REVISIONS TO THE STATE IMPLEMENTATION PLAN (SIP) FOR THE CONTROL OF OZONE AIR POLLUTION

NORTHEAST TEXAS AREA EARLY ACTION COMPACT OZONE STATE IMPLEMENTATION PLAN REVISION

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
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SECTION VI. CONTROL STRATEGY

A. Introduction (No Change)

B. Ozone (Revised)

1. *Dallas/Fort Worth* (No change.)
2. *Houston/Galveston* (No change.)
3. *Beaumont/Port Arthur* (No change.)
4. *El Paso* (No change.)
5. *Regional Strategies* **(**No Change**)**
6. *Northeast Texas*
   Chapter 1: General
   Chapter 2: Emissions Inventory
   Chapter 3: Photochemical Modeling
   Chapter 4: Data Analysis
   Chapter 5: Control Strategies
7. *Austin Area*
8. *San Antonio Area*

C. Particulate Matter (No change.)

D. Carbon Monoxide (No change.)

E. Lead (No change.)

F. Oxides of Nitrogen (No change.)

G. Sulfur Dioxide (No change.)

H. Conformity with the National Ambient Air Quality Standards (No Change)

I. Site Specific (No change.)

J. Mobile Sources Strategies (No change)

LIST OF ACRONYMS

AAA- Accelerated Attainment Area
AACOG- Alamo Area Council of Governments
ACAAP- Austin Clean Air Action Plan
AE- Austin Energy
AEAD - Austin EAC Attainment Demonstration
AER-Austin EAC Region
ARPDB- Acid Rain Program Data Base
BEIS2 - Biogenic Emissions Inventory System version 2
BELD - Biogenic Emission Land-use Database
CAC- Clean Air Coalition
CAF- CLEAN AIR Force of Central Texas
CAMPO- Capital Area Metropolitan Planning Organization
CAMS- Continuous Air Monitoring System
CAMx- Comprehensive Air Quality Model with Extensions
CAAP - Clean Air Action Plan
CAP- Clean Air Partners
CAPCO- Capital Area Planning Council
CB-IV- Carbon Bond Mechanism, version IV
CO- carbon monoxide
CTSIP- Central Texas Sustainability Indicators Project
DFW- Dallas/Fort Worth
DLC- Diagnostic Link Connector
DPS- Texas Department of Public Safety
DV(f) - Design Value Future year
DV(c) - Design Value Current year
EAC- Early Action Compact
EDMS- Emissions and Dispersion Modeling System
EGU- electric generating unit
EGAS- Economic Growth Analysis System
EI- emissions inventory
EIP- Early Implementation Plan
EIQ- Emissions Inventory questionnaires
EPA- Environmental Protection Agency
ESL- Energy Systems Laboratory
ETCCC - East Texas Clean Cities Coalition
ETCOG - East Texas Council of Government
FCAA- Federal Clean Air Act
FPP- Fayette Power Project
GloBEIS- Global Biogenic Emissions Inventory System
HAP- hazardous air pollutant
HB- House Bill
HC-hydrocarbon
HGB - Houston/Galveston/Brazoria
HPMS - Highway Performance Monitoring System
HRVOC - Highly Reactive Volatile Organic Compounds

I/M - inspection/maintenance
LaDEQ - Louisiana Department of Environmental Quality
LCRA - Lower Colorado River Authority
LDAR - Leak Detection and Repair
LIRAP - Low Income Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program
Lu/LC - Land use/Land cover
MCR - Mid Course Review
MFG - Maintenance for Growth
MM5 - Fifth Generation Mesoscale Model
MPO - Metropolitan Planning Organization
MSA - Metropolitan Statistical Area
NAAQS - National Ambient Air Quality Standards
NEGU - non-electric generating unit
NETAC - North East Texas Air Care
NNA - near nonattainment areas
NO_x - nitrogen oxides
O_3 - ozone
OBD - Onboard Diagnostic
PiG - plume-in grid
PM- particulate matter
ppm - parts per million
ppb - parts per billion
PSDB - Point Source Data Base
Q-Q - Quantile Quanitle plots
RRF - relative reduction factor
SB - senate bill
SEP - supplemental environmental project
SIP - State Implementation Plan
SO_2 - sulfur dioxide
SOS -Southern Oxidants Study
SOV - single-occupancy vehicle
TCEQ - Texas Commission on Environmental Quality (formerly the TNRCC)
TERMs - Transportation Emission Reduction Measures
TERP - Texas Emission Reduction Plan
TexAQS 2000 - Texas 2000 Air Quality Study
TNRCC - Texas Natural Resource Conservation Commission (renamed the TCEQ)
tpd - tons per day
tpy - tons per year
TSI - Two Speed Idle
TT I-Texas Transportation Institute
UAM - urban airshed model
UT -The University of Texas at Austin
VERP- Voluntary Emission Reduction Program
VMT- vehicle miles traveled
VOC- volatile organic compounds

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CHAPTER 1: GENERAL INFORMATION

1.1 BACKGROUND

"The History of the Texas State Implementation Plan (SIP), " a comprehensive overview of the SIP revisions submitted to EPA by the State of Texas, is available at the following website:
http://www.tnrcc.state.tx.us/oprd/sips/sipintro.html#History

Northeast Texas

The Texas Commission on Environmental Quality (TCEQ) monitors air quality in Northeast Texas to determine whether the region is in compliance with EPA's National Ambient Air Quality Standards (NAAQS) for ozone. Historically, ozone levels in Northeast Texas have been close to the level of the ozone NAAQS and the region comprising Gregg, Harrison, Rusk, Smith and Upshur Counties has been considered a "near-nonattainment area" (NNA). With the assistance of funding from the State legislature, a local stakeholder group called North East Texas Air Care (NETAC) has conducted scientific studies and developed control strategies to reduce ozone levels. Ozone levels are reduced by controlling emissions of ozone precursors, namely nitrogen oxides (NO_x) and volatile organic compounds (VOCs). NETAC's activities lead to the recent submission of a revised State Implementation Plan (SIP) for 1-hour ozone in Northeast Texas. The 1-hour ozone SIP revision enforces significant emissions reductions that were entered into on a voluntary basis by several local industries, namely American Electric Power (AEP), Eastman Chemical Company, Texas Operations and TXU. All counties in the NETAC area were designated as attainment for the 8-hour ozone standard by the U.S. Environmental Protection Agency (EPA) on April 15, 2004.

1.2 EARLY ACTION COMPACT

On December 20, 2002, NETAC signed an Early Action Compact (EAC) for 8-hour ozone. The objective of the EAC is to develop and implement a Clean Air Action Plan that includes emission reductions needed to demonstrate attainment of the 8-hour ozone standard by 2007 and maintain the standard beyond that date. Since the EAC was initiated, monitoring data show that Northeast Texas has come into compliance with the 8-hour ozone standard. By continuing with the EAC, NETAC is developing additional strategies to bring the region further into compliance with the EPA's 8-hour ozone standard and protect air quality in the region through at least 2012.

The EAC has a series of milestones that track progress toward developing a Clean Air Action Plan (CAAP) and then a State Implementation Plan (SIP) revision for the region. Key milestones for the Northeast Texas EAC are shown in Table 1-1.

The purpose of the CAAP is to lay out NETAC's strategy for improving ozone air quality in Northeast Texas and maintaining future compliance with the 8-hour ozone standard. The CAAP for Northeast Texas was used as the basis for this SIP revision. (see Appendix A)

Table 1-1. Key Milestone dates for the Northeast Texas Early Action Compact (EAC)

Date	Item
December 31, 2002	Signed EAC agreement
June 16, 2003	Identity/describe potential local emission reduction strategies
November 30, 2003	Initial modeling emission inventory completed Conceptual Model completed Base case (1999) modeling completed
December 31, 2003	Future year (2007) emission inventory completed Emission inventory comparison for 1999 and 2007 Future case modeling completed
January 31, 2004	Schedule for developing further episodes completed Local emission reduction strategies selected One or more control cases modeled for 2007 Attainment maintenance analysis (to 2012) completed Submit preliminary Clean Air Action Plan (CAAP) to TCEQ and EPA
March 31, 2004	Final revisions to 2007 control case modeling completed Final revisions to local emission reduction strategies completed Final attainment maintenance analysis completed Submit final CAAP to TCEQ and EPA
December 31, 2004	State submits SIP incorporating the CAAP to EPA
December 31, 2005	Local emission reduction strategies implemented no later than this date
December 31, 2007	Attainment of the 8-hour ozone standard

1.3 PUBLIC HEARING INFORMATION

The commission held public hearings on the revisions to the SIP and related rules:

- Monday, August 23, 2004, 2 PM at TCEQ Bldg F Room 2210, at 12100 Park 35 Circle, Austin
- Tuesday, August 24, 2004, 10 AM at Longview City Hall Council Chambers, located at 300 West Cotton Street, Longview, Texas; and
- Thursday, August 26, 2004, 10 AM and 7 PM at AACOG Board Room, located at 8700 Tesoro Dr. , San Antonio, Texas.

The comment period ended on August 30, 2004.

1.4 SOCIAL AND ECONOMIC CONSIDERATIONS

Because the Northeast Texas SIP is a local voluntary initiative, the state has not performed an analysis of social and economic considerations.

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 implementation of this plan.

CHAPTER 2: EMISSIONS INVENTORY

2.1 OVERVIEW

Federal and state rules require that emissions inventories be prepared statewide, particularly for ozone nonattainment areas. Because ozone is photochemically produced in the atmosphere when VOCs are mixed with NO_x in the presence of sunlight, it is critical that the agency compile information on the important sources of these precursor pollutants. The emission inventory's (EI) role is to identify the source types present in an area, the amount of each pollutant emitted, and the types of processes and control devices employed at each plant or source category. The EI provides data for a variety of air quality planning tasks, including establishing baseline emission levels, calculating reduction targets, control strategy development for achieving the required emission reductions, emission inputs into air quality simulation models, and tracking actual emission reductions against the established emissions growth and control budgets. The total inventory of emissions of VOC, NO_x, and CO for an area is summarized from the estimates developed for five general categories of emissions sources which are described below.

2.2 POINT SOURCES

Major point sources are defined for inventory reporting purposes in nonattainment areas as industrial, commercial, or institutional sources which emit actual levels of criteria pollutants at or above the following amounts: 10 tpy of VOC, 25 tpy of NO_x, or 100 tpy of any of the other criteria pollutants, which are CO, sulfur dioxide (SO_2), particulate matter (smaller than or equal to 10 microns—PM_{10} and $PM_{2.5}$), and lead. For the attainment areas of the state, any company that emits a minimum of 100 tpy of any criteria pollutant must complete an inventory. Additionally, any source that generates or has the potential to generate at least 10 tpy of any single hazardous air pollutant (HAP) or 25 tpy of aggregate HAPs is also required to report emissions to the commission.

To collect emissions and industrial process operating data for these plants, the TCEQ mails emissions inventory questionnaires (EIQ) to all sources identified as having emissions that trigger the reporting requirements. Companies must report the type of emissions from all emission-generating units and emission points, as well as the amount of materials used in the processes which result in emissions. Information is also requested in the EIQ on process equipment descriptions, operation schedules, emissions control devices, abatement device control efficiency, and stack parameters such as location, height, and exhaust gas flow rate. All data submitted to the EIQ are subjected to rigorous quality assurance procedures.

2.3 AREA SOURCES

Area sources are defined as emission sources that fall below the point source reporting levels, and are too numerous or too small to identify individually. To estimate emissions from these sources, calculations are performed on the basis of source category or group. Area sources are commercial, small-scale industrial and residential categories of sources which use materials or operate processes which can generate emissions. Area sources can be divided into two groups, characterized by the emission mechanism: hydrocarbon evaporative emissions and fuel combustion emissions. Examples of evaporative losses include printing, industrial coatings, degreasing solvents, house paints, leaking underground storage tanks, gasoline service station underground tank filling, and vehicle refueling operations. Fuel combustion sources include stationary source fossil fuel combustion at residences and businesses, as well as outdoor burning, structural fires, and wildfires. These emissions, with some exceptions, may be calculated by multiplication of an established emission factor (emissions per unit of activity) times the appropriate activity or activity surrogate responsible for generating emissions. Population is the most commonly used activity surrogate for many area source categories, while other activity data include amount of gasoline sold in an area, employment by industry type, and acres of cropland.

2.4 ONROAD MOBILE SOURCES

Onroad mobile sources consist of automobiles, trucks, motorcycles, and other motor vehicles traveling on public roadways in the area. Combustion-related emissions are estimated for vehicle engine exhaust, and evaporative hydrocarbon emissions are estimated for the fuel tank and other evaporative leak sources on the vehicle. Emission factors have been developed using the EPA's mobile emission factor model, MOBILE6. Various inputs are provided to the model to simulate the vehicle fleet driving in each particular area. Inputs include such parameters as vehicle speeds by roadway type, vehicle registration by vehicle type and age, percentage of vehicles in cold start mode, percentage of miles traveled by vehicle type, type of inspection/maintenance (I/M) program in place (where applicable), and gasoline vapor pressure. All of these inputs have an impact on the emission factor calculated by the MOBILE model, and every effort is made to input parameters reflecting local conditions. To complete the emissions estimate, the emission factors calculated by the MOBILE model must then be multiplied by the level of vehicle activity vehicle miles traveled (VMT). The level of vehicle travel activity is developed from the federal Highway Performance Monitoring System (HPMS) data compiled by the Texas Department of Transportation for each county. Finally, roadway speeds, which are required for the MOBILE model's input, are obtained from an analysis for several roadway types performed by the Texas Transportation Institute (TTI).

2.5 NONROAD MOBILE SOURCES

Nonroad mobile sources includes aircraft operations, recreational boats, railroad locomotives, and a very broad category of off-highway equipment that includes everything from 600-hp engines mounted on construction equipment to 1-hp string trimmers. Methods for calculating emissions from nonroad engine sources are based on information about equipment population, engine horsepower, load factor, emission factor, and annual usage. Emission estimates for all sources in the nonroad category except aircraft, locomotives, commercial marine vessels, diesel construction equipment, and airport support equipment were originally developed using the current version of EPA's NONROAD model. Emissions were projected to later years by running the NONROAD model for the required years. Aircraft emissions have been estimated from landings and takeoff data for airports used in conjunction with the Emissions and Dispersion Modeling System (EDMS) aircraft emissions model. Locomotive emissions have been developed from fuel usage and track mileage data obtained from individual railroads.

2.6 BIOGENIC SOURCES

Biogenic sources include hydrocarbon emissions from crops, lawn grass, and forests, as well as a small amount of NO_x emissions from soils. Plants are sources of VOC such as isoprene, monoterpene, and alpha-pinene. Tools for estimating emissions include satellite imaging for mapping of vegetative types, field biomass surveys, and computer modeling of emissions estimates based on emission factors by plant species. A locally specific biogenic EI was developed for the Northeast Texas region. This EI was initially prepared using an updated version of EPA's Biogenic Emissions Inventory System, version 2 (BEIS2) biogenic model called Global Biogenic Emissions Inventory System (GloBEIS), which allows locally specific data to be used. A final base case inventory used the GloBEIS2 model, which effectively reduced the estimated biogenic VOC emissions by 30 percent. Emissions from biogenic sources are subtracted from the inventory prior to determining any required reductions for a rate of progress or attainment plan. However, the biogenic emissions are important in determining the overall emissions profile of an area, and therefore are required for air quality modeling.

2.7 EMISSIONS SUMMARY

The 1999 emission inventory for the 5 counties in the NETAC area is summarized in Tables 2-1 through 2-3 for NO_x, VOC and CO, respectively. These tables show the episode average day emissions for August 13-22, 1999, where the days are weighted together so that weekdays have a weight of 4/7 and Fridays, Saturdays and Sundays each have a weight of 1/7. The episode average emissions are shown to fairly represent emissions over the entire episode period. Table 2-2 shows the dominant role of biogenic sources in the VOC emissions inventory for the 5-county area: biogenics account for 89 percent of the total VOC emissions. For 1999 NO_x emissions in the 5-county area, point sources account for 50 percent, onroad mobile sources account for 25 percent, area sources account for 16 percent, offroad mobile sources for 8 percent and biogenic sources for less than 1 percent of the total NO_x emissions.

Point sources are the largest contributor to the NO_x emission inventory in the NETAC 5-county area. In 1999, four major sources in the 5-county area (Martin Lake power plant, Pirkey power plant, Eastman Chemical Company and Knox Lee power plant) accounted for 127 out of 145 tons/day (tpd) of point source NO_x emissions. The total emissions for these four facilities declined to 81 tpd in 2002 and 92 tpd in the 2007 inventory. The fact that the 2007 emissions (92 tpd) are higher than the 2002 emissions (81tpd) reflects differing assumptions for the EGU sources (i.e., Martin Lake, Pirkey and Knox Lee). The 2002 EGU emissions are based on actual 3rd quarter (July-September 2002) average emissions reported to EPA's Acid Rain database. The 2007 emissions reflect permit maximum emission rates which are higher than summer average rates for two reasons: (1) EGU sources are unlikely to operate at permit limits for prolonged periods and; (2) summer average heat input rates tend to be below the episodic heat input rates used to calculate the 2007 emissions. The permit maximum emission rates were calculated by multiplying the permit limit emission factors (lb/MMBtu) by episodic heat input rates (MMBtu/hour) from July 1997, as used in the 1-hour ozone SIP revision for Northeast Texas.

Table 2-1. 1999 episode average day NO_x emissions (tons per day) for the NETAC area

Source	Gregg	Harrison	Rusk	Smith	Upshur
Area	12.0	7.8	12.9	5.0	8.3
Offroad	4.4	6.0	2.5	6.5	2.4
Onroad	22.9	17.7	4.1	25.5	2.7
Points	14.7	45.5	79.9	3.6	1.0
Subtotal	**54.0**	**77.0**	**99.4**	**40.6**	**14.4**
Biogenics	0.2	0.5	0.5	0.7	0.4
Total	**54.2**	**77.5**	**99.9**	**41.3**	**14.9**

Table 2-2. 1999 episode average day VOC emissions (tons per day) for the NETAC area.

Source	Gregg	Harrison	Rusk	Smith	Upshur
Area	13.6	12.7	11.3	13.0	13.1
Offroad	2.5	1.5	1.1	4.2	0.5
Onroad	6.5	5.5	3.2	10.5	2.1
Points	3.4	15.3	2.0	8.5	0.8
Subtotal	**26.0**	**34.9**	**17.5**	**36.2**	**16.5**
Biogenics	65.0	316.8	271.8	253.9	157.1
Total	**91.0**	**351.7**	**289.4**	**290.1**	**173.5**

Table 2-3. 1999 episode average day CO emissions (tons per day) for the NETAC area.

Source	Gregg	Harrison	Rusk	Smith	Upshur
Area	3.4	6.8	8.0	7.7	5.2
Offroad	44.0	11.6	8.9	56.2	5.3
Onroad	82.3	75.7	39.4	135.8	25.9
Points	5.7	12.7	6.1	2.1	0.7
Subtotal	**135.5**	**106.9**	**62.4**	**201.8**	**37.2**
Biogenics	6.0	30.9	27.9	24.2	15.6
Total	**141.5**	**137.8**	**90.3**	**226.0**	**52.8**

Emission Trends

The trends in anthropogenic emissions from 1999 to 2002 to 2007 to 2012 are shown in Figure 2-1. This figure shows episode average day emissions for the NETAC 5-county area calculated by weighting days of the week as described above. The biogenic emissions are excluded from Figure 2-1 because they do not vary by year.

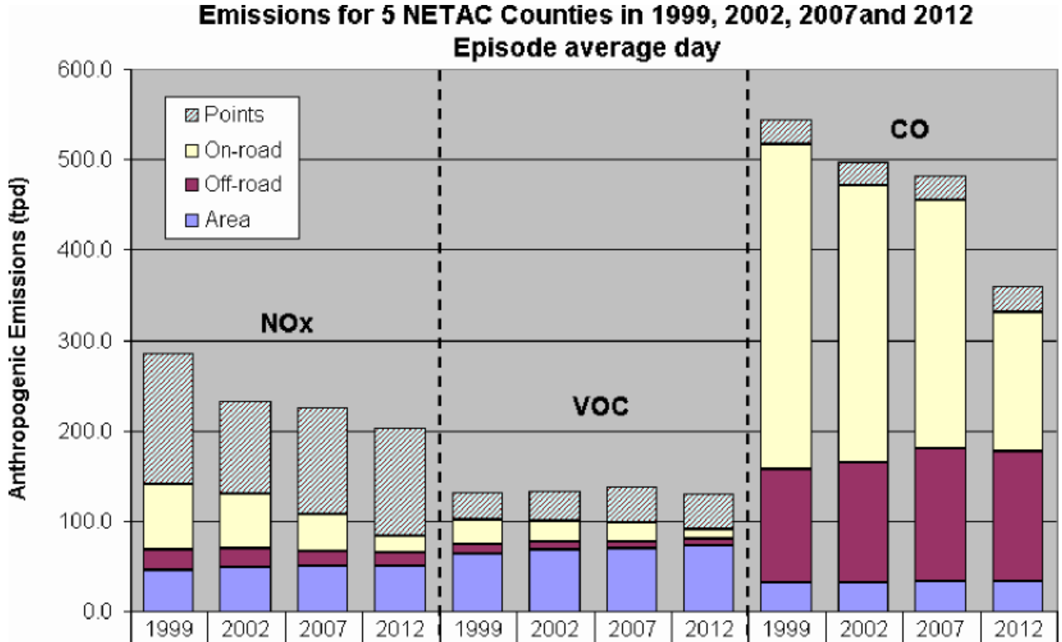
Total anthropogenic NO_x emissions decrease from 1999 to 2012 due primarily to decreases in point source NO_x in the early years and decreases in mobile source NO_x in the later years. The decreases in point source NO_x result from NETAC control measures whereas the decreases in mobile source NO_x result from federal control programs for light-duty, heavy-duty and offroad vehicles. The federal control programs for heavy-duty diesel vehicles have a relatively large impact in the NETAC area because I-20 runs through Smith, Gregg and Harrison Counties.

Total anthropogenic VOC emissions increase slightly from 1999 to 2007 due primarily to increases in area source VOCs, but then decrease from 2007 to 2012 due to decreases in mobile source VOCs. Anthropogenic VOC emissions were only about 11 percent of total VOCs in 1999 due to the dominant influence of biogenic emissions.

Total anthropogenic CO emissions decrease from 1999 to 2012 due to decreasing onroad mobile source CO emissions due to more stringent federal controls, combined with the fact that onroad sources are the largest contributor to CO emissions.

In summary, NETAC developed its base case and future case emission files for its area, and shared those files with the other areas. The TCEQ provided 4-km, 12-km, and 36- km emission files for base case for areas outside of the EAC areas. The emissions files outside of the EAC areas were the same as the emissions files being used for the HGB MCR at the time the EACs were developed. A sensitivity study based upon ozone modeling conducted to evaluate the impact of Houston emissions upon the Austin and San Antonio areas also showed little impact. Based upon that study no adjustments to Houston VOC emissions were made in either the base case or future case modeling.

Figure 2-1. Trends in Northeast Texas episode average anthropogenic emissions (tons/day) from 1999 to 2012



	1999	2002	2007	2012	1999	2002	2007	2012	1999	2002	2007	2012
Points	144.7	102.1	118.5	118.5	29.9	33.0	39.5	39.5	27.4	25.8	28.3	28.3
On-road	72.9	61.6	40.0	19.2	27.7	23.2	21.3	11.0	359.1	307.5	274.2	154.2
Off-road	21.9	19.9	16.8	13.9	9.8	9.3	7.7	7.8	126.1	132.5	147.1	142.8
Area	46.0	49.0	50.1	50.6	63.7	67.4	69.5	72.1	31.1	32.0	33.0	34.0

CHAPTER 3: PHOTOCHEMICAL MODELING

3.1 INTRODUCTION

This chapter briefly describes the photochemical modeling conducted to demonstrate attainment of the 8-hour ozone standard in the Northeast Texas EAC area. A more detailed description of the photochemical modeling is found in Appendix E, "Modeling an August 1999 Ozone Episode in Northeast Texas", January 2003 (Environ) and Appendix I, "Ozone Modeling for the Northeast Texas Early Action Compact", June 2004 (Environ).

For this demonstration, one episode (August 13-22, 1999) was modeled. This modeling includes the effects of source specific point source NO_x reductions made enforceable through Agreed Orders in 2002, new HRVOC reductions being made at a local chemical plant complex, as well as the effects of other local, regional, and national controls. In accordance with the requirements of the EAC, a future attainment year of 2007 was modeled.

3.2 BACKGROUND

The August 13-22, 1999, episode modeled for this attainment demonstration is considered to be representative of ozone episodes that occur in the Northeast Texas Region. A complete discussion of the episode selection process, as well as an analysis of ozone formation in northeast Texas, can be found in Appendix F, "Conceptual Model of Ozone Formation in the Tyler/Longview/Marshall Near Nonattainment Area", January 2004 (Environ). An outline of the development of the modeling is found in Appendix B, "Modeling Protocol - Ozone Modeling for North East Texas Early Action Compact," October 2003 (Environ).

The photochemical model used for this 8-hour ozone attainment demonstration is the public domain Comprehensive Air Quality Model with Extensions (CAMx). CAMx is a state-of-the-science photochemical grid model with numerous improvements over the 1990-vintage Urban Airshed Model, version IV. CAMx uses the Carbon Bond Mechanism, version IV (CB-IV) chemistry package, nested grids, plume-in-grid (PiG) for point sources, and three choices for advection schemes: Smolarkiewicz, Bott, or Piece-wise Parabolic Method (PPM). For this modeling exercise, PiG was applied to major point sources, and the PPM advection scheme was used. The modeling domains are shown in Appendices E and I.

3.3 METEOROLOGICAL MODELING

CAMx requires gridded meteorological variables of wind speed and direction (vector component), ambient temperature, atmospheric pressure, water vapor mixing ratio, vertical mixing coefficients, and vertical model layer interface heights. The meteorological parameters are typically developed by either a diagnostic or prognostic meteorological model. For this episode, the Fifth-Generation Penn State/National Center for Atmospheric Research Mesoscale Meteorological Model (MM5) was used. Since meteorological models may have the same horizontal grid structure as CAMx, but finer vertical resolution, an aggregation/interpolation routine is used to put the meteorological fields into the same grid as that set up for CAMx. MM5CAMX was used to aggregate/interpolate theMM5 fields into CAMx. A

more detailed discussion of the development of the meteorological fields for CAMx may be found in

Appendices E and I.

3.4 EMISSIONS INVENTORY

CAMx requires hourly, gridded values of VOC, NO_x, and CO from source categories of onroad mobile, area and nonroad mobile, point (low-level and elevated), and biogenic. VOC emissions must also be speciated. Emissions were developed for both a 12-km regional grid, plus an urban-scale 4-km grid. The regional and urban grids are shown in Appendices E and I.

Point source emissions for Texas, as well as Louisiana, were obtained from several sources, namely the EPA Acid Rain Data Base for Texas and Louisiana electric generating units (EGUs), the Texas Point Source Data Base for Texas non-EGU point sources, and the Louisiana Department of Environmental Quality (LaDEQ) for Louisiana non-EGUs. Facility-specific data for the Eastman Chemical Company plant in Longview was also incorporated.

Onroad mobile source emissions were developed by the Texas Transportation Institute (TTI) using travel demand models and EPA's MOBILE6 emissions model for the following Texas counties: Gregg, Smith, Hays, Travis, Williamson, Nueces, and Victoria. LaDEQ supplied county-level onroad emissions for the six Louisiana parishes within the 4 km domain.

Nonroad mobile and area source emissions within the northeast Texas area were developed by Pollution Solutions and may be found in the report "Tyler/Longview/Marshall Flexible Attainment Region Emission Inventory Ozone Precursors, VOC, NO_x, and CO 1999 Emissions", May 2002 (Pollution Solutions). The area and nonroad emissions inventory was also updated in Appendix H, "Updates to Offroad Mobile Emissions for East Texas", September 2003 (Environ).

For the 12-km domain (for those areas outside of Texas and Louisiana), the source of point, area, onroad mobile, and nonroad mobile emissions was the 1999 National Emissions Inventory, version 1.

Biogenic emissions for both domains were built using the GloBEIS model, version 2.2. The TCEQ Land Use/Land Cover (LU/LC) data was used for Texas, and EPA's BELD LU/LC was used for the remainder of the domain.

A complete discussion of the emissions processing is found in Appendices E and I.

3.5 BASE CASE PERFORMANCE EVALUATION

Once the emissions inventory and meteorological fields are developed, they are fed into CAMx during the Base Case Performance Evaluation (base case). This exercise is designed to determine if CAMx can replicate the actual ozone produced during the episode. EPA guidance requires that model predictions be compared to actual ozone observations within the area of interest using statistical and graphical methods. Graphical techniques include time series plots (predicted versus observed at a monitoring station) and isopleth maps (lines of constant daily maximum predicted ozone concentration). Statistical methods are unpaired peak accuracy, normalized bias, and gross error. EPA acceptance criteria for each are ±15-20 percent, ±5-15 percent, and 30-35 percent, respectively. For the base case performance evaluation phase, five base cases were modeled (all described in Appendices E and I). Table 3-1 shows the 1-hour ozone statistical performance evaluation for the 4- km domain (excluding Louisiana stations). In addition, several diagnostic and sensitivity analyses, which are designed to gauge the model's responsiveness to various input changes, were conducted. Model performance was acceptable for characterizing ozone levels in the area. A full discussion of the base case model performance evaluation, including statistical measures, isopleth plots, and time series is found in Appendices E and I.

Table 3-1 1-hour Ozone Statistical Performance Evaluation - Base 5

Episode day	Peak observed (ppb)	Peak modeled (ppb)	Unpaired peak accuracy (±20%)	Normalized Bias (±15%)	Gross error (35%)
August 15	95	84	-11	-9	14
August 16	124	105	-15	-24	25
August 17	134	136	2	-13	20
August 18	91	136	50	7	12
August 19	101	133	32	-6	12
August 20	99	109	10	-18	19
August 21	107	98	-9	-24	24
August 22	107	106	-1	-8	15

3.6 FUTURE CASE EMISSIONS INVENTORY

After the base case modeling passes all performance evaluation tests, the next step is to grow the base case inventory to the future case or attainment year. As previously noted, the attainment year for this 8-hour ozone attainment demonstration is 2007. The 2007 inventory consists of the incorporation of emissions due to anticipated growth, plus controls on source categories due to rules that have been promulgated and will be in place by 2007, but were not in effect at the time of the episode(s). For point sources, a description of the 2007 point source inventory may be found in Point Source Modeling Inventory Development, of the 2004 Houston/Galveston/Brazoria Mid-Course Review SIP Revision. The emissions files outside of the EAC areas were the same as the emissions files being used for the HGB mid-course review at the time the EACs were developed. This inventory also includes recently-permitted sources that were not in operation at the time of the episode, but are anticipated to be by 2007. These are Entergy Power Ventures, Gateway Power Project, LG&E Power Project, and Tenaska Gateway.

Similar to the base case emissions, 2007 onroad mobile emissions were built by TTI using traffic demand modeling and MOBILE6. County-level Louisiana onroad data from LaDEQ was used, and EPA's 2007 Heavy Duty Diesel engine rule (HDD) inventory was used for the remainder of the regional emission inventory.

Area emissions for Northeast Texas for 2007 were based on the previously-mentioned Pollution Solutions report, and grown to 2007 using Economic Growth Analysis System (EGAS) 4.0. Nonroad mobile source emissions were based on TCEQ's 1990-2010 Emission Inventory Trends and Projections report.

Biogenic emissions for 2007 were assumed to be the same as in the base case episode period.

As a result of the 2002 Northeast Texas 1-hour ozone SIP revision, several sources in Northeast Texas area entered into voluntary emission reduction agreements with the TCEQ. These reductions were made enforceable by agreed orders. These include EGUs belonging to TXU (Martin Lake, Monticello), AEP (Knox Lee, Pirkey, Wilkes), as well as Eastman Chemical.

In addition, Eastman Chemical and Huntsman Chemical (a polypropylene facility located within Eastman's complex) are implementing fugitive emission Leak Detection and Repair (LDAR) programs to reduce emissions of HRVOCs. Other NETAC reduction measures that will be implemented include the Department of Energy's Clean Cities program, and energy efficiencies. The future case inventory also includes two changes which occurred after the SIP was originally proposed. These include VOC reductions due to the statewide portable fuel container rule (proposed Chapter 115.620-22, 115.626-627, and 115.629), and an elimination of reductions associated with the statewide small gas fired water heater/boiler rule (Chapter 117.460-469). As a Weight of Evidence sensitivity run, 1.5 tons/day of NO_x were reduced from the nonroad sector due to Texas Emission Reduction Plan (TERP). However, TERP reductions are not being relied upon for this North East Texas attainment demonstration.

EPA's draft 8-hour modeling guidance indicates that a "current" year inventory must also be developed and modeled. For this modeling, the current year is 2002. The 2002 inventory was a combination of actual and projected emissions. 2002 point source emissions included the use of 2002 3rd quarter Acid Rain Data Base data for EGUs (in Texas, Louisiana, Arkansas, and Oklahoma), 2000 Texas PSDB data for other Texas point sources, and 1999 NEI version 2 for all other point sources.

The 2002 onroad mobile source emissions were built in a manner similar to the 2007 set (TTI plus NEI). Area sources were based on growing the 1999 emissions to 2002. Nonroad mobile emissions were built using NonRoad2002 and local survey data for mining and construction equipment. Biogenic emissions are assumed to be the same as the base case.

A full discussion of the 2002 and 2007 future case inventory development and modeling is found in Appendices A, E, and I.

3.7 ATTAINMENT DEMONSTRATION

After the current and future case (which includes all other known controls to be in place by 2007) inventories were built, CAMx was run for each case to provide the modeling basis used in determining the area's ability to meet the 8-hour ozone standard. EPA's draft 8-hour ozone modeling guidance indicates that the photochemical model is to be used in a relative manner. The guidance states that the relative reduction in ozone from current case to future/control case is to be multiplied by the 8-hour ozone monitored design value in order to estimate the future design value. If this calculated future design value is less than 85 ppb, attainment has been demonstrated.

In general, this can be thought of as:

Future design value (DVf) = Base/current year DV (DVc) * Relative Reduction Factor (RRF)
and

RRF = 2007 max modeled ozone / 2002 max modeled ozone

The year 2002 was used as the current year because it is the middle year of the 2001-03 time frame, upon which Northeast Texas 8-hour ozone classification was based. Although the details of the DVf calculations can be found in Appendix I, Table 3-2 summarizes the results of the calculations. Table 3-3 summarizes the results of the TERP reduction Weight of Evidence analysis.

Table 3-2 2007 Future Design Values

Station	2001-03 8-hour ozone design value (ppb)	Relative Reduction Factor	Calculated 2007 DVf
Longview (CAMS19)	82	0.980	80
Tyler (CAMS82)	81	0.954	77
Karnack (CAMS85)	84	0.958	80
Waskom (NETAC)	84	0.966	81

Table 3-3 2007 Future Design Values Assuming TERP Reductions (Weight of Evidence)

Station	2001-03 8-hour design value	Relative Reduction Factor	Calculated 2007 DVf
Longview (CAMS19)	82	0.979	80
Tyler (CAMS82)	81	0.951	77
Karnack (CAMS85)	84	0.958	80
Waskom (NETAC)	84	0.965	81

Since all calculated future design values are below 85 ppb for 2007, attainment of the 8-hour ozone standard has been demonstrated.

CHAPTER 4: DATA ANALYSIS

4.1 Summary

Air quality data determine compliance with the NAAQS for ozone and accordingly the TCEQ operates several monitoring sites in Northeast Texas. Additionally, NETAC has collected supplemental data on ozone and precursors through research monitoring and an aircraft study in 2002. The air quality data for Northeast Texas are considered in detail in the recent conceptual model report by Stoeckenius et al. (see Appendix F). This section presents an overview of the air quality data, discusses air quality trends and shows the status of Northeast Texas in attaining both the 8-hour and 1-hour ozone NAAQS at all monitors.

4.2 TCEQ Monitoring Network

The TCEQ operates several continuous air monitoring stations (CAMS) in Northeast Texas as shown by the map in Figure 4-1. Historically, the highest ozone concentrations have been recorded at the Longview monitor (CAMS-19) located at the Gregg County airport where ozone data have been collected since the 1970s. Ozone monitoring commenced in 1995 at Tyler Airport (CAMS-86) although the monitor was relocated within the airport in 2000 due to construction and assigned a new number (CAMS-82). A monitoring site was established toward the east of the region in Marion County at the Cypress River Airport (CAMS-50) in 1998. The Cypress River monitor was discontinued in March 2001 and a new site located across the county line in Harrison County (Karnack, CAMS-85) began operating in September 2001. The CAMS 605 monitor was discontinued in October 2001 and the CAMS 133 monitor was discontinued in April 1997.

4.3 NETAC Research Monitoring

The NETAC has undertaken research monitoring to collect ozone data at additional locations and supplemental precursor data at the TCEQ monitoring locations. The NETAC research-monitoring site was located at Waskom in eastern Harrison County for the 2002 and 2003 ozone seasons and data were reported via the TCEQ's data system as CAMS-612, which is shown in Figure 4-1. VOC samples were collected at CAMS19 in Longview in 2002 and 2003.

4.4 NETAC Aircraft Study in 2002

Air quality measurements were performed aboard the Baylor Cessna 172 aircraft during August and September 2002, as part of the NETAC Air Quality Study. Measurements included ozone, NO, NO_2, NOy, SO_2, continuous olefins, VOC canister, light scattering, photolysis rate, and meteorological parameters[1]. Not every parameter was measured on every flight. A total of 33 flight hours were used.

Flight plans were developed to collect data to address the following issues:

- Background ozone levels entering Northeast Texas during easterly/northeasterly wind events frequently associated with high ozone in the area.
- Ozone production associated with major point sources in Northeast Texas.
- Ozone production associated with major urban areas (urban plumes) such as Tyler and Longview.

Actual flight schedules were selected according to the conditions on each day. Several flights observed transport of high background ozone into Northeast Texas, as discussed below. Flights did not find urban plumes that were distinct from plumes downwind of major point sources. Flights found some high ozone concentrations downwind of major NO_x point sources (utilities) but the levels were lower than observed by a flight during the TexAQS field study, discussed below. One flight using the continuous olefins instrument found an olefins plume downwind of the Eastman/Huntsman chemical plants near Longview

[1] NO is nitric oxide. NO_2 is nitrogen dioxide. NO_Y is the sum of oxidized nitrogen compounds. SO_2 is sulfur dioxide. VOC is volatile organic compounds.

that also contained elevated ozone concentrations, but the flight was not on a high ozone day and the ozone levels observed were below the level of the 8-hour ozone standard (see Appendix F).

Elevated ozone concentrations were observed upwind of the Northeast Texas area under meteorological conditions frequently associated with high ozone. For example, on August 28 - 30, 2002, 70 – 85 ppb of ozone was observed at about 500 - 600 m above ground level all along the Texas-Louisiana state line northeast of the study region (see example for August 29 in Figure 4-2). These flights also traversed various NO_x plumes. Winds were generally northeast at 3 – 8 knots throughout these flights and back trajectories for mid afternoon on August 29, 2002 are shown in Figure 4-3. The back trajectories are model results showing the path taken by a hypothetical air parcel to arrive at a specific place and time. 8-hour daily maximum ozone values on August 29, 2002 ranged from 76 ppb at Tyler to 88 ppb at Karnack. These aircraft data show that transported ozone can cause near exceedances of the 8-hour ozone standard in Northeast Texas.

4.5 2000 TEXAQS AIR Quality Study (TexAQS2000)

Ozone formation in power plant plumes has been studied extensively in Texas and elsewhere. A NOAA Lockheed Electra aircraft collected data in Northeast Texas in connection with the TexAQS2000. A flight on September 3, 2000, provided data on power plant plumes in Northeast Texas and these data were analyzed by NETAC. Plumes were identified by looking for SO_2 concentration peaks at locations downwind of major NO_x sources such as the Monticello, Welsh, or Martin Lake power plants. SO_2 and ozone concentrations along the aircraft flight path are shown along with the locations of the NO_x point sources in Figure 4-4. Ozone concentrations are indicated by the color scale and the thickness of the line indicates the magnitude of the SO_2 concentration. NO_x point sources are indicated by circles with diameters proportional to the magnitude of NO_x emissions. Winds were out of the northwest during this flight. Varying amounts of ozone formation are evident downwind of the Monticello, Welsh and Martin Lake power plants. Ozone formation in NO_x point source plumes is sensitive to the amount and overall reactivity of VOCs in the environment into which the plume is dispersing relative to the NO_x concentration in the plume since ozone formation efficiency (moles O_3 produced per mole NO_x) is a strong function of the VOC/NO_x ratio. This explains why the amount of ozone observed in plumes from different sources may vary widely even under similar meteorological conditions and why the amount of ozone formed in a plume from a given source will vary from day to day in response to changes in dispersion conditions. Regional background ozone was close to the level of the 8-hour standard during this flight and the ozone production from power plant emissions resulted in ozone aloft exceeding the level of the 1-hour standard.

4.6 Ozone Trends

Figure 4-5 shows the 1995 – 2003 trend in the annual fourth highest daily maximum 8-hour average ozone concentrations (the "annual design value") at monitoring sites in Northeast Texas and the Shreveport area (Bossier and Caddo parishes). Annual design values are shown here because they are part of the attainment status determination discussed below. In general the trends are similar over all sites, with values generally increasing to a maximum in 1999 before falling again. Sites in Louisiana show the same general trend as the Northeast Texas sites. However, a change appears to have occurred at the Longview monitoring site beginning in 2001. During 1995 – 2000, the highest annual design value always occurred at Longview (except in 1996) but as of 2001, the annual design value at Longview is nearly equal to that at Tyler and is much closer to the levels observed in Louisiana.

Ozone trends for 1995 – 2002 at Longview and Tyler are compared with Dallas and Shreveport in Figure 4-6. Annual 8-hour design values at Shreveport are based on the maximum of the Caddo and Bossier parish design values; annual 8-hour design values for Dallas are based on the maximum over five sites for which valid design values were available in each year. Trends at all locations share similar features. The annual design value in Dallas is higher than at the other locations in every year except 1998 and, in contrast to annual design values in Northeast Texas and Shreveport, did not drop off significantly in 2001 and 2002. Annual design values at Longview were comparable to those in Dallas during 1998 – 2000 but were much lower (and instead comparable to those at Tyler and in Shreveport) in 1996-1997 and 2001-2002.

4.7 Ozone Attainment Status

EPA's NAAQS for ozone includes both a 1-hour average standard and an 8-hour average standard. The 1-hour ozone standard limits the frequency with which the daily maximum 1-hour ozone average concentration can exceed 0.12 ppm to once per year (averaged over three years) while the 8-hour ozone standard sets a maximum level (0.08 ppm) for the three year running average of the annual fourth-highest daily maximum 8-hour ozone average concentration.[1] The 1-hour ozone standard is violated if the fourth highest concentration in a period of three consecutive years exceeds 0.12 ppm.[2]

No monitor in Northeast Texas recorded a 1-hour ozone level exceeding 125 ppb in 2001 to 2003. The area is monitoring attainment of the 1-hour standard.

The annual fourth highest daily maximum 8-hour ozone values for 2001 to 2003 are shown in Table 4-1 for monitors in Northeast Texas. The Karnack and Waskom monitors have only 2 years of data and will not be used by EPA in attainment designations based on 2001 to 2003 data. Two-year design values are shown for Karnak and Waskom because they are used in the ozone attainment demonstration modeling and for comparison with Longview and Tyler. The 2001-2003 8-hour ozone design values for Longview and Tyler are both below 85 ppb and so Northeast Texas is monitoring attainment of the 8-hour standard.

Table 4-1. Annual fourth highest daily maximum 8-hour ozone values and 2001-2003 8-hour ozone design values for Northeast Texas.

Year	Longview	Tyler	Karnack	Waskom
2001	82	82	Partial Season	Not Operating
2002	84	84	88	86
2003	82	79	80	82
Design Value	82	81	(84)	(84)

Note: The two-year design values for Karnack and Waskom will not be used for attainment designation

[1] Under the rounding conventions specified in the standard, the 1-hour standard is exceeded by a concentration of 125 ppb or greater while the 8-hour standard is exceeded by a concentration of 85 ppb or greater.

[2] Because the 1-hour standard is actually based on the expected value of the annual exceedance rate (which allows for adjustment of the exceedance count for missing data), it is possible under rare circumstances to record a violation of the standard even if the fourth highest daily 1-hour maximum in three years is less than 0.12 ppm.

Figure 4-1. Map of Northeast Texas showing locations of air quality monitors.

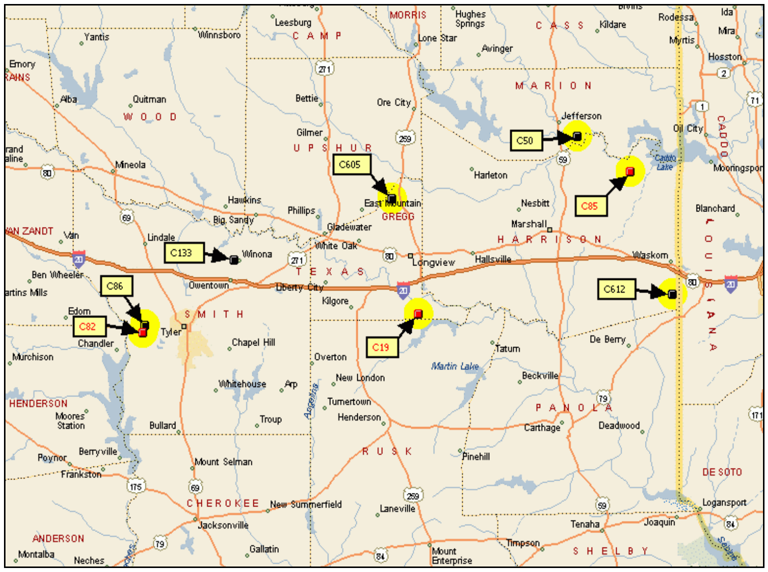


Figure 4-2. Baylor Aircraft ozone measurements for early afternoon of August 29, 2002.

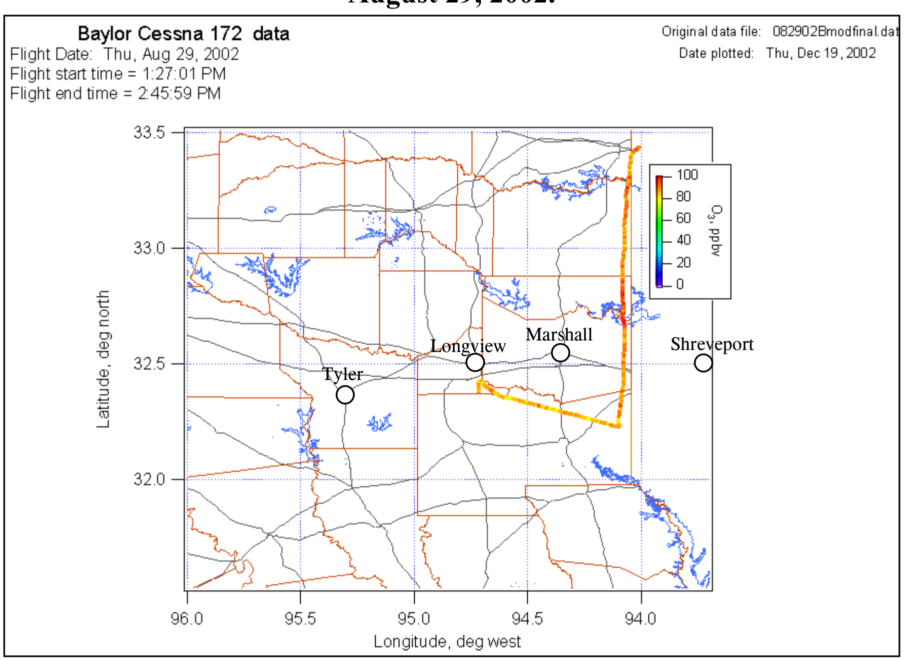


Figure 4.3. Back trajectories for mid afternoon of August 29, 2002.

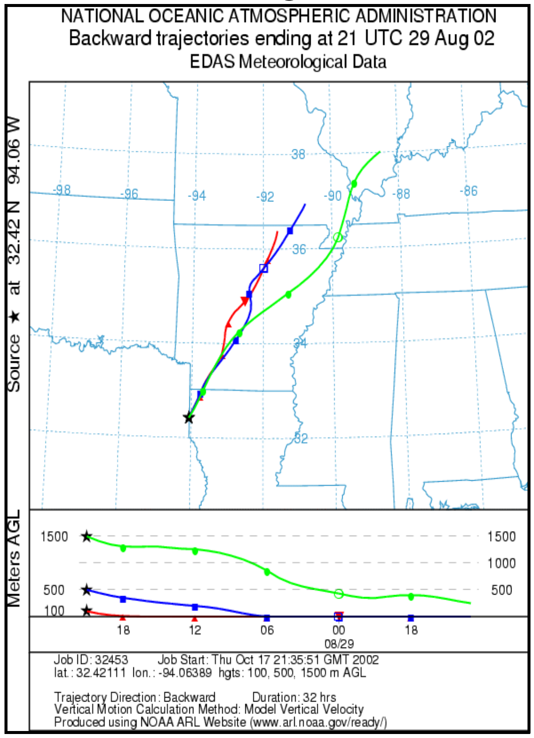


Figure 4-4. TexAQS aircraft flight path on September 3, 2000 showing ozone and SO_2 concentrations downwind of major point sources in Northeast Texas.
Line color indicates the ozone concentration (ppb).
Line thickness indicates the magnitude of the SO_2 concentration.
Circles locate NO_x point sources with magnitude indicated by the diameter of the circle

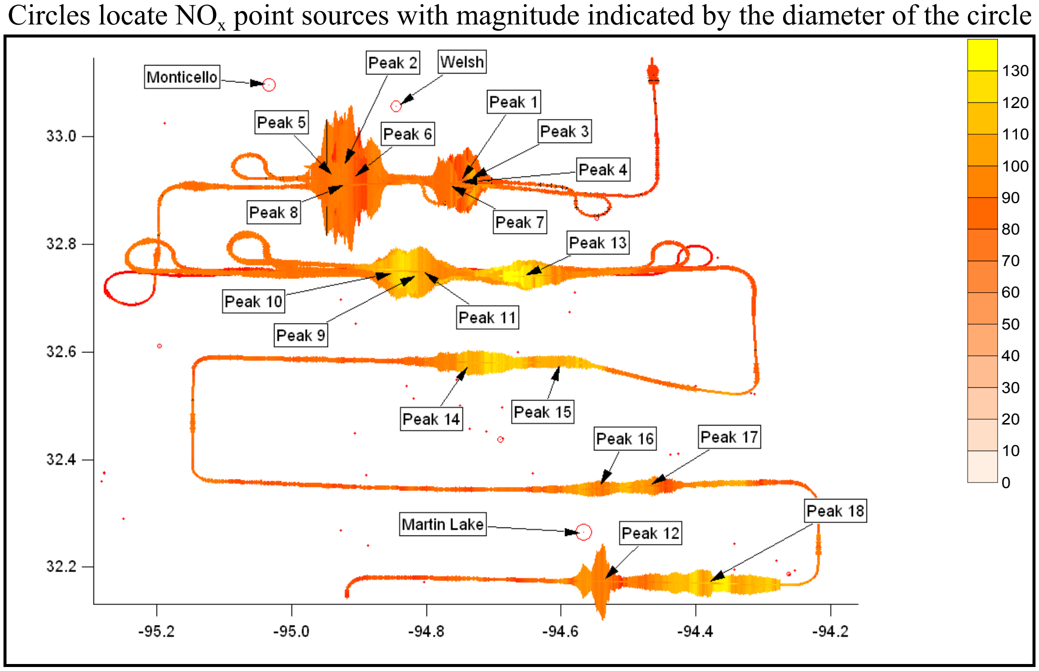


Figure 4-5. Annual 8-hour ozone design values at Northeast Texas and northwestern Louisiana monitoring sites: 1995 – 2003.

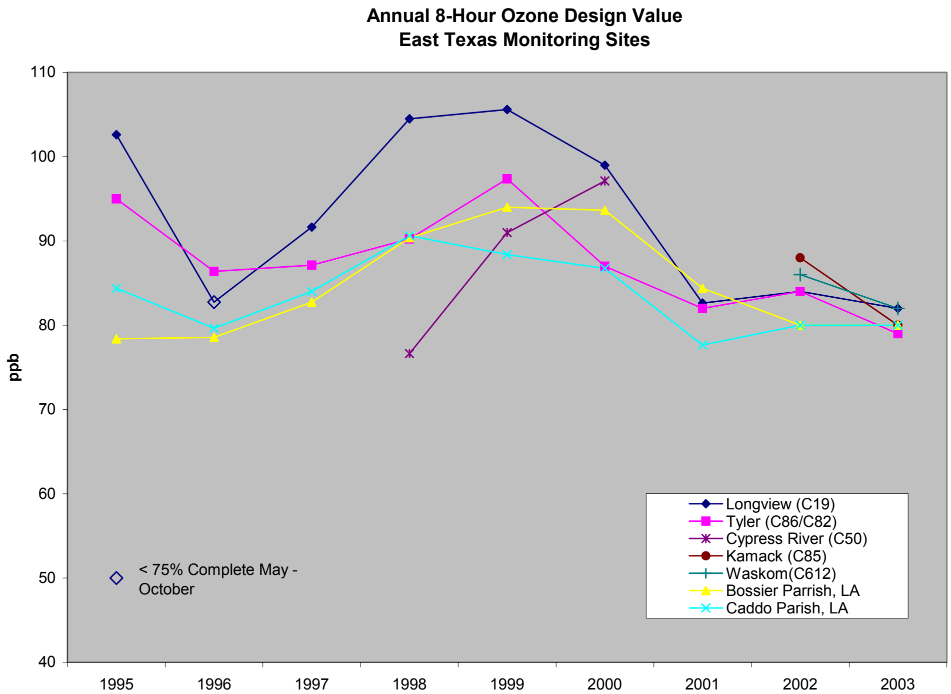
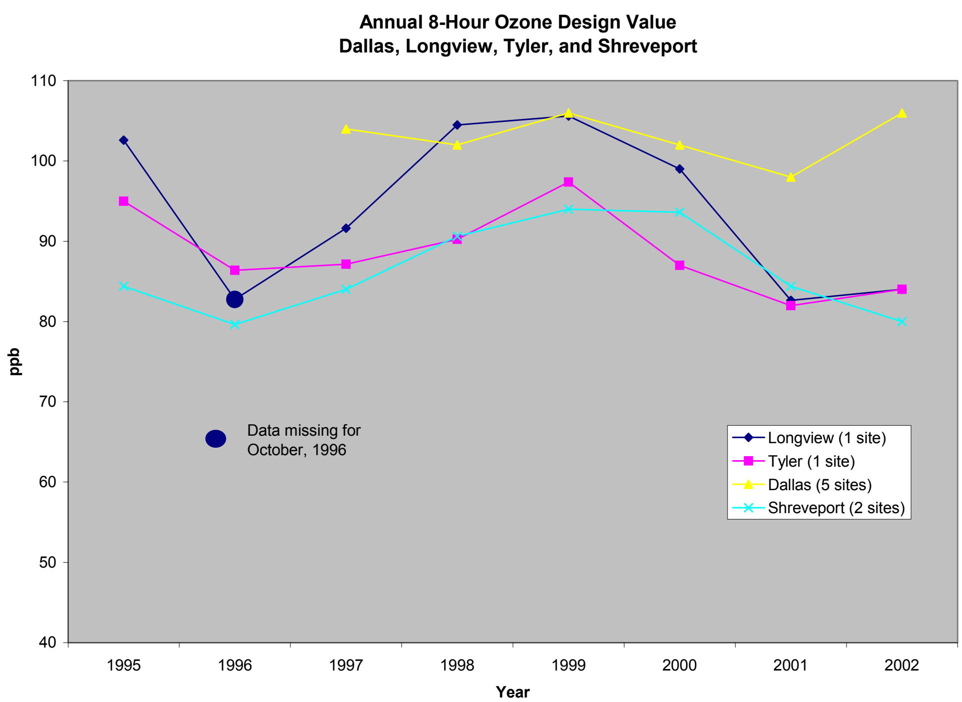


Figure 4-6. Annual 8-hour ozone design values at locations in Northeast Texas, Dallas, and Shreveport, LA



CHAPTER 5: CONTROL STRATEGIES

5.1 8-Hour Ozone Attainment

EPA's NAAQS for ozone includes an 8-hour ozone standard. The 8-hour standard sets a maximum level (0.08 ppm) for the three year running average of the annual fourth-highest daily maximum 8-hour ozone average concentration.[1] A review of recent air quality data for Northeast Texas shows that ozone levels declined over 1999 to 2003. The current 8-hour ozone design values for Longview and Tyler are 82 ppb and 81 ppb, respectively, based on the 2001- 2003 monitoring data. These values are below 85 ppb and show that Northeast Texas is now monitoring attainment of the 8-hour ozone standard.

The recent decline in 8-hour ozone levels has affected both the Longview and Tyler monitors, but is more pronounced at Longview. These declines coincide with significant reductions in NO_x emissions from major point sources in the Longview area that were made on a voluntary basis by NETAC. These voluntary reductions have since been made enforceable through a revision to the Northeast Texas SIP.

Attainment Demonstration for 2007

NETAC developed an ozone model for an August 1999 episode period. The performance of the ozone model was evaluated and then the model was used to evaluate whether Northeast Texas will remain in compliance with the 8-hour ozone standard through 2007. The ozone modeling for 2007 demonstrates attainment of the 8-hour ozone standard with existing control measures. The existing measures include locally developed NETAC control strategies, Texas SIP control strategies and federal EPA measures such as cleaner vehicles and fuels and the NO_x SIP Call. The projected 8-hour ozone design values for 2007 at Longview and Tyler are 80 ppb and 77 ppb, respectively, which are lower than the current design values.

Maintenance for Growth Through 2012

NETAC has developed emission inventories for 2012 to complete the "maintenance for growth" analysis called for in the EAC. NO_x emissions are projected to decline further between 2007 and 2012, which is expected to lead to further reductions in ozone levels in Northeast Texas. The maintenance for growth analysis projects that Northeast Texas will still be attaining the 8-hour ozone standard in 2012.

5.2 Additional NETAC Measures

NETAC conducted a study to identify control measures that are likely to be appropriate and effective in Northeast Texas. This assessment looked at strategies that look capable of achieving substantial reductions in NO_x and HRVOC by December 2005. Several of these strategies are being implemented and are described below.

5.3 Enforceable NETAC Measures

Point Source Control Measures

Two chemical plants near Longview are implementing enhanced Leak Detection and Repair (LDAR) programs to reduce emissions of HRVOC. The current NETAC attainment demonstration for 2007 does not include emissions reductions from these enhanced LDAR programs so these HRVOC reductions will be in addition to the currently modeled local controls.

[1] Under the rounding conventions specified in the standard, the 8-hour standard is exceeded by a concentration of 85 ppb or greater.

Eastman Chemical Company, Texas Operations is implementing enhanced LDAR programs in several parts of their facility in Longview. Voluntary LDAR programs in the Polyethylene Division and the Utilities and Feedstocks Division will be enforceable under Voluntary Emissions Reduction Permits 47007, 48588 and 48590. These measures will be implemented before the 2004 ozone season and will result in estimated emissions reductions of 0.63 tpd of HRVOC. Eastman will also do voluntary early implementation of LDAR programs that are required in 2005 under ethylene MACT regulations that will result in estimated emissions reductions of 0.23 tpd of HRVOC. These emissions reduction estimates may change as the programs are developed further and implemented.

Huntsman Chemical owns a polypropylene plant that is co-located with Eastman Chemical Company's facility near Longview. Huntsman's improved LDAR program will be implemented over a four-year period and is expected to reduce VOCs by 29 tpd by 2005 and 44 tpd by 2008. These estimates may change as the programs are developed further and implemented. Huntsman volunteered these reductions as part of a new Flexible Plant-wide Applicability Limit (PAL) Permit and converted the LDAR programs from 28M to 28VHP. The State of Texas permit number is #18105. Copies of these permits may be obtained by contacting the TCEQ Office of Permitting, Remediation and Registration.

5.4 State Control Measures

Texas Emissions Reduction Plan

The 77th Texas Legislature established TERP in 2001, through enactment of SB 5. The program was not fully funded, however, until the 78th Legislature enacted House Bill (HB) 1365 in 2003. TCEQ expects to have about $115-120 million in revenue in FY 2004, of which approximately $104 million will be available for the TERP Program (see below). Those figures are expected to increase in each of the subsequent fiscal years through FY 2008, averaging a total of $150 million each year. The program is scheduled to end after FY 2008.

The primary purpose of the TERP is to replace, through voluntary incentive programs, the reductions in emissions of NO_X that would have been achieved through mandatory measures that the Legislature directed the TCEQ to remove from the SIP for the DFW and HGB ozone nonattainment areas. TERP funding is also expected to be available to help achieve reductions in counties located in the state's other nonattainment areas and in designated NNA areas, where air quality is approaching nonattainment levels. Forty one counties have been identified for TERP funding to reduce on- and off-road equipment emissions.

HB 1365 designated all five counties in the Northeast Texas EAC area as "affected counties" and therefore eligible for participation. This voluntary program is available to all public and private fleet operators that operate qualifying equipment in any of the five counties. The TERP web page at http://www.terpgrants.org provides additional information on the TERP program.

Expected Emissions Reduction
Because TERP was initially designed to address deficiencies in the HGB and DFW ozone nonattainment areas, a majority of TERP funding will be necessary to address those continuing concerns. The program is expected to reduce approximately 38 tpd in HGB and 22.2 tpd in DFW. The commission allocated funding for up 1.5 tpd of NO_X reductions in the NETAC area by 2007.

5.5 Voluntary NETAC Measures

Compressor Engines Eligible for TERP Funding
The NETAC control strategy analysis identified NO_x emissions from compressor engines used in natural gas production as a source where significant emission reductions could potentially be achieved. NETAC estimated area source NO_x emissions related to oil and gas production to be about 35 tpd in the 5-county NETAC area in 1999 and these emissions are dominated by gas-fueled compressor engines less than 500 hp. Control technologies are readily available for these engines that can reduce NO_x emissions by 50 to 90 percent depending upon engine type.

NETAC has adopted the following approach to obtaining reductions in NO_x emissions from gas compressors in the 5 - county NETAC area. The Texas Legislature funded the TERP which will pay for a variety of NO_x reduction strategies at sources not currently subject to regulation including smaller gas compressor engines in the NETAC area. In 2003 and 2004 NETAC has arranged several public meetings with presentations on TERP funding to raise awareness of this program. In addition, NETAC has access to funding that could be used to develop a demonstration program for NO_x reductions on gas compressor engines during 2004.

Offroad Vehicle Emission Reductions
Two lignite-mining operations associated with power plants in the NETAC area have applied for TERP grants to reduce NO_x emissions from heavy offroad mining equipment. The Oak Hill Mining Area in Rusk County associated with the Martin Lake plant plans to replace two older backhoe excavators (non-tier rated) with two new, cleaner-burning (tier-1 compliant) backhoe excavators. The Sabine Mine associated with the Pirkey plant in Harrison County has submitted TERP applications for funding to replace one dozer and one excavator.

Onroad Vehicle Emission Reductions
The Department of Energy (DOE) Clean Cities program is a voluntary mobile source emission reduction program in East Texas. The East Texas Clean Cities Coalition (ETCCC), coordinated by the East Texas Council of Governments (ETCOG), has successfully obtained a Clean Cities Designation for the region from DOE. ETCCC promotes the use of alternative fuels, such as propane, natural gas, ethanol, and biodiesel.

Eighteen new lower emitting propane light heavy-duty (Class 2b) vans were purchased in 2003 and 2004 for the ETCOG's Rural Transportation Program (10 vans), the City of Longview (7 vans), and Tyler Transit (1 van). The average miles per year driven by these vehicles is 36,820. The emission reduction for each van compared to the average new heavy-duty spark-ignition van available in 2003 and 2004 was 0.021 tpy of VOC and 0.103 tpy NO_x. The eighteen vans being operated in the NETAC area will provide total emissions reductions of 0.4 tpy of VOC and 2.0 tpy NO_x.

Public Awareness Programs
ETCOG runs an annual public education and ozone awareness program for the five county Tyler-Longview-Marshall area. The program includes the following elements: an ozone watch and warning communications network between local governments and industries to communicate ozone action day forecasts issued by the TCEQ; a NETAC website (http://www.netac.org); production and distribution of public service announcements; school programs and teacher training workshops; distribution of public information and educational materials; and an Annual Ozone Season Kick-Off meeting for Northeast Texas.

Energy Efficiency Programs
The City of Tyler is carrying out a series of energy efficiency improvements that will reduce electricity consumption. The City of Tyler projects will result in estimated annual energy savings of 4,653,640 kWh. The programs will involve: Building Lighting, HVAC and Controls Upgrades; Traffic Light Upgrades; Park Lighting Upgrades; and Wastewater Plant Motor and Controls Upgrades.

The City of Longview passed a resolution on August 8, 2002, adopting the goals of SB 5, directing the preparation of an energy efficiency plan and providing for reporting to the State Energy Conservation Office. Since this adoption, the City has undertaken numerous measures to comply with the goal of reducing energy consumption by 5 percent per year for 5 years. The city has completed an Energy Assessment of Designated Municipal Facilities by the firm of Estes, McClure and Associates, Inc. This document will provide for improved planning as electrical systems are retrofitted. As major systems are renovated/retrofitted, energy consumption is a primary decision factor. Improvements have been made in lighting, HVAC systems, swimming pool operations and the purchase of energy efficiency rated equipment for Public Safety Communications.

The City of Marshall is initiating an energy efficiency plan with assistance from Texas A&M University.
East Texas Clean Cities Coalition