

CHAPTER 1: BACKGROUND AND INTRODUCTION

1.1 GENERAL

A link to “The History of the Texas State Implementation Plan (SIP),” a comprehensive overview of the SIP revisions submitted to the United States Environmental Protection Agency (EPA) by the State of Texas, is available at the following web site:

<http://www.tceq.state.tx.us/implementation/air/sip/sipintro.html#History>.

On June 15, 2004, the Houston-Galveston-Brazoria (HGB) ozone nonattainment area was classified as a moderate nonattainment area for the eight-hour National Ambient Air Quality Standard (NAAQS) under the Federal Clean Air Act (FCAA) Amendments of 1990 (42 United States Code (USC) §§ 7401 *et seq.*). The HGB area is therefore required to attain the eight-hour ozone NAAQS of 0.08 parts per million (or 85 parts per billion) by the end of ozone season 2009 and to submit a SIP revision by June 15, 2007 (69 Federal Register (FR) 23857). Control strategies for this SIP revision must be in place by January 1, 2009. For the HGB area, comprising Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties, the Texas Commission on Environmental Quality (TCEQ) has developed this eight-hour ozone SIP revision in accordance with 42 USC § 7410.

The one-hour ozone NAAQS, which preceded the eight-hour ozone standard, was revoked June 15, 2005 (69 FR 23951). Hence, this SIP revision is the first HGB SIP revision under the eight-hour ozone standard.

The HGB nonattainment area has conditions that are conducive to the formation of ozone. The necessary conditions for ozone formation (sunlight, nitrogen oxides (NO_x), and volatile organic compounds (VOC)) are provided by the HGB area’s hot sunny climate, large urban population, and highly concentrated industrial area. The Houston area also has significant biogenic VOC emissions as well as complex meteorology, including land sea breeze air parcel recirculation, both of which complicate air quality modeling.

The HGB SIP development is challenged by the high concentration of industry and motor vehicles in the HGB area and the magnitude of reductions in emissions needed for attainment of the eight-hour ozone standard. Significant NO_x controls are already in place on the industrial sector in the HGB area and further controls on these sources will be difficult. With the complex HGB eight-hour ozone air quality planning situation in mind, the TCEQ contracted with the Houston-Galveston Area Council (H-GAC) to identify possible control strategies for on-road and non-road mobile sources, and with Lamar University to identify possible control strategies for point and area sources. Stakeholders in the HGB area were provided an opportunity to learn about and comment on the possible strategies as they were being analyzed by the contractors. Between March and June 2006, H-GAC, Lamar University, and their subcontractor held six stakeholder meetings to give HGB-area stakeholders the opportunity to hear about the progress of the control strategy development work and provide comment. The subcontractor for H-GAC and Lamar University, ENVIRON International, compiled comprehensive draft control strategy catalogs and evaluated each potential strategy against the EPA’s criteria for SIP creditability. The subcontractor then evaluated each strategy meeting the EPA criteria against a second set of criteria, including feasibility, public acceptability, emissions benefit, and cost effectiveness. After presenting the short list of strategies for public comment, ENVIRON quantified the reductions (where possible) associated with the high-ranking strategies and placed them on a finalized list. The TCEQ evaluated the finalized list of strategies for feasibility and chose a subset of the strategies for further analysis and sensitivity modeling purposes. Please see Chapter 4, Control Strategies, for detailed information on the emission reduction measures that were ultimately selected for this SIP revision.

When examining the current revision to the SIP for the HGB area, recent HGB-area SIP revisions should be consulted to provide context and greater understanding of the complex issues involved

in HGB's ozone challenge. The most relevant HGB SIP revisions to date are the December 2000 one-hour ozone standard attainment demonstration, the September 2001 follow-up revision, the December 2002 NO_x/highly-reactive VOC (HRVOC) revision, and the December 2004 mid-course review (MCR).

1.1.1 December 2000

The December 2000 SIP revision contains rules and photochemical modeling analyses in support of the HGB one-hour ozone attainment demonstration. The majority of the emission reductions identified in this revision were from an overall 90 percent reduction in point source NO_x. A modeling analysis, showing a 141 parts per billion peak ozone level, indicated a shortfall of 91 tons per day (tpd) in NO_x emissions reductions that were necessary, but not readily available, for an approvable attainment demonstration. In addition, the revision contained post-1999 rate-of-progress (ROP) plans for the milestone years 2002 and 2005, the attainment year 2007, and transportation conformity motor vehicle emissions budgets (MVEB) for NO_x and VOC. The SIP also contained enforceable commitments to implement further measures (in support of the HGB area's attainment demonstration and to remedy the estimated 91 tpd shortfall), as well as a commitment to perform and submit a MCR to EPA.

1.1.2 September 2001

The September 2001 SIP revision for the HGB one-hour ozone nonattainment area included the following elements: 1) corrections to the ROP table/budget for the years 2002, 2005, and 2007 due to a mathematical error; 2) incorporation of a change to the idling restriction control strategy clarifying that the operator of a rented or leased vehicle is responsible for compliance with the requirements in situations where the operator of a leased or rented vehicle is not employed by the owner of the vehicle; 3) incorporation of revisions to the clean diesel fuel rules to provide greater flexibility in complying with the requirements of the rule while preserving the emission reductions previously represented; 4) incorporation of a stationary diesel engine rule; 5) incorporation of revisions to the point source NO_x rules; 6) incorporation of revisions to the NO_x emissions cap and trade rules; 7) removal of the construction equipment operating restriction and the accelerated purchase requirement for Tier 2/Tier 3 heavy-duty equipment; 8) replacement of the Tier 2/Tier 3 rules with the Texas Emission Reduction Plan; 9) layout of the MCR process which detailed how the state would fulfill the commitment to obtain the additional emission reductions necessary to demonstrate attainment of the one-hour ozone standard in the HGB area; and 10) replacement of 2007 rate-of-progress MVEB to be consistent with the attainment MVEB.

Despite the gap control measures adopted in December 2000 and the stationary diesel engine rules included in the September revision, an estimated 56 tpd NO_x reduction shortfall remained. The state committed to address the remaining shortfall through the MCR process. In the November 14, 2001, issue of the Federal Register, EPA approved the December 2000 and September 2001 submittals.

1.1.3 December 2002

In January 2001, the Business Coalition for Clean Air-Appeal Group (BCCA-AG) and several regulated companies challenged the December 2000 HGB SIP and some of the associated rules. Among other things, BCCA-AG contended that the last 10 percent of the NO_x emissions reductions were not cost effective and that the ozone plan would fail because the TCEQ did not account for VOC emissions associated with upset conditions. In May 2001, the parties agreed to a stay in the case, and Judge Margaret Cooper, Travis County District Court, signed a Consent Order, effective June 8, 2001. The order required the commission to perform an independent and thorough analysis of the causes of rapid ozone formation events and to identify potential mitigating measures not yet identified in the HGB attainment demonstration.

In compliance with the Consent Order, the commission conducted a scientific evaluation based in large part on aircraft data collected by the Texas Air Quality Study 2000 (TexAQS 2000). The TexAQS 2000 was a comprehensive research project, conducted in August and September 2000,

involving more than 40 research organizations and over 200 scientists that studied ground-level ozone air pollution in the HGB and east Texas regions. These and other studies suggested that the HGB area's high ozone events can be attributed to, in part, the presence of significant reactivity in the airshed. An analysis of automated gas chromatograph data (Estes, 2002) revealed that four HRVOC were frequently responsible for high reactivity days: ethylene, propylene, 1,3-butadiene, and butenes. As such, these compounds were selected as the best candidates for HRVOC emission controls. Analysis showed that the ozone control strategy involving limits on emissions of ethylene, propylene, 1,3-butadiene, and butenes from industrial sources, in conjunction with an 80 percent reduction in industrial or point source NO_x, was equivalent or better in terms of air quality benefit than the previous ozone control strategy (a 90 percent point source NO_x emissions reduction requirement alone). Therefore, in December 2002, the TCEQ adopted a SIP revision that replaced the most stringent 10 percent industrial source NO_x emissions reductions with industrial source HRVOC controls. The result was an industrial source ozone control strategy that relies on an 80 percent reduction in NO_x emissions and HRVOC rules that better quantify and reduce emissions of HRVOC from four key industrial sources: fugitives, flares, process vents, and cooling towers. The HRVOC rules are performance-based and emphasize monitoring, recordkeeping, reporting, and enforcement, rather than establishing individual unit emission rates. The 2002 SIP revision exchanging the two strategies for the one strategy met the FCAA Section 110(l) requirement which allow revision of the SIP where that revision would not interfere with reasonable further progress toward attainment of the NAAQS.

1.1.4 December 2004

In December 2000, the TCEQ committed to perform a MCR to ensure attainment of the one-hour ozone standard. The MCR process provides the opportunity to update emissions inventory data, use current modeling tools, and enhance the photochemical grid modeling. The data gathered from the TexAQS 2000 was used to improve the photochemical modeling of the HGB area. These technical improvements provided a more comprehensive understanding of the ozone challenge in Houston that is necessary to develop an attainment plan. In early 2003, as the TCEQ was preparing to move forward with the MCR, EPA announced its plans to begin implementation of the eight-hour ozone standard. On June 2, 2003, the Federal Register published EPA's proposed "Implementation Rule for the Eight-Hour Ozone Standard." In the same timeframe, EPA formalized its intentions to designate areas for the eight-hour ozone standard by April 15, 2004, requiring states to reassess their efforts and control strategies to address this new standard in a revised plan to be submitted to EPA by June 2007. Recognizing that existing one-hour nonattainment areas would soon be subject to the eight-hour ozone standard and in an effort to efficiently manage the state's limited resources, the TCEQ developed an approach that addressed the outstanding obligations under the one-hour ozone standard while beginning to analyze eight-hour ozone issues.

The TCEQ's one-hour ozone SIP commitments that were addressed in the December 2004 revision include:

- completion of a one-hour ozone MCR;
- performance of modeling;
- adoption of measures sufficient to fill the shortfall of NO_x reductions;
- adoption of measures sufficient to demonstrate attainment; and
- revision of the MVEB using the MOBILE6 model.

The December 2004 revision reflects a shift from primarily reducing industrial emissions of NO_x to reducing both industrial emissions of NO_x and point source HRVOC. This revision included measures to ensure compliance with the specific strategies to control HRVOC emissions and created the HRVOC emissions cap-and-trade (HECT) program. The HECT program is an annual cap and trade program to provide compliance flexibility to the Chapter 115 control requirements for flares, process vents, and cooling-tower heat exchangers. Sites subject to the program are

required to possess an HRVOC allowance for each ton of HRVOC emissions. Sites have the option to trade excess HRVOC allowances on the open market. The December 2004 revision also reflected the repeal of the motor vehicle idling rules and modified certain recordkeeping requirements of the general VOC fugitive emission rules to make them apply only to sources of HRVOC fugitive emissions.

1.1.5 EPA Approval of the One-Hour Ozone Attainment Demonstration and Associated Rules

On September 6, 2006, EPA published the approval of the HGB nonattainment area's one-hour ozone attainment demonstration and associated rules (71 FR 52656). The one-hour attainment SIP revision demonstrates that the HGB nonattainment area will comply with the one-hour ozone standard by 2007. The approval was published in six parts, covering the rules for the control of HRVOC, the HECT program, the mass emission cap and trade program for NO_x, the one-hour ozone attainment plan, the emissions credit banking and trading program, and the discrete emission credit banking and trading program.

1.1.6 One-Hour Ozone Control Strategies

Tables 4-1: *Existing One-Hour Ozone Control Strategies*, and 4-2: *Existing Voluntary Mobile Emission Reduction Programs (VMEP) Ozone Control Strategies*, show key control strategies for complying with the one-hour ozone standard in the HGB nonattainment area. Existing control strategies targeted to the one-hour standard, are expected to continue to reduce the emission of precursors to ozone in the HGB area and positively impact progress toward attainment of the eight-hour ozone standard. The one-hour and eight-hour ozone design values for the HGB area from 1991 to 2005 are illustrated in Figure 1-1: *One-Hour and Eight-Hour Ozone Design Value Trends (1991 to 2005) and HGB Area Population*. Both values decrease over the past 15 years. The 2005 one-hour design value was 169 parts per billion (ppb), representing a 23 percent decrease from the value for 1991 (220 ppb). The 2005 eight-hour design value was 103 ppb, a 13 percent decrease from the 1991 value of 119 ppb. These decreases occur in spite of a 36 percent increase in area population, as shown in the figure.

**Ozone 1-Hour and 8-Hour Design Values for the HGB Area,
and HGB Area Population
(1991-2005)**

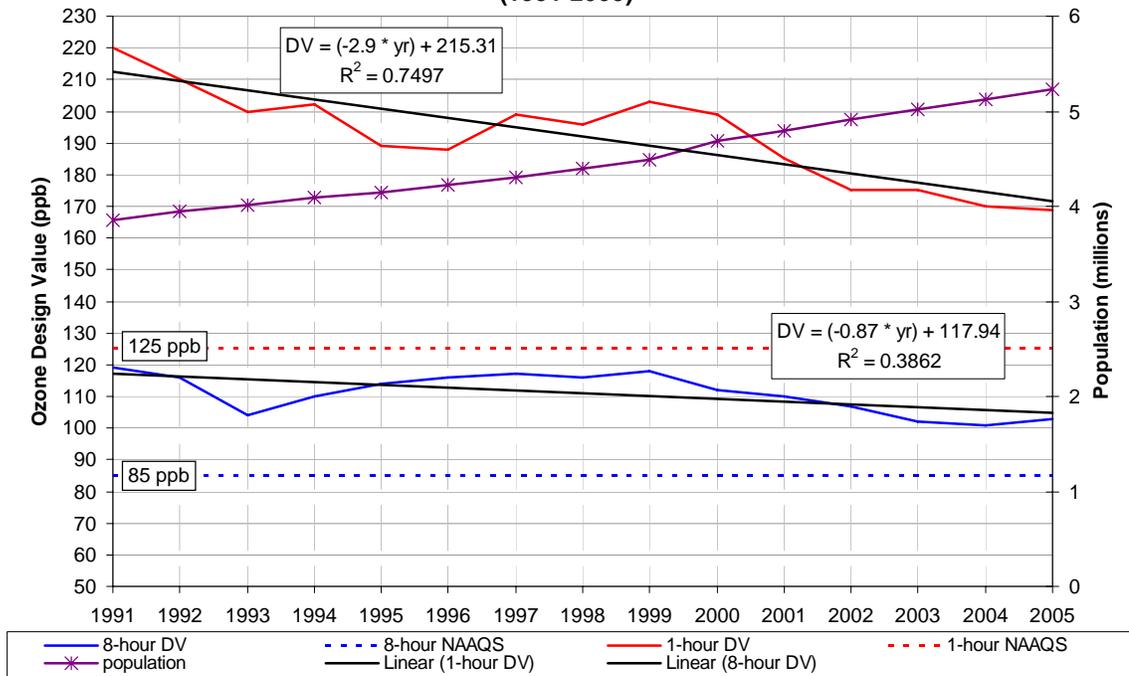


Figure 1-1: One-Hour and Eight-Hour Ozone Design Value Trends (1991 to 2005) and HGB Area Population

1.2 HEALTH EFFECTS

In 1997, EPA revised the NAAQS for ozone from a one-hour to an eight-hour standard based on scientific data that indicated that the eight-hour standard provides better protection of public health from longer-term exposures to moderate levels of ozone. To support the eight-hour ozone standard, EPA provided information that indicated that even low levels of ozone can decrease lung capacity temporarily in some healthy adults and cause inflammation of lung tissue, aggravate asthma, and make people more susceptible to respiratory illnesses such as bronchitis and pneumonia.

Children are at a higher risk from exposure to ozone, since they breathe more air per pound of body weight than adults and because children’s respiratory systems are still developing. Children also spend a considerable amount of time outdoors during summer and during the start of the school year (August-October) when the highest ozone levels are recorded. Adults most at risk to ozone exposure are outdoor workers, people outside exercising, and individuals with preexisting respiratory diseases.

1.3 PUBLIC HEARING AND COMMENT INFORMATION

The commission will hold public hearings at the following times and locations:

CITY	DATE	TIME	LOCATION
Houston	January 29, 2007	2:00 PM	Houston-Galveston Area Council 3555 Timmons Lane Houston, TX 77027 Conference Room A, on the second floor

Houston	January 29, 2007	6:00 PM	Houston-Galveston Area Council 3555 Timmons Lane Houston, TX 77027 Conference Room A, on the second floor
Dallas	January 31, 2007	7:00 P.M.	Dallas Public Library Auditorium 1515 Young St., Dallas, TX 75201
Arlington	February 1, 2007	2:00 P.M.	Arlington City Hall 101 W. Abram Street Arlington, TX 76010
Midlothian	February 1, 2007	6:00 P.M.	Midlothian Conference Center 1 Community Center Circle Midlothian, TX 76065
Longview	February 6, 2007	2:00 P.M.	Longview Public Library 222 W. Cotton Street Longview, TX 75601
Austin	February 8, 2007	2:00 P.M.	Texas Commission on Environmental Quality 12100 Park 35 Circle, Austin, TX 78753 Building E, Room 201S

The public comment period will open on December 29, 2006, and close on February 12, 2007. Written comments will be accepted via mail, fax, or through the e-comment system. All comments should reference “the HGB SIP revision” and Project Number 2006-027-SIP-NR. Comments may be submitted to Emily Barrett, MC 206, State Implementation Plan Team, Chief Engineer’s Office, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087 or faxed to (512) 239-5687. Electronic comments may be submitted at <http://www5.tceq.state.tx.us/rules/ecomments>. Comments must be received by February 12, 2007.

1.4 SOCIAL AND ECONOMIC CONSIDERATIONS

For a detailed explanation of the social and economic issues involved with any of the strategies, please refer to the preambles that precede each proposed rule package accompanying this SIP.

1.5 FISCAL AND MANPOWER RESOURCES

The state has determined that its fiscal and manpower resources are adequate and will not be adversely affected through the implementation of this plan.