POST-1982
OZONE CONTROL STRATEGIES
DALLAS AND TARRANT COUNTIES

TEXAS STATE IMPLEMENTATION PLAN
REVISIONS

December 18, 1987

Revisions for Dallas, Tarrant, and El Paso counties.

- Adopted August 23, 1985
- Submitted to EPA September 30, 1985

Supplemental Revisions for Dallas and Tarrant counties.

- Adopted December 18, 1987
- Submitted to EPA December 21, 1987

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.

Proposals to revise the Texas SIP for Dallas, Tarrant, and El Paso counties were submitted to EPA on September 30, 1985. The revisions for Dallas and Tarrant counties, however, did not provide sufficient reductions to demonstrate attainment of the ozone standard and on July 14, 1987 EPA published intent to invoke sanctions. Public officials in the two counties expressed a strong desire to provide additional control measures sufficient to satisfy requirements for an attainment demonstration.

A program of supplemental controls was taken to public hearings in late October 1987. As a result of testimony received at the hearings, a number of the controls were modified and several were deleted, but sufficient reductions were retained to demonstrate attainment by December 31, 1991. These controls were adopted by the TACB on December 18, 1987 and will be submitted to EPA as proposed revisions to the SIP. Supplemental data and supporting documentation are included in Appendices AA through AO.

B. OZONE CONTROL STRATEGY

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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. Such VOC emission reductions are required by EPA in areas which exceed the ozone National Ambient Air Quality Standard (NAAQS) in the expectation that reductions in accordance with technical guidance will lower ozone concentrations sufficiently to achieve the standard.

The plan provides for the emission reductions required to demonstrate attainment by the deadline of December 31, 1982, or December 31, 1987 in the case of Harris and El Paso counties, and December 31, 1991 for Dallas and Tarrant counties.

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 VOCs are emitted by businesses, industries, and motor vehicles. The plan identifies the contribution from known sources and sets forth a program of reductions required to demonstrate attainment of the ozone standard by December 31, 1982, or for Harris and El Paso counties by December 31, 1987 and for Dallas and Tarrant counties by December 31, 1991.

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)

B. 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

Table 15.

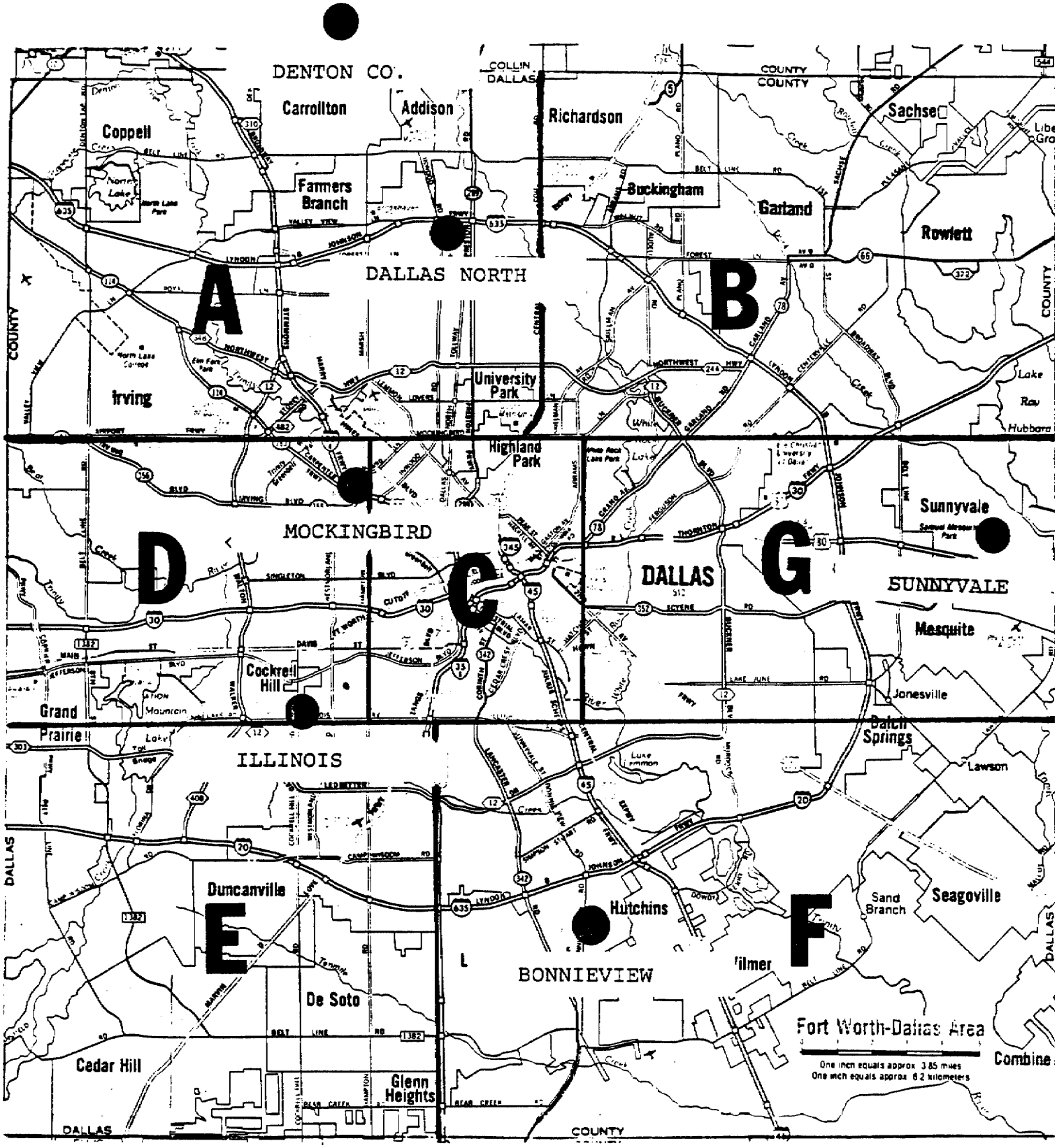
HIGHEST OZONE DAYS AT EACH DALLAS COUNTY MONITORING STATION (a)

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



concentrations appropriate for Tarrant County. Hence, the monitoring stations for Tarrant County meet the siting requirements of the January 22, 1981 guidelines.

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

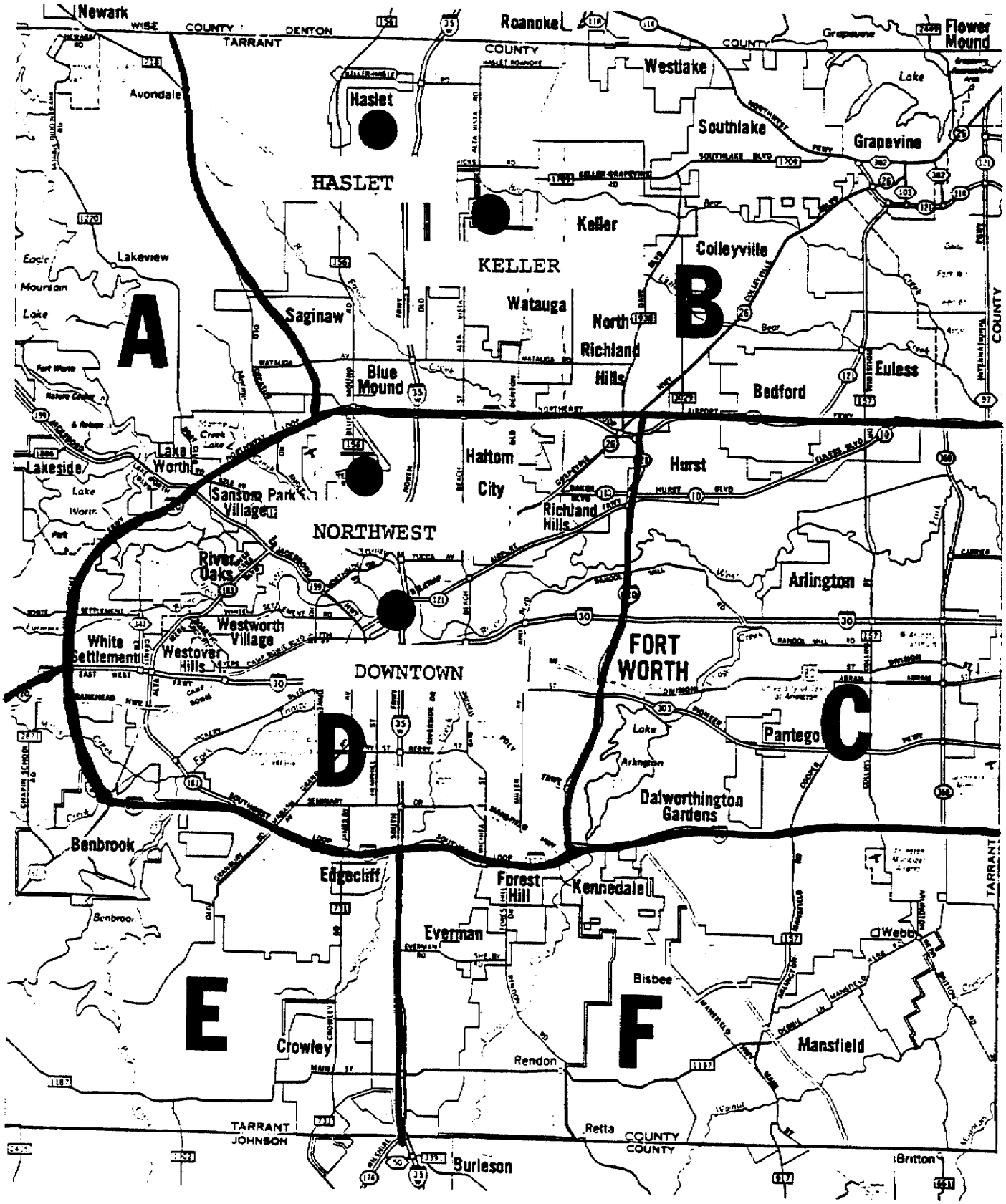


Table 18.

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.

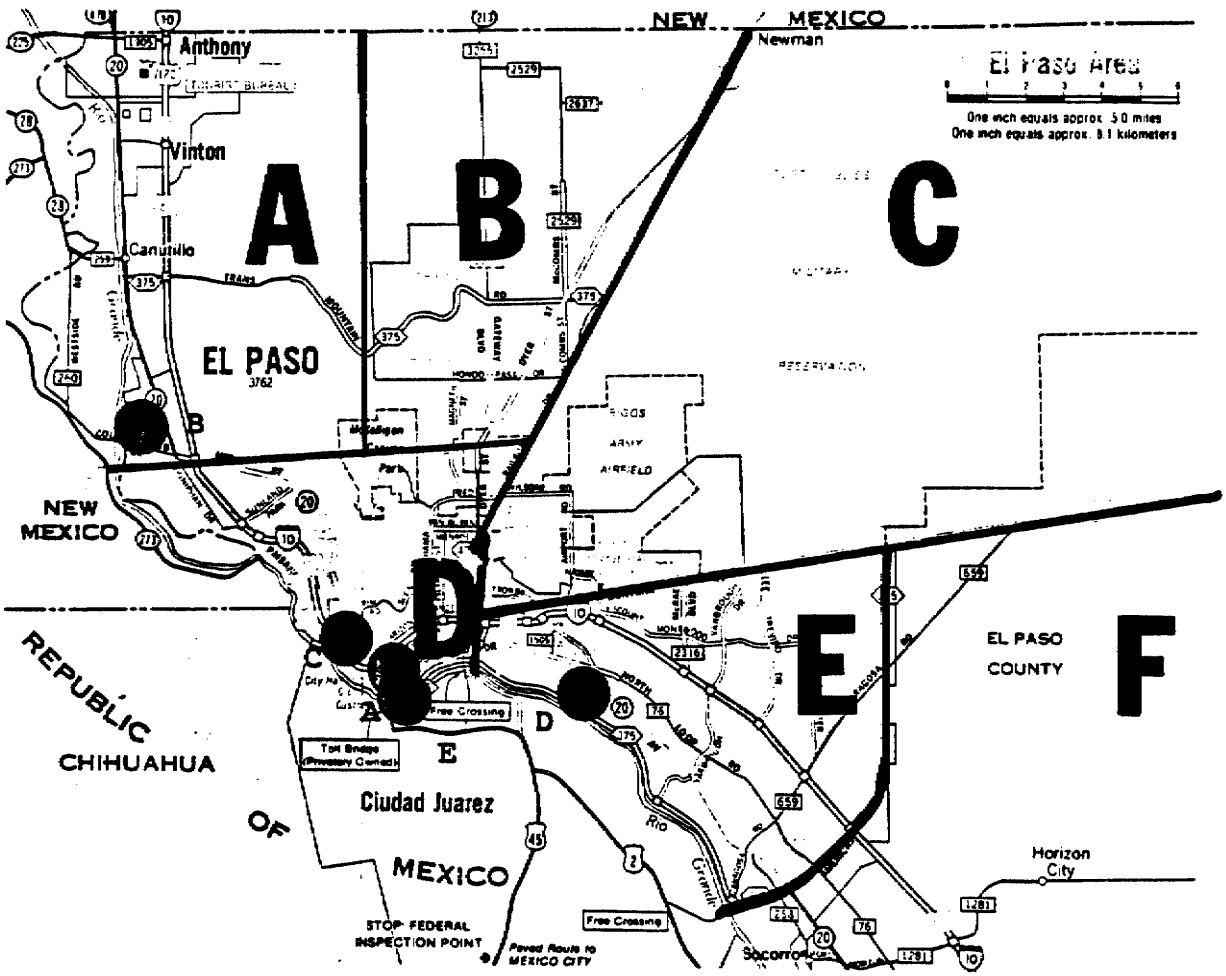
HIGHEST OZONE DAYS AT EACH EL PASO COUNTY MONITORING STATION (a)

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.

(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. Temperatures for Dallas were from Dallas Love Field and temperatures for Fort Worth were from Fort Worth Meacham Field
minimum mixing height was less than 250 meters, 250
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 was used as recommended in EPA guidelines. In such cases, a maximum mixing height of 1,830 meters was used since this is the summer average mixing height reported by Holzworth for Oklahoma City. This follows guidance from EPA.

(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 NO_x

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. Following EPA guidance for each day being modeled in Dallas and Tarrant counties, the straight line trajectory was determined by drawing a straight line from the center of the city to the monitor measuring the high ozone concentration. For each hour, emissions used in the model were based upon the sector which the straight line trajectory passed over. When the actual air parcel trajectory indicated that the air parcel began in Tarrant County, but impacted a monitor in Dallas or Denton counties, the straight line trajectory was drawn from the center of the city in Fort Worth to the monitor where the high ozone was measured. In a similar manner, when an air parcel began in Dallas County, but impacted a monitor in Tarrant County, the straight line trajectory was drawn from the center of the city in Dallas to the monitor where the high ozone was measured. Following methods described in the EPA guidelines, the hourly emissions were then represented as a fraction of the initial emission density. For El Paso County, hourly emission contributions to the air parcel were determined from the hourly emissions inventory for each sector through which the air parcel was estimated to have actually travelled.

(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 located upwind and in as rural an area as possible. In Dallas and Tarrant counties, ozone aloft values were reduced to 0.065 ppm when measured values exceeded 0.065 ppm following guidance provided by EPA. The reduction requirement in the two counties was determined by reducing future ozone aloft values in the final set of EKMA runs in accordance with EPA guidelines on future ozone aloft. In both counties, when ozone aloft exceeded 0.05 ppm, the future ozone aloft was reduced using the method for isolated cities published in Guideline for Use of City-Specific EKMA in Preparing Ozone SIPs.

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 from the same time period from the La Union monitoring site in New Mexico just north of El Paso.

(8) NO_x 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 1991. The NO_x reductions for Dallas and Tarrant counties are 5.0% and 1.2%, respectively. Projected NO_x emissions in 1991 are as follows:

1991	Point Sources (kilograms per day)	Area Sources (kilograms per day)	Mobile Sources (kilograms per day)	Total (kilograms per day)
Dallas	45,226	42,096	129,875	217,197
Tarrant	29,516	24,414	69,246	123,176

For El Paso County, the reduction was calculated from estimates of NO_x emissions from 1983 to 1987 and represents reductions of 4.0%. Projected 1987 El Paso NO_x emissions are 3,428 tons per year point sources, 5,521 tons per year area sources, and 9,781 tons per year mobile sources, totaling 18,730 tons per year.

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.

If the modeling for a given day did not meet the $\pm$30 percent criterion, the model inputs were reexamined. Initially, concentrations of NMHC were adjusted to a value between 0.6 ppm and 1.6 ppm and remodeled. If the $\pm$30 percent criterion was still not met, the initial concentrations of NO_x were varied

by as much as ±15 percent. After reexamination of the data, if a day still does not meet the ±30 percent criterion, 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.

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

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

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 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 43.9 percent in Dallas County to demonstrate attainment of the ozone standard at the Dallas North site. The corresponding situation in Tarrant County is a reduction of 41.7 percent at the Denton County site.

Table 20. - Continued

SUMMARY OF EKMA MODELING RESULTS

Monitoring Site	Date	Origin for Air Parcel	Ozone Aloft Present/Future (ppm)	Measured Value (ppm)	Predicted Value (ppm)	Percent Differences	Reduction Requirement (Percent)
Dallas	7/13/82	Ft Worth	.065/.062	.16	.095	-40.5	52.6 (c,m)
Denton Co	8/25/83	Dallas	.060/.058	.16	.138	-13.9	49.8 (h)
	6/08/83	Ft Worth	.065/.062	.15	.191	+27.6	47.0 (c)
	9/11/81	Ft Worth	.065/.062	.15	.126	-16.1	41.7 (b,c)
	8/26/83	Ft Worth	.065/.062	.15	.162	+ 8.3	41.6 (c)
	8/10/81	Dallas	.063/.060	.14	.135	- 3.5	37.9 (b,h,ac)
	7/21/83	Dallas	.040/.040	.14	.181	+29.2	35.3 (h)
	8/24/81	Ft Worth	.065/.062	.14	.153	+ 9.1	29.9 (c)
	8/13/83	Ft Worth	.065/.062	.14	.098	-29.8	26.3 (c,ad)
TARRANT COUNTY							
Fort Worth	7/22/82	Dallas	.065/.062	.20	.155	-22.5	66.2 (h)
Northwest	7/08/83	Dallas	.065/.062	.17	.150	-12.0	53.7 (h)
	7/24/82	Ft Worth	.065/.062	.14	.107	-23.5	29.2
	9/07/82	Ft Worth	.065/.062	.14	.137	- 2.4	28.7 (b)
	9/03/81	Dallas	.055/.054	.14	.149	+ 6.4	28.6 (b,h,i)
	8/07/82	Ft Worth	.065/.062	.14	.119	-15.0	25.3
	6/21/82	Dallas	.050/.052	.13	.114	-12.4	10.5 (h)
	4/30/81	Ft Worth	.054/.053	.13	.093	-28.1	7.7 (ac)
	9/12/81	Dallas	.065/.062	.13	.154	+18.1	4.8 (h,j)
Fort Worth	8/31/83	Ft Worth	.065/.062	.16	.095	-40.3	41.1 (m)
North	7/08/83	Dallas	.065/.062	.15	.137	- 8.7	39.3 (b,h)
Keller	8/01/83	Ft Worth	.065/.062	.14	.120	-14.0	31.7 (b)
	8/27/83	Ft Worth	.065/.062	.14	.102	-26.9	25.9
	5/25/83						
Fort Worth	5/26/81	Dallas	.043/.043	.13	.108	-17.2	7.9 (h)
North	9/12/81	Dallas	.063/.060	.13	.151	+16.2	6.7 (b,h,l)
Haslett							

Table 20.

SUMMARY OF EKMA MODELING RESULTS

Monitoring Site	Date	Origin for Air Parcel	Ozone Aloft Present/Future (ppm)	Measured Value (ppm)	Predicted Value (ppm)	Percent Differences	Reduction Requirement (Percent)
DALLAS COUNTY							
Dallas Mockingbird	6/17/82	Dallas	.057/.056	.16	.174	+ 8.6	61.4 (q)
	6/29/83	Ft Worth	.065/.062	.17	.103	-39.6	51.3 (c,m)
	8/27/83	Dallas	.065/.062	.16	.117	-27.1	42.4
	6/07/81	Dallas	.056/.055	.18	.132	-26.7	41.8 (b,r)
	7/13/82	Dallas	.065/.062	.17	.125	-26.6	41.1 (s)
	8/31/83	Dallas	.065/.062	.16	.122	-24.0	30.4 (t)
	8/11/81	Ft Worth	.065/.062	.14	.125	-10.7	30.0 (b,c)
	8/20/82	Ft Worth	.065/.062	.14	.172	+23.1	23.5 (c)
Dallas North	6/17/82	Dallas	.057/.056	.20	.256	+27.9	72.6 (u)
	7/22/82	Dallas	.065/.062	.17	.136	-19.8	59.4
	4/24/81	Dallas	.034/.034	.15	.123	-18.2	48.5 (v)
	7/13/82	Dallas	.065/.062	.17	.127	-25.2	43.9 (b,w)
	7/10/81	Ft Worth	.064/.061	.15	.152	+ 1.5	38.5 (b,c)
	7/28/82	Denton	.063/.060	.15	.117	-22.0	38.2
	8/30/83	Ft Worth	.030/.030	.14	.100	-28.5	19.6 (c,x)
	6/29/83	Ft Worth		.15			(y)
Dallas Illinois	8/27/83	Dallas	.065/.062	.16	.127	-20.5	43.6
	8/31/83	Dallas	.065/.062	.17	.119	-30.0	36.1 (z)
	8/01/83	Dallas	.065/.062	.14	.155	+10.5	32.1 (aa)
	6/18/82	Dallas	.065/.062	.15	.133	-11.6	28.5 (b)
	8/06/83	Dallas	.060/.058	.14	.163	+16.6	30.5
Dallas Bonnieview	7/23/82	Dallas	.065/.062	.15	.190	+26.6	42.0 (ab)
	8/31/83	Dallas	.065/.062	.15	.102	-31.8	37.7 (m)
	5/26/83	Dallas	.065/.062	.13	.135	+ 3.9	3.8 (b,f)
	8/27/83	Dallas		.13			(y)
Dallas Sunnyvale	8/27/81			.13			(g)

Table 20. - Continued

SUMMARY OF EKMA MODELING RESULTS

Monitoring Site	Date	Origin for Air Parcel	Ozone Aloft Present/Future (ppm)	Measured Value (ppm)	Predicted Value (ppm)	Percent Differences	Reduction Requirement (Percent)	
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)

Table 20. - Continued

SUMMARY OF EKMA MODELING RESULTS

(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 Dallas were used for modeling.
(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.
(q) Initial modeling yielded a concentration of 0.300 ppm, an overprediction of 87.6%. The initial concentration of NMHC was changed from 2.35 ppm to 0.6 ppm and the results are reported here.
(r) Initial conditions at Dallas Mockingbird were not available. With initial modeling with initial conditions at Dallas North, the model would not draw both isopleths. The day was remodeled with the initial conditions for NMHC over the range from 0.6 ppm to 1.6 ppm, but the model would not draw both isopeths. Initial conditions for NO_x were changed from 0.03 ppm to 0.04 ppm and the results are reported here.
(s) Initial modeling yielded a concentration of 0.111 ppm, an underprediction of 34.5%. The initial concentration of NMHC was changed from 0.96 ppm to 1.6 ppm and the results are reported here.
(t) Initial modeling yielded a concentration of 0.110 ppm, an underprediction of 31.3%. The initial concentration of NMHC was changed from 0.85 ppm to 1.4 ppm and the results are reported here.
(u) Initial modeling yielded a concentration of 0.290 ppm, an overprediction of 44.7%. The initial concentration of NMHC was changed from 2.35 ppm to 1.2 ppm and the results are reported here.

Table 20. - Continued

SUMMARY OF EKMA MODELING RESULTS

(v) Initial modeling yielded a concentration of 0.232 ppm, an overprediction of 54.8%. The initial concentration of NMHC was changed from 5.28 ppm to 1.2 ppm and the results are reported here.

(w) Initial modeling yielded a concentration of 0.116 ppm, an underprediction of 32.0%. The initial concentration of NMHC was changed from 0.96 ppm to 1.6 ppm and the results are reported here.

(x) Initial modeling yielded a concentration of 0.092 ppm, an underprediction of 34.5%. The initial concentration of NMHC was changed from 0.87 ppm to 1.2 ppm and the results are reported here.

(y) Day not modeled with agreement from EPA since the air did not pass over the city.

(z) Initial modeling yielded a concentration of 0.112 ppm, an underprediction of 34.4%. The initial concentration of NMHC was changed from 0.85 ppm to 1.4 ppm and the results are reported here.

(aa) Initial modeling yielded a concentration of 0.198 ppm, an overprediction of 41.4%. The initial concentration of NMHC was changed from 2.77 ppm to 1.6 ppm and the results are reported here.

(ab) Initial modeling yielded a concentration of 0.245 ppm, an overprediction of 63.4%. The initial concentration of NMHC was changed from 1.51 ppm to 0.6 ppm and the results are reported here.

(ac) Initial modeling yielded a concentration of 0.204 ppm, an overprediction of 45.3%. The initial concentration of NMHC was changed from 4.60 ppm to 1.6 ppm and the results are reported here.

(ad) Initial modeling yielded a concentration of 0.094 ppm, an underprediction of 32.6%. The initial concentration of NMHC was changed from 0.80 ppm to 1.0 ppm and the results are reported here.

(ae) Initial modeling yielded a concentration of 0.083 ppm, an underprediction of 36.4%. The initial concentration of NMHC was changed from 0.50 ppm to 1.0 ppm and the results are reported here.

Table 21.

SUMMARY OF VOC REDUCTION REQUIREMENTS

County	Monitoring Site	VOC Reduction Requirement (Percent)
Dallas	Dallas Mockingbird	41.8
	Dallas North	43.9 (a)
	Dallas Illinois	30.5
	Dallas Bonnieview	3.8
	Dallas Sunnyvale	none
	Denton	37.9
	Fort Worth Northwest	28.6
	Fort Worth North - Haslet	6.7
	Fort Worth North - Keller	39.3
Tarrant	Dallas Mockingbird	30.0
	Dallas North	38.5
	Denton	41.7 (a)
	Fort Worth Northwest	28.7
	Fort Worth North - Haslet	none
	Fort Worth North - Keller	31.7
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.

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.

The process to identify all major sources for inclusion in the emission inventory relied on a review of the 1973 and 1980 emission inventory listings and identification, by the TACB regional staff, of sources found through investigations to have a 100 ton per year VOC emission potential. All major sources known in 1983 are included in the inventory listing. Although resource constraints prohibited the targeting of all known minor sources for the 1983 data collection effort, a number of sources reported emissions less than 100 tons per year and these minor sources were included in the emissions data summaries. In addition, minor sources with emissions data listed in the TACB's point source data base were also included in the emissions data summaries. All major and minor sources included in the inventory are shown in Appendix AD.

Seasonally adjusted actual daily emission rates (kg/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. 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 and 1991 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. Emissions data for certain minor point sources

are listed in Appendix AD if an emissions inventory report was submitted by that source (they were inventoried as a potential major source) or if emissions estimates provided pursuant to a TACB new source permit review have been entered in the TACB's point source data base. However, since information was not available for all minor sources in the affected counties, the emission totals for each minor source category relied on EPA AP-42 and guideline document (EPA 450/2-77-028) emission factors for estimation of minor and area source totals.

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 4, was used by EPA staff to generate emission factors for various types of vehicles. This model contained evaporative emissions data based on the use of gasoline with a Reid Vapor Pressure (RVP) of 10.4 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. These findings are consistent with the ASTM specifications of 10.0 recommended for the Southeast part of the United States which includes the Dallas/Fort Worth area and 9.0 for the Southwest which includes El Paso. These specifications allow for variations based on temperature and locality in which the product is to be used.

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 4 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 (See Appendix AL), average vehicle speeds of 29.9 and 30.8 miles per hour were utilized for Dallas and Tarrant counties, respectively. Mobile source VMT data represents typical weekday traffic volume. No seasonal adjustments were necessary. The SDHPT determined that El Paso County average vehicle speed was 31.0 miles per hour.

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.

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

Table 22.

1983 TOTAL EMISSIONS SUMMARY
Kilograms/Day (Percent of Total by County)
Volatile Organic Compounds

County	Major Sources	Area & Minor Sources	Mobile Sources	Total County Emissions
Dallas	23,414 (8.7%)	64,160 (23.9%)	180,823 (67.4%)	268,397 (100%)
Tarrant	32,286 (18.7%)	40,560 (23.4%)	100,109 (57.9%)	172,955 (100%)
El Paso	5,418 (8.6%)	20,055 (31.9%)	37,391 (59.5%)	62,864 (100%)

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 (or 1991 for Dallas and Tarrant counties).

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 by December 31, 1987, (2) several additional types of controls not previously implemented in Texas are to be implemented by December 31, 1987, and (3) certain more stringent controls are to be implemented in Dallas and Tarrant counties by December 31, 1989. The TACB intends to incorporate appropriate test methods in accordance with the schedule included in Section B.6.a.7)e) Regulation Review.

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 and are to be implemented by December 31, 1987:

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.

The following controls have not previously been implemented in Texas or are more stringent than previously required and are to be implemented in Dallas and Tarrant counties by December 31, 1989.

i) The VOC content of architectural coatings sold or offered for sale shall not exceed specified limits for identified families of coatings including

latex paints, alkyd paints, epoxy paints, stains, urethane coatings, varnishes, and lacquers.

ii) The VOC content of coatings and solvent used in automobile refinishing operations shall not exceed specified limits for identified families of coatings including primers, acrylic enamels, alkyd enamels, base coats, clear coats, and lacquers; and specified equipment cleaning systems and procedures shall be utilized.

iii) Rotogravure and flexographic printing processes which emit more than 50 tons of VOC per year must use low-solvent inks or install and operate systems to capture and control VOC emissions.

iv) The use, application, sale, or offering for sale of cutback asphalt shall be prohibited during the period from April 16 to September 15 of each year. When emulsified asphalt is used as an alternative to cutback asphalt during that period, the VOC content shall not exceed specified limits for identified applications. In exception to other controls discussed in this subsection, compliance for this measure shall be by December 31, 1988.

v) The sale or offering for sale of a consumer-solvent product, specifically automobile windshield washer fluids containing VOC, shall be prohibited.

(c) Additional Control Technique Guidelines (CTGs)

The TACB commits to adopt all reasonable control techniques for each source category for which EPA issues CTGs within one year after issuance or to provide negative declarations to EPA. An examination of source information and regulatory

requirements confirms that all major sources covered by Set I-III CTGs are controlled by existing TACB regulations or are not located in Dallas and Tarrant counties. In addition, Reasonably Available Control Technology has been considered and, when applicable, adopted for all other minor or major non-CTG sources in Dallas and Tarrant counties.

(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 tto 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 4 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. In addition, EPA has proposed to require all 1991 and newer model year vehicles to be equipped with a system for controlling the VOC emissions from vehicle refueling. MOBILE 4 calculates the effects of the FMVCP emission standards on motor vehicle emissions for current and future years. However, no credit was taken for reductions which may result from the proposed 1991 implementation of new refueling emission controls.

(b) Federal Gasoline Volatility (Reid Vapor Pressure) Control Program

This program, to be administered by the federal government, will require that the volatility of all gasoline marketed for use in motor vehicles must not exceed a specified Reid Vapor Pressure (RVP) during the summer ozone season of May 16 - September 15. On July 14, 1987, EPA proposed a two-phased, nationwide control program for the reduction of gasoline volatility. In accordance with the proposed schedule, all gasoline sold in the Dallas/Fort Worth metropolitan area during the specified summer ozone seasons in 1989 - 1991 must have an RVP of 9.1 psia or less. Beginning in 1992, a more stringent RVP limit of 7.8 psia or less will be required during the summer ozone seasons. These lower gasoline RVP limits are primarily achieved by a reduction in the amount of butane blended into the gasoline prior to final marketing.

Significant reductions in average daily summertime VOC emissions from both mobile and stationary sources will result from the control of gasoline volatility. The MOBILE 4 computer model is used to calculate the VOC emission reductions from in-use motor vehicles which will result from the lower evaporative losses during normal operation and hot-soak conditions. Stationary source reductions will also occur from all gasoline marketing operations where fuel is stored, transferred, or dispensed. Average fuel use projections and existing state gasoline marketing control measures have been examined to estimate the stationary source reductions from the proposed federal RVP controls. Because there is some uncertainty as to if and when EPA will promulgate a nationwide RVP control program, emission reduction credits based on a gasoline volatility of 9.0 psia were calculated starting in the summer of 1990 and a state commitment to implement RVP controls, absent EPA action, is included in the contingency plan for Dallas and Tarrant counties.

(c) 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.

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

EPA's 1984 guidelines address the need for a vehicle inspection/maintenance (I/M) program largely in terms of attainment of the ozone and carbon monoxide standards by December 31, 1987. EPA 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 required in each of the counties affected by this revision because Dallas and Tarrant counties have ozone design values above 0.15 ppm, and El Paso County, although ozone levels do not invoke an I/M requirement, includes areas designated as nonattainment for CO.

The vehicle parameter (anti-tampering) I/M program, initially developed for Harris County, was implemented in Dallas, Tarrant, and El Paso counties on January 1, 1986. Texas Senate Bill 1205 (see Appendix X) authorizes the Texas Department of Public Safety (DPS), at the request of the TACB, to implement the parameter I/M program in any county of the state which does not meet the national standards. The parameter I/M program requires the visual inspection of specified air pollution control systems and devices on all 1968 and newer vehicles with particular emphasis on the detection and repair of 1980 and newer catalytic converter equipped vehicles which have been misfueled with leaded gasoline (see Appendices AM and AN, respectively, for DPS rules and enforcement commitments from local law enforcement agencies). In all applicable counties in Texas, the parameter I/M program qualifies as Reasonably Available Control Techinology for hydrocarbons based on EPA guidelines for determining the minimum emission reduction credit which may be achieved. In El Paso a vehicle idle I/M program was also required to achieve necessary CO emission

reduction credits. A detailed description of this program is included in Appendix AK.

The parameter I/ program is also scheduled for start-up in Collin, Denton, Ellis, Johnson, Kaufman, Parker, and Rockwall counties by January 1, 1990. This includes all counties in the Dallas/Fort Worth Consolidated Metropolitan Statistical Area (CMSA). The emission-related inspection of vehicles in these counties is necessary to reduce the contribution of VOC emissions resulting from the operation in Dallas and Tarrant counties of vehicles registered in surrounding counties. If additional statutory authority is determined to be necessary to implement the I/M program in counties not determined to be in violation of the ozone standard, appropriate revisions would be considered during the next regular session of the Texas Legislature in 1989. Future EPA action concerning the designation of ozone nonattainment areas by CMSA boundaries may affect the need for such statutory changes prior to extending the I/M program to other counties. The reductions associated with extending the parameter I/M program to adjacent counties have been included in the demonstrations of attainment for Dallas and Tarrant counties. The expanded geographic coverage of the parameter I/M program also addresses EPA concerns regarding the regional nature of the ozone problem in the Dallas/Fort Worth metropolitan area by recognizing the emission reductions available if vehicles from neighboring counties that travel in Dallas and Tarrant counties are subject to an I/M program. A schedule for implementing this program is included in Appendix AG.

(e) Vehicle Idle Inspection and Maintenance Program (I/M)

A vehicle idle (tail pipe) I/M program, initially developed for the control of CO in El Paso County, has been revised to

address VOC emissions (See Appendix AK) and has been scheduled for start-up in Dallas and Tarrant counties by January 1, 1990. The associated Specifications for Vehicle Exhaust Gas Analyzer Systems is also being revised for VOC purposes. A schedule for the implementation of this program is included in Appendix AG.

Senate Bill 725 (Appendix AJ), passed on May 27, 1985, authorizes the DPS, at the request of the TACB, to implement any motor vehicle inspection program, including an idle I/M program, required by federal law. The idle I/M program requires the testing of exhaust emissions, while the vehicle is operated in the idle mode, to detect excessive VOC and CO emissions resulting from poor maintenance or major equipment malfunctions. The emission reduction credits associated with the implementation of the idle I/M program in Dallas and Tarrant counties are required in order to provide for a demonstration of attainment of the ozone standard

Texas House Bill 1593 (Appendix AJ), which became 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 are not required to undergo emission-related testing at the inspection prior to initial sale, but will be inspected at the first inspection after two years and annually thereafter. MOBILE 4 cannot be used directly to assess the effect on emission 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 emission 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 in either the parameter or the idle I/M program.

(f) 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.

(g) 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 the continuous update and annual reporting to EPA 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.

Enforcement of new controls will be structured to effectively utilize existing and anticipated resources in the TACB central and regional offices. Through a combination of future recordkeeping and reporting requirements and random inspection of and testing at commercial retail outlets and distributors in Dallas and Tarrant counties, TACB and local enforcement staff will compile sufficient information annually to assess the overall effectiveness of the architectural coating and consumer products rules. Similarly, recordkeeping and random testing of affected auto refinishing facilities will be carried out. Usage records will be screened to assess the effectiveness of the cutback asphalt restrictions. Annual inspections will be expanded as resources allow to assess compliance at the smaller affected graphic arts facilities. The enforcement information will be compiled and reviewed annually as part of the review of overall control strategy effectiveness and adjustments made to the emissions inventory as necessary and reported annually to EPA in the required Reasonable Further Progress Report. In the absence of specific information and experience concerning effectiveness to be expected for these controls, 100% effectiveness was assumed for all stationary source controls except for the architectural coating and windshield washer fluid controls for which 90% effectiveness was assumed due to the number of sales outlets that will be affected by the requirement and the recognition that 100% effectiveness is unlikely with available resources. If actual experience indicates that rule effectiveness is lower than anticipated, to the point that the demonstration of attainment is undermined, the TACB will identify, for consideration by the Legislature, the resources necessary for effective enforcement or take action pursuant to the Contingency Plan to ensure maintenance of the attainment demonstration.

Factors for determining Dallas and Tarrant county highway vehicle emissions will be monitored by NCTCOG and reported annually to the TACB and in turn to EPA. 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.

The emission inventory updates, vehicle miles of travel updates, and reports from the local metropolitan planning agencies on the progress of TCMs will be submitted annually to EPA as required by guidance for the preparation of Reasonable Further Progress reports.

e) Regulation Review

The TACB will continue to work with EPA to identify areas where applicable regulations may be strengthened (review of existing exemption levels, record keeping/reporting requirements, inclusion of test methods, etc.) to insure maximum effectiveness in reducing VOC emission levels. As part of this commitment, the TACB intends to proceed on the following schedule:

December 31, 1987	Submit draft Texas Air Control Board (TACB) Regulation V revisions incorporating appropriate test methods to the Environmental Protection Agency (EPA).

January 15, 1988	Meet with EPA staff to discuss draft test methods.
January 22, 1988	Submit draft Regulation V revisions to EPA regarding compliance checking, enforceability, and exemption level issues for surface coating, graphic arts, consumer-solvent products, water separation, and turnaround/ vacuum-producing systems. EPA will submit to TACB comments outstanding regarding the new regulations adopted December, 1987.
January 29, 1988	Meet with EPA to discuss January 22 submittal including EPA's submittal to TACB on January 22, 1988.
February 16, 1988	Submit draft Regulation V revisions to EPA regarding compliance checking, enforceability, and exemption level issues for gasoline marketing, general vent gas streams, degreasing, and dry cleaning.
February 23, 1988	Meet with EPA to discuss February 16 submittal.
March 1, 1988	Submit final draft TACB Regulation V incorporating all required changes to EPA.
March 15, 1988	Meet with EPA staff to discuss any remaining issues concerning comprehensive Regulation V revisions.

April 1, 1988	Mailout of proposed revisions to Regulation V to TACB Regulation Development Committee and EPA.
April 22, 1988	Regulation Development Committee meeting to request approval to conduct public hearings to consider the proposed revisions to Regulation V.
June 1, 1988	Conduct public hearings.
July 15, 1988	Meet with EPA staff to discuss the progress of the evaluation of testimony and development of final recommendations.
August 26, 1988	Adopt final revisions to Regulation V.
September 1, 1988	Forward revisions to Regulation V to Governor for submittal to EPA as State Implementation Plan revisions for Dallas and Tarrant counties.

b. Dallas County Ozone Control Strategy

1) General

VOC 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 North monitoring site was utilized in determining the modeled VOC reduction requirement of 43.9% in Dallas County. As a consequence, the 1983 emission inventory of 268,397 kilograms per day must be reduced to 150,571 kilograms per day. This results in a reduction requirement of 117,826 kilograms per day, plus 14,479 kilograms per day to account for projected minor, area, and non-highway mobile source growth by 1991. The following subsections discuss the VOC reduction estimates associated with each control.

2) Estimated Emission Reductions

a) Emission Reductions and Growth Unaffected by This Plan

VOC emission projections through 1991 take into consideration changes expected to result from growth and from federally enforceable control measures.

Population estimates used to project emissions through 1991 were obtained from NCTCOG and reflect a growth in population in Dallas County from 1,644,000 in 1983 to 1,902,000 in 1991.

This population increase results in an estimated 17% increase in emissions from area sources not subject to control requirements during the period 1983 to 1991.

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 increase the annual emission rate by 310 kilograms per day each year (2480 total kilograms per day by 1991). This estimate is based on review of TACB records which indicate an average increase in the annual emission rate of 350 kilograms per day each year from 1983 to 1986 and an average decrease of 40 kilograms per day due to shutdowns. The TACB expects 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 48% by the end of 1991 because of the FMVCP and the federal gasoline volatility control program.

The effects of the FMVCP on vehicle emissions are calculated by using MOBILE 4. For mobile sources other than vehicles,

increases in emissions of approximately 49% were predicted by the TACB area source model.

The TACB will institute a tracking system to document anticipated changes in emissions resulting from future activities funded by the federal government. The TACB will compare these emissions changes to the expected overall growth, and if the activities significantly exceed the expected growth, additional analysis will be undertaken to determine if the total VOC emissions in Dallas County will exceed levels needed to maintain a demonstration of attainment. Additional control measures will be considered for adoption if needed to offset growth and provide for maintenance of the standard. The tracking system will include an evaluation of any proposed ozone precursor changes associated with Environmental Assessments and Environmental Impact Statements.

Predicted emissions changes from 1983 to 1991 are itemized in Appendix AD (permitted minor source growth excluded) and summarized in Table 25.

b) Stationary Source Controls Included With This Plan

Reasonably Available Control Measures 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. Appendix AD contains a cross-reference list identifying TACB rules which address specific EPA CTG requirements.

(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 verified reductions of at least 3,363 kilograms per day occurring after 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 reduction estimated to result from these controls is 9,067 kilograms per day. Individual source category reductions are shown in Table 23.

(3) New Control Measures to be Implemented by December 31, 1987

The TACB is 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 455 kilograms per day, while reducing the size of gasoline terminals impacted by improved vapor recovery requirements to 100,000 gallons per day produces 193 kilograms per

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 (kilograms per day)
Graphic Arts	.201, .202, & .203	3,363
Subtotal (Compliance Extensions)		3,363
Large Gasoline Terminals	.111(2)	100
Gasoline Tank Trucks	.261, .262, .263, & .264	1,441
Degreasing	.172, .173, .174, .175, & .176	4,324
Dry Cleaning	.221, .222, & .223	2,009
Coating Operations	.191, .192, .193, & .194	1,193
Subtotal (Harris County-Type Controls)		9,067
Medium Gasoline Terminals	.111(2)	193
Cutback Asphalt	.171 & .176(a)	455
Airplane Prime Coating	.191, .192, .193, & .194	26
Process Vents	.163 .164	4,842
Subtotal (New Controls 1987)		5,516
Architectural Coating	.191, .192, .193, & .194	4,893
Auto Refinishing	.191, .192, .193, & .194	1,437
Graphic Arts	.201, .202, & .203	709
Cutback Asphalt	.171 & .176	3,181
Consumer-Solvent Products	.291, .292, & .294	1,276
Subtotal (New Controls 1989)		11,496
TOTAL		29,442

day of reduction. Requiring airplane manufacturers to utilize low VOC solvent prime coatings will provide additional reductions of 26 kilograms per day. Finally, requirements to flare or incinerate certain process vent gas streams will result in reductions of 4,842 kilograms per day. These controls are itemized in Table 23.

(4) New Control Measures to be Implemented by December 31, 1989

Several additional new or more stringent controls are to be implemented by December 31, 1989. These include restrictions on the VOC content of architectural coatings and auto refinishing coatings. These restrictions will result in reductions of 4,893 kilograms per day and 1,437 kilograms per day, respectively. Regulation of smaller graphic arts (printing) operations will provide reductions of 709 kilograms per day, while a ban on a specified consumer-solvent product may provide an additional reduction of 1,276 kilograms per day. A seasonal ban on the application and sale of cutback asphalt will produce reductions of 3,181 kilograms per day. Each of these controls are listed in Table 23.

Recent information provided to the TACB indicates that emissions resulting from architectural coatings actually in use in Tarrant County in the early 1980's may be lower than the levels estimated for 1983 using EPA approved emission factors and methodology. Absent additional information or guidance from EPA concerning use of other emission factors, architectural coating rules are being adopted to insure enforceability of the lower limits. If further research and guidance from EPA indicates that the inventory and/or emission credits should be adjusted, the TACB will do so and assess the impact of such changes with regard to projected annual increments of emissions reduction.

c) Federal Motor Vehicle Control Program

Based on information provided by the NCTCOG and calculations from MOBILE 4, reductions from the FMVCP are estimated to be 55,130 kilograms per day by 1991.

d) Federal Gasoline Volatility (Reid Vapor Pressure) Control Program

Based on information provided by the NCTCOG and calculations from MOBILE 4, highway vehicle emission reductions from proposed RVP controls are estimated to be 22,095 kilograms per day by 1991. Related stationary source reductions from gasoline marketing operations and vehicle refueling are estimated to be 1,364 kilograms per day by 1991.

e) Transportation Control Measures

An analysis of candidate TCMs for possible use in the Post-1982 SIP revisions 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 could not be implemented by the attainment date (see Appendix AL). The remaining TCMs were categorized into two types:

(1) Intersection Signal Improvements, including traffic signal timing, traffic signal progression, and low-cost intersection improvements.

(2) Travel Demand Management Programs for employers with over 100 employees, including carpool/vanpool programs, parking incentive programs, variable work hour programs, and transit fare subsidy programs.

The emission reductions from recommended TCMs by 1991 have been determined by NCTCOG and are presented in Table 24.

Table 24.

DALLAS COUNTY TRANSPORTATION CONTROL MEASURES

TCM Category	Reductions kilograms/day
Intersection Signal Improvements	2,485
Travel Demand Management Program	696
TOTAL	3,181

NCTCOG has obtained formal commitments from local officials and/or authorities to implement these TCMs prior to December 31, 1991. Appendix AG contains documentation of these commitments including proposed funding sources.

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

f) Vehicle Parameter Inspection/Maintenance Program

The parameter I/M program implemented in Dallas County is the same in all major components to the one initiated in Harris County. Inspectors are conducting a general anti-tampering check of all 1968 and newer model year light-duty vehicles and trucks and an enhanced inspection for 1980 and newer model year vehicles to verify proper operation of the catalytic converter. The parameter inspection program will also be implemented in Collin, Denton, Ellis, Johnson, Kaufman, Parker, and Rockwall counties to reduce the emissions from vehicles travelling from these counties into Dallas County.

MOBILE 4 was utilized by EPA staff to calculate the emission reductions which can be achieved from the vehicle parameter I/M program in Dallas County. The parameter I/M program was initiated on January 1, 1986 in Dallas County and is estimated to result in a reduction of 16,167 kilograms per day by 1991. Since the parameter I/M program is scheduled to begin in perimeter counties (counties other than Dallas and Tarrant) by January 1, 1990, this reduction estimate has not been discounted to account for the impact of commuter travel on Dallas County.

g) Vehicle Idle Inspection/Maintenance Program

A detailed description of the vehicle idle I/M program which will be implemented in Dallas County is included in Appendix AK. Inspectors will test exhaust emissions of all 1975 and newer light-duty vehicles and trucks with automated exhaust gas analyzers to detect excessive emissions of HC and CO resulting from poor vehicle maintenance or major equipment malfunction.

MOBILE 4 was utilized by EPA staff to calculate the emission reductions which can be achieved from the vehicle idle I/M program in Dallas County. Assuming a start-up date of January 1, 1990, the program is estimated to result in a reduction of 6,013 kilograms of VOC per day by 1991. This estimate reflects a discount of 7.01 percent or 453 kilograms per day 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 idle 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.

Table 25.

VOC EMISSION CHANGES FOR DALLAS COUNTY BETWEEN 1983 AND 1991

	VOC Reduction		VOC Increase		Net Emissions Change	
	kg/day	%*	kg/day	%*	kg/day	%*
Regulation V Controls as Applied in Harris County	9,067	3.4				
Regulation V Compliance Extensions	3,363	1.3				
Regulation V (1987 Compliance)						
Gasoline Terminals	193	0.1				
Cutback Asphalt (7%)	455	0.2				
Airplane Prime Coating	26	0.0				
Process Vents	4,842	1.8				
Regulation V (1990 Compliance)						
Architectural Coating	4,893	1.8				
Auto Refinishing	1,437	0.5				
Graphic Arts	709	0.3				
Cutback Asphalt (0%)	3,181	1.2				
Consumer-Solvent Products	1,276	0.5				
Gasoline Station RVP	1,364	0.5				
Area and Minor Source Growth			5,877	2.2		
Permits			2,480	0.9		
SUBTOTAL (STATIONARY)	30,806	11.5	8,357	3.1	22,449	8.4
Federal Motor Vehicle Control Plan (& Highway Growth)	55,130	20.5				
Highway Vehicle RVP	22,095	8.2				
Parameter I/M (Dallas)	15,407	5.7				
Parameter I/M (Collin & Denton)		0.3				
Parameter I/M (other CMSA Counties)	42	0.0				
Idle I/M	6,013	2.2				
Transportation Control Measures	3,181	1.2				
Non-Highway Mobile Growth			6,122	2.3		
SUBTOTAL (MOBILE)	102,586	38.2	6,122	2.3	96,464	35.9
TOTAL	133,392	49.7	14,479	5.4	118,913	44.3

*Percent of 1983 Emissions Inventory (268,397 kilograms per day)

3) Demonstration of Attainment

According to EKMA modeling results, the 1983 VOC emissions inventory for Dallas County must be reduced by 43.9% in order to demonstrate attainment of the ozone standard by December 31, 1991. The total 1983 VOC emission rate of 268,397 kilograms per day must, therefore, be reduced to 150,571 kilograms per day. This results in a reduction estimate of 132,305 kilograms per day (including 14,479 kilograms per day 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 reduction of 133,392 kilograms per day is 1,087 kilograms per day more than required to demonstrate attainment of the standard, after allowing for projected growth.

4) Projection of Reasonable Further Progress (RFP)

Table 26 lists the annual estimated VOC emissions for mobile, minor and area, and stationary sources in Dallas County for the period 1983-1991.

Table 26.

DALLAS COUNTY VOC EMISSION ESTIMATES
(kilograms/day)

ate	obile Sources	Major Sources	Minor Sources	Area Sources	Total	Linear Decrease
1983	180,823	23,413	5,938	58,223	268,397	268,397
1984	164,791	23,413	6,248	58,901	253,353	253,669
1985	159,368	23,413	6,558	59,470	248,809	238,941
1986	148,759	20,050	6,868	60,546	236,223	224,212
1987	138,464	13,769	5,289	55,289	211,881	209,484
1988	131,583	13,769	5,599	54,365	205,316	194,756
1989	119,720	13,769	5,909	53,259	192,657	180,028
1990	91,545	13,769	6,219	43,734	155,267	165,299
1991	84,937	13,769	6,529	44,249	149,484	150,571

The total estimated VOC emissions and amount of VOC emissions that would represent a linear VOC emission reduction from 1983 to 1991 are also listed. The mobile emissions estimates include linear reductions resulting from the implementation of TCMs beginning in 1984. Specific details for annual TCM reductions are not calculated because of the large number of small projects which must be scheduled and completed. However, a commitment has been made by NCTCOG to accomplish sufficient TCMs each year to achieve a linear reduction in that Mobile Source category. FMVCP and I/M reductions were calculated using MOBILE 4. 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 26. Area source growth and reductions were calculated as described in paragraph VI.B.6.b.2)a). Annual emissions will be reported for each year until attainment is achieved.

5) Contingency Plan

The TACB is committed to implementing additional control measures to maintain the RFP curve corresponding to the demonstrated attainment date of December 31, 1991. If the VOC control measures committed to in this SIP revision are insufficient to effect RFP between 1983 and 1991, the TACB will adopt additional control measures in order to demonstrate attainment. This includes a commitment by the TACB to adopt a gasoline volatility control program by May 16, 1989 for implementation in May 1990 if EPA fails to take final action on the proposed national program.

c. Tarrant County Ozone Control Strategy

1) General

VOC 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 0.15 ppm design value recorded at the Denton County monitoring site was utilized in determining the modeled VOC reduction requirement of 41.7% in Tarrant County. As a consequence, the 1983 emission inventory of 172,955 kilograms per day must be reduced to 100,833 kilograms per day. This results in a reduction requirement of 72,122 kilograms, plus 12,523 kilograms per day to account for projected minor, area, and non-highway mobile source growth by 1991. 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 1992 take into consideration changes expected to result from growth and from federally enforceable control measures.

Population estimates used to project emissions through 1992 were obtained from NCTCOG and reflect a growth in population in Tarrant County from 943,950 in 1983 to 1,229,300 in 1991. This population increase results in an estimated 23% increase in emissions from area sources not subject to control requirements during the period 1983 to 1991.

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 increase the annual emission rate by 310 kilograms per day each year (2,480 total kilograms per day by 1991). This estimate is based on review of TACB records which indicate an average increase in the annual emission rate of 350 kilograms per day each year from 1983 to 1986 and an average decrease of 40 kilograms per day due to shutdowns. The TACB expects 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 44% by the end of 1991 because of the FMVCP and federal gasoline volatility control program.

The effects of the FMVCP on vehicle emissions are calculated by using MOBILE 4. For mobile sources other than vehicles, increases in emissions of approximately 34% were predicted by the TACB area source model.

The TACB will institute a tracking system to document anticipated changes in emissions resulting from future activities by the federal government. The TACB will compare these emissions changes to the expected overall growth, and if the activities significantly exceed the expected growth, additional analysis will be undertaken to determine if the total VOC emissions in Tarrant County will exceed levels needed to maintain a demonstration of attainment. Additional control measures will be considered for adoption if needed to offset growth and provide for maintenance of the standard. The tracking system will include an evaluation of any proposed ozone precursor impacts associated with Environmental Assessments and Environmental Impact Statements.

Predicted emissions changes from 1983 to 1991 are itemized in Appendix AD (permitted minor source growth excluded) and summarized in Table 28.

b) Stationary Source Controls Included With This Plan

Reasonably Available Control Measures 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. Appendix AD contains a cross-reference list identifying TACB rules which address specific EPA CTG requirements.

(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 verified reductions of at least 1,311 and 364 kilograms per day, respectively, occurring after December 31, 1985.

The automotive coating industry is also scheduled for reductions of 11,005 kilograms per day by December 31, 1987. Thus, the total estimated reductions from existing controls is 12,680 kilograms per day.

(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 8,245 kilograms per day. Individual source category reductions are shown in Table 28.

(3) New Control Measures to be Implemented by December 31, 1987

The TACB is 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 266 kilograms per day, while reducing the size of gasoline terminals impacted by improved vapor recovery requirements to 100,000 gallons per day produces 357 kilograms

Table 28.

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

Source/Category	Regulation V Existing or Proposed Rule Number	Reduction (kilograms per day)
Can Coating	.191, .193, & .194	364
Graphic Arts	.201, .202, & .203	1,311
Automotive Coating	.191, .193, & .194	11,005
Subtotal (Compliance Extensions)		12,680
Large Gasoline Terminals	.111(2)	237
Gasoline Tank Trucks	.261, .262, .263, & .264	2,927
Degreasing	.172, .173, .174, .175, & .176	2,679
Dry Cleaning	.221, .222, .223	1,299
Coating Operations	.191, .192, .193, & .194	1,103
Subtotal (Harris County-Type Controls)		8,245
Medium Gasoline Terminals	.111(2)	357
Cutback Asphalt	.171 & .176(a)	266
Airplane Prime Coating	.191, .192, .193, & .194	91
Process Vents	.163 & .164	2,477
Subtotal (New Controls 1987)		3,191
Architectural Coating	.191, .192, .193, & .194	3,162
Auto Refinishing	.191, .192, .193, & .194	929
Graphic Arts	.201, .202, & .203	458
Cutback Asphalt	.171 & .176	1,842
Consumer-Solvent Products	.291, .292, & .294	825
Subtotal (New Controls 1990)		7,216
TOTAL		31,332

per day of reduction. Requiring airplane manufacturers to utilize low VOC solvent prime coatings will provide additional reductions of 91 kilograms per day. Finally, requirements to flare or incinerate certain process vent gas streams will result in reductions of 2,477 kilograms per day. These controls are itemized in Table 28.

(4) New Control Measures to be Implemented by December 31, 1989

Several additional new or more stringent controls are to be implemented by December 31, 1989. These include restrictions on the VOC content of architectural coatings and auto refinishing coatings. These restrictions will result in reductions of 3,162 and 929 kilograms per day, respectively. Regulation of smaller graphic arts (printing) operations will provide reductions of 458 kilograms per day, while a ban on a specified consumer-solvent product may provide an additional reduction of 825 kilograms per day. A seasonal ban on the application and sale of cutback asphalt will produce reductions of 1,842 kilograms per day. Each of these controls are listed in Table 28.

Recent information provided to the TACB indicates that emissions resulting from architectural coatings actually in use in Tarrant County in the early 1980's may be lower than the levels estimated for 1983 using EPA approved emission factors and methodology. Absent additional information or guidance from EPA concerning use of other emission factors, architectural coating rules are being adopted to insure enforceability of the lower limits. If further research and guidance from EPA indicates that the inventory and/or emission credits should be adjusted, the TACB will do so and assess the impact of such changes with regard to projected annual increments of emissions reduction.

c) Federal Motor Vehicle Control Program

Based on information provided by the NCTCOG and calculations from MOBILE 4, reductions from the FMVCP are estimated to be 29,518 kilograms per day by 1991.

d) Federal Gasoline Volatility (Reid Vapor Pressure) Control Program

Based on information provided by the NCTCOG and calculations from MOBILE 4, highway vehicle emission reductions from proposed RVP controls are estimated to be 9,805 kilograms per day by 1991. Related stationary source reductions from gasoline marketing operations and vehicle refueling are estimated to be 1,104 kilograms per day based on a gasoline volatility level of 9.0 psia by 1991.

e) Transportation Control Measures

An analysis of candidate TCMs for possible use in the Post-1982 SIP revisions 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 could not be implemented by the attainment date (See Appendix AL). The remaining TCMs were categorized into two types:

(1) Intersection Signal Improvements, including traffic signal timing, traffic signal progression, and low-cost intersection improvements.

(2) Travel Demand Management Programs for employers with over 100 employees, including carpool/vanpool

programs, parking incentive programs, variable work hour programs, and transit fare subsidy programs.

The emission reductions from recommended TCMs by 1991 have been determined by NCTCOG and are presented in Table 29.

Table 29.
TARRANT COUNTY TRANSPORTATION CONTROL MEASURES

TCM Category	Reductions kilograms/day
Intersection Signal Improvements	1,367
Travel Demand Management Program	224
TOTAL	1,591

NCTCOG has obtained formal commitments from local officials and/or authorities to implement these TCMs prior to December 31, 1991. Appendix AG contains documentation of these commitments including proposed funding sources.

In addition, the annual element of the Transportation Improvement Program for Tarrant County will be examined for conformity with these SIP revisions and the results reported to EPA.

f) Vehicle Parameter Inspection/Maintenance Program

The parameter I/M program implemented in Tarrant County is the same in all major components to the one initiated in Harris County. Inspectors are conducting a general anti-tampering check of all 1968 and newer model year light-duty vehicles and trucks and an enhanced inspection for 1980 and newer model year vehicles to verify proper operation of the catalytic converter. The parameter inspection program will also be implemented in

Collin, Denton, Ellis, Johnson, Kaufman, Parker, and Rockwall counties to reduce the emissions from vehicles travelling from these counties into Tarrant County.

MOBILE 4 was utilized by EPA staff to calculate the emission reductions which can be achieved from the vehicle parameter I/M program in Tarrant County. The parameter I/M program was initiated on January 1, 1986 in Tarrant County and is estimated to result in a reduction of 9,498 kilograms per day by 1991. Since the parameter I/M program is scheduled to begin in perimeter counties (counties other than Dallas and Tarrant) by January 1, 1990 this reduction estimate has not been discounted to account for the impact of commuter travel on Dallas County.

g) Vehicle Idle Inspection/Maintenance Program

A detailed description of the vehicle idle I/M program which will be implemented in Tarrant County is included in Appendix AK. Inspectors will test exhaust emissions of all 1975 and newer light-duty vehicles and trucks with automated exhaust gas analyzers to detect excessive emissions of HC and CO resulting from poor vehicle maintenance or major equipment malfunction.

MOBILE 4 was utilized by EPA staff to calculate the emission reductions which can be achieved from the vehicle idle I/M program in Tarrant County. Assuming a start-up date of January 1, 1990, the program is estimated to result in a reduction of 4,682 kilograms of VOC per day by 1991. This estimate reflects a discount of 4.49 percent or 220 kilograms per day 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 idle 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.

Table 30.

VOC EMISSION CHANGES FOR TARRANT COUNTY BETWEEN 1983 AND 1992

	VOC Reduction		VOC Increase		Net Emissions Change	
	kg/day	%*	kg/day	%*	kg/day	%*
Regulation V Controls as Applied in Harris County	8,245	4.8				
Regulation V Compliance Extensions	12,680	7.3				
Regulation V (1987 Compliance)						
Gasoline Terminals	357	0.2				
Cutback Asphalt (7%)	266	0.2				
Airplane Prime Coating	91	0.1				
Process Vents	2,477	1.4				
Regulation V (1990 Compliance)						
Architectural Coating	3,162	1.8				
Auto Refinishing	929	0.5				
Graphic Arts	458	0.3				
Cutback Asphalt (0%)	1,842	1.1				
Consumer-Solvent Products	825	0.5				
Gasoline Station RVP	1,104	0.6				
Area and Minor Source Growth			6,717	3.9		
Permits			2,480	1.4		
SUBTOTAL (STATIONARY)	32,436	18.8	9,197	5.3	23,239	13.4
Federal Motor Vehicle Control Plan (& Highway Growth)	29,518	17.1				
Highway Vehicle RVP	9,805	5.7				
Parameter I/M (Tarrant)	9,071	5.3				
Parameter I/M (Collin & Denton)	40	0.0				
Parameter I/M (other CMSA Counties)	387	0.2				
Idle I/M	4,682	2.7				
Transportation Control Measures	1,591	0.9				
Non-Highway Mobile Growth			3,326	1.9		
SUBTOTAL (MOBILE)	55,094	31.9	3,326	1.9	51,768	29.9
TOTAL	87,530	50.6	12,523	7.2	75,007	43.4

*Percent of 1983 Emissions Inventory (172,955 kilograms per day)

3) Demonstration of Attainment

According to EKMA modeling results, the 1983 VOC emissions inventory for Tarrant County must be reduced by 41.7% in order to demonstrate attainment of the ozone standard by December 31, 1991. The total 1983 VOC emission rate of 172,955 kilograms per day must, therefore, be reduced to 100,833 kilograms per day. This results in a reduction estimate of 84,645 kilograms per day (including 12,523 kilograms per day 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 reduction of 87,530 kilograms per day is 2,885 kilograms per day more than required to demonstrate attainment of the standard, after allowing for projected growth.

4) Projection of Reasonable Further Progress (RFP)

Table 31 lists the annual estimated VOC emissions for mobile and stationary sources in Tarrant County for the period 1983-1991.

Table 31.

TARRANT COUNTY VOC EMISSION ESTIMATES
(kilograms/day)

Date	Mobile Sources	Major Sources	Minor Sources	Area Sources	Total	Linear Decrease
1983	100,109	32,286	7,089	33,471	172,955	172,955
1984	92,581	32,286	7,399	34,091	166,357	163,940
1985	89,429	32,286	7,709	35,100	164,524	154,925
1986	82,716	19,605	8,019	35,893	146,233	145,909
1987	73,658	14,771	5,843	33,086	127,358	136,894
1988	71,512	14,771	6,153	33,887	126,323	127,879
1989	67,359	14,771	6,463	32,771	121,364	118,864
1990	51,131	14,771	6,773	27,502	100,177	109,848
1991	48,342	14,771	7,083	27,752	97,948	100,833

The total estimated VOC emissions and amount of VOC emissions that would represent a linear VOC emission reduction from 1983 to 1991 are also listed. The mobile emissions estimates include linear reductions resulting from the implementation of TCMs beginning in 1985. Specific details for annual TCM reductions are not calculated because of the large number of small projects which must be scheduled and completed. However, a commitment has been made by NCTCOG to accomplish sufficient TCMs each year to achieve a linear reduction in that Mobile Source category. FMVCP and I/M reductions were calculated using MOBILE 4. 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 rule 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 31. Area source growth and reductions were calculated as described in paragraph VI.B.6.b.2)a). Annual emissions will be reported for each year until attainment is achieved.

5) Contingency Plan

The TACB is committed to implementing additional control measures to maintain the RFP curve corresponding to the demonstrated attainment date of December 31, 1991. If the VOC control measures committed to in this SIP revision are insufficient to effect RFP between 1983 and 1991, the TACB will adopt additional control measures in order to demonstrate attainment. This includes a commitment by the TACB to adopt a gasoline volatility control program by May 16, 1989 for implementation in May 1990 if EPA fails to take final action on the proposed national program.