TEXAS AIR CONTROL BOARD

REVISIONS

TEXAS STATE IMPLEMENTATION PLAN

CONTROL STRATEGIES

-- OZONE

-- PARTICULATE

-- CARBON MONOXIDE

March 30, 1979

REPRINTED DECEMBER 21, 1979
(Includes Revisions of July 18, 1979 and November 16, 1979)

PREFACE TO REPRINT

OF DECEMBER 21, 1979

This reprint to the Control Strategy section of the Texas State Implementation Plan includes certain changes resulting from discussions with representatives of the EPA Region VI office relative to the approvability of the SIP revision adopted March 30, 1979. These changes were included in two subsequent revisions submitted to EPA Region VI in July and November 1979.

For ease of reference, those parts in the Plan which have been revised have been identified by marginal lines. The dates at the bottom of each revised page have also been changed to reflect the date (either 7/18/79 or 11/16/79) of the revision.

The revision of July 18, 1979 affects Subsection B, pages 13, 36, 37, 41, 42, and Appendix G, and Appendix I. This revision:

1. Added Metropolitan Transit Authority Board Order 78-8 as an appendix and added reference in text.
2. Revised certain parts of the ozone control strategy to include public transportation.
3. Updated the reference to H.B. 726 to reflect passage of bill and included final bill in Appendix I.
4. Changed wording concerning adoption of additional controls in Harris County to eliminate inconsistency.

The revision of November 16, 1979 affects Subsection C, pages VI-49 through VI-61, Appendix pages L-1 through L-9, O-1 and O-2. This revision:

1. Corrected a mathematical error in computation of emissions from unpaved parking lots.
2. Clarified effectiveness of controls specified in TACB Regulation I by stating that the specified 85% value applies when maximum controls are necessary to attain the standard.
3. Established the technical basis for the use of 50 $\mu g/m^3$ background in El Paso.
4. Changed certain TSP design values to those specified by EPA Region VI.

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A. INTRODUCTION

Requirements for State Implementation Plans 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, do not exceed the national standards set for these pollutants anywhere in Texas. Therefore, no control strategies for these pollutants are included in this plan. Control strategies are included in this section for those pollutants which do exceed the National Ambient Air Quality Standard (NAAQS) based on data collected from 1975 to 1977 -- ozone, total suspended particulate, and carbon monoxide.

For each of these pollutants, the nonattainment areas in the state are defined and strategies presented. Using EPA guidelines, the strategies are shown to result in attainment of the primary NAAQS by the December 31, 1982 statutory deadline established in the Federal Clean Air Act Amendments (FCAAA) of 1977, except for ozone in the Harris County nonattainment area. For that area, an extension to December 31, 1987 is requested, as provided for in the FCAAA.

Supplemental material, including emission inventories for volatile organic compounds and total suspended particulates is located in the Appendix.

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1. POLICY AND PURPOSE

a. Primary Purpose of Plan

The primary purpose of this plan is to accomplish Volatile Organic Compound (VOC) emission reductions as required by the 1977 Federal Clean Air Act (FCAA) and the Environmental Protection Agency (EPA) in order to avoid the severe sanctions and penalties prescribed by Sections 110(a)(2)(I), 176, and 316 of the FCAA.

Where possible, the plan will show accomplishments of required emission reductions by the federal statutory deadline of December 31, 1982 through use of a program of reasonable controls. If the required reductions are not achievable with the use of reasonable controls, the plan will demonstrate that requirements for obtaining an extension of the deadline to December 31, 1987 as specified in Section 172 of the FCAA will be met. No commitment will be made in this plan for the adoption of the extra controls that will be needed to obtain reductions beyond December 31, 1982, but a discussion of control measures which may be used to secure such reductions is included.

b. Attainment of Ozone Standard

While this plan uses simple mathematical relationships between ozone concentrations and emissions of volatile organic compounds to determine emission reduction requirements, the TACB does not believe any such simple relationship exists. Therefore this plan does not purport to demonstrate that the ozone standard will be attained everywhere (or anywhere) in Texas. It shows only the fulfillment, by established deadlines, of emission reduction requirements calculated by methods contained in guidance received from EPA.

c. Scope of Plan

This plan is limited in scope to meeting the federal requirements for such a plan, and does not address other TACB control policies or activities undertaken under authority of the Texas Clean Air Act that are not related to the federal requirements.

d. Deletion of Non-essential Requirements

Since its sole purpose is limited to meeting federal requirements, any portion of this plan which is later determined by the TACB not to be required by federal law, regulation, or policy guidance will be withdrawn from the plan.

2. SUMMARY OF THE PRINCIPAL ELEMENTS ADDRESSED WITHIN THIS PLAN. (DETAILS ARE PROVIDED IN THE VARIOUS SUBSEQUENT SECTIONS AND APPENDICES.)

a. Definition of Attainment and Nonattainment Areas

The 1977 Amendments to the FCAA required that each state submit to the Administrator of EPA lists of areas which on August 7, 1977 did not meet a primary National Ambient Air Quality Standard (NAAQS), which had air quality better than any NAAQS, or for which there was not sufficient data for classification. The Administrator of EPA was required to promulgate these lists with such modifications as he deemed necessary.

b. Responsibilities for Plan Development

Following promulgation of the area classification lists, state and locally elected officials were required by the FCAA to jointly consult and agree on which portions of the emissions control plans for areas classified as nonattainment for ozone would be prepared by each. The Governor was required to certify the planning organization designated by locally elected officials to be responsible for working with the state in the plan's development.

c. Establishing Baseline Air Quality

In order to determine the severity of the ozone problem in each nonattainment area, EPA required that data from monitoring done in 1975, 1976 and 1977 be examined. Data from 1978 was also considered when it became available. Procedures for selecting or calculating a 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 national ambient air quality standard for ozone. Reduction requirements are calculated by the use of formulae or models that rely on measured data as well as certain assumed values. These formulae and the various factors involved in each are discussed in detail. EPA requires that emission reduction requirements be calculated only for urban nonattainment areas — those containing an urban place with a 1970 census population of 200,000 or more.

e. Sources of Emission Reductions

Substantial quantities of volatile organic compounds are emitted

by businesses and industry and by motor vehicles. The plan identifies the contribution from all known sources and sets forth a program of reductions that will be adequate to demonstrate to EPA either attainment of the standard or reasonable further progress toward attainment by December 31, 1982.

f. Additional Requirements for Areas Where Demonstration of Attainment by December 31, 1982 is Not Made

Where application of reasonably available control technology is not expected to result in enough emission reductions by December 31, 1982, an extension to December 31, 1987 may be obtained from EPA if certain additional commitments and emission reduction programs are undertaken by the state. The plan identifies the one area (Harris County) where such extensions are needed and demonstrates that the additional requirements will be met for this area.

3. OZONE CONTROL PLAN

a. General

This Section of the plan discusses the actions taken by the TACB in developing an ozone control plan as they are related to the federal requirements discussed in the previous Section.

b. Ozone Nonattainment Area Designations in Texas

1) General

The Federal Clean Air Act, as amended in 1977, requires in Section 107(d)(1) that each state classify each of its Air Quality Control Regions (AQCR's), or portion thereof, as nonattainment, attainment, or unclassifiable for ozone. To fulfill this requirement, the TACB staff completed an ozone air quality analysis, using the ambient data available from twenty TACB continuous monitors which were in operation by June, 1977. The analysis showed that the then .08 ozone standard had been exceeded at each of the twenty continuous monitors located in Bexar, Brazoria, Dallas, Ector, El Paso, Galveston, Gregg, Harris, Jefferson, McLennan, Nueces, Orange, Tarrant and Travis Counties. As a result of this analysis, these fourteen counties, along with certain nearby counties (Denton, Hardin, Matagorda, Montgomery and San Patricio Counties) were tentatively identified as nonattainment for ozone (see Appendix A).

2) Public Meetings

Public participation in the designation of nonattainment areas was solicited through a series of twenty-four public meetings held in November, 1977 (see Appendix B for a list of the meeting

locations). The purposes of these meetings were: 1) to inform the public of the requirement of the 1977 Clean Air Act Amendments to list those AQCR's, or portions thereof, which have or have not attained the National Ambient Air Quality Standard or for which insufficient data are available to make this determination; 2) to inform the public of the consequences of classifying an area attainment/nonattainment; and 3) to solicit information useful to the Board in their classification of these areas as attainment or nonattainment. Serious concern was expressed by the citizens of some of the less industrialized counties (Ector, Gregg and McLennan) about the possibility that the nonattainment designation would place their communities at an unfair disadvantage in competing with nondesignated communities for new industries.

3) Public Hearings

Pursuant to the requirements established by Section 3.09 of the Texas Clean Air Act, Article 4777-5, V.A.T.S., public hearings concerning area designations were conducted in December, 1977 (see Appendix C for a list of the hearing locations). At these hearings the prevailing recommendation was that, to avoid the implementation of unnecessary and costly control measures, only those counties where ozone nonattainment was definitely substantiated, should be classified as nonattainment.

4) Board Resolution

As the result of the comments received during the public meetings and hearings, the Board adopted a Resolution on January 9, 1978, recommending to the EPA that Bexar, Brazoria, Dallas, El Paso, Galveston, Harris, Jefferson, Orange, Tarrant, Travis and a portion of Nueces Counties be designated nonattainment for ozone (see Appendix D).

5) EPA Promulgation

The EPA accepted the TACB's recommendation but added Ector, Gregg, McLennan and Victoria Counties to the list of nonattainment areas. EPA's rationale for the additions was that violations of the ozone standard had been recorded in each of the four counties (a non-TACB ozone monitor had been located in Victoria County). The EPA attainment/nonattainment area designations were published in the Federal Register on March 3, 1978 (see Appendix E).

6) EPA Revision

Later, in the September 11, 1978 Federal Register, the EPA revised their designation to include all of Nueces County as a nonattainment area. They stated that a partial-county nonattainment designation for ozone in Nueces County "cannot be supported

with geographical or emission densities arguments."

7) Urban/Rural Designation

At the EPA Workshop on Requirements for Nonattainment Area Plans held in Kansas City, Missouri, in March, 1978, the EPA indicated that in developing control strategies for ozone, rural and urban counties could be treated separately, with lesser controls necessary in rural counties. An urban county as defined by EPA is any county with an urban place population of greater than 200,000 according to the 1970 U.S. Census. Under this definition, the urban nonattainment counties in Texas are Bexar, Dallas, El Paso, Harris, Nueces, Tarrant and Travis. The remaining nonattainment counties — Brazoria, Ector, Galveston, Gregg, Jefferson, McLennan, Orange and Victoria — are thus considered to be "rural" nonattainment counties.

8) Redesignation Due to Revision of Ozone Standard

To determine the impact of the January 1979 revision of the ozone standard to .12 ppm, the air quality data for all designated nonattainment areas were re-examined. As a result of this re-examination, it was determined that concentrations in Travis and McLennan Counties do not exceed the new standard. Action is being initiated to officially redesignate these counties as attainment areas. In the meantime they are being considered as such for the purpose of this Plan.

c. Planning Procedures and Consultation

1) Requirements Under Sections 121 and 174 of the FCAA

The FCAA emphasizes extensive local involvement in the planning and decision making process at governmental and citizen levels. To insure adequate understanding of local needs and full participation by local elected officials and citizens, states are required, under Section 121, to provide a satisfactory process of consultation with general purpose local governments and designated organizations of elected officials of local governments. Section 174 sets forth procedures for the development of revisions to the State Implementation Plan for regions in which the national primary ambient air quality standard for carbon monoxide or ozone will not be attained by July 1, 1979. State and elected officials of affected local governments are required to determine jointly which elements of the revised State Implementation Plan will be planned for and implemented or enforced by the State, local governments, or regional agencies or any combination thereof. It is also required that preparation of SIP revisions under these provisions be coordinated with the continuing, cooperative, and comprehensive transportation planning process required under Section 134 of Title 23, United States Code and Section 110 provisions of the FCAA.

2) Status of Requirement

In accordance with procedures set forth in Sections 121 and 174 of the Federal Clean Air Act (FCAA), joint guidance from EPA and the Department of Transportation (DOT), and direction by Texas Governor Dolph Briscoe to coordinate plan revisions required by the FCAA (ref. Appendix F "Planning Procedures and Consultation: Supporting Documentation" Attachment 1), TACB initiated intergovernmental consultation and planning processes in addition to those already established by sponsoring a briefing for state officials on major provisions of the Clean Air Act Amendments during October, 1977. Briefings for elected officials and the general public were held in January, 1978 with the primary objective of stressing FCAA provisions dealing with the participation of local and regional governments in the development of revisions to Texas' State Implementation Plan. Letters were sent to all elected officials in the 15 ozone nonattainment areas inviting them to the briefings and soliciting recommendations concerning the role of local governments in this process.

3) Response from Local Officials

Following these briefings, resolutions were received from a number of local governments and regional planning agencies with various recommendations. Included were the following:

a) Harris County - On February 12, 1978, the Steering Committee of the Policy Advisory Committee for Multimodal Transportation Planning recommended that the Houston-Galveston Area Council (HGAC) be designated as the organization responsible for developing local responses to the control strategies required by the Clean Air Act Amendments of 1977. The Executive Committee of the Houston-Galveston Area Council concurred with that recommendation on February 21, 1978. (Appendix F, Attachment 2)

b) Bexar County - The San Antonio-Bexar County Urban Transportation Study Steering Committee (SABCUTS), acting as the Metropolitan Planning Organization, on January 24, 1978 voted to accept designation as the lead planning agency for preparing air-quality related transportation plans in Bexar County. Resolutions were received from both Bexar County and the City of San Antonio supporting the nomination of SABCUTS. (Appendix F, Attachment 3)

c) Dallas-Tarrant Counties - On December 15, 1977, the Steering Committee of the Regional Transportation Advisory Committee nominated the North Central Texas Council of Governments (NCTCOG) as the lead planning agency for development of air-quality related transportation control plans. Resolutions supporting this nomination were received from the Cities of Arlington, Fort Worth, Mesquite, Garland, Dallas, and Dallas County. (Appendix F, Attachment 4)

In response to these resolutions, TACB entered into detailed negotiations to determine jointly which elements of the revised State Implementation Plan would be planned for and implemented or enforced by the state and which elements will be planned for and implemented or enforced by local governments or regional agencies. As a result of the negotiations, specific agreement was reached during April, 1978 that the following agencies would be responsible, in the areas indicated, for developing transportation plans as necessary to improve air quality and to assure effective state and local consultation on all elements of the revised SIP:

HGAC-MPO ----------Harris County
NCTCOG-MPO ----------Dallas, Tarrant Counties
SABCUTS-MPO ----------Bexar County

On May 19, 1978, the TACB adopted Resolution R78-5 recommending to the Governor of Texas the designation of the above named agencies to prepare plans for submittal to, and consideration by the Texas Air Control Board and to provide for implementation of transportation control measures determined to be reasonable, and which may assist efforts to attain the national ambient air quality standard for ozone. The official designation is contained in a letter dated July 24, 1978 from the Governor to the Administrator of EPA. The above cited documents are contained in Appendix F, Attachment 5.

d) El Paso, Travis, and Nueces Counties

Resolutions also were received concerning recommendation of agencies to develop transportation plans to improve air quality for the remaining urban areas in Texas: El Paso, Travis, and Nueces Counties. These included:

-- A resolution adopted by the City of El Paso and El Paso County on February 14, 1978, nominating the City of El Paso, acting as the MPO, as the lead planning organization.

-- Resolutions by Travis County on January 30, 1978 and the City of Austin on June 29, 1978, nominating the Austin Transportation Study Policy Advisory Committee as lead planning agency for Travis County.

-- Resolution of the City of Corpus Christi on November 15, 1978, nominating the Corpus Christi Metropolitan Planning Organization as the lead air quality planning agency in Nueces County.

Copies of each resolution are contained in Attachment 6 to Appendix F.

Since revision of the ozone standard has changed the attainment status of Travis County and reduced the emission reductions re-

quired to demonstrate attainment in Nueces and El Paso Counties, it is now apparent that transportation control measures will not be required by federal law in these counties. Therefore, no formal action is currently underway to designate planning agencies in these counties. However, TACB continues to support planning for and implementation of any reasonable measures to improve air quality.

e) Jefferson, Orange, and McLennan Counties

Resolutions and correspondence also were received concerning designation of the South East Texas Regional Planning Commission as lead planning agency for Jefferson and Orange Counties and the City of Waco Metropolitan Planning Organization for McLennan County. Since U.S. EPA policy does not require implementation of transportation control measures in "rural" nonattainment areas, those having no urban place with population greater than 200,000, no formal action to designate these agencies was taken. However, because of the nonattainment status of two of these areas, and to assure cooperative efforts and joint response to any future air pollution abatement requirements, the Texas Air Control Board established consultation procedures with the MPO's in these areas. During June, 1978 air quality workshops were held in each rural as well as each urban nonattainment area to discuss information, issues and options related to planning for attainment of national ambient air quality standards. Procedures established to transmit air-quality related information on a regular basis also serves to apprise local officials of current issues relevant to their areas.

4) Responsibilities and Planning Processes of Lead Planning Agencies for Harris, Dallas, Tarrant and Bexar Counties

As a result of the recent revision to the National Ambient Air Quality Standard for ozone, Harris County is the only area for which a continuous process of air-quality related transportation planning must be established. However, each of the three designated Metropolitan Planning Organizations (MPO's) responsible for conducting the continuing, cooperative, and comprehensive transportation planning processes for their respective areas under Section 134 of Title 23, United States Code currently plan to carry out such a process. As lead planning agencies, under the general goal of developing air-quality related transportation control plans, general responsibilities include development of mobile source inventories, coordination of local response to and development of strategies for the reduction of mobile source emissions, and ensuring legal enforceability and enforcement of resources adopted.

It is anticipated that the cooperative efforts of TACB and lead planning agencies will provide for maximum local government par-

ticipation for the development, implementation, and enforcement of procedures in accordance with policy of affected agencies and requirements of the Federal Clean Air Act. The collective expertise of these agencies is apparent in descriptions of organizational processes and resources of each as described in material transmitted to the TACB via a letter dated October 3, 1978 from Dr. Joe W. Pyle, Director of Physical Planning and Development, HGAC; and responses to Environmental Protection Agency Requests for Proposals (RFP) for projects to assess air quality impacts from implementation of reasonable transportation measures for inclusion in Texas' SIP by NCTCOG (RFP DA-78-016) and SABCUTS (RFP DA-78-015). This information and copies of these responses to EPA RFP's were not submitted formally by HGAC, NCTCOG, and SABCUTS for inclusion in the SIP. They were submitted for information only and finalization of material contained in these documents is subject to approval at the local level and/or agreement between EPA and the affected agencies. A summary of the descriptions contained in these documents follows:

Houston-Galveston Area Council - HGAC utilizes an integrated planning approach to develop transportation-air quality improvement, control strategies and overall lead planning agency responsibilities for Harris County. This integrated approach includes modification of existing transportation-air quality processes; evaluation and revision of ongoing transportation projects, plans and programs to ensure their compliance with Texas and Federal Clean Air Act requirements; incorporation into the Transportation Control Plan of major, related elements of ongoing and existing plans, programs and projects; development of local responses to transportation control measures required by State and Federal Clean Air Acts; monitoring of related area programs; development of public information and consultation programs and procedures to increase involvement of appropriate elected officials in transportation-air quality decision making and monitoring of transportation and air quality trend indicators.

With respect to its responsibility of establishing and coordinating responsibilities and working relationships of all area agencies involved in transportation air quality planning, the council regularly consults with and receives inputs from area agencies including: city councils of general purpose local governments, the Steering Committee of the Policy Advisory Committee for Multimodal Transportation Planning, the Executive Committee of HGAC, the Metropolitan Transit Authority, City of Houston Air Pollution Control Program, Houston Chamber of Commerce, and the State Department of Highways and Public Transportation. Provisions for planning and agency coordination have been designed to provide for meeting cooperative goals as expeditiously as practicable.

Manpower resources committed to the initial study effort through calendar year 1978 include six professional staff: planners,

administrators, engineers and technicians.

San Antonio-Bexar County Urban Transportation Study - Technical management of performing lead planning agency responsibilities is expected to involve formation of a study committee comprised of members of participating committees and chaired by the MPO. Periodic meetings will identify potential problems, their solutions, and guide technical aspects of the study. Agencies involved include the MPO staff, the City of San Antonio, Departments of Planning and Traffic and Transportation, State Department of Highways and Public Transportation, the VIA Metropolitan Transit Authority, and the Alamo Area Council of Governments. MPO staff consists of two administrative personnel.

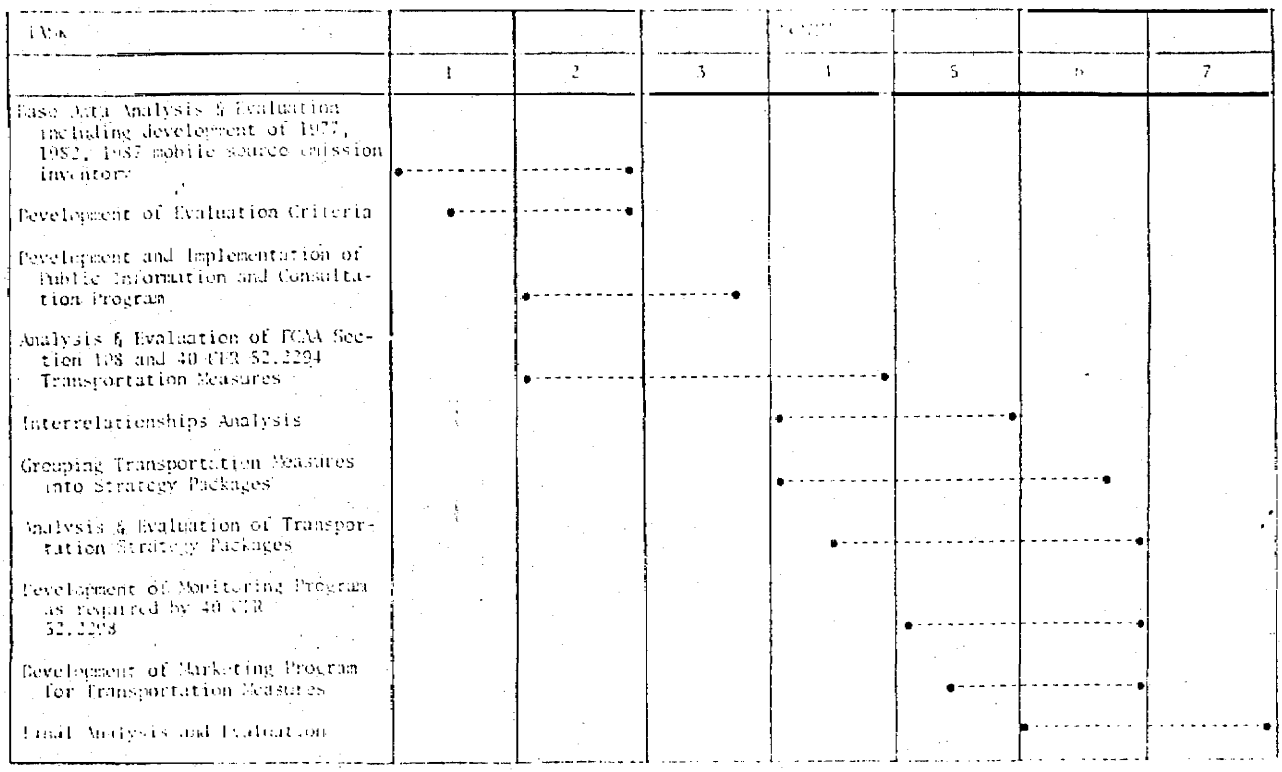
North Central Texas Council of Governments - The Transportation and Energy Department of NCTCOG utilizes task forces as the major organizational structure to accommodate transportation planning studies. Policy development for transportation planning in North Central Texas is provided by a committee structure developed jointly by State Department of Highways and Public Transportation and local governments for coordination among all governments and transportation entities. A single policy committee, the Regional Transportation Council, provides day-to-day supervision of the transportation planning process in NCTCOG's urbanized areas.

The transportation planning process for North Central Texas is structured to include concurrent consideration of air quality, energy contingencies, alternative analysis, transportation system management, and long-range planning. This process was devised primarily to assist local elected officials in making the decisions that will be demanded at the local level for transportation system management and implementation of actions to improve air quality.

The Transportation and Energy Department is staffed by 16 professionals: a director, deputy director, three senior planners, 11 planners and 15 support personnel. Funding also is provided for two professional and two support staff in NCTCOG Research and Planning Coordination Department to provide for agency-wide coordination.

Schedule and Current Status - Harris County - Since attainment of the national ambient air quality standard for ozone cannot be demonstrated in Harris County by 1982, HGAC has developed the following schedule to plan for achieving general goals and for considering Section 108 Transportation Control Measures.

WORK SCHEDULE
Houston-Galveston Area Council
January through July, 1979



A draft document, "Transportation Control Measures: Current Status" has been prepared by HGAC staff. This document summarizes status of Section 108 Transportation Measures in Harris County and is contained in Appendix G-1 It is emphasized this document has not been reviewed nor adopted by the HGAC Executive Committee nor by the MPO Policy Advisory Committee as a formal submission to TACB for inclusion in the SIP. Appendix G-2 Contains the text of the Metropolitan Transit Authority (MTA) Board Order 78-8 certifying the election in Harris County which created the MTA.

Schedules - Dallas-Tarrant and Bexar Counties - Even though this plan meets the emission reduction requirements need for a demonstration of attainment of the ozone standard in Dallas, Tarrant and Bexar Counties, schedules also have been developed by NCTCOG and SABCUTS for preliminary analysis of air quality related transportation measures, to develop mobile source emission inventories, and to study EPA transportation regulations promulgated July 21, 1977. These schedules are set forth below.

North Central Texas Council of Governments
February through August, 1979

TASK				MONTH			
	1	2	3	4	5	6	7
A - 1977, 1982, 1987 Emission Inventory							
Procedure Development							
Execution							
Monitoring Process required by 40 CFR 52.2298							
B - Study of Bus/Carpool Incentives required by 40 CFR 52.2294							
Park and Ride/Preferential Treatment Study							
Preliminary Technical Memo on Other Incentives							
C - Planning Program to Consider FCAA Section 108 Transportation Measures							

San Antonio-Bexar County Urban Transportation Study
February through August, 1979

TASK				MONTH			
	1	2	3	4	5	6	7
1977 Emission Inventory							
1982 Emission Inventory							
1987 Emission Inventory							
Feasibility Studies Concerning Requirements of 40 CFR 52.2294 and 40 CFR 52.2298							
Program Development for Evaluation of Section 108 Transportation Measures							
Transit Improvements							
Long Range Transit Improvements							
Bicycling, Bicycle Lanes, Etc.							

Although the Federal Clean Air Act does not require transportation planning and implementation of these controls, TACB is in full support of any locally developed incentives to improve air quality.

Section 175 Planning - The planning and evaluation processes set forth in the above tables will be continued and expanded pending contractual agreements between EPA and the lead planning agencies for the MPO's to perform air quality improvement planning with FCAA Section 175 funds. Further schedules, when finalized, will be included in future revisions to the SIP as necessary.

d. Degree of Nonattainment - Selection of Air Quality Baseline

In promulgating the new ozone standard, EPA has advocated the use of a statistical procedure for selecting a baseline ozone concentration value representative of existing (1977) levels. This value is designated as the "design value". The Empirical Frequency Distribution (Graphical Estimation) method, as described in the January 1977 EPA document, "Guidelines for Interpretation of Ozone Air Quality Standards," was suggested by Region VI EPA for use in this Plan. Briefly, the procedure consists of plotting a frequency distribution curve of the occurence of the highest ozone measurements for 1975 through 1978 for each area, and selecting the representative value such that higher values occur no more than one day per year. This value appears at the 99.98% point on the frequency distribution curve. Table 1 shows the design values, calculated by EPA using this method, which have been used in this plan.

TABLE 1

OZONE REDUCTION DESIGN VALUES

Nonattainment County	Design Value Concentration (ppm)
HARRIS	.27
DALLAS	.17
TARRANT	.16
EL PASO	.16
BEXAR	.15
NUECES	.14

e. Relationship Between Air Quality Baseline (Design Value) and Emission Reductions Required to Attain Ambient Air Quality Standard

1) Uncertainty of Relationship

There are significant questions about the assumption that a reduction in manmade volatile organic compounds (VOC) emissions will result in a reduction in ozone formation in the manner calculated by any of the methods specified by EPA. Previous experience in the Houston area indicates that this assumption may be in error. Significant reductions in VOC emissions have been achieved in that area in the past few years, amounting to perhaps as much as 35% to 40% on a community-wide basis. While long-term monitoring results are not adequate to make firm estimates of trends in ozone occurrences, available information indicates that little or no significant reduction in the frequency or severity of ozone episodes has occurred. This raises serious question about the effectiveness of the additional VOC control measures that are required and are now being incorporated into the Texas State Implementation Plan. The Texas Air Control Board intends to follow research now in progress by EPA and others in order to determine if some different approach to the control of ozone episodes would be more effective. The Board will consider additional SIP revisions if such research indicates that alternative strategies would be effective in reducing ozone concentrations.

2) Choice of Emission Reduction Model

Despite the lack of an adequate relationship, or model, it is obvious that decisions must be made as to the amount of emission reduction to impose in attempting to meet the mandatory attainment requirements of the Federal Clean Air Act. Some rather complex models are now available or are being developed for use in calculating the amount of VOC emission reductions to be required in ozone nonattinment areas in order to demonstrate attainment of the ozone standards.

These models require very accurate and extensive measurements of nonmethane VOC and oxides of nitrogen ambient air concentrations. Such data are not available for most areas. In areas where the detailed air quality and emissions data needed to apply the sophisticated modeling techniques are not available, EPA permits states to calculate the amount of VOC emission reduction that will be required using the assumption that measured ozone is directly proportional to local emissions of VOC (roll-back model). A modified version of this model accounts for the effect on local ozone measurements of ozone transported into the area from other urban areas and the amount of ozone resulting from natural (non-anthropogenic) processes. This modified roll-back formula, shown in Figure 1, is used in this plan.

3) Choice of Values for Current and Future Transported Ozone Concentrations

The correct values for current and future transported ozone (T_o and T_f) to be used in the modified roll-back formula are difficult to estimate. Ideally, current transported ozone concentrations should be measured at rural measuring sites upwind

FIGURE 1

ROLLBACK REDUCTION FORMULA

$$\% \text{ Reduction} = \frac{[C - A \times T_o] - [S - A \times T_f]}{[C - A \times T_o]} \times 100$$

Where:

C is the design ozone concentration value

A is an additivity factor (Assumed to be .5)*

T_o is the assumed concentration of transported ozone associated with the design ozone concentration value (including natural background)

S is the standard ozone concentration (.12 ppm)

T_f is the assumed concentration of transported ozone after ozone standard is attained in the area (including natural background)

x indicates multiplication

*Additivity Factor: Although transported ozone affects measured values, its effect will be something less than the amount transported because of locally generated oxides of nitrogen and dilution. A value of .5 was selected as being in the middle of the reported range of .2 to .7 for this parameter.

of the urban areas in which high values are measured. Unfortunately no such measurement sites existed in Texas during the air quality baseline period.

However, data from rural sites can be used to give an indication of the probable range of transported ozone to be expected, even though such stations are not directly upwind from the ozone nonattainment areas. Ozone concentrations of .12 ppm and higher have been measured at these rural stations at which little or no locally generated ozone is assumed to exist. A conservative value of .10 ppm has been chosen by EPA, and agreed upon by the TACB, to represent the probable value of transported ozone throughout the State.

Having assigned a value to existing ozone transport, the next problem is to predict the future ozone transport into an area at the time when the ozone standard is attained. Logically, one would assume that ozone transport would decrease as controls are applied to upwind sources, approaching some "natural background" level when all sources are controlled. Assuming a natural ozone minimum of .04 ppm, one can then estimate the probable future transport level depending upon the present transport value and the assumed effectiveness of controls on upwind sources. Since the ozone standard of .12 ppm will allow a certain amount of ozone to be transported even after the standard is met, the future transport value should be somewhat higher than the .04 ppm natural background. A value of .06 has been selected by EPA and agreed upon by the TACB as a reasonable estimate of future transported ozone concentrations everywhere in Texas.

4) Emission Reduction Requirements Resulting From Application of Model

The VOC emission reductions needed to satisfy EPA requirements for a demonstration of attainment of the .12 ppm ozone standard resulting from application of the model to the design values in Table 1, using assumed transport values of .10 present and .06 future, are shown in Table 2.

TABLE 2

EMISSION REDUCTION REQUIREMENTS

NONATTAINMENT COUNTY	AIR QUALITY DESIGN VALUE (ppm of ozone)	REQUIRED VOC EMISSION REDUCTIONS %
HARRIS	.27	59
DALLAS	.17	25
TARRANT	.16	18
EL PASO	.16	18
BEXAR	.15	10
NUECES	.14	0

F. Identification of Emission Changes

1) Sources of VOC Emissions

Volatile organic compounds are emitted from a wide variety of sources. For purposes of this plan, actual or allowable emissions which result from operation of a source (manufacturing facility, automobiles, etc.) are expressed as emission rates, e.g., tons/yr. Emission reductions, however, which result from application of a new control measure or which are identified through calculations as the result of the FMVCP are considered as one-time events and therefore expressed as tons. This convention is necessary to avoid the impression that new emission control regulations reduce emissions at a rate which is, therefore, cumulative. For ease of reference, these sources have been grouped into two general categories, Stationary and Mobile Sources. Descriptions of each follow:

a) Stationary Sources - Stationary sources consist of all spatially fixed sources of volatile organic compound emissions. For control purposes, stationary sources are divided into three size categories; large identifiable sources with a potential to emit 100 tons per year of volatile organic compounds, identifiable sources with a lesser potential, and very small sources which are not specifically identified and not inventoried individually.

(1) Sources With Greater Than 100 Tons/Yr Potential Emissions - These sources will be controlled in all ozone nonattainment areas. Examples of such sources might be: a large petroleum refinery, a petrochemical plant, or a petroleum loading/unloading facility.

(2) Other Identified Stationary Sources - These sources will be controlled, under this plan, only as required to demonstrate attainment or reasonable further progress in urban nonattainment areas. Examples might be a metal furniture manufacturing company or a cotton oil mill.

(3) Area Sources (Not Individually Inventoried) - Very small, but numerous sources are generally classified as area sources. Each of these sources considered individually would probably be an insignificant emitter, but when considered collectively, constitute a significant source of VOC emissions. Typical examples would be home furnaces and fireplaces, retail dry cleaning establishments, gasoline service stations, and house painting.

b) Mobile Sources - Mobile sources (motor vehicles) are generally treated separately because of their unique characteristics, i.e., mobility. The VOC emissions from these sources generally consist of unburned gasoline or fuel oil from internal combustion piston and turbine engines used in powering water, air and land vehicles, including automobiles. Miscellaneous gasoline and diesel fuel powered engines such as used in lawnmowers and construction equipment are also usually included in this category under the designation, "off-highway". As with stationary area source emissions, mobile source emissions are usually estimated by the use of average emission factors, together with some factor for estimating the number of amount of use of such sources in a given area, such as population, number of vehicles registered, number of vehicle miles traveled (VMT), number of aircraft landings and takeoffs, etc.

2) Factors Affecting Magnitude of VOC Emissions

a) New or Modified Sources

(1) New or Modified Stationary Sources (Other Than Area Sources) - The amount of VOC emissions is obviously affected by the addition of new emissions resulting from the construction of new manufacturing facilities or modification of existing facilities for the purpose of increasing production.

Since 1972, all new stationary emission sources in Texas have been subjected to a permit program which requires the use of the best available control technology (BACT) to control emissions to the lowest practicable level. In addition, new major sources in ozone nonattainment areas are required by Regulation VI to emit at the lowest achievable emission rate (LAER). For these reasons, emissions from new sources are generally at much smaller rates than from older sources of similar types and even though industrial expansion is expected to continue in Texas through 1987 at a fairly rapid rate, the rate of associated emission increases will be very much less. To obtain an estimate of the amount of emissions growth likely to occur, the emissions from new or modified VOC sources for which permits were issued during the years 1975 through 1977 were totaled and averaged to obtain an historical emissions growth rate for each urban nonattainment county. These growth rates are shown in Table 3. The emissions inventories included as Appendix H do not reflect this estimated point source growth since any growth which would prohibit the demonstration of attainment of the standard by 1982 or reasonable further progress toward attainment in the case of Harris County will be offset by equivalent or greater emission reductions. The actual emissions increases due to point source growth will, of course, be reflected in future emission inventories.

TABLE 3

ESTIMATED POINT SOURCE GROWTH RATES IN
URBAN NONATTAINMENT AREAS

COUNTY	Annual Emission Increases (Tons/Year)			Mean Annual Increase	
	1975	1976	1977	Tons/Year	% of 1977 Total Emissions
HARRIS	5695	2189	3337	3740	1.4
DALLAS	36	81	78	65	0.1
TARRANT	404	301	156	287	0.4
BEXAR	608	50	54	237	0.4
EL PASO	0	0	0	0	0
NUECES	1085	621	180	629	1.1

(2) 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 home heaters and retail dry cleaning establishments. Uncontrolled emissions from most of these area type sources are related to the population in area and the emissions are assumed to grow at the estimated population growth rate. In the case of emissions from service stations, uncontrolled emission growth is estimated from the projected changes in vehicular travel and average amount of gasoline used per mile traveled.

(3) Replacement of Existing Industrial Processes With New, More Efficient Processes - Some of the industrial equipment in use today will become obsolete in the next several years and replaced with new, more efficient machinery. To the extent that this new machinery is designed to reduce air pollution emissions, there will probably be a net emission reduction from this replacement. The quantitative effect on overall emissions is difficult to estimate in advance, but will become apparent as accurate annual emission inventories are used to track the actual emission reductions as they occur.

b) Changes in Motor Vehicle Emissions

Emissions from motor vehicles constitute a large percentage of the total emissions in most urban nonattainment areas, therefore, any changes in these emissions will have a large im-

pact on the total emissions inventory and on the emission reduction rate required to demonstrate attainment of the standard. For the next several years, the trend of emissions from motor vehicles will be downward. This reduction represents the net effect of the following factors:

(1) Federal Motor Vehicle Control Program (FMVCP) - This program, administered by the federal government, sets and enforces emission standards for new motor vehicles, and 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 also requires that all 1980 and later model year vehicles meet substantially more stringent emission limits than prior year models.

(2) Increases in Vehicular Use - Countering the decreases in average emissions from individual vehicles are the large increases in the number and use of vehicles which have been experienced in all urban areas of Texas, and particularly in the Houston area. For the past few years, emission reductions from FMVCP significantly exceeded the emissions increases due to increased vehicular use, resulting in an overall net emissions decrease. This net reduction in vehicle emissions is expected to continue at least through 1987. However, as growth continues and emissions from each individual vehicle level off in the late 1980's, total vehicle emissions will probably begin to show a net increase unless steps are taken to limit or better manage vehicle use.

(3) Decreases in Vehicle Use Due to Gasoline Price Increases - The current trend of gasoline price increases is predicted to continue through 1982 and act to decrease the amount of VMT increase which would otherwise occur. A recent study prepared for the Federal Energy Administration[1] predicts a 5.1% decrease in VMT due to doubling of gasoline prices. Since the price of gasoline can reasonably be expected to double between 1977 and 1982, the VMT predictions obtained from the Texas Department of Highways and Public Transportation which did not consider this factor have been decreased by 5% prior to use with the MOBILE 1 computer program to predict motor vehicle emissions expected in 1982.

(4) Transportation Planning - Recognizing the adverse impacts of increased vehicle use on traffic congestion and safety as well as air quality, most urban areas have established transportation planning agencies to deal with this problem on a continuing basis. As discussed in a previous section, although Harris County is the only area where a continuing process of transporta-

[1]Cambridge Systematics Inc. "Carpool Incentives: Analysis of Transportation Impacts," June, 1976, P. 58.

tion planning must be included in the SIP, three Metropolitan Planning Organizations have been designated to consider plans which will emphasize the air quality improvement aspects of their transportation planning efforts. Emission reductions resulting from these activities are difficult to quantify, consequently, they are often masked by the much larger effects of vehicle use growth and FMVCP reductions. For these reasons, no specific emission reductions tonnages resulting from transportation planning are quantified in this plan. Actual reductions will be reflected in annual updates of the emissions inventory.

c) Reductions in Stationary Source Emissions Due to Additional Controls

As required by the Clean Air Act and EPA guidance reasonably available control measures will be applied to all stationary sources in all oxidant nonattainment areas if such sources have a potential to emit 100 or more tons per year. In Harris County, certain minor sources (sources with a potential to emit less than 100 tons per year) will be controlled since attainment of the ozone standard by December 31, 1982 cannot be demonstrated.

Control Measures to be applied are prescribed in changes to TACB Regulation V that have been developed or that may be developed later consistent with the following:

(1) EPA's Control Technique Guidelines Published Prior to January 1, 1978 - These guidelines discuss reasonable controls for certain industrial processes and establish norms for emission reductions obtainable by such controls. Except for magnet wire coating, for which there are no sources in Texas, controls consistent with these guidelines have been incorporated into TACB Regulation V. Rule numbers in the revised Regulation V are shown in Table 4, along with estimated resulting emission reductions for each urban nonattainment county. For all the new rules, compliance on or before December 31, 1982 is required. The following ten source categories are covered by these controls:

Large Appliance Manufacture
Gasoline Bulk Plants
Metal Furniture Coating
Petroleum Liquid Storage (Fixed Roof)
Degreasing
Bulk Gasoline Terminals
Miscellaneous Petroleum Refining Processes
Cutback Asphalt
Surface Coating of Automobiles, Cans, and Metal Coils
Magnet Wire Coating

A thorough search of all business directories as well as replies to formal questionnaires mailed by the TACB to all local air pollu-

TABLE 4

VOC EMISSION REDUCTION FROM APPLICATION OF CONTROLS IN REVISED REGULATION V
INCLUDING PUBLISHED PACT GUIDELINES

CONTROL	TACB REGULATION V RULE # 131.07	AMOUNT OF VOC REDUCTION BY COUNTY (Tons)					
		HARRIS	DALLAS	TARRANT	BEXAR	EL PASO	NUECES
Large Appliance Manufacture	.60.101, .60.101(1), .60.102, .60.103, .60.104	0	102	101	303	0	0
Gasoline Bulk Plants	.53.101, .53.102, .53.103	989	0	0	0	0	0
Metal Furniture	.60.101, .60.101(2), .60.102, .60.103, .60.104	1	0	0	0	0	0
Petroleum Liquid Storage Fixed Roof Only	.51.101, .51.102, .51.104, .51.105	10047	0	24	0	0	8286
Degreasing	.59.102, .59.103, .59.104, .59.105, .59.106	3544	100	255	189	0	0
Bulk Gasoline Terminals	.52.101(2), .52.101(3), .52.103, .52.104	300	213	137	132	52	42
Petroleum Refining; Turnaround, Vacuum Systems, & Waste Water Sep.	.56.101, .56.102, 56.104, 55.101, .55.103, .55.105, .55.106	24767	0	598	117	2067	11394
Cutback Asphalt	.59.101, .59.105(a)	769	0	0	0	0	0
Surface Coating, Auto, Can, etc.	.60.101, .60.101(3) through (8), .60.102, .60.103, .60.104	1850	823	4834	0	0	0
Stage I, Vapor Recovery[1]	.54.101, .54.102, .54.103, .54.104, .54.105	0	3509	1918	0	954	0
Removal of Exemptions	.62.102	1256					145
TOTAL		43523	4747	7868	741	3073	19865

[1]Includes estimated growth in fuel usage to 1982.

tion control programs and all TACB Regional Supervisors have failed to reveal any magnet wire coating operation in any ozone nonattainment area in Texas. Therefore, inclusion of emission controls for this type of activity in Regulation V would serve no useful purpose.

(2) Cancellation of Exemptions Previously Granted Under The Provisions of TACB Regulation V, Rule 131.07.07 All exemptions previously granted by the Executive Director under the provisions of Rule 131.07.07 for specific compounds or specific gas streams are cancelled by revised Regulation V, Rule 131.07.61.102. The final compliance date for sources previously exempted is December 31, 1981. Any person affected by this cancellation may reapply to the Texas Air Control Board (TACB) for an exemption for any specific gas stream if it can be demonstrated that the emissions from the gas stream will not make a significant contribution of air contaminants to the atmosphere. If the TACB approves any such application for exemption it will document the exemption by Board Order which will then be forwarded through appropriate channels to the Administrator of EPA for inclusion in the Texas SIP.

(3) Vapor Recovery at Gasoline Dispensing Stations (Stage I) - This control requires reduction of the amount of gasoline vapors normally emitted from storage tanks during filling operations by returning them to the delivery truck in a closed system. The vapors in the truck, in turn, are returned to the bulk gasoline plant or terminal and eventually recovered in liquid form by refrigeration or disposed of through some other method.

(4) Control Technique Guidelines Published After January 1, 1978 - In addition to adopting controls consistent with guidelines published prior to January 1, 1978, the TACB will consider for adoption additional VOC controls consistent with EPA guidelines published after January 1, 1978. Each new guideline will be considered by the Board in the calendar year following the year of its publication. Following is a list of guidelines published in 1978 and a tentative schedule provided by EPA for the publication of later guidelines along with the year in which they may be expected to be considered by the TACB. No emission reductions from these additional controls are expected before December 31, 1982.

ADDITIONAL CONTROL TECHNIQUE GUIDELINES FOR VOC PUBLISHED AFTER JANUARY 1, 1978 OR PROPOSED FOR PUBLICATION BY EPA

Source Category	Publication Date	Year of Planned TACB Consideration
Petroleum Refinery Fugitive Emissions (Leaks)	1978	1979
Gasoline Tank Truck and Vapor Recovery System - Leaks	1978	1979
Surface Coating of Miscellaneous Metal Parts and Products	1978	1979
Vegetable Oil Processing	1978	1979
Factory Surface Coating of Flatwood Products	1978	1979
Graphic Arts (Printing)	1978	1979
Pharmaceutical Manufacture	1978	1979
Rubber Products Manufacture	1978	1979
Dry Cleaning	1978	1979
Petroleum Liquid Storage, Floating Roof Tanks	1978	1979
Organic Chemical Manufacture	1979	1980
Process Streams	1979	1980
Fugitive (Leaks)	1979	1980
Service Stations, Stage II	1979	1980
Architectural and Miscellaneous Coatings	1979	1980
Ship and Barge Transport of Gasoline and Crude Oil	1979	1980
Wood Furniture Manufacture	1979	1980
Organic Chemical Manufacture	1979	1980
Waste Disposal	1979	1980
Storage Handling	1979	1980
Natural Gas and Crude Oil Production	No Estimate	No Estimate
Natural Gas and Natural Gasoline Plants	No Estimate	No Estimate
Adhesives	No Estimate	No Estimate
Other Industrial Surface Coatings	No Estimate	No Estimate
Auto Refinishing	No Estimate	No Estimate
Other Solvent Usage	No Estimate	No Estimate

3) Emissions Inventory

a) 1977 VOC Emissions Inventory

The 1977 Volatile Organic Compound (VOC) Emissions Inventory Summary is a compilation of stationary and mobile source emissions in the thirteen counties classified as nonattainment for photochemical oxidants. The basic source for this inventory was the 1977 Oxidant Attainment Analysis Emissions Inventory (OAAEI), published by the Texas Air Control Board (TACB) on November 25, 1977. The report represented the best emissions estimate for sources contained in the TACB 1973, 1975 and 1976 emissions questionnaires.

The data obtained from the OAAEI was updated by reviewing all permits issued to processes which started operating prior to December 31, 1977. Those permit units which had controlled emissions of 25 tons/yr or 5 lb/hr (of VOC) were added to the OAAEI data.

Control Technique Guideline (CTG) item emissions were defined using the criteria outlined in the respective EPA documents. In some instances, emissions information for CTG items had to be obtained from emission inventory questionnaires which had not been included in the OAAEI because of the higher emission cutoff points for that study. In other instances, no emission inventory questionnaires existed for the CTG category and emissions were estimated from county data and from national emissions published by EPA and scaled down to the county level.

The automotive emissions in the OAAEI were recomputed using the latest mobile emission factors as determined from EPA's MOBILE 1 computer program and updated vehicle use data obtained from the Texas Department of Highways and Public Transportation.

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

(1) Stationary Sources (Other Than Area Sources) - The bulk of the inventory information for large stationary sources was derived from the 1977 OAAEI and operating permits for facilities which started operation before December 31, 1977. The emissions were reorganized by industry group type and then these groups were subdivided into CTG and non-CTG items. A few of the CTG items were not adequately inventoried. These items are listed below, along with the methodology used to estimate the emissions from each.

(a) Petroleum Refineries - Vacuum Systems, Waste Water Separators, Unit Turnarounds - Emissions were based on emission factors obtained from the EPA document, "Compilation of Air Pollutant Emission Factors," and refining capacity published in "The Railroad Commission of Texas Annual Report of the Oil and Gas Division, 1975." Operating level was assumed to be 90% of capacity with 75% of purge gas sent to flares.

(b) Petroleum Refineries - Fugitive Emissions - Emissions were based on emission factors obtained from EPA document, "Compilation of Air Pollution Emission Factors," and refining capacity published in "The Railroad Commission of Texas Annual Report of the Oil and Gas Division, 1975." Operating level was assumed to be 90% of capacity.

(c) Storage, Transportation and Marketing of Petroleum Products - Gasoline Bulk Plants - National emissions as determined by EPA were used as the basis for estimating these emissions. The national emissions were multiplied by the ratio of motor fuel used in Texas over the national use. The county emission levels were estimated by apportioning the State emissions among the counties, according to population.

(d) Bulk Gasoline Terminals - State gasoline usage, based on the tax, was obtained from the State Comptroller of Texas. It was assumed that all gasoline passed through bulk terminals. The county emission levels were estimated by apportioning the State level among the counties, according to population.

(e) Other Industrial Manufacturing - Pharmaceuticals - The national emissions from this industry as tabulated by EPA were used as the basis. State emission levels were estimated by multiplying the national level by the ratio of the number of State pharmaceutical employees over the number of national pharmaceutical employees. County levels were determined by proportioning the State emission level to the number of pharmaceutical operations in the county.

(f) Industrial Surface Coating - Metal Furniture - Surface coating emissions were estimated using an emissions factor of 3 pounds of VOC emissions per gallon of paint used from the EPA publication, "Compilation of Air Pollutant Emission Factors." The number of gallons of paint used was obtained by a telephone survey of applicable operations listed in the "Directory of Texas Manufacturers, 1977-78."

(g) Miscellaneous Solvent Use - Degreasing - National emissions as determined by EPA were also used as the basis for estimating these emissions. The State emission level was deter-

mined by multiplying the national level by the ratio of the State population over the national population. The State emissions were apportioned among the counties based on the number of people in manufacturing industries in each county as listed in the Texas Almanac.

(2) Area Source Emissions Inventory - Area sources actually are combinations of many individual sources too numerous and too small to be individually recorded. Each small source may emit only minute quantities of air contaminants but, collectively, their impact may be quite significant. The object of area source calculations is to obtain an accurate estimate of these collective emissions within a specific geographical area, a county in the case of this plan.

The emissions are estimated by employing emission factors, a measure of activity and the distribution of the individual sources. Often, it is necessary to use indirect measures to determine the activity level and distribution of these sources. The emission factors are from the EPA publication "Compilation of Air Pollutant Emission Factors" - (AP-42). The activity measures and distribution are discussed below.

(a) Storage, Transportation and Marketing of Petroleum Products - Service Station Loading and Motor Vehicle Loading - Emissions for these categories were calculated from AP-42 factors, using vehicle miles traveled and average fuel consumption data to estimate fuel transferred. Effect of existing Stage I controls were considered in estimating emissions from service station loading.

(b) Non-Industrial Surface Coating - Architectural Coatings - This category includes evaporative losses due to normal residential or commercial usage of volatile organic solvents in paint and varnish. An emissions factor of .9 tons of VOC per 1000 population was used, as derived in the TACB "Reactive Carbon Compound Control Reexamination for the State of Texas," SP-1 Report, dated March 13, 1975.

(c) Non-Industrial Surface Coating - Dry Cleaning - This category includes evaporated dry cleaning establishments. An emissions factor of .5 tons of VOC per 1000 population was used based upon the TACB report, "Reactive Carbon Compound Control Reexamination for the State of Texas," SP-1.

(d) Miscellaneous Solvent Use - Cutback Asphalt - Cutback asphalt paving emissions were derived from data for the State provided by the State of Texas Highways and Public Transportation Department. It was estimated by the Highway Department that they used 45% of all cutback asphalt in the State. The State Highway Department furnished data on tons of cutback asphalt they used.

The usage by the private sector, including cities, etc., was calculated by factoring the State's use of cutback asphalt by the 45-55% proportion. 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 county were calculated.

(e) Combustion Sources - Heating - This category includes emissions resulting from residential and commercial institutional fuel use. Residential fuel consists of fuel oil and wood used in home heating, cooking, fireplaces, etc. The fuel oil consumed is assumed to be kerosene. Emission estimates from wood burning are based on the assumption that 30% of the single family units have fireplaces and each burns 0.5 cords of wood per year. These emissions are proportional to the population of the area. Commercial-institutional fuel is that consumed in commercial establishments such as shops and public and private institutions such as schools, libraries, etc. The emissions are dependent upon the amount of kerosene, distillate and fuel oil used. Again, the emissions are proportioned to the population.

(f) Combustion Sources - Solid Waste Disposal - This category represents the emissions from disposal by open burning and incineration of solid waste produced by commercial establishments and institutions. It is assumed that 75 tons of municipal-type wastes per 1000 population are burned openly.

(g) Combustion Sources - Forest and Structural Fires - Structural fires emissions are estimated and distributed by four structural fires per 1000 population and 10% of the structure is assumed to be consumed in the fire. Emissions from forest fires are based on the 10-year (1962-1971) average of 0.28% of the forested land burned each year. The emissions are proportioned to the acres of forest in the county. Agricultural fires are not reported because of the complete lack of data available on this activity.

(h) Miscellaneous Sources - Irrigation Pumps - Irrigation pump emissions are those associated with internal combustion engines used to pump water to Texas farmlands. The emissions are proportioned by the number of acres irrigated in each area.

(3) Mobile Sources

(a) Highway Vehicles - This category includes the emissions from the operation of internal combustion engines in all forms of land conveyances. Included are light-duty vehicles

[automobiles, light-duty trucks (weight less than 8000 lbs.), heavy-duty trucks (gross weight greater than 8000 lbs.), and motorcycles]. EPA's MOBILE 1 program was used to determine the emission factors used.

(b) Off-Highway Vehicles - This category includes such miscellaneous gasoline or diesel fueled equipment as lawn mowers, generators, pumps, minibikes, tractors, dozers, road graders, etc.

(c) Rail - Emission from diesel railroad engines were estimated by county apportionment of the estimated total statewide emissions.

(d) Aircraft - Aircraft emissions include landing and takeoff activity for all types of aircraft (military, commercial, private). Engine testing emissions during manufacture and repair are included in point source emission of the facility engaged in that work.

(e) Vessels - Vessels include both cargo carrying vessels (diesel and residual) and pleasure craft (gasoline). Diesel and residual vessels emissions are based on underway and in-port traffic for each waterway, and are apportioned according to ton-miles of waterway and number of ships docked in each county. Emissions from gasoline fueled vessels are based on the number registered and are distributed evenly over the lake and bay surface of the State.

(4) Inventory Summaries - The resulting 1977 inventory summaries for each of the urban ozone nonattainment areas are appended in Appendix H.

b) Emission Reductions and Growth

Also included in the inventories in Appendix H are estimates of the amount of emission reductions resulting from application of controls or other causes and of the amount of growth in area source emissions. Area source emission increases are generally based upon estimated population increases, with the exception of motor vehicle emissions growth which reflect estimated increases in vehicle miles traveled (VMT).

c) Required Emission Reductions

From the inventory emissions and growth data summarized in Appendix H, and the percentage reduction requirements in Table 3, the emission reductions required to demonstrate attainment can be calculated. Table 5 shows the estimated emission

TABLE 5

POINT AND AREA VOC EMISSIONS REDUCTIONS
REQUIRED IN URBAN NONATTAINMENT COUNTIES
1977-1982

Urban Non-Attainment County	Required 1977 Reduction %	Baseline (1977) VOC Emissions (Tons/Yr)	Final (1982) Emissions Allowable (Tons/Yr)	Additional (by 1982) Reductions Required to Account for Area Source Growth (Tons/Yr)	Required Reductions by 1982	
					Tons **	%
Harris	59	277,400	113,700	3,600	167,300	60*
Dallas	25	110,800	83,100	2,600	30,300	27
Tarrant	18	71,900	58,900	1,600	14,600	20
El Paso	18	29,100	23,800	600	5,900	20
Bexar	10	53,800	48,400	1,300	6,700	12
Nueces	0	65,400	65,382	500	500	<1

*Percent reduction required for Reasonable Further Progress (RFP) = 27%
**See section 3.f.1).

reduction requirements in tons and percent of 1977 emissions for each urban nonattainment county.

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 current inventory "be revised and resubmitted as frequently as may be necessary".

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

The TACB proposes to meet these requirements by a continuous update of the emissions inventory using source surveillance and permit data, as well as updated estimates of vehicle emission factors, VMT, and population.

4. CONTROL STRATEGY

a. General

In all but the Harris County nonattainment area, this strategy will result in sufficient emission reductions to provide a demonstration of attainment of the standard by December 31, 1982, thus satisfying the requirements of the Federal Clean Air Act.

In the case of Harris County where demonstration of attainment by December 31, 1982 is not possible with reasonable controls, an extension of the attainment date to December 31, 1987 is requested as discussed in the next section.

Simply stated the control strategy for securing emission reductions necessary to demonstrate attainment of the ozone standard consists of the VOC controls imposed on new vehicles by the Federal Motor Vehicle Control Program (FMVCP), reasonable controls on existing stationary sources of VOC by changes to TACB Regulation V, and strict control of new stationary source VOC emissions by a permit program.

b. Estimated Emission Reductions

The emission reductions predicted from the FMVCP and the imposition of reasonably available controls on stationary sources are shown in Table 6 for each urban nonattainment county. For comparison purposes, the reduction requirements for each area are also shown.

From this Table it can be seen that the estimated emission reductions are equal to or greater than the required reductions in all nonattainment areas except Harris County.

In Harris County, an additional reduction of 90,300 tons will be required to demonstrate attainment by December 31, 1987.

c. New Source Review

In addition to the emission reductions to be effected by stationary source type controls and the FMVCP, the TACB strategy calls for the review of new sources in accordance with Section 173 of the FCAA, as reflected in revised Regulation VI.

The revised Regulation requires that a demonstration be made that the expected increased emissions from any major new or modified new source in a nonattainment area when combined with the emissions from other sources, be sufficiently less at the time of beginning of operation than at the time of the permit application so as to represent Reasonable Further Progress (RFP).

In all cases where equivalent emission reductions may be required in order to permit a new major stationary source, reductions can be obtained in whatever manner is appropriate. In some cases, reductions might be available from sources under the control of the permit applicant or from previously "banked" emission reductions. Such emission reduction banking is specifically provided for in the revised Regulation VI. In other cases the reduction might be obtained through agreements with other sources. In still other cases, if the construction of the source is in the public interest, the local community or the State might assist in obtaining the required reductions. The local community or the State can also set up a bank of emissions reduction to be used to provide necessary equivalent reductions for new sources.

5. REQUEST FOR EXTENSION IN HARRIS COUNTY

In accordance with Section 172(b) of the Federal Clean Air Act as amended August 1977, an extension to December 31, 1987 of the deadline for demonstration of attainment of the National Ambient Air Quality Standard for Ozone is requested for the Harris County ozone nonattainment area.

a. Requirements for the Request

The Federal Clean Air Act as amended in 1977, requires the demonstration of attainment of each of the criteria pollutants by December 31, 1982. However, in Section 172(a)(2), the Act gives the Administrator of EPA the authority to extend this deadline for ozone and carbon monoxide until December 31, 1987. With this extension are coupled several requirements which must be incorporated into the SIP before the Administrator can grant this extension.

TABLE 6

ANTICIPATED AND REQUIRED EMISSION REDUCTIONS

Urban Nonattainment County	1977 to 1982 Emission Reductions Anticipated						Required Reductions (by 1982)	
	From FMVCP		From RACT[2]		TOTAL[3]			
	Tons	%[1]	Tons	%	Tons	%	Tons	%
Harris	33,500	12.1	43,500	15.7	77,000	27.8	167,300	60
Dallas	25,600	23.1	4,700	4.2	30,300	27.3	30,300	27
Tarrant	13,700	19.1	7,900	11.0	21,600	30.0	14,600	20
El Paso	4,300	14.7	3,100	10.7	7,400	25.4	5,900	20
Bexar	11,500	21.4	700	1.3	12,200	22.7	6,700	12
Nueces	3,000	4.6	19,900	30.4	22,900	35.0	500	<1

[1]Percent of 1977 Baseline

[2]First 10 CTG's (major sources only, except for Harris County) + Stage I

[3]FMVCP + RACT

1) Demonstrate that Attainment is Not Feasible

The State must show that even with the implementation of reasonable control measures, a nonattainment area will not be able to show sufficient reductions in VOC emissions to demonstrate attainment of the ozone standard by 1982.

2) Establish a Schedule for Inspection/Maintenance

Section 172(b)(11)(B) requires the establishment of a specific schedule for implementation of a vehicle emission control inspection and maintenance program.

3) Establish a Program of Alternate Site Analysis

Section 172(b)(11)(A) requires the establishment of a program which requires, prior to issuance of any permit for construction or modification of a major emitting facility, an analysis of alternative sites, sizes, production processes and environmental control techniques for such proposed source which demonstrates that benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction or modification.

4) Improve Public Transportation and Establish a Continuing Process of Air Quality Related Transportation Planning

Section 110(a)(3)(D) requires the establishment, expansion, or improvement of public transportation measures to meet basic transportation needs and the implementation of transportation control measures necessary to attain and maintain the ambient standard.

5) Amend State Implementation Plan

Section 172(c) requires that a revision to the SIP be submitted by July 1, 1982, which contains enforceable measures to assure attainment of the standard by December 31, 1987.

6) Demonstrate Reasonable Further Progress Toward Attainment of the NAAQS for Ozone

Section 172(b)(3) requires that reasonable further progress [as defined in Section 171(1)] including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology.

7) List Additional Measures Necessary

Section 172(b)(11)(C) requires the identification of other

measures necessary to provide for the attainment of the NAAQS not later than December 31, 1987.

b. Response to the Requirements

This plan provides for sufficient VOC emission reductions to satisfy the requirements as determined from the use of the EPA approved modified rollback model for all ozone nonattainment areas except Harris County.

1) Demonstration that Attainment is not Feasible

This plan proposes the imposition of all available reasonable controls on all sources of VOC in all urban ozone nonattainment counties. However, even with all such controls, sufficient reductions will not be achieved in Harris County, as shown in Tables 5 and 6. In Harris County, an additional 32% emission reduction would be required by 1982 to satisfy the requirement for an attainment demonstration as determined from the model.

2) Establishment of a Schedule of Implementation of Inspection/Maintenance

On June 23, 1978, TACB adopted Resolution R78-5 identifying FCAA provisions that may require state legislation. Inspection and maintenance of motor vehicles in post-1982 carbon monoxide or ozone nonattainment areas was cited as one such provision.

The 66th Texas Legislature commenced on January 9, 1979 and after considerable study, consultation, and negotiation between and among members of the Texas Legislature, TACB, and EPA, House Bill 726 was introduced on March 9, 1979. This bill provides for amendment of the Texas Clean Air Act to require TACB, with the cooperation of Texas Department of Public Safety and the State Department of Highways and Public Transportation to:

1) conduct an I/M pilot program,
2) study various feasibility and implementation I/M program options,
3) prepare for an I/M program in Harris County to allow for full implementation of the program not later than December 31, 1982, and
4) report to the 67th Session of the Texas Legislature concerning these requirements on or before December 1, 1980.

H.B. 726 (Appendix I) was adopted by the Legislature, signed into law by the Governor on June 13, 1979, and will become effective as set forth in the law:

"EFFECTIVE DATE. This Act shall become effective upon approval by the Administrator of the Environmental Protection Agency of those provisions of the plan submitted

by the Governor of the State of Texas in accordance with the Federal Clean Air Act Amendments of 1977 which relate to inspection and maintenance of motor vehicles and the use of emission reductions credited to the pilot program established by this Act to allow for new source growth in affected areas."

This provision of the draft legislation was agreed upon by Texas State Representative Tim Von Dohlen and EPA Assistant Administrator for Air, Noise, and Radiation, David Hawkins. A March 9, 1979 letter from Mr. Von Dohlen to Mr. Hawkins (Appendix J) documents this agreement.

Also, on March 9, 1979, EPA Administrator Douglas Costle forwarded to Representative Von Dohlen a letter (Appendix K) indicating this legislation, if adopted, can legally be approved. Following is a quote from that correspondence.

"We have reviewed the draft legislation and believe its passage by the Texas Legislature will satisfy the requirements of the Clean Air Act regarding legal authority for an inspection and maintenance program in the State of Texas. As you know, the Clean Air Act requires our Agency to propose all State Implementation Plan approval actions in the Federal Register for public comment prior to taking final action. This letter is to advise you of our belief that this legislation, if adopted, can legally be approved by EPA. We will propose such approval in the Federal Register after receiving and reviewing the Texas State Implementation Plan.

My staff is also prepared to meet rapidly with the Texas Air Control Board to determine a mutually agreeable level of emission reduction credits associated with this program for inclusion in the State Implementation Plan. The level of emission reduction credits agreed to will also be published for comment in the Federal Register proposal action."

The emission reduction credits cited in H.B. 726 and Mr. Costle's March 9th letter were discussed in a March 22, 1979 meeting between EPA and TACB staff. In that meeting, it was agreed that credits set forth in Table 7 may be accrued for vehicles inspected under a pilot program carried out in Harris County or other affected nonattainment areas and that such emission reductions may be used as offsets for major new sources proposing to locate in the affected areas. Three years of data are provided for information purposes only. This table shall in no way be construed as a commitment for any given period of time for program operation.

TABLE 7

Tons of Non-Methane Hydrocarbon Reduction Achieved In
Indicated Calendar Year For Each 1,000 Light-Duty Vehicles Inspected
During the Indicated Period of Inspection as Part of a Pilot I/M Program

	Calendar Year					
	1980		1981		1982	
Period of Inspection	No Mechanics Training	Mechanics Training	No Mechanics Training	Mechanics Training	No Mechanics Training	Mechanics Training
July, 1979 - June 30, 1980	0.684	1.117	0.640	1.044	0.598	0.976
July 1, 1980 - June 30, 1981	-	-	0.576	0.938	0.538	0.877
July 1, 1981 - June 30, 1982	-	-	-	-	0.506	0.830

These credits were calculated with the following assumptions and conditions;

1. Input parameters to MOBILE 1 emission factor calculations as follows:

   (a) Average temperature = 67.8 (°F)
   (b) Average traffic speeds:

Year	Urban Speed	Rural Speed
1980	35	49
1981	36	49
1982	36	49

   (c) Hot/cold start factors:

	Urban	Rural
PCCO	15.1	7.6
PCBS	37.1	3.0
PCCC	24.4	8.4

   (d) Urban/Rural VMT split:

Year	Urban	Rural
1980	0.916	0.084
1981	0.919	0.081
1982	0.923	0.077

   (e) All other parameters are national averages.

2. Stringency factor of inspection standards = 30%.

3. Rate of repair among failed vehicles = 30%.

4. The vehicles inspected in a given period are assumed to be distributed among model years in proportion to vehicle registration.

5. Once inspected, and possibly repaired, in a given inspection period, vehicles are assumed to not be inspected in following years. Emissions of these vehicles are assumed to deteriorate in parallel with similar vehicles which have never been inspected. (The smaller reduction in the following years, for example 0.640 in 1981 versus 0.684 in 1980 for the group of vehicles inspected in the 1979/80 period, is due to lower mileage accumulation rates with time.)

EPA representatives also agreed that emission reduction credits resulting from inspection of vehicles registered outside of the nonattainment area may be used to offset emissions expected to result from operation of a major new source proposing to locate in Harris County or other affected nonattainment counties where such reductions would be expected to affect the nonattainment area.

3) Establishment of A Program of Alternate Site Analysis

The TACB Permit Application Form PI-1 is being amended to require the applicant to respond as to whether or not an alternate site analysis has been performed. This amended form will become effective as soon as the revision is completed.

4) Improvement of Public Transportation, Establishment of Transportation Planning Process and Evaluation of Alternatives

Public transportation improvements and the transportation planning processes established to identify and select feasible air quality related transportation improvement measures are described in Section 3.c. beginning on page VI-7.

5) Amendment of the SIP

The TACB will monitor the emission reductions and air quality improvement resulting from the imposed control strategies in each of the nonattainment areas. By July 1, 1982, a revision to the SIP will be developed and submitted to EPA which incorporates such additional enforceable measures as may be needed to demonstrate any additional emission reductions required by December 31, 1987.

6) Demonstration of Reasonable Further Progress Toward Attainment of the NAAQS for Ozone

This plan provides for implementation of VOC controls consistent with all Control Technique Guidelines (CTG's) issued by EPA before January 1, 1978 and includes a commitment to consider for adoption control of source categories for which CTG's are issued on or after January 1, 1978 within the year following their year of issuance.

According to guidance received from EPA, in areas where the standard cannot be attained by December 31, 1982, emission reductions of 44% of the total required emission reductions are necessary by that date to demonstrate reasonable further progress. In the case of Harris County, an emission reduction of 27% (44% of the required 62% total reductions needed by 1987 with area source growth included) is therefore required.

As shown in Table 6, anticipated emission reductions from application of controls in accordance with the first 11 Control Technique

Guidelines and the Federal Motor Vehicle Pollution Controls will result in an estimated emission reduction of about 28%, as compared to the 60% required to demonstrate attainment of the standard by 1982.

These sources will provide enough additional emission reductions to meet the 27% reduction requirement for RFP in Harris County.

7) List of Additional Measures Necessary

Since imposition of additional reasonable controls on stationary sources and FMVCP in Harris County will not result in sufficient emission reductions to demonstrate attainment of the standard by December 31, 1982, estimates of additional emission reductions available in the period from December 31, 1982 to December 31, 1987 are necessary. The total reduction in the annual emission for Harris County necessary to demonstrate attainment by December 31, 1987 is estimated as follows:

Reductions Required by 1987	163,700 tons	(59%)
Growth to 1987	8,100 tons *	
Total Required Reductions	171,800 tons	(62%)
Reductions Anticipated From FMVCP (1977 to 1987)	58,000 tons	
Reductions Anticipated From Stationary Sources (First 11 CTG's only)	43,500 tons	
Total Anticipated Reductions	101,500 tons	
Total Reductions From Additional Measures Required by 1987 (Total Required-Total Anticipated)	70,300 tons	

*Growth includes area source growth only since point source emission increases will be compensated for by equivalent reductions from existing point sources.

Control measures in addition to FMVCP and reasonable controls on stationary sources will be necessary in Harris County to provide the additional 70,300 tons reduction necessary to demonstrate attainment of the NAAQS by December 31, 1987. These additional control measures, which could possibly be imposed between 1982 and 1987, are listed and discussed below. The estimated emission reductions to be provided by each is indicated in Table 8, with the possible total of 81,000 tons being sufficient to demonstrate

attainment by December 31, 1987.

TABLE 8

EMISSION REDUCTION ESTIMATES
FROM ADDITIONAL MEASURES

HARRIS COUNTY

ADDITIONAL MEASURES	TONS
Additional CTG's	28,000
2 for 1 Emissions Reduction	18,000
10% Reduction in VMT	5,000
Replacement of RACT and BACT with LAER	10,000
Improvement in Control Technology Assumptions	10,000
Vehicle Inspection and Maintenance Program	10,000
TOTAL	81,000

a) Additional Control Technique Guidelines(CTG's)

The TACB has committed to consideration for adoption reasonable Control Technique Guidelines (CTG's) for each source category for which EPA issues future CTG's. These CTG's which have been proposed are listed in Section 3 and will be referred to here as additional Control Technique Guidelines (additional CTG's). Although it is impossible to predict accurately the timetable for, or exact impact of, their adoption, imposition of controls consistent with these additional CTG's could result in an estimated reduction of as much as 28,000 tons (10% of 1977 baseline emissions).

b) Compensation for Point Source Emission Increases Due to Permitting

By requiring compensating emission reductions in excess of

emissions permitted for new sources, a net reduction in total emissions can be obtained. If a ratio of two-to-one is used in such a program for the years 1982-1987, it could be expected that a net reduction of 18,000 tons could be obtained. The exact amount of the reduction would, of course, be dependant on the actual growth. Larger reductions could be achieved by requiring larger ratios of reductions to new emissions.

c) Reduction in Vehicle Miles Traveled (VMT)

A reduction in emissions from motor vehicles can be accomplished by reducing the projected number of vehicle miles traveled (VMT) by such measures as carpooling and mass transit, or in the extreme, by gasoline rationing. It is not possible at this time to estimate with any substantial degree of accuracy the total impact of transportation control measures on VMT. This is true because the analyses on which such measures will be based are not yet completed. However, it can be assumed that these measures will have a measurable effect over the long term. A recent EPA study[1] estimated that such measures would reduce vehicle emissions by 20% in the Houston area. A more realistic estimate might be a 10% reduction. If this estimate is applied, total area emissions would be reduced by about 5,000 tons by 1987.

d) Replacement of Existing Controls with LAER

Reasonable Available Control Technology and Best Available Control Technology (for sources permitted with BACT), currently applied to existing sources, could be replaced with Lowest Achievable Emission Rates (LAER) control technology resulting in decreased emissions. An estimate of the emission reductions available from this measure is dependent upon the amount of RACT and BACT applied and upon the requirement for reduction of emissions from existing sources to allow for new VOC emissions. It is estimated* that about 4% (10,000 tons) of the 1977 total emissions inventory in Harris County could be reduced by this measure.

1"Analysis of Alternative Policies for Dealing with New Source Growth in Nonattainment Areas," Vol. II: Oxidants Study Area: Houston-Galveston AQCR, EPA August 31, 1978.

*Estimate derived from interpolation of data contained in "Analysis of Alternative Policies for Dealing with New Source Growth in Nonattainment Areas," Vol. II: Oxidants Study Area: Houston-Galveston AQCR, EPA August 31, 1978.

e) Improvement in Control Technology Assumptions

It is expected that new emissions control devices and techniques will be developed and will become available for use during the next nine years. As this technology evolves, TACB rules can be amended to require its application. It is estimated that emission reductions from these new developments in control technology will be in the range of 4% of the 1977 baseline, or 10,000 tons.

f) Vehicle Inspection and Maintenance Program

A reduction in emissions from motor vehicles can be accomplished by implementing a program of inspection and maintenance. If mandated by the state legislature, this program would require an annual inspection of motor vehicles, possibly in conjunction with the safety inspection. Those vehicles with exhaust emissions greater than levels set for that type of vehicle or with engine functions that fail to meet established criteria would be required to be adjusted or repaired. In an area with the vehicle density of Harris County, this measure could be expected to reduce total baseline emissions about 4% or 10,000 tons.

These are rough estimates of reductions that may be possible. Reductions of this magnitude would, however, require some rather extreme control measures on Texas industry and transportation systems. Later studies will be needed to determine the economic and social feasibility of adopting these or possible alternative measures.

6. SOCIAL AND ECONOMIC CONSIDERATIONS OF THE PLAN

This section contains remarks relating to the effect this plan has on the society, public health, and welfare of the state. Also, the effects the plan will have on the economy of the state and the fuel consumption in the state are discussed.

a. Health Effects

Current disagreement within the scientific and medical communities regarding health effects of ozone and photochemical oxidants creates uncertainties which make the assessment of health effects impossible. The reduction of volatile organic compounds in the ambient air will reduce the amounts of certain compounds that may be toxic, carcinogenic, or mutagenic. No health effects data is available, however, to quantify the relation of reductions that will occur to any improvement in health that may result.

b. Social and Public Welfare Effects

It is assumed that other states will enact plans roughly equivalent

to this plan to deal with their ozone problems. Unless this is done, differences in state control requirements could cause a migration of industry from Texas because of its more stringent requirements. This could cause a loss of jobs and increased public welfare needs. Attempts by industry to relocate to attainment areas in Texas are not likely because of the Plan's continuing requirement for application of Best Available Control Technology (BACT) to new sources locating in such areas. BACT will, in all cases, be at least as stringent and, in most cases, more stringent than the RACT prescribed by the plan for existing sources in nonattainment areas.

c. Economic Effects

The exact cost to industry and the public or citizens for compliance with the provisions of this plan that affect stationary sources cannot be accurately computed at this time. This is due to the fact that industry will be allowed to select from all available control methods and equipments so long as emissions do not exceed the limits specified in the plan. It can be predicted with certainty, however, that the economic impacts will be great and far reaching -- probably exceeding 100 million dollars. The economic impact of the changes will be felt most heavily in the urban industrialized centers of Houston, Corpus Christi, and El Paso, but substantial costs for compliance will be incurred in all of the 13 ozone nonattainment areas in the state. Orange, Jefferson, Ector, Brazoria, Galveston, and Victoria Counties, although classified as "rural" will be particularly affected because of their concentrations of petroleum and chemical industries. In some cases the cost is reduced by the value of the product saved, but with some control procedures, capture is not practicable and resort to incineration may be necessary.

Each of the new controls that are required by this plan revision is consistent with guidelines published by the U.S. Environmental Protection Agency. Those guidelines, in most instances, have been developed with the cooperation and assistance of U.S. industry representatives and therefore should represent reasonable and practicable control techniques.

d. Effects on Energy Consumption

As with compliance costs, the possible energy impacts of this revision will vary with the types of controls that may be used to meet the specified emission reduction requirements. It is possible, for example, that the emission limitations can be met by a process change which may result in less energy consumption than before the change. Generally, however, the emission controls will probably be accomplished by the addition of some type of pollution control device, some of which consume fairly large

amounts of energy in the form of electricity to drive fans or compressors or in the form of fuel for incinerators.

7. FISCAL AND MANPOWER RESOURCES

In compliance with the Clean Air Act [Section 110(a)(2)(F)(i)], the financial and manpower resources available to the state and local air pollution control agencies are described in another section of the plan which will be submitted to EPA at a later date. The necessary resources needed to carry out the provisions of this plan are available for the current (1979) fiscal year. The availability of the resources necessary for later fiscal years is dependent upon the appropriation actions of the Texas Legislature and local governments.

8. HEARINGS REQUIREMENTS

a. Requirements

The Clean Air Act (1977) requires evidence of public hearings on the plan [172(b)(1)]. It also requires evidence of legislative involvement of, and consultation with, the public, local government, and State.

b. Notification

In order to comply with the above requirements, notification was accomplished by the following methods:

1. Publication in Area Newspapers
2. Publication in the Texas Register
3. Mailing of Announcements and copies of the Proposed Regulations and Plan to approximately 550 of the following:
   a. Congressmen
   b. Legislators
   c. City and County Officials
   d. Trade and Citizen Organizations
   e. Interested Individuals
4. Making Several Copies of the Regulations and Plan available to the public in each of TACB's twelve (12) Regional Offices.

c. Public Hearings -- November 9-16, 1978

1) Location, Date, Time (work hour and evening session in each city):

Houston	November 9	9:30 AM, 1:30 & 6:30 PM
San Antonio	November 10	1:30 & 6:30 PM

Arlington	November 13	1:30 & 6:30 PM
Odessa	November 14	1:30 & 6:30 PM
El Paso	November 15	1:30 & 6:30 PM
Galveston	November 16	1:30 & 6:30 PM

2) Attendance and Participation

City	Attendance	Oral Presentations	Written Presentations
Houston	216	30	21
San Antonio	35	5	4
Arlington	102	11	10
Odessa	31	3	1
El Paso	32	5	2
Galveston	72	17	20
TOTAL	488	71	58

Additional Written Statements Mailed to Austin 68

Total Written Statements 126

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

C. TOTAL SUSPENDED PARTICULATES (TSP)

CONTENTS

1. INTRODUCTION
2. BASIC STRATEGIES
3. CONTROL STRATEGIES FOR INDIVIDUAL NONATTAINMENT AREAS
4. EMISSIONS INVENTORY
5. MANAGEMENT OF NEW SOURCE GROWTH
6. ECONOMIC AND SOCIAL IMPACTS OF THIS STRATEGY

1. INTRODUCTION

On March 3, 1978, the Administrator of the EPA designated 25 areas in Texas as "nonattainment" for TSP. The nonattainment area (NAA designations were based upon TSP measurements taken in 1976 and the first half of 1977. On March 30, 1979 the TACB adopted Board Resolution 79-2 which requested redesignation of 11 of these areas. The EPA accepted these recommendations and redesignations were published as a proposal in the Federal Register on October 12, 1979. The TACB also requested redesignation of one additional area in the Board Resolution 79-5 adopted on November 16, 1979. The control strategies for the remaining 13 TSP NAA's contained in this section are designed to attain the primary NAAQS for TSP by December 31, 1982, and the secondary NAAQS for TSP as expeditiously as possible (by December 31, 1987), as required by the Federal Clean Air Act Amendments of 1977 and in accordance with guidance received from EPA Region VI (Dallas), who defined "as expeditiously as possible."

2. BASIC STRATEGIES

Preliminary identifications of major sources contributing to nonattainment were made by on-site analyses and by reference to the Texas Air Control Board Attainment Analysis Volume I Causes of Nonattainment (Price, J.H., Gise, J.P., Sievers, H.E., Ehlers, S.E., and Knape, B.K., January, 1977). The results of these analyses indicated that the major causes of nonattainment in all NAA's are: 1) monitors located too close to heavily traveled roads and/or too close to the ground and 2) fugitive dust from agricultural tilling activities; the wind erosion of arid lands; dirty paved streets and parking lots; unpaved streets, parking lots, and alleys; construction activities; and industrial processes. Those NAA's containing a monitor located too close to heavily traveled roads and/or too close to the ground, or influenced by agricultural tilling activities according with EPA's Rural Fugitive Dust Policy were redesignated (see Introduction). Consequently, the overall control strategies for excessive TSP emissions in the remaining TSP NAA's will be to implement changes to TACB Regulation I which provide for increased enforceability and stringency of control of the fugitive dust emissions from materials handling; construction activities;

and the use and maintenance of roads, streets, alleys, and parking lots. These controls will be required only in TSP NAA's to the extent required for attainment and maintenance of the ambient particulate standards.

The revised Regulation I represents the application of Reasonably Available Control Technology (RACT) for TSP in TSP NAA's, as required by the Federal Clean Air Act Amendments of 1977 and in accordance with guidance received from EPA Region VI. Changes to Regulation I will result in substantial reductions of particulate emissions and are expected to result in attainment in all TSP NAA's. However, in case later measurements indicate that problems persist or recur, joint TACB/local air pollution control agency studies and analyses will be conducted to identify the causes of and the corrective actions to be taken to resolve such problems (see Table 9). These joint studies and analyses will involve the TACB and local air pollution control agencies in Houston, Dallas, Fort Worth, San Antonio, and El Paso.

3. CONTROL STRATEGIES FOR INDIVIDUAL TSP NAA's

This section contains a preliminary description of the problems, major causes of nonattainment, and examples of additional control measures which could be implemented to achieve the primary and/or secondary NAAQS in each TSP NAA. These examples do not represent firm commitments; they are all subject to change as a result of the joint studies and analyses which may reveal more desirable alternatives. The calculations contained in Appendix L demonstrate that attainment of the primary NAAQS for TSP by December 31, 1982, and of the secondary NAAQS for TSP by December 31, 1987, will be possible through the effective enforcement of the revised TACB Regulation I. Baseline air quality data used in this section and in Appendix L for Aldine, Dallas 2, and Fort Worth 1 are from 1976 and the first half of 1977, baseline air quality data for all other areas are from 1976 and 1977. For a complete description of the boundaries of the NAA's, see Appendix M.

a. Nonattainment Areas for Which Control Strategies Have Been Developed

Aldine

Standard Exceeded:	Secondary
TACB/EPA Region:	7/216
Monitor (SAROAD) No.:	2330024 F01

The baseline air quality shows an exceedence of only the secondary NAAQS, with a second-high 24-hour average of 181 $\mu g/m^3$ (corresponding roughly to an AGM of 65 $\mu g/m^3$). Preliminary studies and analyses have shown that the primary causes of nonattainment here are fugitive dust emissions from streets, roads, and parking lots. Fugitive dust emissions from streets, roads, and industrial and commercial parking lots will be controlled in accordance with the rules in the changes to TACB Regulation I; these controls will yield sufficient reductions of TSP in the vicinity of the monitor to achieve attainment of the secondary NAAQS for TSP by December 31, 1987, as shown in Appendix L-1.

TABLE 9 - SCHEDULE OF TSP CONTROL ACTIONS

EVENT	TARGET DATE 1978	1979	1980	1981	1982	1983	1987	1988
Negotiations among the TACB and local air pollution control agencies regarding the responsibilities for development of control strategies for excessive TSP emissions in each TSP NAA.	▲—▲							
Joint study and investigation by the TACB and local air pollution control agencies of the major TSP sources, problems, and possible corrective actions to be taken in each TSP NAA.		▲—▲						
Joint study by the TACB and local air pollution control agencies of the effectiveness and economic reasonableness of all possible TSP control measures.		▲——▲						
Submittal of the initial SIP revision to EPA, principally involving changes to TACB Regulations I and VI.		▲						
Continued monitoring to determine progress toward attainment status.		▲——▲						
Relocation of improperly sited monitors.		▲——▲						
If later monitoring indicates the need, submittal of additional SIP revisions for control measures over and above those required by TACB Regulation I to attain the primary NAAQS for TSP by December 31, 1982; the additional control measures will be determined from the joint studies by the TACB and local air pollution control agencies.				▲—▲				
If later monitoring indicates the need, submittal of additional SIP revisions for control measures over and above those required by TACB Regulation I to attain the secondary NAAQS for TSP by December 31, 1987; the additional control measures will be determined from the joint studies by the TACB and local air pollution control agencies.					▲—▲			
Completion of all previously approved control measures required for attainment of the primary NAAQS for TSP.						▲		
Completion of all previously approved control measures required for attainment of the secondary NAAQS for TSP.								▲

3/30/79

Houston 1

Standard Exceeded:	Primary
TACB/EPA Region:	7/216
Monitors (SAROAD) No.:	2560015 H01 2560017 H02 2560019 H01
	2560034 F01 2560035 H01 4060002 H01

Monitors with SAROAD Nos. 2560015, 2560017, and 2560019 do not conform to established siting criteria and will be moved on or before December 31, 1979, within the NAA to sites which will be more representative of the ambient air in this area of Houston. The baseline air quality from the remaining monitors does show exceedence of the primary NAAQS, with AGM values of 89, 137, and 79 $\mu g/m^3$ representing monitors 2560034, 2560035 and 4060002. The major causes for nonattainment of the standards here have been identified as fugitive dust emissions from commercial establishments' unpaved parking lots, unpaved roads, dirty paved streets (Clinton Drive, which is heavily traveled by trucks, has unpaved shoulders and is quite dirty), and fugitive emissions from industrial stockpiles. Computer modeling indicates that TSP contributions from stationary sources in this NAA are negligible (see Figure 1, Appendix N). Compliance with the changes to TACB Regulation I will yield sufficient reductions in fugitive dust emissions from commercial and industrial properties to achieve the primary NAAQS for TSP by December 31, 1982, as shown in Appendix L-2. However, the TACB and the local air pollution control agency here will analyze for the reasonableness and cost effectiveness of additional control measures, which may include paving and curbing of the shoulders on Clinton Drive from N. Wayside Drive to Federal Road (about 4.5 miles), paving of Clinton Park Street and the access road to Clinton Drive in front of the monitor with SAROAD No. 2560035 following Clinton Drive to Fidelity Health Center, and rigorous cleaning of Clinton Drive from N. Wayside Drive to Federal Road. If future monitoring indicates that such added action is necessary, the SIP will be amended as may be mutually agreeable between the TACB and the local government.

Dallas 2

Standard Exceeded:	Secondary
TACB/EPA Region:	8/215
Monitor (SAROAD) No.:	1310018 H01

This monitor was installed not to measure ambient air quality, but to serve as a source-oriented monitor to enable the City of Dallas to enforce its lead ordinance. The monitor is located about 0.25 miles north of two major secondary lead smelters (NL Industries and Dixie Metals, both of which are currently under court orders to comply with certain Rules of current Regulation I). The NAA designation should be removed because of the nature of the monitor's location; however, even if this is not done, compliance of industrial and commercial establishments with changes to TACB Regulation I as shown in Appendix L-3, and the reductions of fugitive dust emissions from the lead smelters by compliance with the provisions of the court orders and the Dallas lead ordinance will result in attainment of the secondary NAAQS for TSP by December 31, 1987. The baseline air quality here shows an exceedence of only the secondary NAAQS, with a second-high 24-hour average of 155 $\mu g/m^3$ (corresponding roughly to an AGM of 61 $\mu g/m^3$).

Fort Worth 1

Standard Exceeded:	Secondary
TACB/EPA Region:	8/215
Monitor (SAROAD) No.:	1880007 H01
	1880061 H01

The monitor with SAROAD No. 1880007 is located on the ground and cannot reasonably be used for determining attainment or nonattainment, as it does not conform to established siting criteria. The baseline air quality from the properly located monitor in this area shows an exceedence of only the secondary NAAQS, with a second-high 24-hour average of 155 $\mu g/m^3$ (corresponding roughly to an AGM of 61 $\mu g/m^3$). The major causes for nonattainment of the standard have tentatively been identified as fugitive dust emissions from uncurbed and dusty streets in the NAA. Compliance with amended TACB Regulation I should result in attainment, as shown in Appendix L-4. If later monitoring indicates that additional control actions are necessary, the measures identified in studies and analyses conducted by the TACB and the local government can be implemented to obtain additional reductions. Additional measures that will be studied include curbing of all the uncurbed streets in the NAA (28th, Loraine, 29th, Dewey, and 30th Streets from Weber Street to Hale, and Hale, Hutchinson, Oscar, Schwartz, Lulu and Weber Streets from 28th Street to 30th Street - a total of about 3.2 miles of streets).

El Paso 1

Standard Exceeded:	Primary	
TACB/EPA Region:	11/153	
Monitor (SAROAD) No.:	1700002 F01	1700021 G01
	1700015 G01	1700022 G02
	1700018 G01	1700027 F01
		1700028 F01

Monitors with SAROAD Nos. 1700022 and 1700027 do not conform to established siting criteria and will be moved on or before December 31, 1979, within the NAA to sites which will be more representative of the ambient air in this area of El Paso. The baseline air quality from the properly located monitors shows an exceedence of the primary NAAQS, with AGM values of 110, 145, 122, 96 and 131 $\mu g/m^3$ representing monitors 1700002, 1700015, 1700018, 1700021 and 1700028. The major causes for nonattainment of the standards here have been identified as fugitive dust emissions from the wind erosion of nearby arid land areas and from commercial establishments' unpaved parking lots and roads. Computer modeling indicates that TSP contributions from stationary sources in this NAA are negligible (see Figure 2, Appendix N). Compliance with the changes to TACB Regulation I will yield substantial reductions in fugitive dust emissions from commercial and industrial properties and from construction activities, and may be expected to result in attainment of the primary and secondary NAAQS for TSP, as shown in Appendix L-5. However, infrequent exceedences of the NAAQS for TSP may occur due to the wind erosion of the nearby arid land areas. No reasonable or cost effective control measure for this natural phenomenon is currently

known; however, fugitive dust from this natural source is largely not toxic or respirable. The TACB and the local air pollution control agency will continue to study and analyze the reasonableness and cost effectiveness of control measures.

El Paso 2

Standard Exceeded:	Primary
TACB/EPA Region:	11/153
Monitor (SAROAD) No.:	1700025 G01

The baseline air quality shows an exceedence of the primary NAAQS, with an AGM of 99 $\mu g/m^3$. The major causes for nonattainment of the standards here are fugitive dust emissions from the wind erosion of nearby arid land areas. Compliance with the changes to TACB Regulation I will yield substantial reductions in fugitive dust emissions from commercial and industrial properties and from construction activities, and may be expected to result in attainment of the primary and secondary NAAQS for TSP, as shown in Appendix L-6. However, infrequent exceedences of the NAAQS for TSP may occur due to the wind erosion of the nearby arid land areas. No reasonable or cost effective control measure for this natural phenomenon is currently known; however, fugitive dust from this natural source is largely not toxic or respirable. The TACB and the local air pollution control agency will continue to study and analyze the reasonableness and cost effectiveness of control measures.

b. Nonattainment Areas for Which Control Strategies are Being Developed

Strategies are being completed according to procedures outlined in Section 2, above, for the following areas:

San Benito
Brownsville
Corpus Christi 1
Corpus Christi 2
Dallas 1
Dallas 3
El Paso 4

4. EMISSIONS INVENTORY

The TSP Emissions Inventory is included in Appendix O. Emission inventories for point sources were obtained from information gathered by the TACB; emission inventories for fugitive sources were calculated as explained in Appendix L entitled "CALCULATION OF AIR QUALITY IMPROVEMENTS THAT SHOULD RESULT FROM IMPLEMENTATION OF THE TOTAL SUSPENDED PARTICULATE CONTROL STRATEGIES." In industrialized NAA's point

sources have emission inventories much larger than those of fugitive sources. However, using the POINT-AREA-LINE (PAL) Model to obtain average annual particulate concentrations at several monitoring locations in the Houston and in one of the El Paso NAA's indicates that contributions from the point sources are negligible (see Appendix N).

5. MANAGEMENT OF NEW SOURCE GROWTH

No major new emissions source that would cause an exceedence of a TSP NAAQS at any location in Texas or would contribute to an existing TSP annual standard exceedence by 1 microgram per cubic meter or more, or to an existing 24-hour standard exceedence by 5 micrograms per cubic meter or more will be permitted to begin construction or operation until it can be assured that the provisions of TACB Regulation VI as pertain to such new source, will be met.

6. ECONOMIC AND SOCIAL IMPACTS OF THIS STRATEGY

The cost of implementation of the more stringent rules contained in the changes to TACB Regulation I will be borne principally by industries, construction companies, commercial establishments, and State and local governments. Since several measures to control each category of excessive fugitive TSP emissions are allowable and available, no implementation cost can be estimated. However, several recent studies have shown that the cost of particulate control through implementation of the proposed control measures should be considerably less than industrial point source or process controls.

The possible energy impacts of the implementation of this strategy will also vary with the types of control measures chosen to implement the provisions contained in the changes to TACB Regulation I. Generally, however, fairly large amounts of energy will be used in TSP NAA's in the operation of machinery to stabilize (with water or chemicals) land areas which have been cleared for construction activities and for the operation of machinery to water, oil, pave, or clean roads, streets, alleys, and parking lots.

Particles of soil generally are large enough not to be respirable and are usually non-toxic. In urban areas, however, it is likely that toxic or smaller particles from industrial and vehicular sources may either be attached to or mixed with the larger particles that constitute the largest portion of the total mass of TSP as measured by the high-volume air samplers. Consequently, significant health benefits should result from implementation of the proposed fugitive dust controls within the TSP NAA's, which are generally heavily industrialized and populated.

The implementation of this strategy may provide some social benefit in small areas. For limited TSP NAA's in the industrialized areas of Dallas, El Paso, and Harris Counties, human enjoyment of the environment may increase as a result of the lowered dust levels; objects such as clothing, streets, cars, buildings and furnishings will remain relatively dust-free for longer periods of time.

D. CARBON MONOXIDE

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1. GENERAL
2. AIR QUALITY
3. EMISSIONS REDUCTION REQUIREMENT
4. EMISSIONS INVENTORY
5. MANAGEMENT OF NEW SOURCE GROWTH
6. PROPOSED CONTROL STRATEGY

1. GENERAL

Measurements made by two TACB monitoring stations in the City of El Paso indicate that the eight-hour National Ambient Air Quality Standard for Carbon Monoxide was exceeded on five occasions during the fall and winter of 1976. As a result of these measurements, a carbon monoxide nonattainment area which encompasses much of the downtown area of El Paso (see Appendix P) was designated by the Administrator of EPA on March 3, 1978.

Careful examination of the air quality meteorological and emissions data has not yet resulted in any definitive explanation of the causes for these measured exceedences. In El Paso emissions from motor vehicles represent the predominant source of carbon monoxide. Emissions from major industrial sources located in the United States and impacting on the nonattainment area are not significant. El Paso is unique among Texas cities, however, with respect to surrounding terrain and proximity to a foreign city. It appears that the terrain of the El Paso area accentuates the concentration effects of low wind speed and desert temperature inversions. Sufficient detailed meteorological data are not available, however, to determine the nature of the combination of conditions that result in concentrations which exceed the standard.

Compounding the problem is the lack of specific emissions data from Juarez, and possible inaccuracies in the monitoring data due to the use of monitoring equipment not recognized by EPA as equivalent to the approved reference method of measurement. Since it is difficult to determine the cause of the measured exceedences, it is also difficult to specify control strategies which would prevent recurrence of such exceedences. In general, however, reductions of vehicle emissions from the Federal Motor Vehicle Control Program will result in sufficient air quality improvement to attain the standard. Additional emission reductions in the City of Juarez resulting from the recent Memorandum of Understanding between the Subsecretariat for Environmental Improvement of Mexico and the Environmental Protection Agency, and from general traffic improvement measures which have been recently implemented or are proposed by the City of El Paso, will also help in

attaining and maintaining the standard.

2. AIR QUALITY

a. General

TACB air monitoring data show that from time-to-time people in downtown El Paso are exposed to higher levels of carbon monoxide than any other point in Texas at which we have measurements. During the past four years the national ambient air quality standard for CO has been exceeded on ten occasions. It is difficult, however, to determine precisely the amount by which carbon monoxide levels in El Paso should be considered to exceed the national ambient air quality standard.

b. Instrumentation

The TACB monitoring stations in El Paso were deployed in 1973 and 1974 and are both equipped with an instrument which measures carbon monoxide through catalytic conversion to methane and subsequent detection by a flame ionization detector. In 1975 EPA listed the methods to be used to measure air quality for the six criteria pollutants and referred to approved methods as either reference or equivalent methods. The gas chromatograph flame ionization method used in TACB monitoring stations to measure carbon monoxide was not listed by EPA as either a reference or equivalent method. The continuous CO monitors used by the TACB in state monitoring trailers were bought and installed with EPA approval and, in part, with EPA funds. EPA has granted a waiver for continued use of these monitors until 1980, after that time monitoring must be done by a reference or equivalent method.

The staff is confident that the monitoring method used for carbon monoxide in Texas is reasonably reliable and that the clear pattern of the thousands of data points indicating carbon monoxide levels in El Paso tend to be higher than elsewhere in Texas is correct. However, while there is little doubt about the validity of the general picture the data give, the accuracy of any single number or small group of numbers produced by an unapproved measurement technique cannot be assumed to be totally reliable.

c. Selection of Design Value

A problem arises because of the nature of the current air quality standard and the EPA requirement that a single number, the "design value", be used to judge whether a control strategy is adequate to attain the eight-hour national ambient air quality standard for carbon monoxide of 9 ppm, not to be exceeded more than once a year. According to EPA guidance for determining the design value, the highest second-high value measured during the past four years (1975-78) should be used as a "design value" to

determine the adequacy of the control strategy to attain the eight-hour national ambient air quality standard for CO. Over the four-year period 10 measurements (ranging from 9.4 to 13.5 ppm) have exceeded the eight-hour standard with the highest second-high recorded value being 12 ppm. Thus, the design value, using EPA criteria should be set at 12 ppm.

3. EMISSION REDUCTIONS REQUIREMENT

Using the 12 ppm design value in the linear rollback equation, Required Reduction = $\frac{\text{Design Value - Standard}}{\text{Design Value}}$, an emission reduction requirement of 25% is obtained.

4. EMISSIONS INVENTORY

The emissions inventory for carbon monoxide sources in the nonattainment area is shown in Table 11. This inventory was prepared by using the MOBILE 1 computer program for motor vehicle sources which contribute more than 99% of the total carbon monoxide emissions in this area. Input data for this program (VMT, speed, temperature, percentage of hot and cold starts, vehicle age distribution, and vehicle type distribution) were obtained from the Texas Department of Highways and Public Transportation. Since the altitude of El Paso is above 300 feet, the emission factors used were based on interpolation between factors obtained by exercising MOBILE 1 for both low and high altitudes. Also included is an estimated 5% reduction in VMT between 1977 and 1982 due to an estimated doubling of gasoline price in that period.

The emission reductions from 1977 to 1982 in Table 11 reflect the effects of the Federal Motor Vehicle Control Program (FMVCP) on emissions in El Paso. The projected emission reductions shown in Table 11 represent 29.4% of the 1977 emissions inventory of carbon monoxide, and thus indicate attainment of the standard by December 1982.

5. MANAGEMENT OF NEW SOURCE GROWTH

Little or no growth is anticipated in carbon monoxide emissions from industrial sources in the El Paso nonattainment area. No major new emissions source that would cause an exceedence of carbon monoxide NAAQS at any location in El Paso or would contribute to an existing carbon monoxide eight-hour standard exceedence by 0.5 milligrams per cubic meter or more or to an existing one-hour standard exceedence by 2 milligrams per cubic meter or more will be permitted to begin construction or operation until it can be assured that the provisions of revised TACB Regulation VI as pertain to such source, will be met.

6. PROPOSED CONTROL STRATEGY

Since reductions from the Federal Motor Vehicle Control Program will be greater than necessary to demonstrate attainment of the standard by 1982 (25%), no additional carbon monoxide controls are planned for El Paso at the present time. Between now and 1982, efforts of the TACB will be directed toward obtaining reference-equivalent carbon monoxide measurements for the El Paso area, close monitoring of vehicular emissions and air quality trends, active cooperation with the El Paso transportation planning agency to obtain the maximum pollution reduction effect of transportation improvement methods, and continuance of our program of assistance to the Mexican government in developing pollution control programs.

If our continuing study of the carbon monoxide problem in El Paso suggests that additional controls are required to attain and maintain the carbon monoxide standard, an SIP revision will be proposed incorporating the necessary additional control measures.

TABLE 10

1977 Emissions Inventory
and Projected 1982 Emissions Inventory
(Tons/Year)

El Paso Carbon Monoxide Nonattainment Area

AREA	1977 CO EMISSIONS	1982 CO EMISSIONS	REDUCTION
EL PASO NAA	29,095	20,532	29.4%