POST-1982
OZONE CONTROL STRATEGIES
DALLAS, EL PASO, AND TARRANT COUNTIES

TEXAS STATE IMPLEMENTATION PLAN

Section VI
Control Strategy

A. INTRODUCTION

Requirements for State Implementation Plans (SIP) specified in 40 CFR Part 51.12 provide that "...in any region where existing (measured or estimated) ambient levels of pollutant exceed the levels specified by an applicable national standard, the plan shall set forth a control strategy which shall provide for the degree of emission reduction necessary for attainment and maintenance of such national standard...". Ambient levels of sulfur dioxide and oxides of nitrogen, as measured from 1975 through 1977, did not exceed the national standards set for these pollutants anywhere in Texas. Therefore, no control strategies for these pollutants were included in revisions to the Texas SIP submitted on April 13, 1979. Control strategies were submitted and approved for inclusion in the SIP for areas in which measured concentrations of ozone, total suspended particulates, or carbon monoxide exceeded a National Ambient Air Quality Standard (NAAQS) during the period from 1975 to 1977.

The control strategies submitted in 1979 provided by December 31, 1982 the amount of emission reductions required by Environmental Protection Agency (EPA) policy to demonstrate attainment of the primary NAAQS, except for ozone in the Harris County nonattainment area. For that area, an extension to December 31, 1987 was requested, as provided for in the 1977 Federal Clean Air Act (FCAA) Amendments.

Supplemental material, including emission inventories for volatile organic compounds and total suspended particulates submitted with the 1979 SIP revisions, is included in Appendices H and O.

Proposals to revise the Texas SIP to comply with the requirements of the 1977 Amendments to the FCAA were submitted to the EPA on April 13, November 2, and November 21, 1979. On December 18, 1979 (44 FR 75830-74832), EPA approved the proposed revision to the Texas SIP relating to vehicle inspection and maintenance and extended the deadline for attainment of the NAAQS for ozone in Harris County until December 31, 1987. (Appendix Q contains the full text of the extension request and the approval notice.) On March 25, 1980 (45 FR 19231-19245), EPA approved and incorporated into the Texas SIP many of the remaining provisions included in the proposals submitted by the State in April and November, 1979. The March 25, 1980 Federal Register notice also included conditional approval of a number of the proposed SIP revisions submitted by the State.

Additional proposed SIP revisions were submitted to EPA by the State on July 25, 1980, and July 20, 1981 to comply with the requirements of the March 25, 1980 conditional approvals. By May 31, 1982, all of the proposed revisions to the Texas SIP submitted to EPA in April, and November, 1979, July, 1980, and July, 1981, with the exception of provisions relating to the definition of major modification used in new source review and certain portions of the control strategy for total suspended particulate in Harris County, had been fully approved or addressed in a Federal Register notice proposing final approval. The new source review provisions were approved August 13, 1984.

The 1977 Amendments to the FCAA required state implementation plans to be revised by December 31, 1982 to provide additional emission reductions for those areas for which EPA approved extensions of the deadline for attainment of the NAAQS for ozone or carbon monoxide. Paragraph B.5. of this section of the SIP contains the revision to the Texas SIP

submitted to comply with the 1977 Amendments to the FCAA and EPA rules for 1982 SIP revisions. Supplementary emissions inventory data and supporting documentation for the revision are included in Appendices Q through Z.

The only area in Texas receiving an extension of the attainment deadline to December 31, 1987 was Harris County for ozone. Proposals to revise the Texas SIP for Harris County were submitted to EPA on December 9, 1982. On February 3, 1983 EPA proposed to approve all portions of the plan except for the Vehicle Parameter Inspection and Maintenance (I/M) Program. On April 30, 1983 the EPA Administrator proposed sanctions for failure to submit or implement an approvable I/M program in Harris County. Senate Bill 1205 was passed on May 25, 1983 by the Texas Legislature to provide the Texas Department of Public Safety with the authority to implement enhanced vehicle inspection requirements and enforcement procedures. On August 3, 1984 EPA proposed approval of the Texas SIP pending receipt of revisions incorporating these enhanced inspection procedures and measures insuring enforceability of the program. These additional proposed SIP revisions were adopted by the State on November 9, 1984. Final approval by EPA was published on June 26, 1985.

Although the control strategies approved by EPA in the 1979 SIP revisions were implemented in accordance with the provisions of the plan, several areas in Texas did not attain the primary NAAQS by December 31, 1982. On February 23, 1983 EPA published a Federal Register notice identifying those areas and expressing the intent to impose economic and growth sanctions provided in the FCAA. However, EPA reversed that policy in the November 2, 1983 Federal Register, deciding

instead to call for supplemental SIP revisions to include sufficient additional control requirements to demonstrate attainment by December 31, 1987.

On February 24, 1984 the EPA Region 6 Administrator notified the Governor of Texas that such supplemental SIP revisions would be required within one year for ozone in Dallas, Tarrant, and El Paso counties and carbon monoxide in El Paso County. The TACB requested a six-month extension of the deadline (to August 31, 1985) on October 19, 1984. EPA approved this request on November 16, 1984.

The Guidance Document for Correction of Part D SIP's for Nonattainment Areas, published by EPA on January 27, 1984, details the specific procedures necessary to satisfy EPA requirements in order to avoid Clean Air Act sanctions prescribed in Section 110(A)(2)(I), 176, and 316. Subsection B.6. and D.2. of this section contains revisions to the Texas SIP proposed to comply with these EPA procedures and requirements. Supplemental emissions inventory data and supporting documentation for the revisions are included in Appendices AA through AJ.

B. OZONE CONTROL STRATEGY

CONTENTS

B. 1. POLICY AND PURPOSE

a. Primary Purpose of Plan

The primary purpose of this plan is to accomplish volatile organic compound (VOC) emission reductions required by the 1977 Federal Clean Air Act (FCAA) and the Environmental Protection Agency (EPA) and necessary to avoid the sanctions and penalties prescribed by Sections 110(a)(2)(I), 176, and 316 of the FCAA.

The plan provides for the required emission reductions by the federal statutory deadline of December 31, 1982, or December 31, 1987 in the case of Harris, Dallas, Tarrant, and El Paso counties, through a program of reasonable controls.

b. - d. (No Change)

B. 2. SUMMARY OF THE PRINCIPAL ELEMENTS ADDRESSED WITHIN THIS PLAN.

a. - b. (No Change)

c. Establishing Baseline Air Quality

In order to determine the ozone air quality in relation to the National Ambient Air Quality Standards (NAAQS) in each nonattainment area, EPA required that data from monitoring done in 1975, 1976, and 1977 be examined for the 1979 revisions. Data from 1978 was also considered when it became available. For the 1982 revisions, EPA required that monitoring data collected in 1978, 1979, and 1980 be examined. For Post-1982 revisions, EPA required that data collected in 1981, 1982, and 1983 be examined. Supplemental data collected in 1984 also were used to estimate the concentrations of certain air quality parameters. Procedures for

selecting or calculating baseline air quality to be used in plan preparation were promulgated by EPA and are discussed and used within this plan.

d. Required Emission Reductions

Emission reduction requirements for each nonattainment area are related to the degree by which baseline air quality exceeds the NAAQS for ozone. Reduction requirements are calculated by the use of algorithms or models that rely on measured data as well as certain assumed values. These procedures and the various factors involved in each are discussed in detail in subsequent sections concerned with specific SIP revisions. EPA requires that emission reduction requirements be calculated only for urban nonattainment areas - those containing an urban area with a census population of 200,000 or more, based on the 1970 census for 1979 revisions or based on the 1980 census for 1982 and Post-1982 revisions.

e. Sources of Emission Reductions

Substantial quantities of VOC's are emitted by businesses, industries, and motor vehicles. The plan identifies the contribution from known sources and sets forth a program of reductions that will satisfy EPA requirements for demonstration of attainment of the standard by December 31, 1982, or for either attainment of the standard or reasonable progress toward attainment by December 31, 1987, in the case of Harris, Dallas, Tarrant, and El Paso counties.

B. 3. OZONE CONTROL PLAN FOR 1979 SIP REVISION (No Change)

B. 4. CONTROL STRATEGY FOR 1979 SIP REVISION (No Change)

B. 5. 1982 HARRIS COUNTY SIP REVISION (No Change)

6. SIP REVISIONS FOR POST 1982 URBAN NONATTAINMENT AREAS

a. Ozone Control Plan

1) General

This section of the plan describes the actions taken by the Texas Air Control Board (TACB) to provide the VOC emission reductions necessary to satisfy EPA requirements for demonstrating attainment of the ozone NAAQS in Dallas, Tarrant, and El Paso counties. These federal requirements were published in the January 22, 1981 Federal Register (Appendix R) and Guidance Document for Correction of Part D SIP's for Nonattainment Areas published on January 27, 1984 (Appendix AA).

The guidelines require states to compile extensive air quality and emissions data. They specify techniques and procedures to be used by states in determining the amount of emission reductions required. In preparation for Post-1982 SIP revisions, each affected state was required to review data from air quality monitoring, compare the air quality data with the national standard for ozone, calculate the amount of emission reduction required, identify measures available to reduce emissions, and devise legally enforceable measures to provide the required emission reductions.

2) Ozone Nonattainment Area Designations in Texas

There are no changes proposed by this plan to the list of areas designated as nonattainment for ozone. See paragraph VI.B.3.b. for a list of areas designated as nonattainment for ozone and for a discussion of the ozone nonattainment area designation process.

3) Planning Procedures

a) Requirements Under Sections 121 and 174 of the FCAA

See paragraph VI.B.3.C.1) for a descripton of the federal requirements as contained in Sections 121 and 174 of the FCAA.

b) Status of Requirement

Documentation of the planning procedures and consultation for the Post-1982 SIP revision is contained in Appendix AB.

4) Local Consultation

a) Response from Local Officials

In a letter to the Administrator of EPA from the Governor of Texas dated July 24, 1978, the North Central Texas Council of Governments (NCTCOG) was designated to prepare plans for submittal to and consideration by the TACB, pursuant to Section 174 of the FCAA. Such plans are to provide for implementation of those transportation control measures (TCMs) which are determined to be reasonable and which may assist in efforts to reduce VOC emissions in Dallas and Tarrant counties. In a resolution dated February 14, 1978, local officials in El Paso County identified the City of El Paso as the designated Metropolitan Planning Organization (MPO) for transportation control planning associated with SIP revisions. (See Paragraph VI.B.3.c.3)c) and Appendix F.)

On July 3, 1984 and Februrary 27, 1985, NCTCOG and TACB signed formal agreements setting forth the specific roles and responsibilities of each agency for preparation of the Post-1982 SIP revisions for Dallas and Tarrant counties. Specifically, NCTCOG agreed to assist in (1) preparing mobile source emissions inventories and projections, (2) estimating the air quality benefits of various TCMs, (3) obtaining commitments from local officials to implement selected TCMs, (4) conducting public participation activities, and (5) performing other necessary tasks to complete the mobile source portion of the Post-1982 SIP revisions for consideration by TACB. The agreements included detailed schedules and work statements for each project (Appendix AC).

While no formal agreement was signed with the El Paso MPO, close communication was maintained throughout the SIP development process. The El Paso MPO assisted in the preparation of the Post-1982 SIP revisions by (1) providing mobile source data for El Paso and Ciudad Juarez, (2) analyzing and seeking commitments for selected TCMs, (3) supporting public participation activities, and (4) performing other necessary tasks to complete the mobile source portion of the plan for consideration by TACB.

The City of Dallas Department of Health and Human Services, the City of Fort Worth Public Health Department, and the El Paso City-County Health Unit contributed significantly to the Post-1982 SIP revision development by measuring air quality for ozone, gathering additional hydrocarbon and nitrogen oxide data, participating in public information activities, and reviewing control options.

b) Responsibilities and Planning Processes of the North Central Texas Council of Governments and the El Paso Metropolitan Planning Organization

In response to the need for additional air quality control measures in Dallas, Tarrant, and El Paso counties, NCTCOG and El Paso MPO have carried out extensive analyses of potential transportation controls, data collection projects, and public participation activities which were required for completion of the Post-1982 SIP revisions for each county. As a result of these efforts, certain transportation measures related to air quality improvement were found to be reasonable for implementation. NCTCOG and EL Paso MPO have obtained commitments from the elected officials of the local governments with authority to implement the air quality related transportation improvement measures found to be reasonable as described in Paragraphs VI.B.6.b.2)d), VI.B.6.c.2)d), and VI.B.6.d.2)d).

5) Degree of Nonattainment - Selection of Air Quality Baseline

In the January 22, 1981 Federal Register, EPA guidelines on SIP revisions were published requiring states to review ambient ozone data from at least three monitoring sites in each nonattainment area to determine the ozone concentration values to be used for modeling. These modeling results are then used to estimate the VOC reduction required to demonstrate attainment of the ozone standard. The guidelines also include specific criteria for the location of monitoring sites to be considered for modeling. At least one monitoring site should be located upwind of the city, one at the downwind edge of the city, and one 15-40 kilometers downwind from the city.

From the period 1981 through 1983, ozone was measured in Dallas County at four monitoring stations operated by the City of Dallas and one monitoring station operated by the TACB. In addition, the City of Dallas operates a monitoring station located in Denton County. These monitoring stations meet the siting requirements of the January 22, 1981 guidelines.

Table 14 lists, for the period 1981 through 1983, the number of days ozone exceeded 0.12 parts per million (ppm) at Dallas area monitoring stations. Table 15 lists the highest daily maximum ozone concentrations measured at these monitoring sites. The locations of the monitoring stations in Dallas and Denton counties are identified in Figure 2.

Table 14.

NUMBER OF DAYS OZONE CONCENTRATIONS EXCEEDED 0.12 PPM IN DALLAS COUNTY

Monitoring Site	1981	1982	1983
Dallas Mockingbird	6	7	7
Dallas North	4	11	7
Dallas Illinois	2	1	4
Dallas Sunnyvale	1	(a)	(a)
Dallas Bonnieview	(a)	1	3
Denton County	9	2	16

(a) No data for this year.

From the period 1981 through 1983, ozone was measured in Tarrant County at four monitoring stations operated by the TACB. The upwind monitoring station operated in Dallas County provided data which can be used to determine upwind concentrations appropriate for Tarrant County. Hence, the monitoring stations for Tarrant County meet the siting requirements of the January 22, 1981 guidelines.

Table 15.

HIGHEST OZONE DAYS AT EACH DALLAS COUNTY MONITORING STATION (a)

Monitoring Site (Operated by)	Date (b)	Hours when Ozone Exceeded 0.12 ppm	Maximum Ozone Concentration (ppm)
Dallas Mockingbird (City)	06/07/81	1400-1900	0.18
	07/13/82	1200-1700	0.17
	06/29/83	1200-1700	0.17
	06/17/82	1300-1800	0.16
	08/27/83	1100-1600	0.16
	08/31/83	1300-1500	0.16
	08/06/83	1500-1900	0.15
Dallas North (State)	06/17/82	1300-1600	0.20
	07/13/82	1200-1700	0.17
	07/22/82	1200-1400	0.17
	04/24/81	1400-1800	0.15
	07/10/81	1300-1500	0.15
	07/28/82	1400-1600	0.15
	06/29/83	1600-1900	0.15
Dallas Illinois (City)	08/31/83	1300-1600	0.17
	08/27/83	1200-1500	0.16
	06/18/82	1600-1900	0.15
	08/01/83	1100-1300	0.14
	08/06/83	1400-1800	0.14
Dallas Bonnieview (City)	07/23/82	1400-1700	0.15
	08/31/83	1300-1400	0.15
	05/26/83	1200-1400	0.13
	08/27/83	1200-1300	0.13
Dallas Sunnyvalle (City) (discontinued)	08/27/81	1400-1700	0.13
Denton County (City)	07/13/82	1300-1600	0.16
	08/25/83	1100-1500	0.16
	09/11/81	1500-1800	0.15
	06/08/83	1500-1800	0.15
	08/26/83	1600-1800	0.15
	08/10/81	1300-1400	0.14
	08/24/81	1500-1700	0.14
	07/21/83	1300-1600	0.14
	08/13/83	1600-1700	0.14

(a) Includes only days when ozone exceeded 0.12 ppm. Location of each station is shown on Figure 2.

(b) A minimum of the five highest days when ozone exceeded 0.12 ppm are required for modeling. Modeling was performed for each day listed, except for the discontinued Sunnyvale site.

Figure 2. LOCATION OF DALLAS AREA SECTORS AND MONITORING STATIONS

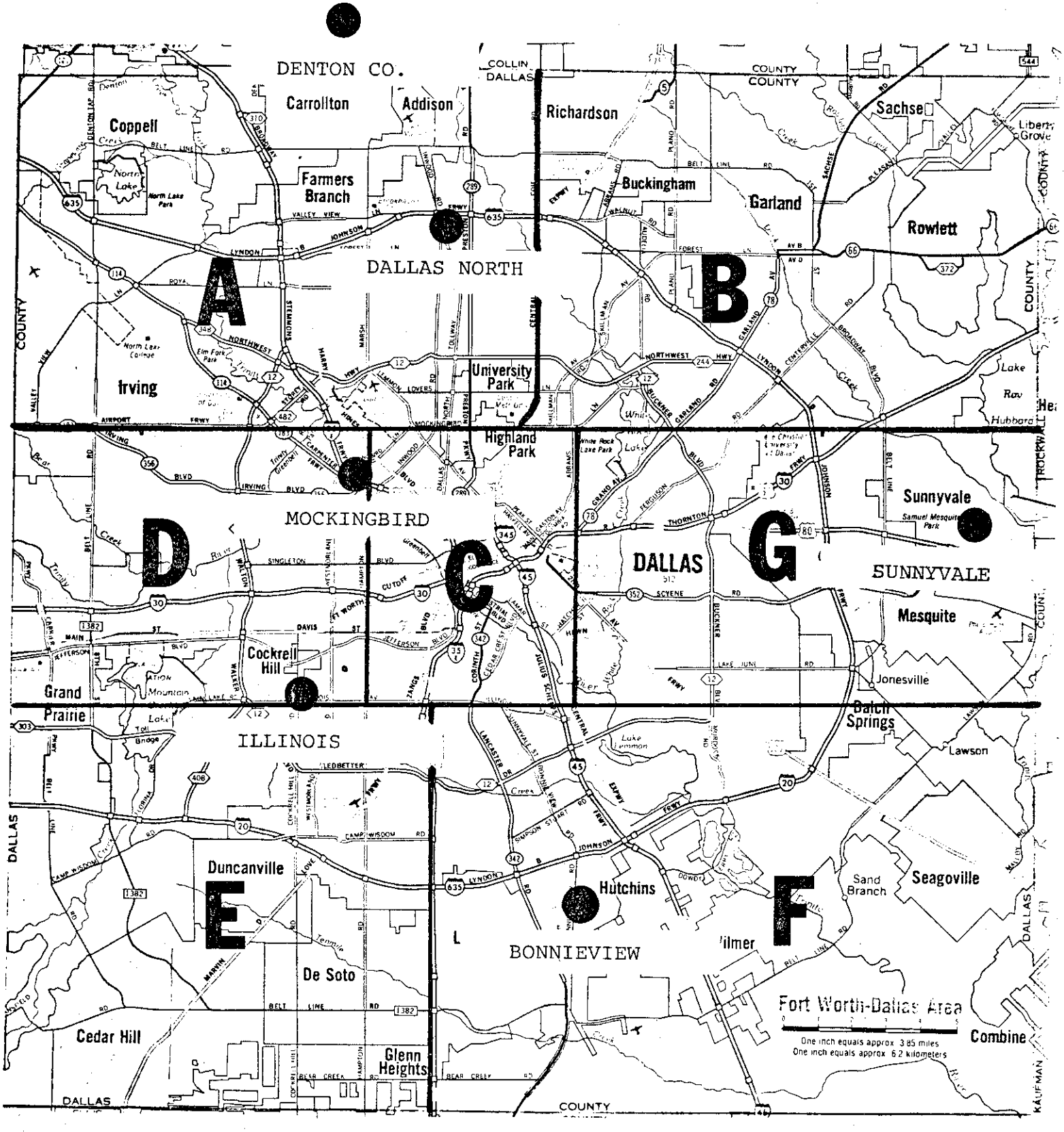


Table 16 lists, for the period 1981 through 1983, the number of days ozone exceeded 0.12 ppm at the Tarrant County area monitoring stations. Table 17 lists the highest daily maximum ozone concentrations measured at these monitoring sites. The locations of these monitoring stations are identified in Figure 3.

Table 16.

NUMBER OF DAYS OZONE CONCENTRATIONS EXCEEDED THE 0.12 PPM IN TARRANT COUNTY

Monitoring Site	1981	1982	1983
Fort Worth Northwest	4	4	1
North Tarrant County			
Haslet Site	2	0	(a)
Keller Site	(a)	0	5
Fort Worth Downtown	0	0	0

(a) No data for this year.

From the period 1981 through 1983, ozone was measured in El Paso County at three monitoring stations operated by the TACB. These monitoring stations meet the siting requirements of the January 22, 1981 guidelines.

Table 18 lists, for the period 1981 through 1983, the number of days ozone exceeded 0.12 ppm at the El Paso area monitoring stations. Table 19 lists the highest daily maximum ozone concentrations measured at these monitoring sites. The locations of the monitoring stations in El Paso County are identified in Figure 4.

Table 17.

HIGHEST OZONE DAYS AT EACH TARRANT COUNTY MONITORING STATION (a)

Monitoring Site (Operated by)	Date (b)	Hours When Ozone Exceeded 0.12 ppm	Maximum Ozone Concentration (ppm)
Ft. Worth Northwest (State)	07/22/82	1500-1900	0.20
	07/08/83	1200-1700	0.17
	09/03/81	1400-1600	0.14
	07/24/82	1100-1600	0.14
	08/07/82	1500-1600	0.14
	09/07/82	1500-1700	0.14
	04/30/81	1400-1600	0.13
	09/12/81	1500-1600	0.13
	06/21/82	1700-1800	0.13
North Tarrant Co Keller site (State)	08/31/83	1500-1700	0.16
	07/08/83	1200-1500	0.15
	08/01/83	1500-1600	0.14
	08/27/83	1600-1900	0.14
	05/25/83	1500-1600	0.13
North Tarrant Co Haslet site (State) (discontinued)	05/26/81	1500-1600	0.13
	09/12/81	1600-1700	0.13
Ft. Worth Downtown (State)	04/30/81	- No values exceeded 0.12 ppm -	

(a) Includes only days when the ozone exceeded 0.12 ppm. Location of each station is shown on Figure 3.

(b) A minimum of the five highest days when ozone exceeded 0.12 ppm are required for modeling. Modeling was performed for each day listed, except for the 05/25/83 exceedance at the Keller site.

Figure 3. LOCATION OF FORT WORTH AREA SECTORS AND MONITORING STATIONS

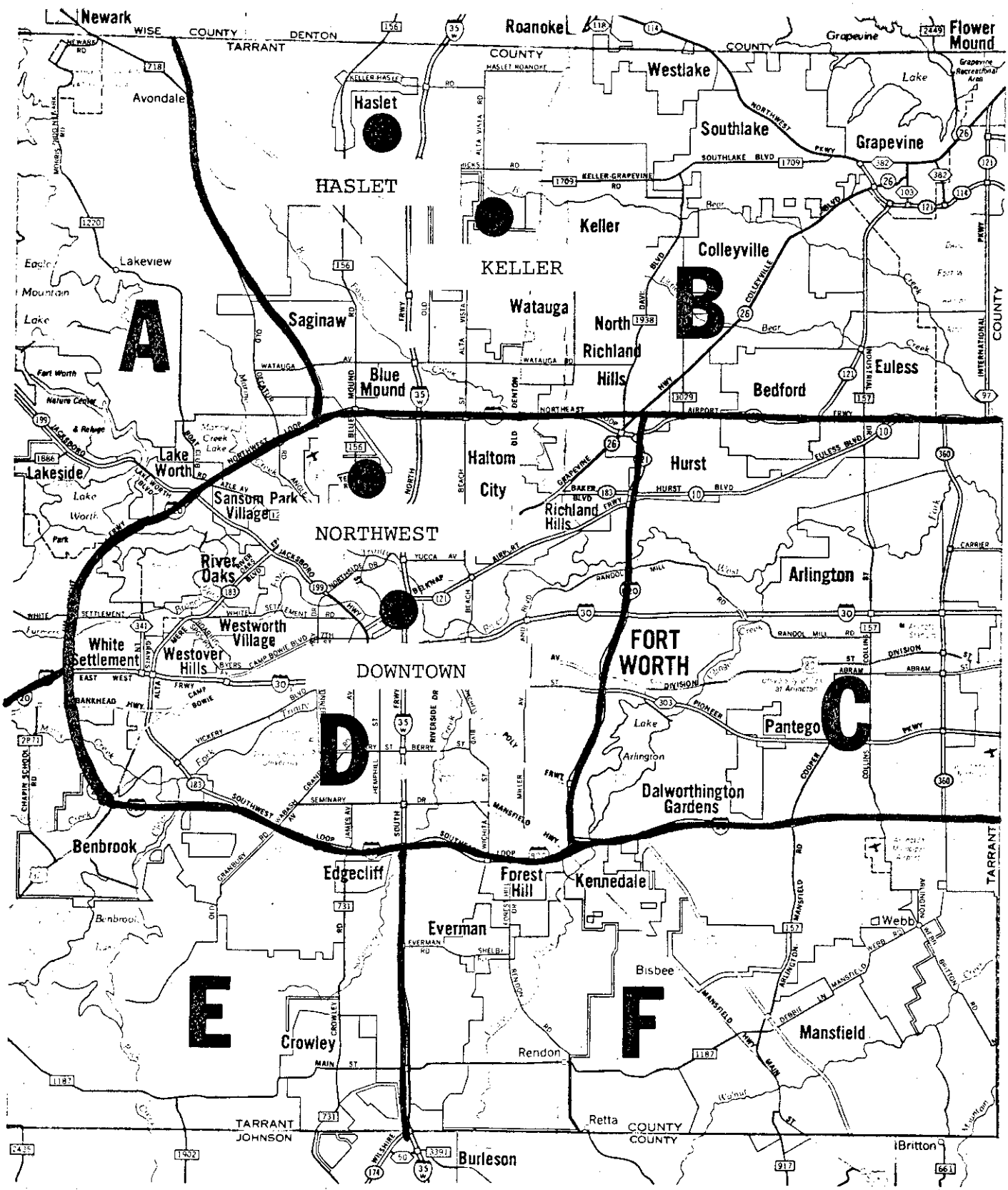


Table 18.

NUMBER OF DAYS OZONE CONCENTRATIONS EXCEEDED 0.12 PPM IN EL PASO COUNTY

Monitoring Site	1981	1982	1983
El Paso Downtown	1	0	0
El Paso Lincoln	1	0	0
El Paso West	1	2	3

Table 19.

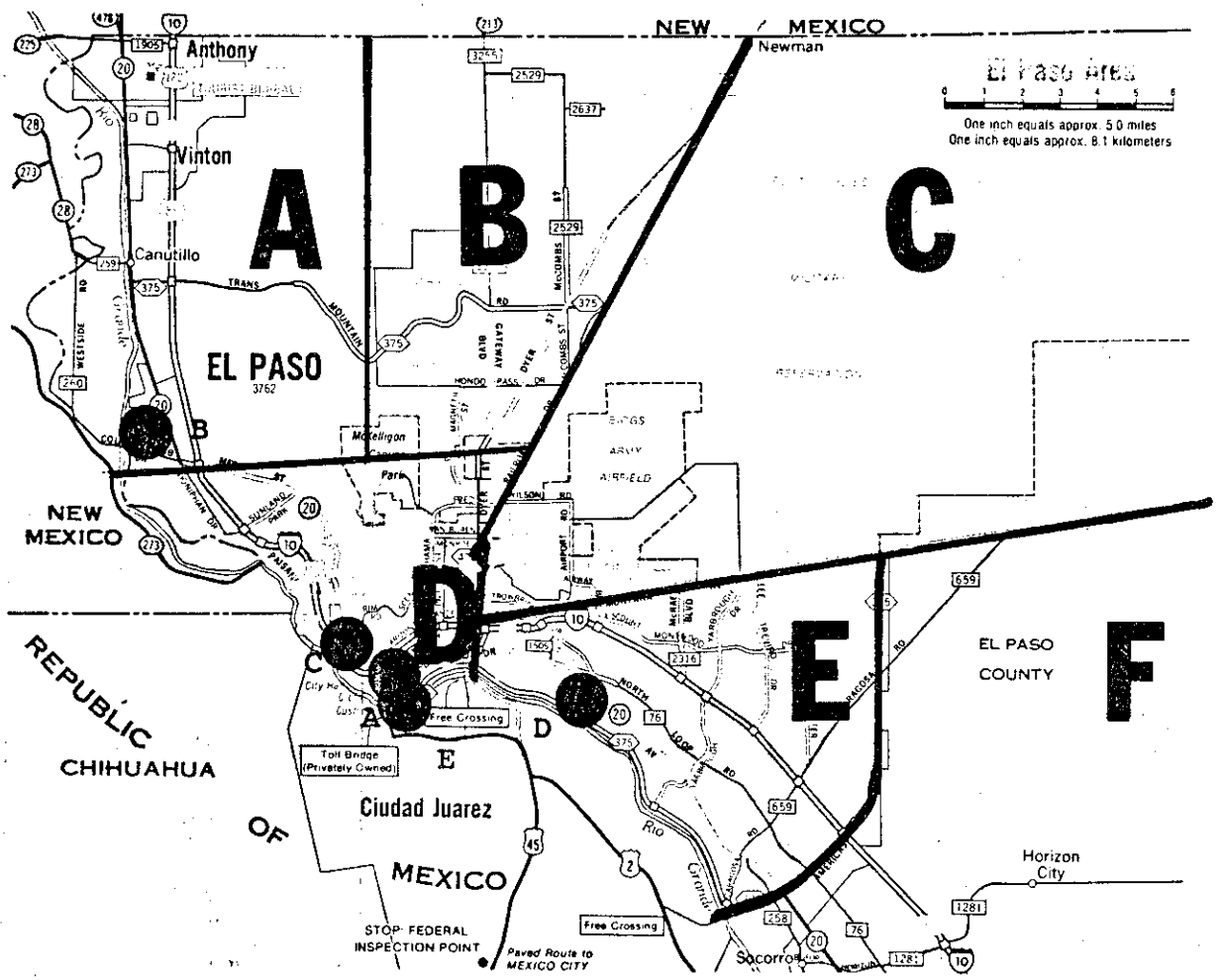
HIGHEST OZONE DAYS AT EACH EL PASO COUNTY MONITORING STATION (a)

Monitoring Site (Operated by)	Date (b)	Hours when Ozone Exceeded 0.12 ppm	Maximum Ozone Concentration (ppm)
El Paso Downtown (State)	10/28/81	1200-1300	0.14
El Paso Lincoln (State)	08/23/81	1300-1400	0.13
El Paso West (State)	09/10/83	1000-1200	0.15
	07/10/83	1000-1400	0.14
	07/11/83	1000-1100	0.14
	03/18/82	1000-1100	0.14
	09/21/81	1200-1300	0.13
	08/30/82	1000-1100	0.13

(a) Includes only days when the ozone exceeded 0.12 ppm Location of each station is shown on Figure 4.

(b) A minimum of the five highest days when ozone exceeded 0.12 ppm are required for modeling. Modeling was performed for each day listed for the El Paso West site.

Figure 4. LOCATION OF EL PASO AREA MONITORING STATIONS



A - El Paso Downtown - Ozone/CO

B - El Paso Lincoln - Ozone

C - El Paso West - Ozone/CO

D - El Paso Ascarate - CO

E - El Paso Campbell - CO

6) Relationship Between Air Quality Baseline and Emission Reductions Required to Satisfy EPA Requirements for Demonstration of Attainment of the Ozone Standard

a) Uncertainty of Relationship

See paragraph VI.B.3.e.1) for a discussion of the uncertainty of the relationship between VOC emissions reductions and changes in ambient ozone concentrations.

b) Choice of Emission Reduction Model

EPA guidelines specify that states must use a "city-specific" version of a modeling technique known as the Empirical Kinetic Modeling Approach (EKMA) to determine VOC emission reduction requirements for Post-1982 SIP revisions. These instructions require that the five days with the highest ozone levels recorded during the three-year monitoring period, at each appropriately sited monitoring station, be modeled to estimate the percentage of VOC reduction required. The EPA guidelines specify that the fourth highest reduction value estimated for each site be identified and the highest of these reduction values be selected as the "design" percentage reduction value for the nonattainment area. VOC emissions must be reduced by that percentage.

c) Choice of Model Input Variables

The March 1981 Guideline for Use of City-Specific EKMA in Preparing Ozone SIPs states that to insure specificity to a particular city under review, city-specific determinations of input data are strongly recommended, with default measures recommended only if specific data are not available. The following city-specific variables were input into the model:

(1) Emission Inventory Sectors

Counties were divided into sectors, each of which is at least 100 square kilometers in area. Six sectors were used in Tarrant and El Paso counties and seven sectors were used for Dallas County. In each case, one sector included the Central Business District. Area source emissions were apportioned to each sector based upon sector population data provided by NCTCOG and the El Paso MPO. Vehicle emissions were apportioned based upon data from the State Department of Highways and Public Transportation that apportioned vehicle miles traveled (VMT) into each sector. Stationary source locations were verified to assign their emissions to the appropriate sectors. Seasonally adjusted, weekday, hourly, emission rates were calculated for area, mobile, and stationary sources in each sector. Figures 2, 3, and 4 show the sector boundaries used in each county. Emissions data by sector for each county is shown in Appendix AE.

(2) Air Parcel Trajectories

For each day to be modeled, wind vector trajectories were determined for the period from 0800 to the time of the maximum daily concentration. The trajectories were based on wind speed and wind direction measurements from the monitoring station that measured the high concentration or, if that data were missing, upon corresponding data from the closest functioning monitoring station. These trajectories were then used to determine the county where the parcel of air associated with the high began. Initial concentrations of nonmethane hydrocarbon (NMHC) and nitrogen oxide (NO_x) from this county were used in the modeling. The post-0800 emissions of NMHC and NO_x used in the modeling were determined using the trajectory for each day. For each hour,

the sector over which the parcel of air passed was identified and the emissions from this sector were used.

(3) Mixing Height

Morning minimum and afternoon maximum mixing heights were determined from morning low and afternoon high temperatures and National Weather Service temperature soundings using the methods described in the EPA guidelines. If the computed minimum mixing height was less than 250 meters, 250 meters was used for the minimum mixing height as recommended in the EPA guidelines. If the data for the mixing height calculations were not available, a minimum mixing height of 250 meters and a maximum mixing height of 1525 meters were used.

(4) NMHC/NOx Ratio

EPA guidelines require that a city-specific value for the ratio of NMHC to NO_x be used in the EKMA modeling technique. This ratio is calculated from monitoring data collected during the hours between 0600 and 0900 on days that the ozone standard is exceeded. NMHC data were not collected in Dallas, Tarrant, and El Paso counties during the period from 1981 to 1983. In order to obtain a city-specific NMHC/NO_x ratio, NMHC and NO_x were measured at downtown sites in Dallas, Fort Worth, and El Paso from June 19, 1984 to September 28, 1984. For each county, the median of the daily NMHC/NO_x ratios was calculated and used for the EKMA modeling. The ratios for Dallas, Tarrant, and El Paso counties are 16:1, 11.6:1, and 15.3:1, respectively.

(5) Initial Concentrations of NMHC and NOx

EPA guidelines require that city-specific values for initial concentrations of NMHC and NO_x be used for each day being

modeled. These concentrations are to be calculated by averaging the hourly measurements collected from 0600 to 0900 at a site in the downtown area of each city.

For the period 1981 through 1983, NO_x was measured hourly in Dallas at the Mockingbird and Dallas North sites. The data from the Mockingbird site, closest to the downtown area, was used for the City of Dallas. In cases where there were no data from the Mockingbird site, the initial concentration of NO_x was estimated using the data collected at the Dallas North site based on the following: 1) for each day during the 1984 sampling period, when data was collected at both monitoring sites, the average NO_x concentration from 0600 to 0900 was determined for each site and the ratio of the Mockingbird to North Dallas values determined; 2) the median of these ratios was then multiplied by the average concentration calculated at Dallas North to estimate the average concentration at the Mockingbird site.

For the period 1981 through 1983, NO_x was not monitored in the downtown area of Fort Worth, but was monitored at the Fort Worth Northwest site. Downtown NO_x concentrations were estimated using measurements from the Northwest site. Using data from the 1984 summer sampling program, the average NO_x concentrations from 0600 to 0900 were calculated for the Downtown and Northwest monitoring sites. For each day when the data was complete, the ratio of the concentrations from the Downtown to Northwest sites was determined. The median of these ratios was multiplied by the average NO_x concentration measured at the Northwest site on each day to be modeled to estimate the initial NO_x concentration downtown.

During the period 1981 through 1983, NO_x concentrations were measured at one site in downtown El Paso. At all locations,

the initial NMHC concentration was estimated by multiplying the city-specific NMHC/NO_x ratio obtained from the 1984 summer monitoring by the initial NO_x concentration.

(6) Emission Fractions

NMHC and NO_x emitted after 0800 into the air parcel being evaluated are included in the modeling. EPA guidelines specify that an initial emission density be calculated for NMHC and NO_x using initial concentrations, mixing height, and a specified conversion factor. Hourly emission contributions to the air parcel were determined from the hourly emissions inventory for each sector through which the air parcel traveled. Following methods described in the EPA guidelines, the hourly emissions were then represented as a fraction of the initial emission density.

(7) Ozone Aloft

For each day being modeled, the ozone concentration from aloft was determined using the recommended procedure outlined in the EPA guidelines. These concentrations were calculated by averaging the ozone concentrations measured between 1000 and 1200 at a monitoring station that was upwind and located in as rural an area as possible. Since there were no monitoring sites in El Paso that were upwind and most of the exceedances occurred near the 1000 to 1200 time period, ozone aloft for El Paso was determined by using data for the same time period from the La Union monitoring site in New Mexico just north of El Paso.

(8) NOx Reduction

One of the inputs in the EKMA modeling technique for determining the VOC reduction is an approximation of the

amount of NO_x reduction between the base year and the year targeted for attainment. For each county, this reduction was calculated from estimates of NO_x emissions in 1983 compared to estimates for 1987. The NO_x reductions for Dallas, Tarrant, and El Paso counties are 5.5%, 3.7%, and 4.0%, respectively. Projected NO_x emissions in 1987 are as follows:

	Point Sources (tons per year)	Area Sources (tons per year)	Mobile Sources (tons per year)	Total (tons per year)
Dallas	18,196	16,267	47,232	81,695
Tarrant	11,875	9,036	24,445	45,356
El Paso	3,428	5,521	9,781	18,730

d) Emission Reduction Requirements Resulting from Application of the Model

EPA guidelines provide specific instructions for use of EKMA in preparation of Post-1982 SIP revisions. The instructions require that the five days with the highest ozone levels recorded during the three-year monitoring period, at each appropriately sited monitoring station, be modeled to estimate the percentage of VOC emission reduction required. EPA guidelines recommend that the modeling results must meet the following additional criteria:

i. For the hour when the maximum ozone concentration was measured, the predicted hourly ozone concentration should be within $\pm$30 percent of the measured concentration.

ii. For at least one day at each monitoring site and for the hour when the maximum ozone concentration was measured, the predicted hourly ozone concentration should be within $\pm$10 percent of the measured concentration.

If the modeling for a given day did not meet the criteria in (i), the model inputs were reexamined. For one case in Dallas, the initial concentrations of NMHC and NO_x appeared to be high and were revised. Estimates using data from the Dallas North site were used instead of those from the Mockingbird site. After reexamination of the data, if a day still does meet the criteria in (i), EPA guidelines specify that if either of the additional criteria listed below are met, then the day may be retained; otherwise the day should not be considered in the analysis.

iii. Peak ozone is underpredicted by more than 30% and the VOC reduction estimate is greater than the candidate site-specific estimate.

iv. Peak ozone is overpredicted by more than 30% and the VOC reduction estimate is lower than the candidate site-specific estimate.

For five cases, the criteria in (i) were not met and in two of these cases, the criteria in (iii) or (iv) were met. Three days were discarded since they did not meet any of the above criteria. For each monitoring station, the conditions in criteria (ii) were met without performing any additional analyses.

EPA guidelines specify that, "...given the form of the ozone standard, the SIP control requirement is that control estimate with a frequency of occurrence of 1/365 for the controlling site." This is equivalent to the fourth highest reduction value estimated for each site with three years of data. The highest of these "fourth highest" site-specific reduction values is selected as the "design" percentage

Table 20.
SUMMARY OF EKMA MODELING RESULTS

Monitoring Site	Date	Sector of Origin for Air Parcel	Ozone Aloft (ppm)	Measured Value (ppm)	Predicted Value (ppm)	Percent Differences	Reduction Requirement (Percent)
DALLAS COUNTY							
Mockingbird	6/07/81	Dallas-A	.056	.18	.141	-21.7	58.2 (a)
	7/13/82	Dallas-C	.080	.17	.124	-26.9	57.2
	8/27/83	Dallas-A	.093	.16	.125	-21.6	53.5
	6/17/82	Dallas-F	.057	.16	.173	+ 8.1	52.8 (b)
	6/29/83	Ft Worth-C	.069	.17	.132	-22.1	51.5 (b,c)
	8/31/83	Dallas-D	.069	.16	.113	-29.3	47.2
Dallas North	6/17/82	Dallas-C	.057	.20	.197	- 1.4	64.8
	7/22/82	Dallas-D	.083	.17	.132	-22.6	63.7
	7/13/82	Dallas-D	.080	.17	.142	-16.7	56.7
	7/28/82	Denton	.063	.15	.130	-13.5	47.2 (d)
	6/29/83	Ft-Worth-A	.070	.15	.122	-18.7	44.2 (b,c)
	4/24/81	Dallas-A	.034	.15	.130	-13.4	40.3 (b,e)
	7/10/81	Ft-Worth-C	.064	.15	.110	-26.7	38.0 (c)
Dallas Illinois	8/27/83	Dallas-D	.093	.16	.135	-15.3	51.0
	8/31/83	Dallas-D	.069	.17	.121	-29.0	45.1
	8/01/83	Dallas-D	.083	.14	.148	+ 5.8	37.4 (b,f)
	6/18/82	Dallas-A	.073	.15	.111	-26.0	30.2
	8/06/83	Dallas-D	.060	.14	.119	-14.9	27.5
Dallas Bonnieview	7/23/82	Dallas-C	.067	.15	.166	+10.9	53.6
	8/31/83	Dallas-E	.069	.15	.108	-28.2	42.9
	8/27/83	Dallas-F	.093	.13	.118	- 9.1	19.0 (b,f)
	5/26/83	Dallas-D	.080	.13	.097	-25.0	0
Dallas Sunnyvale	8/27/81			.13			(g)

Table 20. - Continued
SUMMARY OF EKMA MODELING RESULTS

Monitoring Site	Date	Sector of Origin for Air Parcel	Ozone Aloft (ppm)	Measured Value (ppm)	Predicted Value (ppm)	Percent Differences	Reduction Requirement (Percent)
Dallas	7/13/82	Ft-Worth-B	.075	.16	.137	-14.6	53.8 (c)
Denton Co	8/25/83	Dallas-D	.060	.16	.107	-33.0	51.0 (h,n)
	6/08/83	Ft-Worth-B	.072	.15	.236	+57.6	47.5 (c,k)
	9/11/81	Ft-Worth-E	.086	.15	.145	- 3.2	46.5 (c)
	8/26/83	Ft-Worth-B	.073	.15	.180	+19.8	40.3 (b,c)
	8/10/81	Dallas-A	.063	.14	.122	-12.6	31.7 (b,h)
	8/24/81	Ft-Worth-B	.069	.14	.174	+24.6	30.5 (c)
	7/21/83	Dallas-C	.040	.14	.168	+20.2	27.4 (h)
	8/13/83	Ft-Worth-F	.069	.14	.107	-23.3	27.1 (c)
TARRANT COUNTY							
Fort Worth	7/22/82	Dallas-E	.083	.20	.145	-27.5	66.1 (h)
Northwest	7/08/83	Dallas-E	.100	.17	.140	-17.7	62.6 (h)
	7/24/82	Ft-Worth-C	.080	.14	.106	-24.2	35.6 (c)
	8/07/82	Ft-Worth-D	.074	.14	.121	-13.7	30.2 (b,c)
	9/07/82	Ft-Worth-D	.076	.14	.162	+15.5	29.6 (c)
	9/03/81	Dallas-A	.055	.14	.117	-16.2	28.2 (b,h,i)
	9/12/81	Dallas-D	.078	.13	.127	- 2.5	10.9 (h,i,j)
	4/30/81	Ft-Worth-D	.054	.13	.090	-30.6	7.6 (c,k)
	6/21/82	Dallas-D	.050	.13	.092	-29.3	6.9 (h)
Fort Worth	8/31/83	Ft Worth-C	.087	.16	.123	-22.9	50.0 (c)
North	7/08/83	Dallas-D	.100	.15	.132	-11.8	49.5 (b,h,l)
Keller	8/27/83	Ft Worth-C	.100	.14	.117	-16.2	43.1 (b,c)
	8/01/83	Ft Worth-B	.085	.14	.128	- 8.8	39.4 (c)
	5/25/83						(m)

Table 20. - Continued
SUMMARY OF EKMA MODELING RESULTS

Monitoring Site	Date	Sector of Origin for Air Parcel	Ozone Aloft (ppm)	Measured Value (ppm)	Predicted Value (ppm)	Percent Differences	Reduction Requirement (Percent)
Fort Worth North Haslett	9/12/81	Dallas-A	.063	.13	.121	- 7.0	11.1 (h)
	5/26/81	Dallas-B	.043	.13	.106	-18.3	4.8 (b,h,l)
EL PASO COUNTY							
El Paso Downtown	10/28/81			.14			(g)
El Paso Lincoln	8/23/81			.13			(g)
El Paso West	9/10/83	Juarez	.050	.15	.066	-56.3	44.8 (n,o)
	7/10/83	El Paso-E	.057	.14	.127	- 9.2	37.9
	7/11/83	El Paso-A	.050	.14	.157	+11.8	36.8
	3/18/82	Juarez	.027	.14	.084	-40.1	32.4 (o,p,k)
	8/30/82	Juarez	.037	.13	.094	-27.8	14.1 (b,o)
	9/21/81	El Paso-E	.037	.13	.126	- 3.2	10.5 (b)

(a) Initial modeling with initial conditions at Dallas Mockingbird yielded an underprediction by 41.7% and a reduction requirement of 44.2%. The day was remodeled with initial conditions estimated for Dallas North data and the results are reported here.
(b) Design value for this monitoring site.
(c) Trajectory anaylsis indicates that this air parcel originated in Tarrant County. Initial conditions and the NMHC/NO_x ratio for Fort Worth were used for modeling.
(d) Trajectory analysis indicated that this air parcel originated in the Denton/Collins County area. However, the relatively low wind speeds that were recorded after 10:00 a.m. and the path of the trajectory indicate that Dallas County emissions were the primary influence. Initial conditions and the NMHC/NO_x ratio for Fort Worth were used for modeling.

Table 20. - Continued
SUMMARY OF EKMA MODELING RESULTS

(e) Initial modeling with initial conditions at Dallas Mockingbird yielded an overprediction by 46.3% and a reduction requirement of 49.2%. The day was remodeled with initial conditions estimated from Dallas North data and the results are reported here.
(f) If there are only two years of monitoring data at a site, the third highest reduction requirement is selected as the design value.
(g) If the 0.12 ppm is exceeded only once, no reduction is required.
(h) Trajectory analysis indicated that this air parcel originated in Dallas County. Initial concentrations and NMHC/NO_x ratio for Dallas were used for the modeling.
(i) Initial conditions at Dallas Mockingbird were not available, so initial conditions at Dallas North adjusted to the downtown location were used for modeling.
(j) Initial conditions were not available at Dallas Mockingbird nor at Dallas North, so the median of initial conditions for all days modeled for Dallas was used for modeling.
(k) Following guidance on page 60 of EPA-450/4-84-005, this day was not considered for this analysis.
(l) If there is only one year of monitoring data at a site, the second highest reduction requirement is selected as the design value.
(m) This day was not modeled since the air parcel originated far south of Tarrant County and did not reach the county until 1200.
(n) Following guidance on page 60 of EPA-450/4-84-005, the values reported here were used for this analysis.
(o) Trajectory analysis indicated that this air parcel originated in Juarez, Mexico.
(p) Initial conditions for this day were not available, so the median of initial conditions for all days modeled for El Paso was used for the modeling.

Table 21.

SUMMARY OF VOC REDUCTION REQUIREMENTS

County	Monitoring Site	VOC Reduction Requirement (Percent)
Dallas	Dallas Mockingbird	52.8 (a)
	Dallas North	40.3
	Dallas Illinois	37.4
	Dallas Bonnieview	19.0
	Dallas Sunnyvale	none
	Denton	31.7
	Fort Worth Northwest	28.2
	Fort Worth North - Haslet	4.8
	Fort Worth North - Keller	49.5
Tarrant	Dallas Mockingbird	51.5 (a)
	Dallas North	44.2
	Denton	40.3
	Fort Worth Northwest	30.2
	Fort Worth North - Haslet	none
	Fort Worth North - Keller	43.1
El Paso	El Paso Downtown	none
	El Paso Lincoln	none
	El Paso West	10.5 (a)
Juarez, Mexico	El Paso Downtown	none
	El Paso Lincoln	none
	El Paso West	14.1 (b)

(a) VOC reduction requirement for the county.
(b) VOC reduction requirement for this area if the EKMA modeling approach is applied to the entire El Paso/Ciudad Juarez airshed.

reduction value for the nonattainment area. A summary of the modeling is presented in Table 20. Table 21 lists the reduction values for each site for each county.

In some cases, an analysis of the trajectories indicates that the air parcel associated with ozone above 0.12 ppm originated in a county or area different from the one where the monitor was located. In these cases, the reduction requirements are selected to insure that a frequency of occurrence of 1/365 will not be exceeded, considering all areas of emission origins. For this reason, VOC emissions must be reduced by 52.8 percent in Dallas County and 51.5 percent in Tarrant County to demonstrate attainment of the ozone standard at the Dallas Mockingbird site.

For the El Paso West monitor, an analysis of the trajectories indicates that for three days the air parcel associated with ozone levels above 0.12 ppm originated in Juarez, Mexico. The EKMA modeling procedures were applied to that area and the corresponding reduction requirement is reported in Table 21. The table lists the control requirement that would be used for SIP planning, if these procedures were applicable to the Juarez area. Copies of all trajectory analyses and EKMA model runs, with all data used for the modeling, are available at the TACB office in Austin.

7) Identification of Emission Changes

a) Sources of VOC Emissions

See paragraph VI.B.3.f.1) for a discussion of the types of sources of VOC emissions.

b) Emissions Inventory

(1) 1983 VOC Emissions Inventory

An EPA guideline document (EPA 450/2-77-028) specifies the methods for states to use in preparation of VOC emissions inventories for Post-1982 SIP revisions. The January 22, 1981 and January 27, 1984 EPA guidelines require preparation of a 1983 emissions inventory data base for use in Post-1982 SIP revisions. Copies of the 1983 emissions inventories for Dallas, Tarrant, and El Paso counties are included in Appendix AD. Where a line item is blank in Appendix AD, no sources in that category were identified in the 1983 emission data collection effort. This complete list of source categories is outlined in the EPA guideline document and all source categories are included in this document for reference purposes. Emissions are listed as tons of VOC per year, adjusted to reflect summertime emission rates.

Major sources of VOC emissions were selected by a screening process in which the 1973 grouping of VOC emission sources by descending order of their total VOC emissions was reviewed. Those sources which accounted for 90 percent of the VOC emissions for each county were selected for the emissions inventory. This initial VOC source listing was refined by review of 1980 and later source emissions data. The number of major sources inventoried in Dallas, Tarrant, and El Paso counties were 20, 31, and 3, respectively. Also, selected minor sources were included in the inventory after coordination with the TACB regional offices in the affected areas.

Seasonally adjusted daily emission rates (lbs/day) within designated sectors within each county were used in

calculating VOC reduction requirement estimates for Dallas, Tarrant, and El Paso counties and are listed in Appendix AE. As outlined in EPA guidelines, emissions were adjusted for summertime values when substantial seasonal variation could occur. Source operation schedules were utilized to make summertime adjustments to point source emissions data. These daily emission rates were apportioned into hourly emissions and into sectors within the county. The hourly emission data are on file at the TACB office in Austin.

The following sections more completely describe the various components of the inventory and the methodology used in their determination.

(2) Major Stationary Sources

The operator of each major source (properties or accounts emitting at least 100 tons per year) of VOC emissions in Dallas, Tarrant, and El Paso counties was requested to review and update a TACB generated listing (Comprehensive Report) of emissions data describing the facilities and estimating the type and amount of VOC emissions, including fugitive, from each process. Information from these comprehensive reports was audited for accuracy and completeness and, if required, was verified by comparison with data from field investigations and EPA emission factors in AP-42 (Compilation of Pollutant Emission Factors).

i) Gasoline and Crude Oil Storage & Transfer

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to Regulation V, Rules 115.101-.106 and 115.111-.113.

ii) Synthetic Organic Chemical Storage & Transfer

Emissions were based on reported 1983 emission inventory data. These emission sources are currently controlled pursuant to Regulation V, Rules 115.101-.106 and 115.111-.113.

iii) Bulk Gasoline Terminals

Emissions were based on reported 1983 emission inventory data. These emission sources are currently controlled pursuant to Regulation V, Rules 115.111-.113. Emissions estimates were adjusted by a factor of 1.556 in Dallas and Tarrant counties and 1.359 in El Paso County to account for increased summertime evaporative losses.

iv) Gasoline Bulk Plants

Emissions were based on reported 1983 emissions inventory data.

v) Petroleum Refineries

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.142-.144, 115.151-.153, 115.162 and 115.251-.255.

vi) Inorganic Chemical Manufacture

Emissions were based on reported 1983 emission inventory data.

vii) Plastics Products Manufacture

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.161-.162, and .164.

viii) Rubber Tire Manufacture

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rule 115.162.

ix) Other Industrial Processes (Unspecified SIC)

Emissions were based on reported 1983 emission inventory data.

x) Paint and Coatings Manufacture

Emissions were based on reported 1983 emission inventory data.

xi) Paving and Roofing Material Manufacture

Emissions were based on reported 1983 emission inventory data.

xii) Electronic Circuit Manufacture

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.162 and 115.172-.176.

xiii) Industrial Degreasing

Emissions were based on reported 1983 emission inventory data. The emissions are currently controlled pursuant to TACB Regulation V, Rules 115.173-.176.

xiv) Industrial Surface Coating - Cans

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.191(7), 115.192, 115.193(a), and 115.194.

xv) Industrial Surface Coating - Metal Coils

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.191(3), 115.192, 115.193(a), and 115.194.

xvi) Industrial Surface Coating - Paper

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.191(4), 115.192, 115.193(a), and 115.194.

xvii) Industrial Surface Coating - Large Appliances

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.191(1), 115.192, 115.193(a), and 115.194.

xviii) Industrial Surface Coating - Automobiles

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.191(8), 115.192, 115.193(a), and 115.194.

xix) Industrial Surface Coating - Metal/Wood Products

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.191(2), (10), 115.192, 115.193(a), and 115.194.

xx) Industrial Surface Coating - Miscellaneous Metal Products

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.191(9), 115.192, 115.193(a), (c)(1), (4), (6), and 115.194.

xxi) Industrial Surface Coating - Plastic Parts Painting

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.191(6), 115.192, 115.193(a), and 115.194.

xxii) Industrial Surface Coating - Large Aircraft

Emissions were based on reported 1983 emission inventory data.

xxiii) Graphic Arts (Printing) - Rotogravure and Flexographic Processes

Emissions were based on reported 1983 emission inventory data. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.201-.203.

(3) Minor and Area Sources

Emissions from small industrial sources and area sources were estimated by using EPA emission factors (Procedures for Emissions Inventory Preparation, Volume III: Area Sources) for each type of source. In addition, selected minor VOC sources (properties or accounts emitting 50-100 tons per year) were inventoried. Some of the emission factors are based on population and are derived from national average estimates of emissions from various activities and industrial processes. Information from the 1980 census and NCTCOG was used to determine the population for 1983. Population estimates used to predict 1987 emissions were obtained from the Texas Department of Water Resources 208 Planning Section and NCTCOG. Emission estimates based on projected population increase indicate that minor and area source emissions may be expected to increase.

i) Service Station Loading (Stage I)

Emissions for this category were calculated from AP-42 factors applied to 1983 gasoline throughput. Service station loading factors adjusted for the vapor pressure of locally obtainable gasoline were used. Gasoline throughput was obtained from the State Department of Highways and Public Transportation (SDHPT) as derived from the gasoline tax for quantity of gasoline sold. Total Texas gasoline usage was

allocated to counties based on population. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.131-.135.

ii) Service Station Unloading

The AP-42 factors for uncontrolled vehicle loading, evaporation, and spillage were used to calculate 1983 emissions for this category. The same gasoline throughput as calculated for category i) was used.

iii) Other (Storage and Transfer)

The AP-42 factors for service station tank breathing losses and truck transport losses were used to calculate emissions from this category.

iv) Architectural Coatings

This category includes evaporative losses due to normal residential or commercial usage of volatile organic solvents in paint and varnish. An EPA emission factor of 4.6 lbs/capita/year was used to estimate emissions.

v) Area Degreasing

This category includes cold cleaning degreasing. Open top vapor and conveyorized degreasing emissions are a part of the industrial source emissions. An EPA emission factor of 3 lbs/capita/year was used to estimate emissions. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.172, .175, and .176.

vi) Dry Cleaning

This category includes solvent evaporated from dry cleaning establishments. An EPA emission factor of 1.5 lbs/capita/year was used to estimate emissions. These emissions are currently controlled pursuant to Regulation V, Rules 115.221-.223.

vii) Cutback Asphalt

Cutback asphalt paving emissions were derived from data for the State provided by the SDHPT. It was estimated by the SDHPT that they used 45% of all cutback asphalt in the State. The SDHPT furnished data on tons of cutback asphalt they used. The usage by the private sector, including cities, was calculated by factoring the State's use of cutback asphalt by the 45:55 ratio. The solvent content of cutback asphalt is an average of 21% by weight. County emissions were determined by apportioning the State emissions among the counties according to relative populations. Using population as an indicator for the cutback asphalt used by the private sector, emissions by the county were calculated. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.171 and 115.176.

viii) Fuel Combustion

This category includes emissions resulting from residential, commercial, and institutional distillate fuel use. These emission estimates are proportional to the population of the county. Commercial and institutional fuel use includes consumption by establishments such as shops and public and private institutions such as schools and libraries. The

emissions are dependent upon the amount of distillate used and are assumed to be proportional to the population.

ix) Solid Waste Disposal

This category represents the emissions from disposal by incineration of solid waste produced by commercial establishments and institutions. The TACB area source model uses 15 tons of solid waste per year per 1000 population and the AP-42 emissions factors to calculate emissions. Since a large portion of solid wastes in Texas are disposed of by landfill, the emission factors provided by the EPA guideline document were adjusted to reflect the lower emissions. These emissions are currently controlled pursuant to TACB Regulation I, Rules 111.11 and .12.

x) Forest and Structural Fires

Structural fire emissions are estimated and distributed by assuming four structural fires per 1000 population and 10% of the structure is estimated to be consumed in the fire.

xi) Auto Refinishing

This category includes auto body shops and paint shops. An EPA emission factor of 1.9 lbs/capita/year was used to estimate emissions.

xii) Graphic Arts

This category includes printing operations whose annual emissions of solvent are less than 100 tons/year. An EPA emissions factor of 0.8 lb/capita/year was used to estimate

emissions. These emissions are currently controlled pursuant to TACB Regulation V, Rules 115.201-.203.

xiii) Solvent Extraction Process

Solvent extraction process emissions have not been separated from the industrial process emissions. All emissions of this type that were reported are a part of stationary industrial sources.

xiv) Consumer/Commercial Solvent Use

This category includes household products, toiletries, aerosol products, rubbing compounds, windshield washings, polishes and waxes, nonindustrial adhesives, room deodorizers, moth control, and laundry treatment. An EPA emission factor of 6.3 lb/capita/year was used to estimate emissions.

xv) Pesticide Application

As derived from the EPA procedures document for VOC emissions inventories, synthetic and non-synthetic pesticides application occurs at the rate of 2-5 lbs/yr/harvested acre. The amount of evaporation considered to be photochemically reactive VOC is considered to be 0.9% of total pesticides applied. Using these factors and the harvested acres derived from the Texas Department of Agriculture statistics, the VOC emissions were calculated.

xvi) Waste Solvent Recovery Processes

Emissions were based on reported 1983 emission inventory data.

xvii) Stationary Internal Combustion Engines

Emissions from stationary internal combustion engines are included in industrial process emissions. Other significant applications of stationary engines were not identified.

(4) Mobile Sources

Emissions from motor vehicles, pleasure boats, off-highway equipment, trains, and aircraft were calculated by TACB.

i) Highway Vehicles

This category includes emissions from the operation of vehicles over all the roads in each county. The EPA Mobile Source Emission Model, MOBILE 3, was used to generate emission factors for various types of vehicles. This model contains evaporative emissions data based on the use of gasoline with a Reid Vapor Pressure (RVP) of 11.4 pounds per square inch absolute (psia). Data regarding the actual RVP of gasoline used in Texas were obtained from a survey conducted by Southwest Research Institute for the Texas Mid-Continent Oil and Gas Association. Information provided by this survey indicated that actual RVP levels in Dallas and Tarrant counties were 10.4 psia and 9.3 psia in El Paso County. The MOBILE 3 model was modified, using evaporative emissions block data provided by EPA, to take into account these county-specific data.

The vehicle types are motorcycles, passenger automobiles, both light and heavy pickup trucks, heavy-duty gasoline trucks and all diesel vehicles (light-duty passenger, light duty trucks and heavy duty trucks). Traffic data and other input parameters used for the MOBILE 3 model were furnished

by the SDHPT and NCTCOG. The SDHPT uses the Texas Travel Demand Modeling Package to develop these data inputs. This modeling package has been approved by the Federal Highway Administration. Data from NCTCOG was derived from its regional traffic model. Model inputs were obtained from traffic surveys and counts in Dallas and Tarrant counties. Based on information from the NCTCOG, average vehicle speeds of 29.9 and 30.8 miles per hour were utilized for Dallas and Tarrant counties, respectively. The SDHPT determined that El Paso County average vehicle speed was 31.0 miles per hour.

Revisions to the MOBILE 3 model concerning tampering offsets for cold start, light-duty gas truck (Class 2) temperature correction factors and exhaust gas recirculation system tampering rates were forwarded to TACB on May 15, 1985. Time constraints did not allow these changes to be incorporated, however, an evaluation of the effect of the revisions indicated no significant changes to the inventory would result.

ii) Off-Highway Vehicles

This category includes miscellaneous gasoline or diesel-fueled equipment such as tractors, road graders, and bulldozers. The estimate of emissions was calculated using AP-42 emission factors and SDHPT data for this type of equipment registered in the county.

iii) Rail

Locomotive emissions were calculated by using AP-42 factors for fuel utilization by railroads and apportioned to the county by the miles of railroad track. Data was provided by the Texas Railroad Commission and the U. S. Department of Energy.

Table 22.

1983 TOTAL EMISSIONS SUMMARY
Tons/Year (Percent of Total by County)
Volatile Organic Compounds

County	Major Sources	Area & Minor Sources	Mobile Sources	Total County Emissions
Dallas	12,495 (12.9%)	23,938 (24.6%)	60,684 (62.5%)	97,117 (100%)
Tarrant	14,158 (22.3%)	14,696 (23.1%)	34,764 (54.6%)	63,618 (100%)
El Paso	2,180 (8.6%)	8,069 (31.9%)	15,044 (59.5%)	25,293 (100%)

iv) Aircraft

Landing and takeoff data obtained from the Federal Aviation Administration and the NCTCOG was used with the AP-42 factors to calculate aircraft emissions.

v) Vessels (Pleasure Boats)

The number of pleasure boats registered in Texas was obtained from the Texas Parks and Wildlife Department. AP-42 factors for emissions were used to calculate emissions, which were apportioned to counties by area of lakes available for use by pleasure boats. The expansion of pleasure boat usage is commensurate with population growth factors.

(5) Inventory Summaries

A summary of VOC emissions for each county for 1983 is contained in Table 22.

c) Factors Affecting Magnitude of VOC Emissions

(1) Changes in Stationary Source Emissions

As required by FCAA and EPA guidance, reasonably available control measures have been applied to all stationary sources with a potential to emit 100 or more tons per year of VOC, as well as to certain smaller sources, in Dallas, El Paso, and Tarrant counties. Additional control measures to be applied are described in this subsection. Estimated emission reductions anticipated from previously adopted VOC control measures with compliance dates later than December 31, 1983, or where a company received an extension of the final

compliance date to a date later than December 31, 1983, are included. These reductions have been subtracted from the base year 1983 emissions inventory to document accurately emission changes occurring between 1983 and 1987.

There is also a contrasting projection of growth in emissions for certain stationary and area sources. The characteristics of this growth are discussed in this subsection.

(a) Existing VOC Control Requirements

In the 1979 SIP revisions, the TACB committed to consider for adoption additional VOC control measures based on control technique guidelines (CTGs) published after January 1, 1978. Pursuant to this commitment and the publication of CTGs on the graphic arts, can coating, and automobile coating industries, the TACB subsequently adopted appropriate controls. As provided for in Regulation V, several companies in the graphic arts industry applied for and received an extension of the final compliance date to December 31, 1985, based on the nonavailability of low solvent technology. In addition, more stringent controls on the VOC content of coatings used in the can coating and the automobile and light-duty truck coating industries have a final compliance date of December 31, 1985 and December 31, 1986, respectively. Reduction estimates are credited for each category in the affected counties.

(b) Proposed New VOC Control Measures

Major and minor source categories in the three counties were evaluated to determine the economic and technical feasibility of implementing additional controls. As a result

of this analysis, (1) rules similar to those adopted for Harris County on December 3, 1982 are to be implemented, (2) several additional types of controls not previously implemented in Texas are included, and (3) certain controls have been rejected for economic and/or technical reasons.

The following controls have previously been implemented in Harris County and are to be implemented in Dallas, Tarrant, and/or El Paso counties:

i) VOC vapors from the vapor recovery system vents at gasoline terminals, having 500,000 gallons or more throughput per day, must be reduced to a level not to exceed 0.33 pounds of VOC per 1,000 gallons of gasoline transferred. Gasoline terminals of this size are not located in El Paso County.

ii) Gasoline tank trucks must be tested annually to insure that the tank is vapor-tight. Tanks failing to pass the required test must be repaired and retested within 15 days. Tank trucks must display certification that the tank has passed the test within the past year.

iii) Degreasing operations using VOC solvents must install certain controls and post and practice proper operating procedures. Facilities which, when uncontrolled, emit three pounds or more of VOC in any consecutive 24-hour period must meet these requirements. This does not apply in El Paso County.

iv) Dry cleaners using perchloroethylene must install a carbon adsorption system or equally effective control device and practice other procedures to reduce the amount of VOC emitted. This does not apply in El Paso County.

v) Coating operations in Dallas and Tarrant counties (but not El Paso) must limit the VOC content of the coatings they apply. Facilities which, when uncontrolled, emit 100 pounds or more of VOC in any consecutive 24-hour period must meet these requirements. There are no coating operations in El Paso County that would be impacted by this control measure.

vi) Stage I vapor recovery at service stations is included for El Paso County. This control has already been implemented in Harris, Dallas, and Tarrant counties. Storage tanks at service stations must be equipped with a submerged fill pipe and displaced vapors must be routed back to the gasoline tank truck for processing by a vapor recovery system at the gasoline terminal or bulk plant.

The following controls have not previously been implemented in Texas or are more stringent than in other counties:

i) In Dallas and Tarrant counties, the VOC content of coatings applied to the exterior of airplanes as a prime coat must be limited to 3.5 pounds per gallon on a daily weighted average. Airplane coating operations are not located in El Paso County.

ii) Cutback asphalt used or specified for use by any state, municipal, or county agency must be limited to no more than 7.0 percent of the total annual volume of

asphalt averaged over a two-year period. This applies to Dallas, Tarrant, and El Paso counties and is limited to 8.0 percent in other ozone nonattainment areas of the state.

iii) Gasoline terminals in Dallas and Tarrant counties, with a daily throughput of 100,000 gallons or more must limit VOC vapors from vapor recovery system vents to a level not to exceed 0.33 pounds per 1,000 gallons of gasoline transferred. This does not apply in El Paso County.

iv) Process vent gas streams in Dallas and Tarrant counties having a combined VOC weight greater than 100 pounds in any consecutive 24-hour period, but less than 250 pounds per hour averaged over any consecutive 24-hour period, and having a VOC partial pressure (concentration) of more than 0.009 pounds per square inch, must be flared or incinerated. Vent gas streams with greater than 250 pounds per hour averaged over any consecutive 24-hour period, regardless of partial pressure, must also be flared or incinerated. There are no sources in El Paso County that would be impacted by this control measure.

(c) Additional Control Technique Guidelines

The TACB has committed to consider for adoption reasonable control techniques for each source category for which EPA issues further CTGs.

(d) New or Modified Stationary Sources (Other Than Area Sources)

The construction of new industrial facilities or modification of existing facilities affect VOC emission rates. Since 1972, all new or modified stationary emission sources in

Texas have been required to apply Best Available Control Technology (BACT) to control emissions. Since 1979, new major sources in ozone nonattainment areas have been required to control emissions to the lowest achievable emission rate (LAER) as defined in the FCAA. Construction of new plants and expansion of existing facilities generally cause emissions to increase but such increases are minimized through application of BACT and LAER.

Some of the industrial equipment in use today will become obsolete in the next several years and be replaced with new, more efficient machinery. Through application of BACT and LAER, new or modified emitting facilities generally emit pollutants at a rate lower than older facilities of similar types. In addition, the VOC emissions from new facilities emitting more than 100 tons per year must be offset pursuant to Regulation VI, Rule 116.3(a)(9) and (10).

Process or plant shutdowns and retirements result in additional emission reductions which also offset the emission increases from new or modified emitting facilities. Procedures have been established to track these process or plant shutdowns and retirements through annual field investigations.

(e) New or Modified Area Sources

Total future VOC emissions will also be affected by changes in emissions from small stationary sources for which permits are not required, such as gasoline stations, degreasing operations, and retail dry cleaning establishments. Uncontrolled emissions from other minor and area type sources are calculated or estimated on the basis of population and are assumed to grow at a rate proportional to the estimated population growth.

(2) Changes in Mobile Source Emissions

For the next several years, the trend of emissions from mobile sources will be downward. This reduction represents the net effect of the following factors:

(a) Federal Motor Vehicle Control Program (FMVCP)

This program, administered by the federal government, requires that vehicles meet increasingly more stringent emissions limits. Even when population growth and increased vehicle usage are taken into account, the use of MOBILE 3 emission factors indicates that the FMVCP has resulted in significant VOC emission reductions since 1970. With the passage of time, increasing numbers of older, higher emitting vehicles will be phased out of use. The FMVCP requires that all 1980 and later model year vehicles meet substantially stricter emission limits than in prior years. MOBILE 3 calculates the effects of the FMVCP emission standards on motor vehicle emissions for current and future years.

(b) Transportation Planning

As required by the 1977 FCAA, NCTCOG and El Paso MPO have performed analyses of the transportation control measures (TCMs) listed in Section 108 of the FCAA to assess their feasibility for implementation in Dallas and Tarrant counties and El Paso County, respectively, and to determine the potential of such measures to reduce vehicle emissions. During the evaluation, NCTCOG and El Paso MPO considered the social, economic, and environmental effects that reasonably could be expected to result from implementation of each measure.

The FCAA requires that affected local governments agree to formal and specific commitments to fund and implement each transportation-related control strategy which is submitted to EPA as a SIP revision. Sections VI.B.6.b.2)d), VI.B.6.c.2)d), and VI.B.6.d.2)d) provide the results of the TCM analysis for each county and a description of each TCM commitment and its associated emission reduction. Appendix AG contains the formal documentation of the commitments obtained by NCTCOG and El Paso MPO and submitted as SIP revisions.

Conformity procedures may be used to identify projects in the annual element of the Transportation Improvement Program which may adversely affect air quality. Measures to delay those actions will be considered should future revisions to the SIP be necessary. Additional TCM commitments may also be identified by procedures established in the initial analysis of TCMs. These contingency provisions may be initiated should the EPA Administrator determine it is necessary to compensate for unanticipated shortfalls in emission reductions.

(c) Vehicle Parameter Inspection and Maintenance Program (I/M)

EPA's 1984 guidelines address the need for a vehicle inspection and maintenance (I/M) program largely in terms of attainment of the ozone and carbon monoxide (CO) standards by December 31, 1987. Since a program must be operational for a period of time before substantial emissions benefits accumulate, I/M is not required if the state can demonstrate attainment by other means before an I/M program can be effectively implemented. However, EPA has also stated that for CO nonattainment areas and areas with an ozone design

value above 0.15 ppm, some type of I/M program will be needed to attain the standard and to maintain reasonable further progress.

Based on these guidelines, an I/M program is necessary in each of the counties affected by this revision. Dallas and Tarrant counties have ozone design values above 0.15 ppm. El Paso County must have an I/M program because of the CO nonattainment status, although ozone design levels do not invoke an I/M requirement.

The type of program being developed for each county is the Texas Vehicle Parameter Inspection and Maintenance Program which is currently in operation in Harris County. (See paragraphs following VI.B.5.a.6)b)(2)(d)ii - Program Description). Texas Senate Bill 1205 (See Appendix X) authorizes the TACB to request that the Texas Department of Public Safety (DPS) implement this I/M program in any county of the state which does not meet the national standards. The scheduled start-up date for this program in all three counties in January 1, 1986. EPA requires that an approvable I/M program must be able to achieve an emission credit of 25% or greater to qualify as Reasonably Available Control Technology (RACT).

Texas Senate Bill 321, which becomes effective September 1, 1985, provides that new vehicles registered in Texas are not required to be inspected until two years from the date of the original inspection. Such vehicles will be inspected annually thereafter. MOBILE 3 cannot be used directly to assess the effect on emissions reductions, however, projections have been made using EPA survey data on vehicle failure rates and county-specific data on the number of one-year old vehicles in the fleet. The estimated decrease in emissions

reductions in Dallas, Tarrant, and El Paso counties is expected to be less than 150, 75, and 25 tons per year, respectively. Since the number is small and there is no direct method of evaluating its accuracy, reduction estimates have not been adjusted for this inspection provision. Nevertheless, the VOC emission credits for the parameter inspection program, as calculated by EPA prescribed procedures, exceeds the minimum RACT value in Dallas, Tarrant, and El Paso counties.

(d) Vehicle Population and Miles Traveled

Countering the decreases in average emissions from individual vehicles are the increases in the number and use of vehicles which have been experienced in all urban areas of Texas. For the past few years, emission reductions from FMVCP significantly exceeded the emission increases due to increased vehicle miles traveled. This results in an overall net emissions decrease. This net reduction in vehicle emissions is expected to continue at least through 1992.

(e) Other Mobile Sources

Additional emissions from off-highway vehicles, boats, aircraft, and railroads are attributed to population and economic activity growth. The increase is calculated using the TACB area source emission model.

d) Emissions Tracking

In order to demonstrate that reasonable further progress is being made toward attainment of the standard, the Clean Air Act requires that a comprehensive and accurate inventory "be revised and resubmitted as frequently as may be necessary."

A current inventory also is required to enable a determination to be made of the impact of any proposed new or modified major source.

The TACB will satisfy these requirements by continuous update of the emissions inventory using source surveillance and permit data, as well as updated estimates of vehicle emission factors, VMT, and population. These emissions inventory updates will account for emission reductions resulting from process or plant shutdowns and retirements and emissions increases from new or modified emitting facilities.

Factors for determining Dallas and Tarrant County highway vehicle emissions will be monitored by NCTCOG and reported annually to the TACB. NCTCOG annual updates will involve use of data from SDHPT permanent traffic counters and traffic-count programs performed by the various municipalities within the respective counties. NCTCOG will monitor vanpool commitments and evaluate the degree of success or failure of each implemented TCM.

Factors for updating the highway vehicle emissions inventory for El Paso County will be provided annually by the SDHPT. In addition, the El Paso MPO will monitor the implementation of TCMs and provide data on the effectiveness of these measures to the TACB.

b. Dallas County Ozone Control Strategy

1) General

Volatile organic compound emissions reductions are required by EPA for each urban nonattainment area which did not attain the ozone standard by December 31, 1982. As discussed previously, EPA has specified that states must use City-Specific EKMA to determine the amount of VOC emissions which must be reduced.

Based upon procedures interpreted from EPA guidelines, a 0.16 ppm design value recorded at the Dallas Mockingbird monitoring site was utilized in determining the modeled VOC reduction requirement of 52.8% in Dallas County. As a consequence, the 1983 emission inventory of 97,117 tons per year must be reduced to 45,839 tons per year. This results in a reduction requirement of 51,278 tons, plus 3,225 tons per year to account for projected minor, area, and non-highway mobile source growth by 1987. The following subsections discuss the VOC reduction estimates associated with each control.

2) Estimated Emissions Reduction

a) Emissions Reductions and Growth Unaffected by This Plan

VOC emission projections through 1987 take into consideration changes expected to result from growth and from control measures not a part of this plan.

Population estimates used to project emissions through 1987 were obtained from NCTCOG and reflect a growth in population in Dallas County from 1,644,000 in 1983 to 1,846,175 in 1987. This population increase results in an estimated 12% increase in emissions from minor and area sources during the period 1983 to 1987.

No VOC reductions for existing industrial point sources other than those set forth in this plan are currently scheduled as a result of regulatory requirements except for those required of companies which received extensions of the December 31, 1982 compliance date provided for in TACB Regulation V. Those companies are engaged in graphic arts and industrial surface coating operations and must have scheduled VOC reduction measures implemented by December 31, 1985. The extensions were granted because the companies demonstrated that additional time was necessary to develop the new control technology. New industrial construction is expected to have a small impact on emission levels because of best available control technology requirements included in the state new source review program and the offset provisions of Regulation VI, Rule 116.3(a)(10).

Minor permitted sources not subject to offset requirements are expected to contribute 200 tons per year to the emissions inventory (800 total tons by 1987). This estimate is based on the average addition of 200 tons per year from 1980 to 1983 and on the expectation that growth will continue at the same rate.

Despite expected increases in VMT (based on projections from the SDHPT and NCTCOG), emissions from motor vehicles are

expected to decrease by approximately 19% by the end of 1987 because of the Federal Motor Vehicle Control Program (FMVCP).

The effects of the FMVCP on vehicle emissions are calculated by using MOBILE 3. For mobile sources other than vehicles, increases in emissions of approximately 15% were predicted by the TACB area source model.

Predicted emissions changes from 1983 to 1987 are itemized in Appendix AD (minor source growth excluded) and summarized in Table 25.

b) Stationary Source Controls Included With This Plan

Reasonably Available Control Measures (RACMs) have been applied to all major stationary sources in Dallas County as well as to certain smaller sources. Controls applied are prescribed in previous and current revisions to Regulation V (Control of Volatile Organic Compounds). Each control included in the plan is shown in Table 23 along with the associated Regulation V rule number and estimated reduction potential.

(1) Emissions Reductions from Existing Control Requirements

As discussed previously, this control category involves sources that were affected by earlier control measures, but were granted compliance date extensions because of technological considerations. This includes the graphic arts industry with reductions of 1,353 tons per year anticipated to occur by December 31, 1985.

(2) Emissions Reductions from the Application of Harris County Controls in Dallas County

The TACB has evaluated the reduction potential for Dallas County of stationary controls which were previously implemented in Harris County. These controls will affect degreasing operations, perchloroethylene dry cleaners, surface coating operations, gasoline tank-truck tank leak inspection, and vapor recovery for bulk gasoline terminals. The total emission reductions estimated to result from these controls is 3,042 tons per year. Individual source category reductions are shown in Table 23.

(3) New Control Measures Specifically Applying to Post-1982 Urban Nonattainment Areas

The TACB is also implementing a series of controls not previously applied in the state or with stringency levels greater than elsewhere in Texas. This includes more stringent controls for cutback asphalt and for bulk gasoline terminals. Restricting cutback asphalt to a level of 7.0% or below will result in reductions of 183 tons per year, while reducing the size of gasoline terminals impacted by improved vapor recovery requirements to 100,000 gallons per day produces 78 tons per year of reduction.
Finally, requirements to flare or incinerate certain process vent gas streams will result in reductions of 1,948 tons per year. These controls are itemized in Table 23.

c) Federal Motor Vehicle Control Program

Based on information provided by the NCTCOG and the SDHPT and calculations from MOBILE 3, reductions from the FMVCP are estimated to be 12,959 tons per year by 1987.

Table 23.

VOC EMISSION REDUCTION FOR DALLAS COUNTY FROM APPLICATION OF CONTROLS IN REVISED REGULATION V

Source/Category	Regulation V Existing or Proposed Rule Number	Reduction (tons/year)
Graphic Arts	.201, .202, .203	1,353
Subtotal (Compliance Extensions)		1,353
Large Gasoline Terminals	.111(2)	40
Gasoline Tank Trucks	.261, .262, .263, & .264	500
Degreasing	.172, .173, .174, .175, &.176	1,386
Dry Cleaning	.221, .222, .223	635
Coating Operations	.191, .192, .193, &.194	481
Subtotal (Harris County-Type Controls)		3,042
Medium Gasoline Terminals	.111(2)	78
Cutback Asphalt	.171, .176(a)	183
Airplane Prime Coating	.191, .192, .193 & .194	10
Process Vents	.163, .164	1,948
Subtotal (New Controls)		2,219
TOTAL		6,614

d) Transportation Control Measures

An analysis of candidate TCMs for possible use in the Post-1982 SIP revision for Dallas County was performed by the NCTCOG. Each TCM was evaluated for technical feasibility, economic reasonableness and air quality benefit. Some of the measures were rejected because they were too expensive, or were politically infeasible, or they could not be implemented by the attainment deadline. The remaining seven TCMs are included in this SIP revision. NCTCOG has obtained formal commitments from local officials and/or authorities to implement these TCMs prior to December 31, 1987. Appendix AG contains documentation of these commitments including proposed funding sources.

The emission reductions for recommended TCMs have been determined by NCTCOG and are presented in Table 24.

Table 24.
DALLAS COUNTY TRANSPORTATION CONTROL MEASURES

TCM	Reductions Tons/Year
Signal Timing Improvements	305
Computer Controlled Signal Coordination/Signal Progression	595
Staggered Work Hours	12
Reduced Transit Fare	29
Low Cost Intersection Improvements	27
Carpool/Vanpool Program	30
Transit Improvements	543
TOTAL	1,541

In addition, the annual element of the Transportation Improvement Program for Dallas County will be examined for conformity with these SIP revisions.

e) Vehicle Parameter Inspection/Maintenance Program

The I/M program to be implemented in Dallas County is the same in all major components to the one currently in operation in Harris County. That is, inspectors will conduct a general anti-tampering check of all 1968 and newer model year light-duty vehicles and an enhanced inspection for 1980 and newer model year vehicles to verify proper operation of the catalytic converter.

MOBILE 3 was utilized to calculate the tons of VOC that the I/M program is estimated to reduce per year in Dallas County. Assuming a start-up date of January 1, 1986, the program is estimated to result in a reduction of 4,450 tons of VOC per year by 1987. This estimate reflects a discount of 21.4 percent or 1,211 tons per year to account for Dallas County VMT resulting from perimeter county commuting. Perimeter county VMT data was provided by NCTCOG and was subtracted from Dallas County I/M reduction estimates because motor vehicles from these areas would not be affected by the program. This adjustment is not required by EPA guidance.

3) Demonstration of Attainment and Associated Implications

a) Attainment Demonstration Calculations

According to EKMA modeling results, the 1983 VOC emissions inventory for Dallas County must be reduced by 52.8% in order to demonstrate attainment of the ozone standard by December 31, 1987. The total 1983 VOC emission rate of 97,117 tons per year must, therefore, be reduced to 45,839 tons per year. This results in a reduction estimate of

54,503 tons per year (including 3,225 tons per year to allow for projected minor area and non-highway mobile source growth).

Table 25 presents a listing of the reduction estimates for each of the categories of controls previously discussed. The total of these control measures results in less emissions reductions than are required to demonstrate attainment of the standard. The total reduction of 25,564 tons per year is 28,939 tons less than the amount needed for a demonstration of attainment after allowing for projected growth.

In accordance with the January 27, 1984 EPA guidelines, emissions have been projected to 1992 and are shown in Appendix AD. Although emissions are expected to continue to decrease as a result of the ongoing mobile source emissions control programs previously described, attainment still cannot be demonstrated by 1992.

b) Additional Requirements for Areas Not Demonstrating Attainment by December 31, 1987 and TACB Response

In the January 27, 1984 guidelines, EPA recognized that some areas might be unable to demonstrate attainment of the CO and/or ozone standards by December 31, 1987. The guidelines specify a number of additional requirements that must be met by the affected areas in order to avoid sanctions. These requirements and the TACB response to each is enumerated as follows:

(1) Reasonable Available Control Measures (RACM's)

(a) States must demonstrate in each area where attainment cannot be demonstrated by the deadline that

Table 25.

VOC EMISSION CHANGES FOR DALLAS COUNTY BETWEEN 1983 and 1987

	VOC Reduction		VOC Increase		Net Emissions Change	
	Tons	%*	Tons	%*	Tons	%*
TACB Regulation V Controls as Applied in Harris County	3042	3.1				
TACB Regulation V, Rule 115.191 (Compliance Extensions)	1353	1.4				
TACB Regulation V, Rule 115.111 (Gasoline Terminals)	78	0.1				
TACB Regulation V, Rule 115.171 (Cutback Asphalt)	183	0.2				
TACB Regulation V, Rule 115.191 (Airplane Prime Coating)	10	.01				
TACB Regulation V, Rule 115.161 (Process Vents)	1948	2.0				
Area and Minor Source Growth			1617	1.7		
Permits**			800	0.8		
SUBTOTAL (STATIONARY)	6614	6.8	2417	2.5	4197	4.3
Federal Motor Vehicle Control Program (& highway growth)	12959	13.3				
Transportation Control Measures	1541	1.6				
Vehicle Inspection and Maintenance	4450	4.6				
Non-Highway Mobile Growth			808	0.8		
SUBTOTAL (MOBILE)	18,950	19.5	808	0.8	18142	18.7
Total	25,564	26.3	3225	3.3	22339	23.0

*Percent of 1983 Emissions Inventory (97117 tons)
**Not Itemized in Appendix AD

RACM's are being implemented in each of the emissions source categories.

(b) The TACB has examined the reduction potential of all VOC emission source categories and has proposed the additional controls for Dallas County described previously. These controls, together with the transportation control measure commitments obtained from NCTCOG, represent RACM.

(2) Reasonably Available Control Technology (RACT)

(a) Controls on major and minor stationary sources must exceed the level of control regarded as RACT.

(b) The TACB has evaluated RACT and BACT control technology information available from the TACB point source data base records for all permitted and grandfathered VOC sources. The TACB proposes where feasible, to extend controls on major and minor stationary sources to levels in excess of RACT. Control efficiencies for stationary source controls are shown in Appendix AF.

(3) Previously Uncontrolled Source Categories

(a) Controls must be adopted for sources and source categories not currently subject to control, or which exceed Control Technique Guidelines (CTG) requirements. EPA specifically addresses Stage II Vapor Recovery.

(b) The TACB is proposing controls on uncontrolled sources where technically and economically feasible. The TACB does not believe that Stage II vapor recovery at service stations is the most effective or

economically reasonable control alternative and has recommended that EPA require automotive manufacturers to install on-board cannisters (See Appendix AH and paragraph (8) of this subsection for more detailed discussion).

(4) Transportation Control Measures (TCMs)

(a) More extensive evaluation of TCMs is required. Measures previously rejected because of insufficient time for implementation before the deadline must be reconsidered, given the additional lead time.

(b) NCTCOG is committed to carrying out additional TCM evaluations and to seeking commitments to implement reasonable measures which, in some cases, may not be effective until after the current deadline.

(5) Inspection and Maintenance (I/M) Programs

(a) States are to increase the stringency and coverage of I/M to the extent feasible. EPA published guidelines on December 31, 1983 encouraging the implementation of programs to reduce the incidence of vehicle tampering and misfueling.

(b) The TACB is committed to requesting that DPS extend the State Vehicle Parameter Inspection and Maintenance Program as now implemented in Harris County to Dallas County. This program has been evaluated for Dallas County by methods prescribed by EPA and has been determined to provide SIP emission reduction credits in excess of the level EPA has defined as RACT.

(6) Emissions Offsets

(a) Emissions offsets from major source construction or modification must exceed an amount sufficient to accommodate the growth of uncontrolled area and minor sources.

(b) The provisions of TACB Regulation VI §116.3(a)(10) will apply to major new VOC source construction and modification in Dallas County. This rule provides that at the time the facility is to commence operation, a net decrease in total allowable VOC emissions must result, taking into account any increases from operation of the proposed facility.

(7) Continuing Studies Program

(a) The State must commit to an ongoing program for evaluating and carrying out additional control options as they become available.

(b) The TACB is committed to carrying out a continuing program of evaluating and implementing additonal controls as they become available and as they are determined to be reasonably available control measures.

(8) Evidence for Technical and/or Economic Infeasibility

(a) States must provide evidence that rejected control measures are not economically or technically feasible.

(b) As part of the Post-1982 SIP Revision process, the TACB conducted an intensive cost analysis of various controls on each significant source and source category in Dallas County. On the basis of this study, the TACB determined that the controls implemented in Harris County in conjunction with the 1982 SIP revisons are also reasonable for Dallas County. Costs per ton of VOC reduced for these source categories ranged from approximately $350 to less than $600.

Since attainment could not be demonstrated in Dallas County, the TACB also evaluated controls in comparison to the general guidelines established for BACT in the TACB New Source Review process. On this basis, additional controls determined as reasonable were proposed for Dallas County. Costs per ton of VOC reduced for these source categories ranged from about $240 to less than $1000.

The TACB, however, found a number of sources and source categories where the potential reductions were quite small and/or the control costs were unreasonable. These sources and the estimated costs are shown in Table 26. Each control listed in Table 26 (except airplane top coatings and automotive refinishing) has been rejected because of the high cost of controls. Airplane top coatings must withstand environmental extremes and satisfactory substitutes are not currently available.

Limitations on the VOC content of automotive refinishing coatings have been rejected for both technical and economic reasons. The coatings lose many necessary physical properties as the VOC content is reduced. Alternative coatings are less desirable and require the purchase of expensive application systems.

Table 26.

REJECTED VOC CONTROL MEASURES
DALLAS COUNTY

Control Measure	Reduction (Tons/Year)	Annual Cost	Cost/Ton
Require the collection and incineration or flaring of VOC emissions from all coating operations if the coating operations emit 250 pounds per day or more of any VOC.	4,205	$16,904,000	$ 4,020
Require the collection and incineration or flaring of VOC emissions from all printing, coating, and/or degreasing operations emitting 100 pounds per day or more of any VOC.	150	1,266,000	8,440
Require incineration or flaring of all VOC emissions from process vents emitting 100 pounds per day or more of any VOC.	930	2,184,000	2,348
Limiting VOC content of coatings applied to airplanes.	89	Rejected on technical basis rather than cost.	
Limiting VOC content of coatings used in the auto refinishing industry.	1,159	Rejected on technical and cost basis.	
Stage II Vapor Recovery (Vapor Balance System)	3,712	7,391,000	1,1991
Stage II Vapor Recovery (Hybrid System)*	86	1,436,000	16,699
Limiting Reid vapor pressure of gasoline	4,081	6,973,000	1,709

* Emission reductions and costs for the hybrid system represent increments beyond those attributable to a vapor balance system.

Preliminary estimations of reduction potential and costs of Reid vapor pressure controls on gasoline appeared favorable. Consequently, the TACB initially proposed these controls. Testimony received during the hearing, changes to the MOBILE 3 model assumptions to reflect actual volatility of the gasoline used in the area, and subsequent evaluation, however, indicate that these costs were greatly underestimated. The net cost per ton for gasoline volatility controls is now estimated to be $1,709. In addition, EPA is reviewing possible mechanisms for reducing evaporative emissions from gasoline marketing and is expected to make a decision whether to require Stage II vapor recovery at service stations and/or expand on-board cannisters on vehicles. Either of these controls would have an overlapping effect with gasoline volatility control such that the emission reduction benefit from gasoline volatility control would be reduced and the resulting cost per ton would be increased. Considering the relatively high cost per ton for gasoline volatility control the TACB has decided not to adopt this control prior to EPA's decision.

EPA has expressed a particular interest in inducing states to implement Stage II vapor recovery in any area where attainment of the ozone standard cannot be demonstrated by 1987. The TACB thoroughly evaluated the costs associated with several systems. The vapor balance system of Stage II is estimated to cost $1,991 per ton of VOC reduced. The cost assumes that on-board cannisters will be required on new motor vehicles beginning with the 1988 model year. Implementation of on-board cannisters does not significantly affect Stage II costs in 1988, but by 2000 the annual cost per ton is projected to rise greatly because a smaller number

of tons is controlled. Cost associated with the hybrid system are also appreciably greater.

The TACB has previously developed a detailed statement concerning the advantages of vehicle on-board cannisters over Stage II systems (See Appendix AH). Not only are capital costs unreasonable, but Stage II also requires significant maintenance costs, extensive enforcement efforts, and considerable customer inconvenience. Furthermore, EPA may require on-board vehicle cannisters in the near future. Therefore, any current value of Stage II systems will diminish.

4) Projection of Reasonable Further Progress (RFP)

Table 27 lists the annual estimated VOC emissions for mobile and stationary sources in Dallas County for the period 1983-1987.

Table 27.

ANNUAL DALLAS COUNTY VOC EMISSION ESTIMATES

	Estimated VOC Emission in Tons			Amount of VOC
Date	Mobile Sources	Stationary Sources	Total	Emissions Representing Linear Decrease
1983	60,684	36,433	97,117	97,117
1984	58,650	37,372	96,022	84,298
1985	56,848	37,972	94,820	71,478
1986	51,714	38,448	90,162	58,659
1987	42,542	31,436	73,978	45,839

The total estimated VOC emissions and amount of VOC emissions that would represent a linear VOC emission reduction from 1983 to 1987 are also listed. The mobile emissions estimates include linear reductions resulting from TCMs beginning in

1984. Emissions reduction estimates in 1986 for the parameter I/M program were determined by using a mid-year factor, averaging the January 1, 1986 and 1987 MOBILE 3 emission factors. FMVCP reductions were also calculated using MOBILE 3. Stationary source reductions were calculated by applying control efficiency factors to source emissions data contained in the inventory and assuming the compliance date to be the final compliance date of the applicable TACB Regulation V. Because the addition of required controls is a phased operation and RFP is calculated annually, it may be appropriate to reduce the estimated annual emission by a percent of the required reductions prior to the final compliance date; however, this reduction estimate is not included in Table 27. Area source growth and reductions were calculated as described in paragraph VI.B.6.b.2)a). Future emissions changes will be reported annually.

For each year, total VOC emissions in Dallas County are estimated to be more than the amount of emissions that would be allowed if the required emission reduction of 51,278 tons were accomplished as a linear decrease from the 1983 baseline emissions to 1987.

c. Tarrant County Ozone Control Strategy

1) General

Volatile organic compound emissions reductions are required by EPA for each urban nonattainment area which did not attain the ozone standard by December 31, 1982. As discussed previously, EPA has specified that states must use City-Specific EKMA to determine the amount of VOC emissions which must be reduced.

Based upon procedures interpreted from EPA guidelines, a 0.17 ppm design value recorded at the Dallas County Mockingbird monitoring site was utilized in determining the modeled VOC reduction requirement of 51.5% for Tarrant County. As a consequence, the 1983 emission inventory of 63,618 tons per year must be reduced to 30,855 tons per year. This results in a reduction requirement of 32,763 tons, plus 3,230 tons to account for projected minor, area, and non-highway mobile source growth by 1987. The following subsections discuss the VOC reduction estimates associated with each proposed control.

2) Estimated Emissions Reduction

a) Emissions Reductions and Growth Unaffected by This Plan

VOC emission projections through 1987 take into consideration changes expected to result from growth and from control measures not a part of this plan.

Population estimates used to project emissions through 1987 were obtained from the North Central Texas Council of

Governments and reflect a growth in population in Tarrant County from 943,950 in 1983 to 1,116,457 in 1987. This population increase results in an estimated 14% increase in emissions from minor and area sources during the period 1983 to 1987.

No VOC reductions for existing industrial point sources other than those set forth in this plan are currently scheduled as a result of regulatory requirements except for those required of companies which received extensions of the December 31, 1982 compliance date provided for in TACB Regulation V. Those companies are engaged in graphic arts and industrial surface coating operations and must have scheduled VOC reduction measures implemented by December 31, 1985. The extensions were granted because the companies demonstrated that additional time was necessary to develop the new control technology. New industrial construction is expected to have a small impact on emission levels because of best available control technology requirements included in the state new source review program and the offset provisions of Regulation VI, Rule 116.3(a)(10).

Minor permitted sources not subject to offset requirements are expected to contribute 234 tons per year to the emissions inventory (936 total tons by 1987). This estimate is based on the average addition of 234 tons per year from 1980 to 1983 and on the expectation that growth will continue at the same rate.

Despite expected increases in VMT (based on projections from the SDHPT and NCTCOG), emissions from motor vehicles are expected to decrease by approximately 18% by the end of 1987 because of the FMVCP.

The effects of the FMVCP on vehicle emissions are calculated by using MOBILE 3. For mobile sources other than vehicles, increases in emissions of approximately 19% were predicted by the TACB area source model.

Predicted emissions changes from 1983 to 1987 are itemized in Appendix AD (minor source growth excluded) and summarized in Table 30.

b) Stationary Source Controls Included With This Plan

Reasonably Available Control Measures (RACMs) have been applied to all major stationary sources in Tarrant County, as well as to certain smaller sources. Controls applied are prescribed in previous and current revisions to Regulation V (Control of Volatile Organic Compounds). Each control included in the plan is shown in Table 28 along with the associated Regulation V rule number and estimated reduction potential.

(1) Emissions Reductions from Existing Control Requirements

As discussed previously, this control category involves sources that were affected by earlier control measures, but were granted compliance date extensions because of technological considerations. This includes the graphic arts and can coating industries with reductions of 528 and 146 tons per year, respectively, anticipated to occur by December 31, 1985. The automotive coating industry is also scheduled for reductions of 4,428 tons per year by December 31, 1986. Thus, the total estimated reductions from existing controls is 5,102 tons per year.

(2) Emissions Reductions from the Application of Harris County Controls in Tarrant County

The TACB has evaluated the reduction potential for Tarrant County of stationary controls which were previously implemented in Harris County. These controls will affect degreasing operations, perchloroethylene dry cleaners, surface coating operations, gasoline tank-truck tank leak inspection, and vapor recovery for bulk gasoline terminals. The total emission reduction estimated to result from these controls is 2,624 tons per year. Individual source category reductions are shown in Table 28.

(3) New Control Measures Specifically Applying to Post-1982 Urban Nonattainment Areas

The TACB is also implementing a series of controls not previously applied in the state or with stringency levels greater than elsewhere in Texas. This includes more stringent controls for cutback asphalt and for bulk gasoline terminals. Restricting cutback asphalt to a level of 7.0% or below will result in reductions of 107 tons per year, while reducing the size of gasoline terminals impacted by improved vapor recovery requirements to 100,000 gallons per day produces 144 tons per year of reduction. Finally, requirements to flare or incinerate certain process vent gas streams will result in reductions of 1,041 tons per year. These controls are itemized in Table 28.

c) Federal Motor Vehicle Control Program

Based on information provided by the NCTCOG and the SDHPT and calculations from MOBILE 3, reductions from the FMVCP are estimated to be 7,631 tons per year by 1987.

Table 28.

VOC EMISSION REDUCTIONS FOR TARRANT COUNTY FROM APPLICATION OF CONTROLS IN REVISED REGULATION V

Source/Category	Regulation V Existing or Proposed Rule Number	Reduction (tons/year)
Graphic Arts	.201, .202, .203	528
Can Coating	.191, .192, .193, .194	146
Automotive Coating	.191, .192, .193, .194	4,428
Subtotal (Compliance Extensions)		5,102
Gasoline Tank Trucks	.261, .262, .263, .264	1,017
Large Gasoline Terminals	.111(2)	95
Degreasing	.172, .173, .174, .175 & .176	723
Dry Cleaning	.221, .222, .223	347
Coating Operations	.191, .192, .193, .194	442
Subtotal (Harris County Type Controls)		2,624
Medium Gasoline Terminals	.111(2)	144
Cutback Asphalt	.171, .176(a)	107
Airplane Prime Coating	.191, .192, .193, .194	37
Process Vents	.163, .164	1,041
Subtotal (New Controls)		1,329
TOTAL		9,055

d) Transportation Control Measures

An analysis of candidate TCMs for possible use in the Post-1982 SIP revision for Tarrant County was performed by the NCTCOG. Each TCM was evaluated for technical feasibility, economic reasonableness and air quality benefit. Some of the measures were rejected because they were too expensive, or were politically infeasible, or they could not be implemented by the attainment deadline. The remaining six TCMs are included in this SIP revision. NCTCOG has obtained formal commitments from local officials and/or authorities to implement these TCMs prior to December 31, 1987. Appendix AG contains documentation of these commitments, including proposed funding sources.

The emission reductions for recommended TCMs have been determined by NCTCOG and are presented in Table 29. In addition, the annual element of the Transportation Improvement Program for Tarrant County will be examined for conformity with these SIP revisions.

Table 29.
TARRANT COUNTY TRANSPORTATION CONTROL MEASURES

TCM	Reductions (Tons/Year)
Signal Timing Improvements	152
Computer Controlled Signal Coordination/Signal Progression	595
Staggered Work Hours	6
Low Cost Intersection Improvements	18
Carpool/Vanpool Program	15
Transit Improvements	29
TOTAL	815

e) Vehicle Parameter Inspection/Maintenance Program

The I/M program to be implemented in Tarrant County is the same in all major components to the one currently in operation in Harris County. That is, inspectors will conduct a general anti-tampering check of all 1968 and newer model year light-duty vehicles and an enhanced inspection for 1980 and newer model year vehicles to verify proper operation of the catalytic converter.

MOBILE 3 was utilized to calculate the tons of VOC that the I/M program is estimated to reduce per year in Tarrant County. Assuming a start-up date of January 1, 1986, the program is estimated to result in a reduction of 2,563 tons of VOC per year by 1987. This estimate reflects a discount of 16.1 percent or 492 tons per year to account for Tarrant County VMT resulting from perimeter county commuting. Perimeter county VMT data was provided by NCTCOG and was subtracted from Tarrant County I/M reduction estimates because motor vehicles from these areas would not be affected by the program. This adjustment is not required by EPA guidance.

3) Demonstration of Attainment and Associated Implications

(a) Attainment Demonstration Calculations

According to EKMA modeling results, the 1983 VOC emissions inventory for Tarrant County must be reduced by 51.5 percent to demonstrate attainment of the ozone standard by December 31, 1987. The total 1983 VOC emission rate of 63,618 tons per year must, therefore, be reduced to 30,855 tons per year.

This results in a reduction estimate of 35,993 tons per year (including 3,230 tons per year to allow for projected minor, area, and non-highway mobile source growth).

Table 30 presents a listing of the reduction estimates for each of the categories of controls previously discussed. The total of these control measures results in less emissions reductions than are required to demonstrate attainment of the standard. The total reduction of 20,064 tons per year is 15,929 tons less than the amount needed for a demonstration of attainment, after allowing for projected growth.

In accordance with the January 27, 1984 EPA guidelines, emissions have been projected to 1992 and are shown in Appendix AD. Although emissions are expected to continue to decrease as a result of the ongoing mobile source emissions control programs previously described, attainment still cannot be demonstrated by 1992.

6.b.3)b) Additional Requirements for Areas Not Demonstrating Attainment by December 31, 1987 and TACB Response

In the January 27, 1984 guidelines, EPA recognized that some areas might be unable to demonstrate attainment of the CO and/or ozone standards by December 31, 1987. The guidelines specify a number of additional requirements that must be met by the affected areas in order to avoid sanctions. These requirements and the TACB response to each is enumerated as follows:

(1) Reasonable Available Control Measures (RACMs)

(a) States must demonstrate in each area where attainment cannot be demonstrated by the deadline that

Table 30.

VOC EMISSION CHANGES FOR TARRANT COUNTY BETWEEN 1983 and 1987

	VOC Reduction Tons	% *	VOC Increase Tons	% *	Net Emissions Change Tons	% *
TACB Regulation V Controls as Applied in Harris County	2624	4.1				
TACB Regulation V, (Compliance Extensions)	5102	8.0				
TACB Regulation V, Rule 115.111 (Gasoline Terminals)	144	0.2				
TACB Regulation V, Rule 115.171 (Cutback Asphalt)	107	0.17				
TACB Regulation V, Rule 115.191 (Airplane Prime Coating)	37	0.06				
TACB Regulation V, Rule 115.161 (Process Vents)	1041	1.7				
Area and Minor Source Growth			1484	2.3		
Permits**			936	1.5		
SUBTOTAL (STATIONARY)	9055	14.2	2420	3.8	6635	10.4
Federal Motor Vehicle Control Program (& highway growth)	7631	12.0				
Transportation Control Measures	815	1.3				
Vehicle Inspection and Maintenance	2563	4.0				
Non-Highway Mobile Growth			810	1.3		
SUBTOTAL (MOBILE)	11009	17.3	810	1.3	10199	16.0
Total	20064	31.5	3230	5.1	16834	26.4

*Percent of 1983 Emissions Inventory (63618 tons)
**Not Itemized in Appendix AE

RACM's are being implemented in each of the emissions source categories.

(b) The TACB has examined the reduction potential of all VOC emission source categories and has proposed the additional controls for Tarrant County described previously. These controls, together with the TCM commitments obtained from NCTCOG, represent RACM.

(2) Reasonably Available Control Technology (RACT)

(a) Controls on major and minor stationary sources must exceed the level of control regarded as RACT.

(b) The TACB has evaluated RACT and BACT control technology information available from the TACB point source data base records for all permitted and grandfathered VOC sources. The TACB proposes, where feasible, to extend controls on major and minor stationary sources to levels in excess of RACT. Control efficiencies for stationary source controls are shown in Appendix AF.

(3) Previously Uncontrolled Source Categories

(a) Controls must be adopted for sources and source categories not currently subject to control, or which exceed CTG requirements. EPA specifically addresses Stage II Vapor Recovery.

(b) The TACB is proposing controls on uncontrolled sources where technically and economically feasible. The State does not believe that Stage II vapor recovery at service stations is the most effective or economically reasonable control alternative and has

recommended that EPA require automotive manufacturers to install on-board cannisters (See Appendix AH and paragraph (8) of this subsection for more detailed discussion).

(4) Transportation Control Measures

(a) More extensive evaluation of TCMs is required. Measures previously rejected because of insufficient time for implementation before the deadline must be reconsidered, given the additional lead time.

(b) NCTCOG is committed to carrying out additional TCM evaluations and to seeking commitments to implement reasonable measures which, in some cases, may not be effective until after the current deadline.

(5) Inspection and Maintenance Programs (I/M)

(a) States are to increase the stringency and coverage of I/M to the extent feasible. EPA published guidelines on December 31, 1983 encouraging the implementation of programs to reduce the incidence of vehicle tampering and misfueling.

(b) The TACB is committed to requesting that DPS extend the I/M as now implemented in Harris County to Tarrant County. This program has been evaluated for Tarrant County by methods prescribed by EPA and has been determined to provide SIP emission reduction credits in excess of the level EPA has defined as RACT.

(6) Emissions Offsets

(a) Emissions offsets from major source construction or modification must exceed an amount sufficient to accommodate the growth of uncontrolled area and minor sources.

(b) The provisions of TACB Regulation VI §116.3(a)(10) will apply to major new VOC source construction and modification in Tarrant County. This rule provides that at the time the facility is to commence operation, a net decrease in total allowable VOC emissions must result, taking into account any increases from operation of the proposed facility.

(7) Continuing Studies Program

(a) The State must commit to an ongoing program for evaluating and carrying out additional control options as they become available.

(b) The TACB is committed to carrying out a continuing program of evaluating and implementing additonal controls as they become available and as they are determined to be RACM.

(8) Evidence for Technical and/or Economic Infeasibility

(a) States must provide evidence that rejected control measures are not economically or technically feasible.

(b) As part of the Post-1982 SIP Revision process, the TACB conducted an intensive cost analysis of various controls on each significant source and source category in Tarrant County. On the basis of this study, the TACB determined that the controls implemented in Harris County in conjunction with the 1982 SIP revisons are also reasonable for Tarrant County. Costs per ton of VOC reduced for these source categories ranged from approximately $350 to less than $600.

Since attainment could not be demonstrated in Tarrant County, the TACB also evaluated controls in comparison to the general guidelines established for BACT in the TACB New Source Review process. On this basis, additional controls determined as reasonable are included for Tarrant County. Costs per ton of VOC reduced for these source categories ranged from about $240 to less than $1000.

The TACB, however, found a number of sources and source categories where the potential reductions were quite small and/or the control costs were unreasonable. These sources and the estimated costs are shown in Table 31. Each control listed in Table 31 (except airplane top coatings and automotive refinishing) has been rejected because of the high cost of controls. Airplane top coatings must withstand environmental extremes and satisfactory substitutes are not currently available.

Limitations on the VOC content of automotive refinishing coatings have been rejected for both technical and economic reasons. The coatings lose many necessary physical properties as the VOC content is reduced. Alternative coatings are less desirable and require the purchase of expensive application systems.

Table 31.

REJECTED VOC CONTROL MEASURES
TARRANT COUNTY

Control Measure	Reduction (Tons/Year)	Annual Cost	Cost/Ton
Require the collection and incineration or flaring of VOC emissions from all coating operations if the coating operations emit 250 pounds per day or more of any VOC.	4,094	$16,458,000	$ 4,020
Require the collection and incineration or flaring of VOC emissions from all printing, coating, and/or degreasing operations emitting 100 pounds per day or more of any VOC.	856	7,225,000	8,440
Require incineration or flaring of all VOC emissions from process vents emitting 100 pounds per day or more of any VOC.	1,745	2,785,020	1,596
Limiting VOC content of coatings applied to airplanes.	21	Rejected on technical basis rather than cost.	
Limiting VOC content of coatings used in the auto refinishing industry.	653	Rejected on technical and cost basis.	
Stage II Vapor Recovery (Vapor Balance System)	2,240	4,470,000	1,991
Stage II Vapor Recovery (Hybrid System)*	51	852,000	16,699
Limiting Reid vapor pressure of gasoline	2,632	4,497,000	1,709

* Emission reductions and costs for the hybrid system represent increments beyond those attributable to a vapor balance system.

Preliminary estimations of reduction potential and costs of Reid vapor pressure controls on gasoline appeared favorable. Consequently, the TACB initially proposed these controls. Testimony received during the hearing, changes to the MOBILE 3 model assumptions to reflect actual volatility of the gasoline used in the area, and subsequent evaluation, however, indicate that these costs were greatly underestimated. The net cost per ton for gasoline volatility controls is now estimated to be $1,709. In addition, EPA is reviewing possible mechanisms for reducing evaporative emissions from gasoline marketing and is expected to make a decision whether to require Stage II vapor recovery at service stations and/or expand on-board cannisters on vehicles. Either of these controls would have an overlapping effect with gasoline volatility control such that the emission reduction benefit from gasoline volatility control would be reduced and the resulting cost per ton would be increased. Considering the relatively high cost per ton for gasoline volatility control the TACB has decided not to adopt this control prior to EPA's decision.

EPA has expressed a particular interest in inducing states to implement Stage II vapor recovery in any area where attainment of the ozone standard cannot be demonstrated by 1987. The TACB thoroughly evaluated the costs associated with several systems. The vapor balance system of Stage II is estimated to cost $1,991 per ton of VOC reduced. The cost assumes that on-board cannisters will be required on new motor vehicles beginning with the 1988 model year. Implementation of on-board cannisters does not significantly affect Stage II costs in 1988, but by 2000 the annual cost per ton is projected to rise greatly because a smaller number

of tons is controlled. Cost associated with the hybrid system are also appreciably greater.

The TACB has previously developed a detailed statement concerning the advantages of vehicle on-board cannisters over Stage II systems (See Appendix AH). Not only are capital costs unreasonable, but Stage II also requires significant maintenance costs, extensive enforcement efforts, and considerable customer inconvenience. Furthermore, EPA may require on-board vehicle cannisters in the near future. Therefore, any current value of Stage II systems will diminish.

4) Projection of Reasonable Further Progress

Table 32 lists the annual estimated VOC emissions for mobile and stationary sources in Tarrant County for the period 1983-1987.

Table 32.

ANNUAL TARRANT COUNTY VOC EMISSIONS ESTIMATES

Date	Estimated VOC Emission in Tons			Amount of VOC Emissions Representing Linear Decrease
	Mobile Sources	Stationary Sources	Total	
1983	34,764	28,854	63,618	63,618
1984	34,556	29,561	64,117	55,427
1985	32,903	29,812	62,715	47,237
1986	30,303	30,108	60,411	39,046
1987	24,565	21,283	45,848	30,855

The total estimated VOC emissions and amount of VOC emissions that would represent a linear VOC emission reduction from 1983 to 1987 are also listed. The mobile emissions estimates include linear reductions resulting from TCMs beginning in 1984. Emissions reduction estimates in 1986 for the

parameter I/M program were determined by using a mid-year factor, averaging the January 1, 1986 and 1987 MOBILE 3 emission factors. FMVCP reductions were calculated using MOBILE 3. Stationary source reductions were calculated by applying control efficiency factors to source emissions data contained in the inventory and assuming the compliance date to be the final compliance date of the applicable rules of TACB Regulation V. Because the addition of required controls is a phased operation and RFP is calculated annually, it may be appropriate to reduce the estimated annual emission by a percent of the required reductions prior to the final compliance date; however, this reduction estimate is not included in Table 32. Area source growth and reductions were calculated as described in paragraph VI.B.6.c.2)a). Future emissions changes will be reported annually.

For each year, total VOC emissions in Tarrant County are estimated to be more than the amount of emissions that would be allowed if the required emission reduction of 32,763 tons per year were accomplished as a linear decrease from the 1983 baseline emissions to 1987.

d. El Paso County Ozone Control Strategy

1) General

Volatile organic compound emissions reductions are required by EPA for each urban nonattainment area which did not attain the ozone standard by December 31, 1982. As discussed previously, EPA has specified that states must use City-Specific EKMA to determine the amount of VOC emissions which must be reduced.

Based upon procedures outlined by EPA guidelines, a 0.13 ppm design value recorded at the El Paso West monitoring site was utilized in determining the modeled VOC reduction requirement of 10.5% in El Paso County. As a consequence, the 1983 emission inventory of 25,293 tons per year must be reduced to 22,637 tons per year. This results in a reduction requirement of 2,656 tons, plus 975 tons per year to account for projected minor, area, and non-highway mobile source growth, by 1987. EKMA modeling was also conducted using a set of sectors that included an area for the central business district (sector D) that was smaller than the 100 square kilometer EPA guideline specification for minimum sector size. Based on this modeling approach, the reduction requirement was 2.4 times as great as that indicated by the modeling based upon EPA guideline sector size. Considering the high degree of sensitivity of the EKMA model to this sector size and the uncertainties regarding EPA requirements for areas located in international air basins, it is difficult to determine how EPA will interpret the guideline requirements for determining a reduction requirement for the area. As a result, control measures beyond those necessary to satisfy the 10.5% reduction requirement have been reviewed for economical reasonableness and those determined to be most

reasonable have been included in this plan. The following subsections discuss the VOC reduction estimates associated with each proposed control.

2) Estimated Emissions Reduction

a) Emissions Reductions and Growth Unaffected by This Plan

VOC emission projections through 1987 take into consideration changes expected to result from growth and from control measures not a part of this plan.

Population estimates used to project emissions through 1987 were obtained from the Texas Department of Water Resources 208 Planning Section and reflect a growth in population in El Paso County from 522,500 in 1983 to 583,500 in 1987. This population increase results in an estimated 11% increase in emissions from minor and area sources during the period 1983 to 1987.

No VOC reductions for existing industrial point sources other than those set forth in this plan are currently scheduled as a result of regulatory requirements. New industrial construction is expected to have a small impact on emission levels because of best available control technology requirements included in the state new source review program and the offset provisions of Regulation VI, Rule 116.3(a)(10).

Minor permitted sources not subject to offset requirements are expected to contribute 12 tons per year to the emissions inventory (48 total tons by 1987). This estimate is based on

the average addition of 12 tons per year from 1980 to 1983 and on the expectation that growth will continue at the same rate.

Despite expected increases in VMT (based on projections from the SDHPT), emissions from motor vehicles are expected to decrease by approximately 22% by the end of 1987 because of the Federal Motor Vehicle Control Program (FMVCP). The effects of the FMVCP on vehicle emissions are calculated by using MOBILE 3. For mobile sources other than vehicles, increases in emissions of approximately 15% were predicted by the TACB area source model.

Predicted emissions changes from 1983 to 1987 are itemized in Appendix AD (minor source growth excluded) and summarized in Table 35.

b) Stationary Source Controls Included With This Plan

Controls applied in El Paso County are prescribed in previous and these current revisions to Regulation V (Control of Volatile Organic Compounds). Each control included in this plan is shown in Table 33 along with the associated Regulation V rule number and estimated reduction potential.

(1) Emissions Reductions from the Application of Harris County Controls in El Paso County

The TACB has estimated the reduction potential for El Paso County of stationary controls which were previously implemented in Harris County. These controls will affect gasoline tank-truck tank leak inspection and Stage I vapor recovery. The total emission reduction estimated to result

from these controls is 1,021 tons per year. Individual source category reductions are shown in Table 33.

(2) New Control Measures Specifically Applying to Post-1982 Urban Nonattainment Areas

The TACB is implementing more stringent controls in El Paso County for cutback asphalt. Restricting cutback asphalt to a level of 7.0% or below will result in reductions of 60 tons per year. This control is shown in Table 33.

Table 33.

VOC EMISSION REDUCTIONS FOR EL PASO COUNTY FROM APPLICATION OF CONTROLS IN REVISED REGULATION V

Source/Category	Regulation V Existing or Proposed Rule Number	Reduction (tons/year)
Stage I Vapor Recovery	.131, .132, .133, .134, & .135	873
Gasoline Tank Trucks	.261, .262, .263, .264	148
Cutback Asphalt	.171, .176(a)	60
TOTAL		1,081

c) Federal Motor Vehicle Control Program

Based on information provided by the SDHPT and calculations from MOBILE 3, reductions from the FMVCP are estimated to be 2,940 tons per year by 1987.

d) Transportation Control Measures

An analysis of candidate TCMs for possible use in the Post-1982 SIP revision for El Paso County was performed by the El Paso MPO. Each TCM was evaluated for technical feasibility, economic reasonableness, and air quality benefit. Some of the measures were rejected because they were too expensive, or were politically infeasible, or they could not be implemented by the attainment deadline. The remaining three TCMs are included in this SIP revision. El Paso MPO has obtained formal commitments from local officials and/or authorities to implement these TCMs prior to December 31, 1987. Appendix AG contains documentation of these commitments, including proposed funding sources.

The emission reductions for recommended TCMs have been determined by the El Paso MPO and are presented in Table 34.

Table 34.
EL PASO COUNTY TRANSPORTATION CONTROL MEASURES

TCM	Reductions Tons/Year
Carpool Program	22
Traffic Control System Project	156
Public Transit Improvements	5
TOTAL	183

In addition, the annual element of the Transportation Improvement Program for El Paso County will be examined for conformity with these SIP revisions.

e) Vehicle Parameter Inspection/Maintenance Program

The I/M program to be implemented in El Paso County is the same in all major components to the one currently in

operation in Harris County. That is, inspectors will conduct a general anti-tampering check of all 1968 and newer model year light-duty vehicles and an enhanced inspection for 1980 and newer model year vehicles to verify proper operation of the catalytic converter.

MOBILE 3 was utilized to calculate the tons of VOC that the I/M program is estimated to reduce per year in El Paso County. Assuming a start-up date of January 1, 1986, the program is estimated to result in reductions of 1,119 tons of VOC per year by 1987.

3) Attainment Demonstration Calculations

According to EKMA modeling results, the 1983 VOC emissions inventory for El Paso County must be reduced by 10.5 percent to demonstrate attainment of the ozone standard by December 31, 1987. The total 1983 VOC emission rate of 25,293 tons per year must, therefore, be reduced to 22,637 tons per year. This results in a reduction estimate of 3,631 tons per year (including 975 tons per year to allow for projected minor area and non-highway mobile source growth).

Table 35 presents a listing of the reduction estimates for each of the categories of controls previously discussed. For trajectories originating in El Paso, the total reduction of 5,323 tons per year is 1,692 tons per year more than required to demonstrate attainment of the standard, after allowing for projected growth.

The State of Texas cannot, of course, require emissions reductions in Mexico for trajectories originating in Ciudad Juarez. The TACB, however, has examined such trajectories

Table 35.

VOC EMISSION CHANGES FOR EL PASO COUNTY BETWEEN 1983 and 1987

	VOC Reduction Tons	% *	VOC Increase Tons	% *	Net Emissions Change Tons	% *
TACB Regulation V Controls as Applied in Harris County	148	0.6				
TACB Regulation V, 115.131 (Stage I Vapor Control)	873	3.5				
TACB Regulation V, Rule 115.171 (Cutback Asphalt)	60	0.2				
Area and Minor Source Growth			633	2.5		
Minor Source Permits Growth**			48	0.2		
SUBTOTAL (STATIONARY)	1081	4.3	681	2.7	400	1.6
Federal Motor Vehicle Control Program (& highway growth)	2940	11.6				
Transportation Control Measures	183	0.7				
Vehicle Inspection and Maintenance	1119	4.4				
Non-Highway Mobile Growth			294	1.1		
SUBTOTAL (MOBILE)	4242	16.7	294	1.1	3948	15.6
Total	5323	21.0	975	3.8	4348	17.2

*Percent of 1983 Emissions Inventory (25293 tons)
**Not Itemized in Appendix Ad

and can provide the results to the Air Pollution Work Group. This group is developing an air pollution annex to the "Agreement Between the United States of America and the United Mexican States on Cooperation for the Protection of the Environment in the Border Area," signed by the respective Presidents August 14, 1983.

4) Projection of Reasonable Further Progress

Table 36 lists the annual estimated VOC emissions for mobile and stationary sources in El Paso County for the period 1983 through 1987.

Table 36.

ANNUAL EL PASO COUNTY VOC EMISSIONS ESTIMATES

Date	Estimated VOC Emission in Tons			Amount of VOC Emissions Representing Linear Decrease
	Mobile Sources	Stationary Sources	Total	
1983	15,044	10,249	25,293	25,293
1984	14,599	10,396	24,995	24,629
1985	14,083	10,606	24,689	23,965
1986	12,635	10,825	23,460	23,301
1987	11,096	9,801	20,897	22,637

The total estimated VOC emissions and amount of VOC emissions that would represent a linear VOC emission reduction from 1983 to 1987 are also listed. The mobile emissions estimates include linear reductions resulting from TCMs beginning in 1985. Emission reduction estimates in 1986 for the parameter I/M program were determined by using a mid-year factor, averaging the January 1, 1986 and 1987 MOBILE 3 emission factors. FMVCP reductions were calculated using MOBILE 3. Stationary source reductions were calculated by applying

control efficiency factors to source emissions data contained in the inventory and assuming the compliance date to be the final compliance date of the applicable TACB Regulation V.

Because the addition of required controls is a phased operation and RFP is calculated annually, it may be appropriate to reduce the estimated annual emission by a percent of the required reductions prior to the final compliance date; however, this reduction estimate is not included in Table 36. Area source growth and reductions were calculated as described in paragraph VI.B.6.d.2)a). Future emissions changes will be reported annually.

For 1984 through 1986, total VOC emissions in El Paso County are estimated to be more than the amount of emissions that would be allowed if the required emission reduction of 2,656 tons were accomplished as a linear decrease from the 1983 baseline emissions to 1987. Nevertheless, reductions are projected to be greater than required by 1987.

B. 7. SOCIAL AND ECONOMIC CONSIDERATIONS OF THE PLAN

a. - e. (No Change)

f. Evaluation of the Post-1982 SIP for Urban Nonattainment Areas

Extensive efforts were made to analyze the impacts of controls before they were proposed in this SIP revision. Subsection 6.b.3)b)(8) includes a justification for rejecting certain control measures based on economic consideration. Also, the preambles published with the proposed revisions to TACB Regulation V describe the economic impacts of the proposed controls.

B. 8. FISCAL AND MANPOWER RESOURCES

In compliance with the Clean Air Act [Section 110(a)(2)(F)(i)], the financial and manpower resources available to the state and local air pollution control agencies are described in another section of the plan. The necessary resources needed to carry out the provisions of this plan are available for the current (1985) fiscal year. The availability of the resources necessary for later fiscal years is dependent upon the appropriation actions of the Texas Legislature and local governments.

B. 9. HEARING REQUIREMENTS

a. - d. (No Change)

e. Public Hearings for Post 1982 SIP Revisions

1) Location, Date, Time (work hour and evening session held)

Dallas	March 27	2:30 P.M. & 6:30 P.M.
El Paso	March 27	2:30 P.M. & 6:30 P.M.
Fort Worth	March 28	2:30 P.M. & 6:30 P.M.

2) Attendance and Participation

City	Attendance	Oral Presentations
Dallas	58	12
El Paso	43	19
Fort Worth	48	9
Total	149	40
Total written statements		46

All written and oral testimony are on file at the Texas Air Control Board in Austin.