114-AI	Low Emission Diesel	These rules comprise one element in the attainment demonstration state implementation plan (SIP) control strategy for the Dallas/Fort Worth (DFW) ozone nonattainment area. This control strategy is needed for the DFW area to attain the 1-hour ozone standard by November 15, 2007. These regulations apply to the four core county nonattainment area as well as the eight perimeter counties associated with the DFW consolidated metropolitan statistical area.	Four core DFW counties ² Five perimeter DFW counties ⁴
1999-055C-114-AI	Inspection/Maintenance	These rules comprise one element in the attainment demonstration state implementation plan (SIP) control strategy for the Dallas/Fort Worth (DFW) ozonenonattainment area. This control strategy is needed for the DFW area to attain the 1-hour ozone standard by November 15, 2007. There are three parts to the rules: Accelerated SimulationMode (ASM-2), On-board Diagnostics (OBD-II), and Remote Sensing. These regulations apply to the four core county nonattainment area and may apply as well to the eight perimeter counties associated with the DFW consolidated metropolitan statistical area. The proposed rules also implement the OBD-II requirements in the Houston/Galveston and the El Paso ozone nonattainment areas.	Four core DFW counties ² Five perimeter DFW counties ⁴ Eight HGA counties ³ El Paso County

Rule Log Number	Short Title	Rule Description	Area Affected
1999-055C-SIP-AI	Inspection/ Maintenance SIP	This revision to the SIP modifies the vehicle I/M program to include on-board diagnostics checks and acceleration simulation mode test equipment or its equivalent. This program is one element of the control strategy to reduce emissions of ozone precursor compounds necessary for the counties included in the DFW, El Paso, and HGA ozone nonattainment areas to be able to demonstrate attainment with the national ambient air quality standards for ozone.	Four core DFW counties ² Eight HGA counties ³ El Paso County
Four core DFW counties ² Eight HGA counties ³ El Paso County	Airport GSE	These rules comprise one element in the attainment demonstration state implementation plan (SIP) control strategy for the Dallas/Fort Worth (DFW) ozone nonattainment area. This control strategy is needed for the DFW area to attain the 1-hour ozone standard by November 15, 2007. These regulations apply to the four major airports in the DFW nonattainment area.	Four core DFW counties ²
1999-055F-114-AI	Vehicle Scrappage	These rules comprise one element in the attainment demonstration state implementation plan (SIP) control strategy for the Dallas/Fort Worth (DFW) ozone nonattainment area. This control strategy is needed for the DFW area to attain the 1-hour ozone standard by November 15, 2007. These regulations will apply to the four core county nonattainment area and may apply as well to the eight perimeter counties associated with the DFW consolidated metropolitan statistical area.	Four core DFW counties ²
1999-055G-114-AI	California Spark	These rules comprise one element in the attainment demonstration state implementation plan (SIP) control strategy for the Dallas/Fort Worth (DFW) ozone nonattainment area. This control strategy is needed for the DFW area to attain the 1-hour ozone standard by November 15, 2007. These regulations apply to the four core county nonattainment area as well the eight perimeter counties associated with the DFW consolidated metropolitan statistical area.	Four core DFW counties ² Five perimeter DFW counties ⁴
1999-055H-114-AI	Accelerated Purchase of Tier II/ Tier III Equipment	These rules comprise one element in the attainment demonstration state implementation plan (SIP) control strategy for the Dallas/Fort Worth (DFW) ozone nonattainment area. This control strategy is needed for the DFW area to attain the 1-hour ozone standard by November 15, 2007. These regulations will apply to the four core county nonattainment area.	Four core DFW counties ²

Rule Log Number	Short Title	Rule Description	Area Affected
1999-055I-117-AI	Water Heaters/ Small Boilers	These rules require reductions in the emissions of nitrogen oxides from new natural gas-fired water heaters, small boilers, and process heaters sold and installed in Texas. The rules do not require retrofitting of existing units. These rules comprise one element in the attainment demonstration state implementation plan (SIP) control strategy for the Dallas/Fort Worth (DFW) ozone nonattainment area. This control strategy is needed for the DFW area to attain the 1-hour ozone standard by November 15, 2007. The rules are also one element of a new combined strategy to reduce overall background levels of ozone in order to assist in keeping ozone attainment areas and near-nonattainment areas in compliance with the 1-hour ozone standard. The rules apply statewide.	Statewide
1999-055J-114-AI	Construction Ban	These rules comprise one element in the attainment demonstration state implementation plan (SIP) control strategy for the Dallas/Fort Worth (DFW) ozone nonattainment area. This control strategy is needed for the DFW area to attain the 1-hour ozone standard by November 15, 2007. These regulations apply to the four core county nonattainment area.	Four core DFW counties ²
1999-056-117-AI/ 1999-055D-117-AI	DFW and BPA Utilities	These rules implement regulations that will result in sufficient point source nitrogen oxides reductions in the Beaumont/Port Arthur area to meet the 40% reduction target. The rules lower the nitrogen oxides emission limits and applicability threshold for electric utility, industrial, commercial, and institutional gas-fired boilers, and add specifications for lean-burn gas-fired engines located at major stationary sources in the Dallas/Fort Worth (DFW) ozone nonattainment area. The rules are one element of the state implementation plan for the DFW area to attain the 1-hour ozone standard by November 15, 2007.	Four core DFW counties ² Three BPA counties ⁵
1999-056-SIP-AI	BPA SIP	This revision to the SIP represents "Phase II" of the BPA attainment demonstration SIP, and contains adopted rules specifying NOx emission limits for electric utility boilers, industrial boilers, and industrial process heaters, and a modeling demonstration regarding transport from the HGA area.	Three BPA counties ⁵

1 East/Central Texas includes the following counties: Anderson, Angelina, Aransas, Atascosa, Austin, Bastrop, Bee, Bell, Bexar, Bosque, Bowie, Brazoria, Brazos, Burleson, Caldwell, Calhoun, Camp, Cass, Chambers, Cherokee, Collin, Colorado, Comal, Cooke, Coryell, Dallas, De Witt, Delta, Denton, Ellis, Falls, Fannin, Fayette, Fort Bend, Franklin, Freestone, Galveston, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Hardin, Harris, Harrison, Hays, Henderson, Hill, Hood, Hopkins, Houston, Hunt, Jackson, Jasper, Jefferson, Johnson, Karnes, Kaufman, Lamar, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Madison, Marion, Matagorda, McLennan, Milam, Montgomery, Morris, Nacogdoches, Navarro, Newton, Nueces, Orange, Panola, Parker, Polk, Rains, Red River, Refugio, Robertson, Rockwall, Rusk, Sabine, San Jacinto, San Patricio, San Augustine, Shelby, Smith, Somervell, Tarrant, Titus, Travis, Trinity, Tyler, Upshur, Van Zandt, Victoria, Walker, Waller, Washington, Wharton, Williamson, Wilson, Wise, and Wood.

2 The four core DFW counties are Collin, Dallas, Denton, and Tarrant.

- 3 The eight HGA counties are Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller.
- 4 The five perimeter DFW counties are Ellis, Johnson, Kaufman, Parker, and Rockwall.
- 5 The three BPA counties are Hardin, Jefferson, and Orange.

Attachment B

Houston-Galveston Clean Air Rules and Plans

On August 9, 2000, the commission approved for publication and public hearing proposed revisions to various air quality rules and the State Implementation Plan (SIP). Most of the rule revisions are being developed as part of the Houston/Galveston Area's (HGA) Attainment Demonstration SIP. However, some of the rules apply to areas beyond HGA, including other ozone nonattainment areas, while some affect Eastern and Central Texas, and a few are applicable statewide.

Rule and SIP Summary Table

Rule Log Number	Short Title	Rule Description	Area Affected
1998-089-101-AI	Emissions Banking and Trading	<ul style="list-style-type: none"> • Creates an overall nitrogen oxides (NOx) Mass Emission Cap and Trade Program for the HGA. • Creates a partial bridge between the existing Emissions Banking and Trading Programs and the Mass Emission Cap and Trade Program to provide maximum flexibility in meeting the SIP requirements. • Revises current open market rules currently located in 30 TAC §101.29 to: <ol style="list-style-type: none"> 1. Consolidate banking and trading rules into one location (30 TAC Chapter 101, Subchapter H). 2. Require registration of emission reduction credits within 180 days of the actual reduction. 3. Provide an improved mechanism for mobile sources to generate credits. 4. Guarantee that actual emission reductions are not double counted (i.e., shown as a reduction in the SIP and banked for future use). • Includes mobile source trading. 	<ul style="list-style-type: none"> • Eight HGA counties¹ for the emissions cap. • Statewide for modifications addressing the generation of emission reduction credits.
2000-011-SIP-AI	HGA Post-1999 ROP/ Attainment Demonstration SIP	<p>Speed Limit Reduction</p> <ul style="list-style-type: none"> • The speed limit on all roadways with a current maximum speed limit above 55 mph would be reduced to 55 mph. • Starts May 1, 2002. <hr/> <p>Transportation Control Measures</p> <ul style="list-style-type: none"> • SIP control strategy (no rules required). • Numerous projects have been identified by the Houston-Galveston Area Council for inclusion in the SIP, such as traffic signalization and bicycle/pedestrian projects. 	Eight HGA counties. ¹

Rule Log Number	Short Title	Rule Description	Area Affected
		<p>Voluntary Mobile Emission Reduction Program</p> <ul style="list-style-type: none"> • SIP control strategy (no rule required). • Numerous projects have been identified by the Houston-Galveston Area Council for inclusion in the SIP, such as telecommuting, bus fare promotions, alternative fuel programs, and ozone action days. <hr/> <p>Energy Efficiencies</p> <ul style="list-style-type: none"> • Local and/or legislative measure. • Implements energy conservation efforts for buildings, including the 2000 International Energy Conservation Code criteria, to reduce electricity usage through use of better insulation, reflective roofing, etc. <hr/> <p>Agreements with Continental Airlines and the City of Houston</p> <ul style="list-style-type: none"> • As discussed in Section 6.3.14 of the proposed SIP, agreements are being considered regarding airport and ground support equipment. These agreements may be adopted as part of the SIP. 	
2000-011A-114-AI	Inspection/ Maintenance	<ul style="list-style-type: none"> • Requires Acceleration Simulation Mode or equivalent testing as well as On-Board Diagnostics testing. • Begins May 1, 2002 for Harris County. • Begins May 1, 2003 for Brazoria, Fort Bend, Galveston, and Montgomery Counties. • Begins May 1, 2004 for Chambers, Liberty, and Waller Counties. 	Eight HGA counties. ¹
2000-011B-114-AI	Construction Equipment Operating Restriction	<ul style="list-style-type: none"> • Establishes a restriction on the use of heavy duty diesel construction equipment from 6:00 a.m. - noon starting in April 2005. • Only applies during Daylight Savings Time each year (first weekend in April through the last weekend in October). • Exempts wet concrete operations and emergency operations. • Also provides an exemption from the rule if an alternative plan is submitted assuring equivalent emission reductions. 	Eight HGA counties. ¹

Rule Log Number	Short Title	Rule Description	Area Affected
2000-011C-114-AI	Accelerated Purchase of Tier 2/Tier 3 Diesel Equipment	<ul style="list-style-type: none"> Requires the early retirement of older equipment and purchase of newer, cleaner, off-highway diesel equipment. Phased-in implementation beginning in December 2004. Also provides an exemption from the rule if an alternative plan is submitted assuring equivalent emission reductions. 	Eight HGA counties. ¹
2000-011D-114-AI	Cleaner Diesel Fuel	<ul style="list-style-type: none"> By May 1, 2002 the fuel will have improved aromatics and cetane for all on-highway sales statewide and for all on and off-highway sales in East/Central Texas.² By May 1, 2004 sulfur will be reduced to 30 parts per million (ppm) in East/Central Texas for on- and off-road fuel.² By May 1, 2006 all on-highway fuel statewide will go to 15 ppm (equivalent to the proposed federal rule), and off-highway fuel will go to 15 ppm in East/Central Texas.² 	<ul style="list-style-type: none"> Statewide for on-highway fuel. East/Central Texas² for on and off-highway fuel
2000-011E-114-AI	Airport Ground Support Equipment	<ul style="list-style-type: none"> Requires ground support equipment fleets to reduce emissions by 90% by 2005. Phased-in implementation - 20%, 50%, and 90% in 2003, 2004, and 2005, respectively. Allows for the implementation of alternative emission reduction measures which produce equivalent NOx reductions. 	Hobby, Bush Intercontinental, and Ellington Airports.
2000-011F-114-AI	Low Sulfur Gasoline	<ul style="list-style-type: none"> Requires a low sulfur gasoline (15 ppm). Enhances emissions performance of newer cars. Begins May 1, 2004 	East/Central Texas. ²
2000-011G-114-AI	California Spark-Ignition Engines	<ul style="list-style-type: none"> Requires manufacturers to ensure that all affected large spark-ignition (LSI) engines are certified under California LSI standards. Begins May 1, 2004. Exempts agriculture and construction equipment less than 175 hp, recreational equipment, stationary engines, marine vessels, and equipment on tracks. 	Statewide.

Rule Log Number	Short Title	Rule Description	Area Affected
2000-011H-117-AI	Point Source NOx Controls	<ul style="list-style-type: none"> • Requires a wide variety of minor and major stationary sources to meet new emission specifications and other requirements in order to reduce NOx emissions. • Total NOx reductions required from these sources is 90%. • Requires sources with a design capacity to emit 10 tons per year or greater emissions to participate in the proposed Mass Emission Cap and Trade Program. 	Eight HGA counties. ¹
2000-011I-115-AI	Volatile Organic Compound (VOC) Reasonably Available Control Technology (RACT) Revisions	<ul style="list-style-type: none"> • Implements RACT requirements for batch processes, bakeries, and offset lithographic printers. 	Eight HGA counties. ¹
2000-011J-110-AI	Residential and Commercial Air Conditioners	<ul style="list-style-type: none"> • Requires new units to reduce ozone by at least 70% and retain a minimum ozone reduction efficiency of 50% for 15 years. • Begins January 1, 2002. 	East/Central Texas. ²
2000-011K-114-AI	Diesel Emulsion	<ul style="list-style-type: none"> • Requires retail on-highway diesel fuel sales for heavy-duty vehicles over 10,000 pounds to be diesel emulsion fuels. • Requires off-highway diesel equipment over 175 horsepower to use diesel emulsion fuels. • Begins May 1, 2004. 	Eight HGA counties. ¹
2000-011M-114-AI	NOx Reduction Systems	<ul style="list-style-type: none"> • Requires a reduction system for locally registered (8 HGA counties) on-highway pre-1997 diesel trucks over 10,000 pounds by May 1, 2004. • Requires a reduction system for all locomotives and commercial marine vessels over 175 horsepower by May 1, 2004. • Requires a reduction system for all locally-registered on-highway heavy duty pre-1997 gasoline-powered trucks over 10,000 pounds by May 1, 2004. 	Eight HGA counties. ¹
2000-011N-114-AI	Vehicle Idling Restrictions	<ul style="list-style-type: none"> • Limits idling for all vehicles over 14,000 pounds to five consecutive minutes. • Begins April 1, 2001. • Only applies from April 1 through October 31 each year. 	Eight HGA counties. ¹

Rule Log Number	Short Title	Rule Description	Area Affected
2000-0110-114-AI	Lawn Service Equipment Operating Restrictions	<ul style="list-style-type: none"> • Restricts the use of small gasoline equipment between the hours of 6:00 a.m. - noon starting in 2005. • Only applies April 1 through October 31 each year. 	Eight HGA counties. ¹

- 1 The eight HGA counties are Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller.

- 2 East/Central Texas includes the following counties: Anderson, Angelina, Aransas, Atascosa, Austin, Bastrop, Bee, Bell, Bexar, Bosque, Bowie, Brazoria, Brazos, Burleson, Caldwell, Calhoun, Camp, Cass, Chambers, Cherokee, Collin, Colorado, Comal, Cooke, Coryell, Dallas, De Witt, Delta, Denton, Ellis, Falls, Fannin, Fayette, Fort Bend, Franklin, Freestone, Galveston, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Hardin, Harris, Harrison, Hays, Henderson, Hill, Hood, Hopkins, Houston, Hunt, Jackson, Jasper, Jefferson, Johnson, Karnes, Kaufman, Lamar, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Madison, Marion, Matagorda, McLennan, Milam, Montgomery, Morris, Nacogdoches, Navarro, Newton, Nueces, Orange, Panola, Parker, Polk, Rains, Red River, Refugio, Robertson, Rockwall, Rusk, Sabine, San Jacinto, San Patricio, San Augustine, Shelby, Smith, Somervell, Tarrant, Titus, Travis, Trinity, Tyler, Upshur, Van Zandt, Victoria, Walker, Waller, Washington, Wharton, Williamson, Wilson, Wise, and Wood.