REVISIONS TO THE STATE IMPLEMENTATION PLAN FOR INHALABLE PARTICULATE MATTER (PM_{10})

1991 PM_{10} SIP FOR MODERATE AREA - EL PASO

TEXAS AIR CONTROL BOARD
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CONTENTS

C. INHALABLE PARTICULATE MATTER (PM_{10}) (Revised)

1. INTRODUCTION

In 1970, the Federal Clean Air Act (FCAA) required the United States Environmental Protection Agency (EPA) to establish and periodically revise National Ambient Air Quality Standards (NAAQS). The NAAQS for particulate matter (PM), measured as total suspended particulates (TSP), was promulgated in 1971.

In 1987, EPA promulgated a new particulate NAAQS. The new standard replaced TSP with PM_{10}, the concentration of all particles with an aerodynamic diameter of 10 micrometers or less. The 24-hour PM_{10} NAAQS is 150 micrograms per cubic meter ($\mu g/m^3$), not to be exceeded more than once per year averaged over a three-year period. The annual PM_{10} NAAQS is 50 $\mu g/m^3$, calculated as the arithmetic mean of 24-hour concentrations.

Also in 1987, EPA published a Federal Register notice categorizing areas in the country into three groups based on the probability that an area would violate the PM_{10} NAAQS. Areas with 95 percent or greater probability of violating the NAAQS were classified as Group I. Areas where the probability of nonattainment was estimated at greater than 20 percent, but less than 95 percent, were classified as Group II. Areas with a low probability of nonattainment (less than 20 percent) were classified as Group III. Based on these classifications, EPA identified El Paso as a

Group I area and Harris, Dallas, Nueces, and Lubbock Counties as Group II areas. All other Texas counties were designated as Group III areas. In response to these designations, the Texas Air Control Board (TACB) submitted Group II and III State Implementation Plans (SIPs) to EPA in July 1988. Because of the unique issues arising from the international nature of the PM_{10} problem in El Paso, EPA allowed the TACB to submit an "Interim SIP" for that area in August 1989. In accordance with EPA's guidelines, the SIP contained information on several issues, including a commitment to work with EPA to continue studies to characterize the nature of the PM_{10} being transported into El Paso from the Ciudad Juarez, Mexico (Juarez) area.

On November 15, 1990, new FCAA amendments were enacted. The FCAA specified that all former Group I areas and any areas violating the PM_{10} NAAQS prior to January 1, 1989 were to be designated as "nonattainment." The FCAA defines two categories: "moderate" and "serious." All PM_{10} nonattainment areas were initially classified as "moderate" at the time of enactment of the FCAA, and for these areas, an attainment date of December 31, 1994 was established. The FCAA further required that all areas which had attained the PM_{10} NAAQS by the time of enactment be designated by EPA as "unclassifiable."

According to EPA, El Paso and Lubbock are the only areas in Texas which had not attained the PM_{10} NAAQS by the time of enactment of the FCAA and, thus, were designated as "moderate" nonattainment areas. In April 1991, the TACB petitioned EPA to reclassify Lubbock as "unclassifiable," asserting that the PM_{10} concentrations which indicated the area to be in violation of the PM_{10} NAAQS were caused by dust storms. The TACB maintained that dust storms are exceptional events and, as such, should not be considered in the nonattainment designation process. On August 8, 1991, EPA published a Federal Register notice reclassifying Lubbock as "unclassifiable" for PM_{10}.

2.-3. (No change.)

4. 1991 PM_{10} SIP For Moderate Area - El Paso (New)

a. "Moderate" Area PM_{10} SIP Requirements

The 1990 FCAA requires states to submit SIPs for all areas initially designated as "moderate" nonattainment areas for PM_{10}. The SIP must demonstrate that the area will attain the PM_{10} NAAQS as expeditiously as possible, but not later than December 31, 1994. EPA's guideline document for preparation of PM_{10} SIPs for "moderate" areas (April 2, 1991) requires that each SIP contain specific components. The following section explains how this SIP addresses these requirements as well as components specific to the El Paso area.

1) Definition of "Moderate" Nonattainment Area Boundary and Air Quality Status. This component, found in Section C.4.b, defines the area of El Paso over which the PM_{10} NAAQS is violated and summarizes the short-term and annual ambient PM_{10} data collected by the TACB and the El Paso City-County Health District (EPCCHD) during the period 1986 through 1990.

2) Special Receptor Modeling Studies. This component contains a discussion of the objectives and accomplishments of special studies conducted in El Paso and Juarez by the TACB, EPA, EPCCHD, and Mexico's Secretariat of Urban Development and Ecology (SEDUE). Emphasis is placed on the intense special study conducted in December 1990. The design of these studies has been based on convincing evidence that high PM_{10} concentrations in the El Paso area constitute an international problem requiring extensive study and thoughtful resolution. The studies and subsequent analyses have included PM_{10} and meteorological monitoring in both El Paso and Juarez, trends analyses of the monitoring data, trajectory analyses demonstrating PM_{10} transport from Juarez into El Paso,

and laboratory analyses of air samples. Available results are discussed in Section C.4.c.

3) New Source Review (NSR) Permit Program. This program governs the issuance of permits for the construction and operation of new and modified major stationary sources of PM_{10}. Although this SIP component is not required to be submitted until June 30, 1992, EPA has issued guidance regarding interim NSR requirements. In January 1983, the TACB adopted §116.3(a)(11), requiring new major sources or major modifications of PM_{10} constructed or modified after June 1979 to comply with the Lowest Achievable Emission Rate, meet all applicable state and federal emission limitations and standards, and provide appropriate PM_{10} emission reductions (offsets).

4) Attainment Demonstration. This component must demonstrate attainment of the PM_{10} NAAQS by December 31, 1994, or demonstrate that attainment by that date is impracticable. Title VIII of the 1990 FCAA provides that "moderate" areas will not be redesignated as "serious" if the state can demonstrate that such an area would achieve attainment by the deadline if it were not for air

quality impacts caused by another country. In response to the Title VIII provision, the TACB has demonstrated attainment of the PM_{10} NAAQS through dispersion modeling of United States (U.S.) emissions alone. Section C.4.e. documents modeling techniques and results.

5) Quantitative Milestones. The 1990 FCAA requires that PM_{10} SIPs contain emissions reduction milestones to be achieved every three years, and to demonstrate reasonable further progress (RFP) towards attainment. The SIPs for the "moderate" PM_{10} nonattainment areas are due November 15, 1991 and must demonstrate attainment by December 31, 1994, only 46 days beyond the November 15, 1994 milestone date. Therefore, EPA has determined that the emission reduction progress made between the SIP submittal date and the attainment date will satisfy the RFP three-year quantitative milestone for the "moderate" area SIPs. No additional quantitative milestone information is being submitted through this SIP.

6) Reasonably Available Control Measures (RACM). EPA guidance requires that RACM must include control measures for non-stationary sources of

fugitive dust, residential wood combustion, and prescribed burning. States can determine that one or more of these control measures are unreasonable based on the technological and/or economic infeasibility of the measures. States may identify additional control measures that should be implemented. After appropriate RACMs are identified, these measures must be converted into legally-enforceable rules. The 1990 FCAA requires that SIPs for initial "moderate" areas must provide for implementation of RACM by December 10, 1993. Section C.4.d. contains the TACB's emissions inventory for the El Paso area, Section C.4.f. contains a discussion of RACM, and Section C.4.g. summarizes new TACB air quality regulations for the El Paso area.

7) Reasonably Available Control Technology (RACT). RACT includes control of existing stationary sources of stack, process, and fugitive particulate emissions. EPA guidance requires that all major stationary sources be covered in the RACT analysis, but that such analysis could also include other applicable sources. RACT for a particular source is determined on a case-by-case

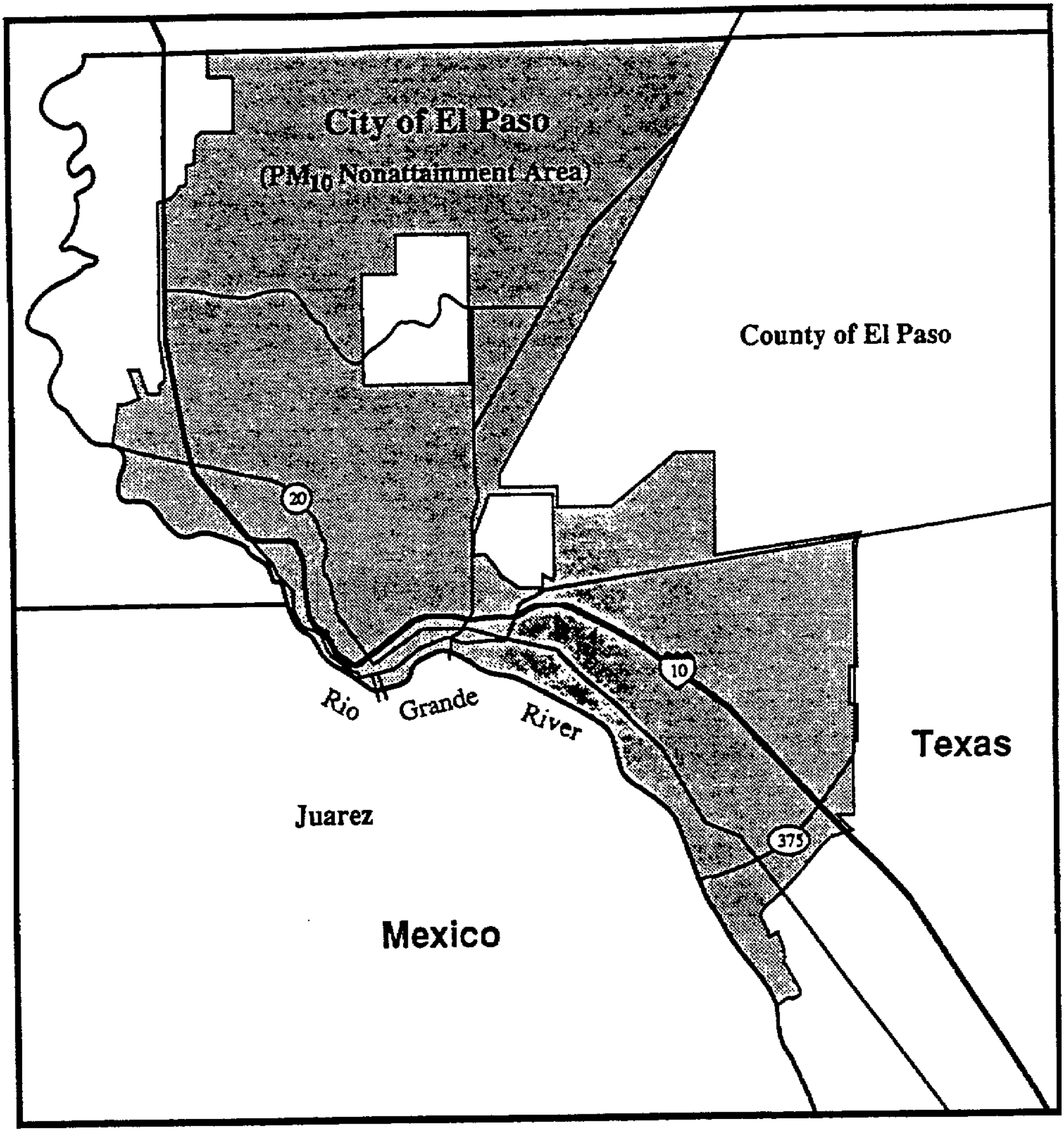
basis and considers the technological and economic feasibility of reducing emissions from that source. The 1990 FCAA requires that SIPs for initial "moderate" areas must provide for implementation of RACT by December 10, 1993. Section C.4.f. contains a discussion of RACT measures for the El Paso area.

b. Definition of Moderate Area Boundary and Air Quality Status

1) Nonattainment Area Boundary

The Federal Register notice listing PM_{10} area classifications (Vol. 56, No. 51, March 15, 1991) designated the City of El Paso as a "moderate" PM_{10} nonattainment area. A map delineating the boundaries of the nonattainment area is shown in Figure 9.

FIGURE 9



El Paso "Moderate" PM_{10} Nonattainment Area

NOTE: Shaded area represents the designated nonattainment area.

2) Air Quality Status

a) PM_{10} Monitoring Site Locations

A list of sites in the El Paso area where PM_{10} has been routinely monitored during the past several years is presented in Table 16. For each monitoring site, the table shows Storage and Retrieval of Aerometric Data/Aerometric Information Retrieval System (SAROAD/AIRS) numbers, the type of site, frequency of monitoring, and the start and end dates of monitoring. Figure 10 shows the location of each PM_{10} monitoring site.

b) Summary of PM_{10} Air Quality - 1986 through 1990

A summary of PM_{10} measurements at each El Paso area monitoring site during the period 1986 through 1990 is presented in Table 17. For each site and year, the table shows the maximum measured 24-hour PM_{10} concentration as well as the annual average concentration.

The data in Table 17 includes dust storm days during which there have been a number of monitored exceedances of the 24-hour PM_{10} standard. Because of the desert environment, high wind speeds associated with dust storm events may cause blowing dust from naturally exposed areas located both inside and outside of the

TABLE 16

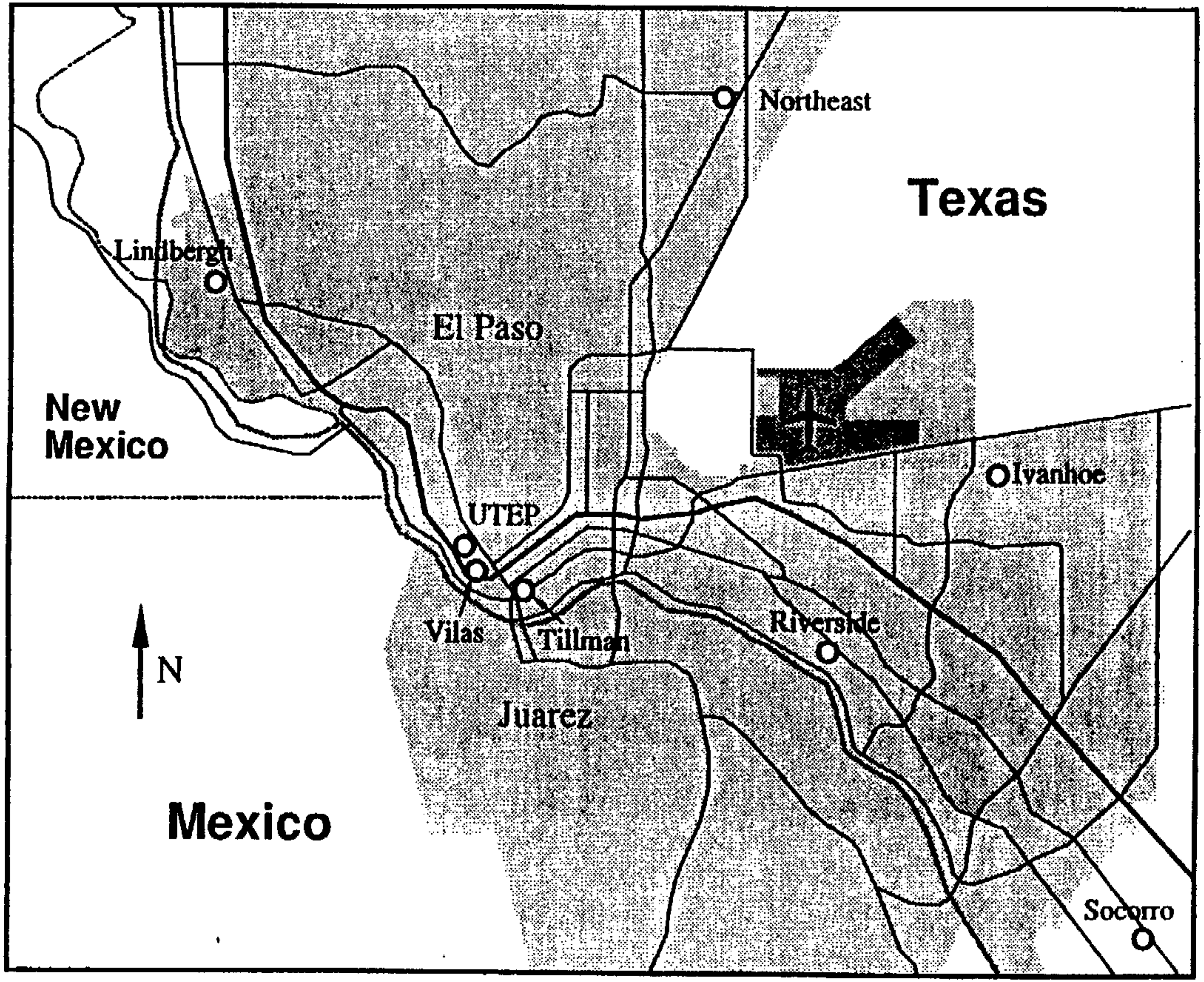
El Paso PM_{10} Monitoring Sites

Name	SAROAD #	AIRS #	Type	Frequency	Start	End
Tillman	451700002G01	481410002	NAMS	Daily	03/05/85	Current
Northeast	451700010G01	481410010	SLAMS	6th Day	10/12/88	Current
Ivanhoe	451700029G01	481410029	NAMS	6th Day	10/12/88	Current
UTEP	451700037F01	481410037	SPM	Every Other Day	03/02/85	6/30/88
Riverside	451700038G01	481410038	SLAMS	6th Day	10/12/88	Current
Vilas	451700041F01	481410041	NAMS	Every Other Day	08/31/88	Current
Socorro	451700043F01	481410043	SPM	6th Day	01/06/91	Current
Lindbergh	451700045F01	481410045	NAMS	6th Day	08/31/88	Current

Abbreviations

NAMS - National Air Monitoring Station
SLAMS - State and Local Air Monitoring Station
SPM - Special Purpose Monitor

FIGURE 10



PM_{10} Monitoring Sites In El Paso

TABLE 17

Air Quality Summary for El Paso PM_{10} Monitoring Sites 1986-1990

Year	Site	Maximum 24-hr Concentration (µg/m³)	Annual Average Concentration (µg/m³)
1986	Tillman	323	58.8
	UTEP	185	42.9
1987	Tillman	202	53.9 *
	UTEP	120	38.5 *
1988	Tillman	263	62.2 *
	Northeast	52	28.8 *
	Ivanhoe	59	30.6 *
	UTEP	139	41.0 *
	Riverside	104	56.2 *
	Vilas	215	92.1 *
	Lindbergh	57	36.2 *
1989	Tillman	272	58.1
	Northeast	66	26.8 *
	Ivanhoe	63	26.4
	Riverside	88	40.5 *
	Vilas	412	68.7
	Lindbergh	113	32.8
1990	Tillman	229	51.2
	Northeast	102	24.3
	Ivanhoe	68	25.2
	Riverside	108	36.8
	Vilas	176	53.8
	Lindbergh	71	26.4
	NAAQS	150	50

*Insufficient data capture for comparison with NAAQS.

El Paso nonattainment area. Therefore, high PM_{10} levels would be expected in association with dust storms in the El Paso desert environment even if the area were not developed. Consequently, control strategies for El Paso are not specifically oriented toward the control of emissions caused by dust storms, although road cleaning measures will help mitigate the effect of PM blown from naturally exposed areas onto roadways during dust storms. Additional discussion of dust storms is provided in the following section.

c) Meteorological Events Associated with High PM_{10} Levels

For the period 1986-1990, the TACB staff conducted a study of meteorological events associated with high particulate levels in the El Paso area. The study concluded that exceedances of the PM_{10} standard occurred most frequently during the winter months and that the majority occurred during stagnant air events. The study also found that high levels of PM_{10} occurred with gusty winds (dust storms), but on a less frequent basis than during air stagnation conditions. A detailed discussion of the meteorological causes of high PM_{10} concentrations in the El Paso area is presented in Appendix H. This appendix contains tables and bar graphs which relate exceedances of the PM_{10} NAAQS during the period 1986-1990 to specific types of meteorological events.

d) Special Studies

As mentioned previously, the PM_{10} data discussed above have been obtained from the routine PM_{10} monitoring sites in the El Paso area. However, special air monitoring studies have been conducted in the El Paso/Juarez air basin over the past several years, the most intense of which was conducted during December 1990. These studies have been conducted to better understand the causes of high PM_{10} in the area, the spatial/temporal trends in PM_{10} air quality, and the potential for transport of PM_{10} from Juarez into El Paso. Descriptions of these studies, and available results from the December 1990 study, are presented in Section C.4.c. and Appendices I and J of this document.

c. <u>Special Receptor Modeling Studies</u>

1) Background and Objectives

The routine PM_{10} monitoring network of size-selective high volume samplers in El Paso does not provide sufficient data for fully understanding the nature and location of the major sources contributing to the high PM_{10} levels in the air basin containing El Paso and Juarez. Nor does the data available from the routine network provide adequate information for analyzing spatial/temporal PM_{10} trends and PM_{10} transport into and within the basin (particularly, transport of PM_{10} from Juarez into El Paso). Thus, special ambient PM_{10} studies have been conducted in a joint effort among the TACB, EPA, the City of El Paso, and SEDUE to obtain additional information to better understand the PM_{10} problem in the basin. The studies have been most intense during wintertime periods, since non-dust storm high PM_{10} concentrations occur most often during this time.

During the winters of 1988-1989 and 1989-1990, two brief PM_{10} studies were performed. These studies provided limited information about the nature of the winter particulate matter, since monitoring did not coincide with major episodes of high PM_{10} concentrations.

The most extensive special study of wintertime PM_{10} was performed during December, 1990. This study, which covered a period of 18 days, was called the "El Paso/Juarez Winter PM_{10} Receptor Modeling Scoping Study." Specific objectives of this study were to:

- Determine the spatial/temporal variation of PM_{10} concentrations in the El Paso/Juarez air basin.

- Identify the general locations of major sources of PM_{10} in the basin.

- To the extent possible, identify the major PM_{10} source types; (e.g., automobiles, residential heating, industrial emissions, dust storms, and open burning).

- Analyze PM_{10} transport in the basin; in particular, determine the potential for PM_{10} transport from Juarez into El Paso.

- Identify the fraction of the PM_{10} that is primary (direct emissions) versus secondary (formed from reactions in the atmosphere).

- Identify the major chemical components in the PM_{10} samples.

- Determine the variations in chemical species concentration with time.

- Based on information obtained during the study, ascertain whether dispersion modeling, receptor modeling, or both should be used in the future as tools for identifying sources of high PM_{10} concentrations and for developing control strategies for El Paso.

2) Measurements - December 1990 Study

During the December 1990 study, dichotomous samplers were used to obtain ambient PM_{10} measurements at five sites in El Paso and Juarez. Twelve-hour samples were collected at each site for the purpose of assessing diurnal trends in the data. Nighttime samples were taken from 5:00 p.m. to 5:00 a.m. and daytime samples were taken from 5:00 a.m. until 5:00 p.m. Meteorological measurements were also obtained at several sites, primarily for the purpose of understanding the complex wind flow in the basin. PM_{10} and meteorological measurements conducted during the December, 1990 study were augmented with measurements already being taken at other sites in El Paso and Juarez in response to Annex V of the 1983 U.S. - Mexico Environmental Agreement. It is Annex V which formed the foundation for cooperation between the two governments for studying and attempting to resolve the air pollution problem in the El Paso/Juarez air basin. Table 18 lists the parameters measured at the monitoring sites, while Figure 11 shows the locations of the sites.

3) Analyses - December 1990 Study

Analyses performed utilizing data obtained during the December 1990 study are listed below, along with a notation of the subsections which discuss the projects.

TABLE 18

Annex V and December 1990 PM_{10} Monitoring Sites

Site Name	SAROAD #	AIRS #	PM_{10} Data	Sample Frequency	Start Date	End Date	Hourly Met Data
Annex V Sites							
Border Patrol	451700052G01	481410052	No				Yes
Ft Bliss	451700051G01	481410051	No				Yes
Ivanhoe	451700029G01	481410029	No				Yes
Moon City Clinic	451700050G01	481410050	No				Yes
Advanced Transformer**	456000064G01	800060004	SSI*	6th Day	06/04/90		Yes
Technologico**	456000061G01	800060001	SSI*	6th Day	06/04/90		Yes
Pestalozzi**	456000062G01	800060002	SSI*	6th Day	06/04/90		
Zenco**	456000063G01	800060003	SSI*	6th Day	06/04/90		
Special Study Sites (Dichot Data)							
CAMS 6/Downtown	451700027F01	481410027	Dichot	Daily	12/03/90	12/21/90	
Chamizal	451700044G01	481410044	Dichot	Daily	12/03/90	12/21/90	Yes
Sun Metro	451700053G01	481410053	Dichot	Daily	12/03/90	12/21/90	Yes
Advanced Transformer**	456000064G01	800060004	Dichot	Daily	12/03/90	12/21/90	
Technologico**	456000061G01	800060001	Dichot	Daily	12/03/90	12/21/90	
NWS Data							
El Paso Airport	N/A	N/A	No	N/A			Yes

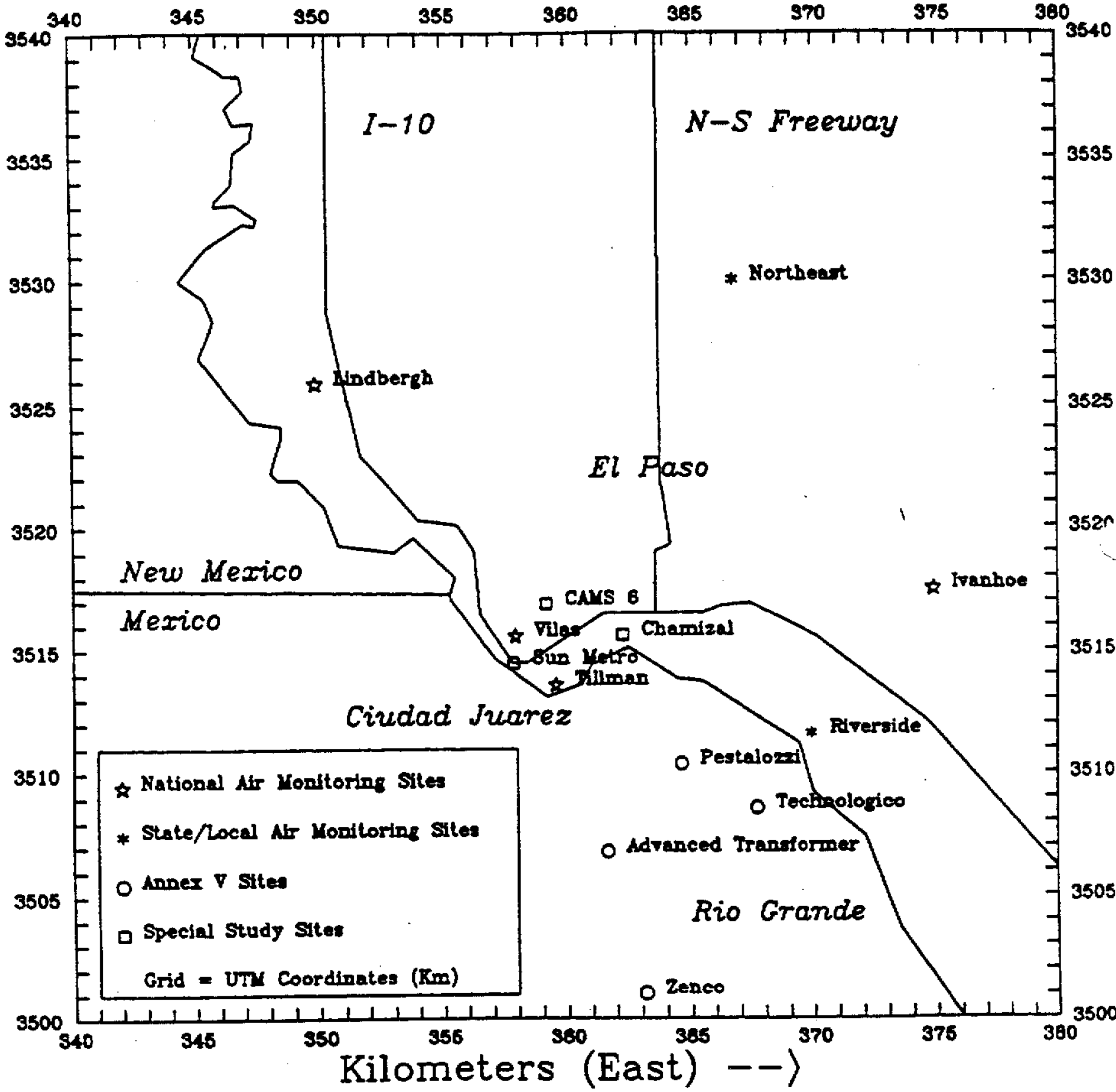
Remarks

Note: This table reflects equipment upgrades for studies related to Annex V of the 1983 U.S. - Mexico Environmental Agreement. For example, the Ivanhoe station is a regular (six-day) station for PM_{10}, but only meteorological sensors were added under Annex V.

*SSI = Wedding (Size Selective Inlet) Samplers
**Sites in Juarez

SAROAD Suffix Code
G = Local Program Site
F = TACB Site

FIGURE 11



PM_{10} Monitoring Sites In
The El Paso/Juarez Air Basin

- Spatial/temporal trends in PM_{10} concentrations in the El Paso/Juarez air basin - Section C.4.c.(3)(a).

- PM_{10} transport in the basin - Section C.4.c.(3)(b).

- Secondary particulate formation - Section C.4.c.(3)(c).

Not all planned analyses had been completed prior to the preparation of this SIP. Additional work to be completed by the agencies involved in the special studies may include the following:

- Laboratory analyses to determine concentrations of various elements in the PM_{10} samples.

- Laboratory analyses to determine concentrations of organic and elemental carbon in the PM_{10} samples.

- Laboratory analyses with microscopic techniques to identify individual particle types in the PM_{10} samples.

- Temporal analyses of laboratory results.

The results of these additional analyses may indicate the need for even further studies and analyses (e.g., source-specific fingerprinting). It is anticipated that the data obtained from current and future studies will be used in dispersion and receptor modeling which is more sophisticated than the methods used for development of the current SIP. Such future analyses should help in obtaining a better understanding of the nature and location of PM_{10} sources that cause high concentrations of PM_{10} in the El Paso/Juarez air basin and help in the development of control strategies which will bring the basin into attainment of the PM_{10} NAAQS.

a) Analysis of Spatial and Temporal Trends

The TACB staff used data from the December 1990 special study to analyze spatial and temporal trends in PM_{10} concentrations in the El Paso/Juarez air basin. A detailed discussion of the methodology employed for this analysis is found in Appendix I of this document. Significant results are as follows:

- o High PM_{10} concentrations occurred in the El Paso/Juarez air basin on clear, cold nights with light winds. Strong winds (e.g., dust storms) are not necessary for the occurrence of high PM_{10} events.

- o PM_{10} concentrations in the basin tended to vary inversely with wind speed and temperature.

- Twelve-hour PM_{10} concentrations tended to show a strong diurnal variation. During periods when the standard was exceeded, the nighttime PM_{10} values were much higher than the daytime values.

- Nephelometer readings (measure of light scatter caused by fine particulate) tended to follow the same diurnal pattern as did the 12-hour PM_{10} concentrations. The maximum value of fine particulate light scatter typically occurred in the evenings. The maximum tended to occur between 8:00 p.m. and 10:00 p.m. following the same pattern as carbon monoxide and nitrogen oxide ambient concentrations. Since the concentrations continued to increase after the end of the evening rush hour, residential heating in the El Paso/Juarez basin may have contributed to the increased PM_{10} concentrations.

- PM_{10} concentrations were generally higher in Juarez than in El Paso. PM_{10} concentrations at sites in the northern portion of El Paso were relatively small, even when the PM_{10} standard was exceeded at other monitoring sites. PM_{10} concentrations tended to increase as the distance to Juarez decreased.

- A significant PM_{10} "hot spot" was identified in Juarez. The Advanced Transformer monitor consistently reported higher PM_{10} values than any other station during the special study period. A source or sources in Juarez, near the Advance Transformer site, probably account for a significant portion of the PM_{10} measured at that site.

b) Analysis of PM_{10} Transport

Using data from the December 1990 study, the TACB staff also conducted an analysis of PM_{10} transport in the El Paso/Juarez air basin. A detailed discussion of the methodology employed for this analysis is found in Appendix I of this document. Significant results are as follows:

- Drainage flows dominated the nighttime wind patterns. Small concentrations of PM_{10} at monitoring stations in the northern and eastern portions of El Paso probably reflect drainage winds carrying cleaner air from areas to the northeast of the city. During the early evening flow transition period, drainage flows tended to be blocked until the cool air was sufficiently heavy to push through to the river.

- The drainage winds that flowed from the upper Rio Grande Valley were generally light and steered by terrain features. Drainage winds increased in speed in the narrow gap in the mountains near the Sun Metro monitoring station. Drainage flows generated complex eddy patterns that tended to mix the cool air along with entrained pollutants draining down from both sides of the river.

- When high PM_{10} concentrations were measured in El Paso, trajectory analyses showed that many of the air parcels came from source regions within Juarez or areas outside Juarez in Mexico.

c) Analysis of Secondary Particulate Formation

Annular denuder samplers were operated at the Continuous Air Monitoring Station (CAMS) 6 monitoring site during the December 1990 study. These samples were collected on the same 12-hour schedule as that used for the PM_{10} dichotomous samplers. The denuder data were analyzed to ascertain whether secondary particulate formation was significant. Secondary particles are small particles formed in the atmosphere from sulfur dioxide (SO_2) and nitrogen oxides (NO_x). The presence of secondary particulates in significant amounts would dictate the need for very sophisticated modeling techniques to adequately assess the contribution of associated SO_2 and NO_x sources to the PM_{10} problem in the basin.

The annular denuder sampler is a specialized PM sampler which has the ability to differentiate between gas and particulate phase compounds in the ambient air. Many pollutant studies have indicated that certain reactive gases such as SO_2 can react on the surface of a PM_{10} filter or react on the particles collected on the filter and cause an overestimation of the true PM_{10} concentration. The sulfate concentrations in the PM_{10} samples collected by the dichotomous sampler at CAMS 6 will be determined through laboratory analysis. These concentrations will be compared with the concentrations measured simultaneously by the denuder system. If the sulfate concentrations on the dichotomous samples are significantly greater than those measured by the annular denuder systems, this would indicate that there was a positive sulfate artifact on the dichotomous samples. Appendix J discusses the annular denuder sampling and the analysis of the annular denuder measurements in detail. Significant results are as follows:

- The large majority (about 90 percent) of the sulfur compounds found on the samples were in the form of the gaseous SO_2, and not in the sulfate particulate phase. This strongly suggests that the time between the emission of SO_2 and collection at the monitoring site was not sufficient for the SO_2 to react and form sulfate. The results also suggest that the SO_2 was largely emitted in the El Paso/Juarez area, that long-range transport of PM into the area is of minor consequence, and that secondary sulfate was only a minor contributor to high PM_{10} concentrations during the study. It should be noted that the denuder measurements were made only at a single site. Thus, no explicit conclusions can be made about the spatial variation of the data.

- The large majority (about 67 percent) of the nitrogen compounds found in the samples were also gaseous. Nitrate, the secondary PM form of nitrogen compounds, was also a minor contributor to PM_{10} during the study period. The fact that most of the mass of nitrogen compounds was in the gaseous phase suggests that these pollutants were also recently emitted in the El Paso/Juarez air basin, that long-range transport of PM into the area is of minor consequence, and that secondary nitrate was a minor contributor high PM_{10} concentrations during the study.

4) Conclusions

The air quality and meteorological analyses using data from the special December 1990 study demonstrate the complexity of the PM_{10} problem in the El Paso/Juarez air basin. The analyses show, most importantly, that the problem is international in scope. Clearly, the PM_{10} problem in El Paso can not be resolved simply through control measures applied only to the U.S. side of the border.

d. PM_{10} Emissions Inventory - El Paso County

1) Background

As part of the program to comply with the PM_{10} NAAQS, the TACB is required to compile certain PM and PM_{10} emissions inventory data. The 1990 PM_{10} emissions inventory for El Paso County is a compilation of stationary and mobile source PM_{10} emissions. The EPA document PM_{10} SIP Development Guideline, (U.S. EPA-450-2-86-001), 1987, specifies the methods for states to use in the preparation of PM_{10} emissions inventories the PM_{10} SIP. The guidelines recommend that the existing TSP emissions inventory be modified for use in a PM_{10} SIP or that the states develop a new PM_{10} emissions inventory. The TACB developed a new PM_{10} emissions inventory using PM_{10} emission factors when available. For input into air quality models, PM_{10} emissions from mobile and area source categories were allocated to grid cells and reported as an annual rate, wintertime 24-hour rate, and a maximum 24-hour rate. Discussion of emissions development is divided into point, area, and mobile sources. Two inventories were developed for sources located in El Paso County. The base case inventory was based on actual emissions for the year 1990. This inventory was input to the air quality model to determine if El Paso attained the PM_{10} NAAQS based on U.S. emissions alone. The second inventory was developed for 1994 and was based on permit allowable emissions where appropriate. The 1994 inventory was adjusted to reflect population growth and the effects of newly adopted changes to TACB Regulation I. A summary of emissions totals in tons per year (T/Y) is provided in Table 19.

TABLE 19

Summary of El Paso County
PM_{10} Emissions
(T/Y)

	Point	Area	Mobile	Total
1990	1,086	1,691	4,640	7,417
1994	1,417	1,740	4,399	7,556

2) Point Sources

Point sources for the 1990 PM_{10} emissions inventory for El Paso County were selected by a search of the TACB's Point Source Data Base (PSDB) for companies that had TSP emissions equal to or greater than 25 tons per year. Consultations with TACB's El Paso Regional Office provided additional information regarding sources not currently in the PSDB. Companies selected were sent an emissions inventory questionnaire with guidance to inform and instruct them on the proper procedures for data entry on the forms. Information describing the purpose of the inventory and for obtaining current PM_{10} factors was also provided. For El Paso

TABLE 20

Point Source PM_{10} Emissions
El Paso County, 1990 and 1994

TACB Account No.	Company	Emissions 1990 (T/Y)	Emissions 1994 (T/Y)
EE-0007-G	ASARCO Inc.	641	641
EE-0011-P	Border Steel Mills, Inc.	22	73
EE-0015-H	Chevron USA Inc.	69	136
EE-0082-P	El Paso Refining Inc.	153	277
EE-0034-D	Jobe Concrete Products Inc.	44	108
EE-0062-V	Parker Brothers and Company, Inc.	9	9
EE-0067-L	Phelps Dodge Refining Corporation	5	21
EE-0068-J	Proler International Corporation	5	4
EE-0024-G	US Army, Ft. Bliss	112	117
*EE-0110-M	Jon T. Hansen Constructors Inc.	0	0
EE-0465-S	Jobe Concrete Products Inc.	26	31
TOTALS		1,086	1,417

*Account no longer in operation.

NOTE: Information from the questionnaires was audited for accuracy and completeness and verified by comparison with data from field investigation and EPA PM_{10} emission factors. Detailed point source data for the inventoried facilities has been entered in the PSDB and can be made available for review upon request.

TABLE 21

Point Source PM_{10} Emissions by Category
El Paso County

Source Category	Process	PM_{10} Emissions (T/Y)
Petroleum Refining	FCCU*	207
Combustion-Natural Gas	All Boilers/Heaters	16
Iron and Steel	EAF** - Melting and Refining	4
	Blast Furnace & Casting	8
	Slag Disposal	10
Asphaltic Concrete	Conventional Plant	7
Ready Mix Concrete	All Processes	3
Rock Quarry	Crushing/Screening	17
	Storage Piles	1
	Quarrying Loading	4
Unpaved Roads	Industrial	42
Paved Roads	Industrial	26
Primary Copper Smelter	Roaster	12
	Converter	439
	Reverb	9
	Ore Storage	62
	Ore Unloading	39
	Acid Plant	41
	Pug Mill	4
	Slag handling	6
Cadmium Production	Roaster	12
Scrap and Waste Metals	Auto Shredding	5
National Security	Tank Maneuvers	112
TOTAL		1,086

*FCCU - fluid catalytic cracking unit
**Electric arc furnace

County, a total of eleven questionnaires were sent and completed. Figure 12 shows the locations of point sources inventoried. Emissions are summarized for each company in Table 20 and are summarized by source category in Table 21.

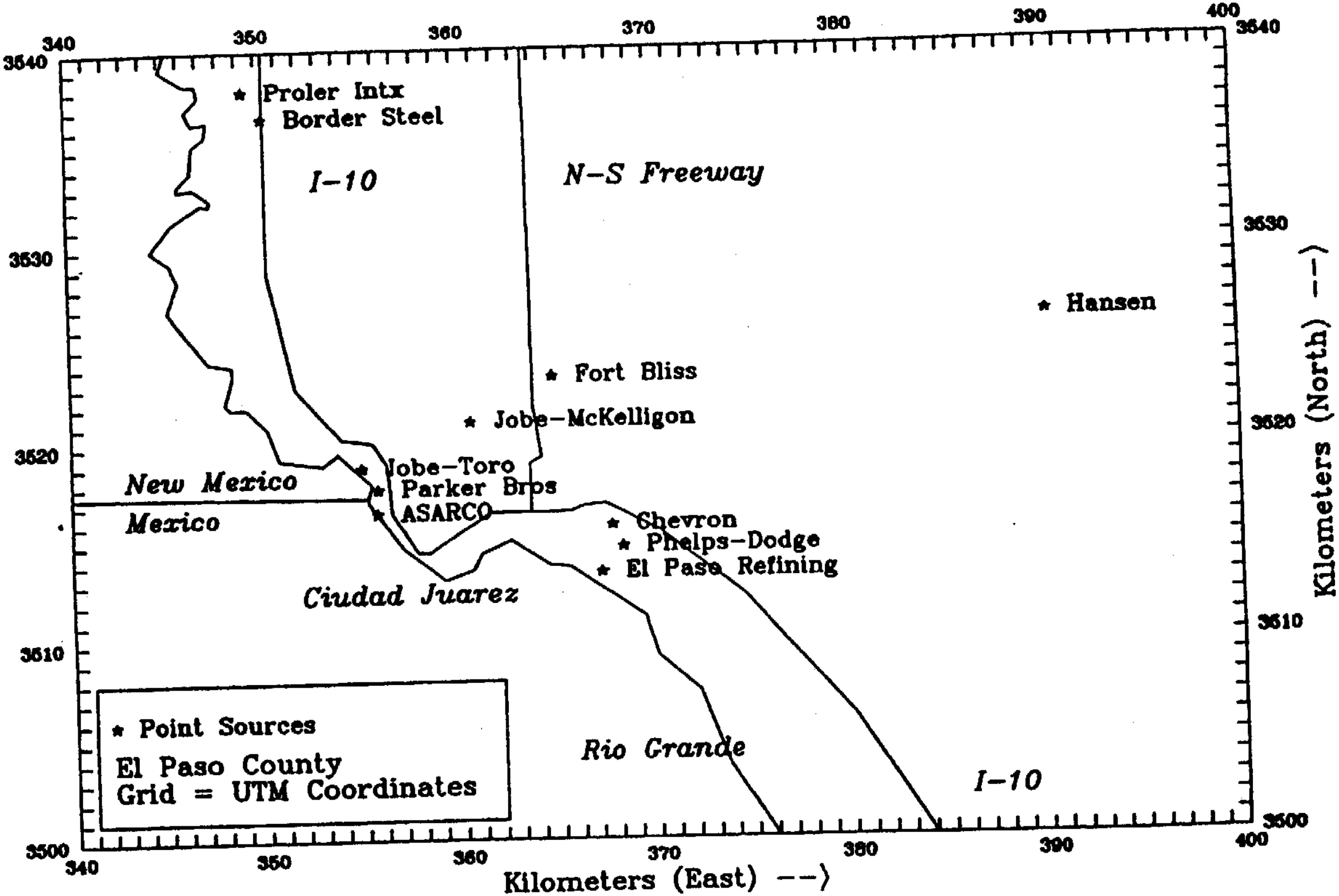
Information from the questionnaires was audited for accuracy and completeness, and verified by comparison with data from field investigations and EPA PM_{10} emission factors. Detailed point source data for the inventoried facilities has been entered in the PSDB and will be made available for review upon request.

Jobe Concrete Products, Incorporated (Jobe) accounts EE0034D-McKelligon Canyon quarry (McKelligon) and EE04655-El Toro Canyon quarry (El Toro) emission inventory reports were developed by the TACB El Paso Regional Office staff and Emissions Inventory Section staff members. Site specific data was supplied by Jobe company representatives. Documentation of emissions estimation methods and emissions calculations for the McKelligon and El Toro sites is available in the emissions inventory files at the TACB.

3) Area Sources

Area sources are combinations of many individual sources too numerous and too small to be individually recorded. The TACB estimated area source PM_{10} emissions by employing the guidance and

FIGURE 12



El Paso County Point Sources

emission factors from two EPA publications: Procedures for Emissions Inventory Preparation, Volume III: Area Sources and Compilation of Air Pollutant Emission Factors (AP-42).

Area source PM_{10} emissions were developed in two different formats:

Countywide - Annual emissions in tons per year, and
Gridded - Annual emission rate, winter emission rate, and 24-hour maximum emission rate.

Additional information describing the methodologies and procedures for estimating PM_{10} emissions from all area source categories is presented in Appendix K. A summary of 1990 and 1994 area source PM_{10} emissions by source category is presented in Table 22.

a) Area Source Categories

(i) Industrial, Construction, and Agricultural Equipment

Industrial Equipment

Industrial equipment includes a variety of types and sizes of machinery, including forklifts, auxiliary engines for various industries, and portable well drilling equipment.

TABLE 22

Area Source PM_{10} Emissions By Source Categories, 1990 and 1994 In Tons/Year (T/Y) and Pounds/Day (Lb/D)

Category	Surrogate to Allocate Emissions	Emissions 1990 T/Y	1990 Lb/D	1994 T/Y	1994 Lb/D
Agricultural Tilling	Cropland	126	690	126	690
Residential/Commercial Fuel Gas	Population	19	104	20	110
Construction Equipment	Population	644	3,529	674	3,693
Industrial Equipment	Urban Area	29	159	30	164
Agricultural Equipment	Cropland	28	153	28	153
Colonia Trash Burning	Cropland	172	943	180	986
Colonia Heating	Colonia	134	734	140	767
Structural Fires	Population	191	1,047	200	1,096
Aircraft	Airports	49	269	51	280
Railroads	Railroad	63	345	66	362
Fireplaces (Non-Colonia)	Urban Area	236	1,293	225	1,233
TOTALS		1,691	9,266	1,740	9,534

Construction Equipment

This category covers a wide variety of equipment used in the construction industry, including bulldozers, power shovels, scrapers, haulers, and motor graders.

Agricultural Equipment (Farm Equipment)

Farm equipment is separated into two major categories: farm tractors, which account for the bulk of activity, and other farm equipment, which includes combines, balers, harvesters, and general purpose machines. For each category, calculations were made for both gasoline and diesel fuels.

(ii) Railroads

Diesel locomotives are the primary source of emissions associated with railroads. All switching yards and through routes are included in this category. Emissions are based on miles of track data obtained from the Texas Railroad Commission.

(iii) Aviation

Aviation may be divided into three categories: commercial, general, and military. Aircraft emissions were based on the number of landing and takeoff (LTO) cycles performed. Each LTO is considered to be a single operation. Although emissions were calculated for each category, they were totaled for the county.

(iv) Fireplaces (City of El Paso)

Population data furnished by the 1990 U.S. Census provided a surrogate to estimate the number of fireplaces within the City of El Paso. The TACB assumed that fireplace burning is primarily related to nonheating purposes such as parties and holiday activities.

(v) Colonias

Several communities in El Paso County are classified as colonias. The City and County of El Paso define a colonia as a community without one or more of the following utilities: water, electricity, and/or sewage system. Officials from both the EPCCHD and El Paso County provided information regarding population and location of the colonias. Approximately 68,300 people live in the five colonias in El Paso County. The source categories below are specifically defined for the colonias.

Fireplaces

TACB staff conducted a visual survey of the colonias in El Paso County to determine the number of fireplaces and other wood burning devices with chimneys. It was assumed that all fireplaces and other wood burning devices in the colonias are used for heating only.

Trash Burning

A visual survey of the colonias was conducted to determine the incidence of trash burning. The survey revealed that many colonia residences burn their trash, although, a telephone survey of the commercial disposal companies in the area indicated that many residences subscribe to their services.

(vi) Open Burning

The EPCCHD, County of El Paso, Texas A&M Agricultural Extension Service (Extension Service), and the Rio Grande Council of Governments (COG) were contacted to determine the occurrence of open burning. The Extension Service and the Rio Grande COG both indicated that open burning of agricultural wastes had, for all practical purposes, been discontinued.

4) On-Road Mobile Sources

The category of on-road mobile sources addresses emissions generated as a result of vehicular traffic on roadways. PM_{10} emissions resulting from the operation of motor vehicles are comprised of direct emissions such as engine exhaust, brake and tire wear, and reentrained dust from paved and unpaved roads. These sources are discussed in the following subparagraphs. Details of the procedures and methodologies used in developing emission estimates for these sources are provided in Appendix L. A sum-mary of on-road mobile source PM_{10} emissions is presented in Table 23.

TABLE 23

On-Road Mobile Sources
PM_{10} Emissions

Category	1990 T/Y	1990 Lb/D	1994 T/Y	1994 Lb/D
Unpaved Roads	1,246	6,827	1,298	7,112
Paved Roads				
Reentrained Dust	2,879	15,775	2,562	14,038
Tailpipe	515	2,822	539	2,953
TOTALS	4,640	25,424	4,399	24,103

a) On-Road Vehicle Exhaust, Tire and Brake Wear

This category includes emissions from the operation of internal combustion engine vehicles on roadways. These emissions consist of organics, lead, sulfates from exhaust; rubber from tire wear; and other particulate from brake wear. The document entitled

A Program to Calculate Size Specific Particulate Emissions for Mobile Sources--A User's Guide (EPA 460/3-85-007), August 1985 and an accompanying computer program were used to estimate onroad vehicle PM_{10} emissions factors. Inputs for this program, such as vehicle speeds and percent of vehicle miles traveled (VMT) by vehicle category, were obtained from the Texas State Department of Highways and Public Transportation (TSDHPT). All other inputs to the mobile particulate model were EPA default values already coded into the program. Emission factors produced by the model were used in conjunction with VMT provided by the TSDHPT to estimate PM_{10} emissions.

b) Dust Reentrainment From On-Road Vehicular Traffic

Paved Roads

Dust reentrainment from traffic on paved roads is a major contributor of PM_{10} emissions. PM is always present on road surfaces due to deposits from wind erosion and deposits from vehicular traffic moving from unpaved areas onto the road. The latter is increased after rains have occurred. The PM residing on the paved roadways is ground to a fine silt dust through the action of vehicular traffic and then is reentrained to the atmosphere.

To estimate the contribution of PM_{10} emissions from paved roads, the TSDHPT was contacted to provide traffic distribution and speed along expressways, highways, and collector and local streets. The volume and speed of traffic along these roadways was used in conjunction with PM_{10} emission factors to determine the quantity of reentrained dust emitted. The TSDHPT's 1987 El Paso County highway network traffic assignment model and IMPACT, a computer model that produces gridded on-road vehicle emissions, provided gridded VMT by functional classification (road type). The TACB estimated 1990 VMT by increasing the 1987 TSDHPT values based on a ratio of El Paso County population estimates for 1987 and 1990.

To estimate reentrained dust emissions, the TACB used the EPA document AP-42. The TACB also incorporated the test results and methods found in the EPA document Control of Open Fugitive Dust Sources (EPA-450/3-88-008). PM_{10} emission factors were derived using silt surface content fractions (fraction of particles $\leq$ 75 microns diameter) and total road surface dust loading values characteristic of the southwest region of the U.S.

Unpaved Roads

The EPCCHD estimated that there are approximately twelve miles of unpaved roads within the City of El Paso. However, neither the city nor the TSDHPT have conducted vehicle counts on these roadways. El Paso County officials estimated that there are approximately 1,000 miles of unpaved roads within the county. Two hundred miles of these roads are located within the colonias. The document entitled Supplement A to AP-42, Compilation of Air Pollutant Emission Factors was used as a guide to estimate the PM_{10} emissions from unpaved roads.

5) Emission Allocation To Grid Cells

Subsequent to calculating annual area and mobile source PM_{10} emissions for El Paso on a countywide basis, the TACB combined and allocated these emissions to an array of grid cells used for air quality modeling. The Gaussian-Plume Multiple Source Air Quality Algorithm (RAM) model, used for dispersion modeling of PM_{10} emissions, will not accept more than 100 area sources. Two-kilometer (km) by two-km grid cells were used in the urban core, and the size for the square grid cells was increased as the distance from the urban core increased. PM_{10} emissions from area and mobile sources allocated to each grid cell were reported as an annual rate, a wintertime 24-hour rate, and a maximum 24-hour rate.

Allocation of Emissions

Allocation by surrogate was the most common method employed for dividing PM_{10} emissions into grid cells. A surrogate is a parameter associated with some emission which is used to apportion that emission. Surrogates are commonly used when the locations of individual emission sources would be impractical to determine. An example of a surrogate is population, which could be used to apportion emissions from house fires.

Population

The 1980 Department of Commerce Census Bureau census tract maps were used to provide population densities of all census tracts in El Paso County. Populations were determined for each grid cell. Total county population was determined by summing values from all cells. Each cell's population was divided by the total county population resulting in fractions for each cell.

Urban Land Use

A United States Geographical Survey (USGS) map of El Paso County showing land use classifications was used to detrmine the location and percent of urban land for each grid cell. Each cell was assigned an urban area in square kilometers, and from this information, the total urban area was determined for El Paso County. Fractions were then determined for each grid cell.

Fort Bliss

Fort Bliss occupies areas located in both Texas and New Mexico. However, only one-fourth of it lies in Texas. Total miles of tank travel in Fort Bliss were divided between Texas and New Mexico. Three-fourths of the mileage was assigned to New Mexico and the remaining to Texas. Fugitive PM_{10} emissions were estimated for the portion in Texas and divided evenly into three cells. Emissions from the portion of the base in New Mexico was assigned to an 18-km by 18-km grid cell in Otero County.

Unpaved Roads

An estimated 70 percent of the VMT on unpaved roads occurs in or very near colonia areas, with the remainder distributed throughout other rural areas. A weighted surrogate was derived assigning 70 percent of the emission to the colonia surrogate and 30 percent to the rural surrogate.

Paved Roads

For each grid cell, VMT by roadway type was determined by the IMPACT model. Emissions from paved roads were allocated based on the percent of total VMT for each roadway classification within each grid cell.

- The area near Anthony in the northwest part of the county,
- Fabens and vicinity,
- East of Socorro (north of I-10), and
- West of Hueco Tanks along Highway (Hwy.) 62.

From these areas, a total countywide area for colonias was calculated and a fraction of this total was allocated to each appropriate cell, as with cropland.

Aircraft

The El Paso International Airport and the adjacent military airfield fit within one 12-km by 12-km cell, so all aircraft emissions were assigned to this cell.

Railroads

A USGS map was used to determine the mileage of railroad track in each grid cell. Each cell's amount of mileage was divided by the total for the county to produce fractions for each cell.

Rural Land Use

A USGS map of El Paso County showing land use classifications was also used to determine the location and percent of rural land for each grid cell. Each cell was assigned an area of rural land in square kilometers, and from this information, the total rural land area was determined for El Paso County. Fractions were then determined for each grid cell.

Cropland

A USGS map of El Paso County showing land use classifications was used to determine the location and percent of cropland for each grid cell. Each cell was assigned an area of cropland in square kilometers, and from this information, the total cropland area was determined for El Paso County. Fractions were then determined for each grid cell.

Colonias

There were five colonias identified in El Paso County:

- The area from Socorro to Clint and bounded by Interstate 10 (I-10) on the north and the Rio Grande on the south,

6) Determination of Seasonal Adjustments for Modeling

a) Annual Emission Rate

To determine the annual emission rate for a particular emission category within a particular cell, the total emissions in the cell were multiplied by 0.028792, a factor derived by converting tons per year to grams per second and assuming 8,760 hours of operation in a year.

b) Winter Emission Rates

There were three categories which had a winter emission rate different from the annual rate: fireplaces, residential/commercial fuel gas, and Colonia heating. This rate was determined in a manner similar to the annual rate, except that total emissions in each cell were multiplied by 0.086377, which assumes that all of the emissions in these three categories occur only during the four winter months (November - February). In all other categories, the winter emission rate is the same as the annual rate based on the assumption that these emissions occur uniformly throughout the seasons of the year.

c) 24-Hour Maximum Emission Rate

The multipliers used in determining the 24-hour maximum emission rate are shown in Table 24. For categories not listed, the 24-hour maximum emission rate is the same as the annual rate.

Military Traffic and Unpaved Roads

El Paso receives an average of eight inches of rain per year. It was determined there are typically a total of ten days per year the ground is damp enough to inhibit dust emissions from military tanks and other similar vehicles traveling unpaved roads within Fort Bliss. Thus, the annual rate was multiplied by 365/355 or 1.03. The same multiplier applies to civilian traffic on unpaved roads.

Agricultural Tilling and Agricultural Equipment

All farming in El Paso County is concentrated along the Rio Grande River to take advantage of the rich alluvial soil and irrigation potential of the river basin. Farming activities in this area are usually conducted five and a half days per week. Thus, the annual rate was multiplied by seven days and divided by five and a half days, resulting in a factor of 1.27.

TABLE 24

24-Hour Maximum Emission Rates

Category	24-Hour Max	
Military Traffic	1.03	*Annual Rate
Agricultural Tilling	1.27	*Annual Rate
Unpaved Roads	1.03	*Annual Rate
Residential/Commercial Fuel Gas	1.33	*Winter Rate
Construction Equipment	1.17	*Annual Rate
Industrial Equipment	1.17	*Annual Rate
Agricultural Equipment	1.27	*Annual Rate
Colonia Heating	1.33	*Winter Rate
Non-Colonia Fireplaces	1.33	*Winter Rate

Residential/Commercial Fuel Gas, Colonia Heating, and Non-Colonia Fireplaces

Since typically there are at least 30 days during the four month winter season when temperatures are warm enough to make residential space heating unnecessary, the winter rate was multiplied by four months/three months or 1.33.

7) Projected Emissions

The TACB staff estimated projected 1994 PM_{10} emissions for all source categories: area, mobile, and point. Projected emissions are presented in Tables 20, 22, and 23.

a) Area Sources

Area source emissions were increased at the same rate as the expected population growth (4.68% between 1990 and 1994). In two area source categories, agricultural tilling and agricultural equipment, no growth was expected because of the lack of new farmland. Therefore, emissions were not projected to increase.

Residential Fireplaces, City of El Paso

Residential fireplaces in the City of El Paso are controlled by a city ordinance prohibiting fireplace operation during periods of air stagnation. Emission reductions for this category were estimated for 1994 based on a projected 4.68 percent increase in population from 1990 coupled with controls associated with restrictions on fireplace operation on predicted air stagnation days. Without restrictions on fireplace operation, PM_{10} emissions would increase by 11 tons per year for this category from 1990 to 1994. However, with the effect of El Paso's fireplace ordinance, a net decrease of 11 tons per year will occur from 1990 to 1994.

b) Mobile Sources

Mobile source emissions were projected with the assumption that an increase in population will cause a corresponding increase in VMT and, therefore, in related PM_{10} emissions. Following EPA guidance, RACM was applied to projected emissions from two mobile source categories with the following results:

(i) Unpaved Roads

All unpaved roads in the city of El Paso are to be paved in order to reduce this category's projected 1994 emissions by 0.5 percent.

(ii) Paved Roads--Reentrained Dust

Rules which are currently in effect to reduce reentrained dust emissions from paved roads will be enhanced by the new rule changes reducing this category's projected 1994 emissions by 15 percent.

c) Point Sources

For point sources having TACB permits, the permitted allowable emissions were used for the projected inventory. In those circumstances where only PM was reported for the permit allowable, adjustments were made using the ratio of PM_{10} to PM emissions factors, taking into account the type of abatement equipment used. For instance, permitted emissions for equipment controlled by bag filters were assumed to be all PM_{10}. For permitted sources with no PM_{10} emissions factors, 75 percent of the PM allowed was assumed to be PM_{10}. For sources not permitted, the allowable emission rate was assumed to be equal to the actual emission rate. This assumption is valid since a source must obtain a permit to emit above historical actual emission rates.

8) Quality Assurance (QA)

A major component of the emissions inventory effort was the development and implementation of a QA program. The purpose of this program was to define a systematic pattern of activities that would provide confidence that the resulting emissions inventory would be of such quality to meet the requirements of EPA and to be the basis for reliable control strategy planning and attainment demonstration. The QA program was designed to ensure the development of an emissions inventory that was complete, accurate, and in compliance with the content and reporting requirements outlined in the PM_{10} SIP Development Guideline, (U.S. EPA-450-2-86-001), 1987. The following sections describe elements of the QA program followed by the TACB staff during the course of preparing this inventory.

a) Completeness

EPA guidance materials were followed to ensure that all emissions-producing categories were included in the inventory. As noted in the section describing point sources, a concerted effort was made by the TACB staff to ensure that all potential point sources were identified. This was accomplished through exhaustive research into the existing point source inventory and data available from manufacturing guides, TACB regional offices, and other state agencies.

b) Accuracy

A systematic method of uniformly performing reasonableness checks on point source estimates was accomplished by the TACB Emissions Inventory Section staff. In order to prevent errors from occurring in the emissions data base, a procedure was set in place whereby each inventory was cross-checked by different staff members after each stage of the inventory process. This procedure included randomly rechecking emissions calculations.

A research program was established for developing a more accurate list of area source categories based upon demographic information from various sources. This research is an ongoing process, with data from each category being compared to per capita emission factors for accuracy.

c) Compliance with EPA Content and Reporting Requirements

EPA guidance documents were used whenever possible for inventory development activities.

e. Dispersion Modeling

1) Overview

The 1990 FCAA generally requires a SIP to demonstrate that "moderate" PM_{10} nonattainment areas will reach attainment of the NAAQS by December 31, 1994. Title VIII of the FCAA provides relief from this requirement for special cases where an area's air quality may be adversely influenced by emissions from another country. In such cases, Title VIII provides that a moderate PM_{10} nonattainment area will not be redesignated to the "serious" category if the state demonstrates that such an area would achieve attainment of the PM_{10} NAAQS by December 31, 1994, if it were not for air quality impacts caused by another country.

To the best of our ability within the time constraints imposed by the FCAA and the availability of data and non-resource intensive models, the TACB staff has conducted dispersion modeling to demonstrate that the El Paso moderate area will be in attainment of the PM_{10} NAAQS by December 31, 1994 based on U.S. PM_{10} emissions alone. This demonstration considers only U.S. emissions since an appropriate PM_{10} emissions inventory for Juarez is not available. Also, the TACB is unable to develop such an inventory from the very limited information that is available.

According to the PM$_{10}$ SIP Development Guideline, (U.S. EPA-450-2-86-001), 1987, the preferred method for demonstrating attainment of the PM$_{10}$ NAAQS and for developing control strategies is to use dispersion and receptor models in combination. If it is determined that dispersion modeling in conjunction with receptor modeling is not feasible, the guideline recommends that dispersion modeling alone be used.

As discussed in Section C.4.c., meteorological analyses were performed to demonstrate the potential for transport of PM$_{10}$ emissions from Juarez into El Paso. Other types of receptor modeling (e.g., the chemical mass balance method) might be used to quantify individual source contributions to measured PM$_{10}$ concentrations at various locations. Results of this type of receptor modeling can then be compared to the emissions inventory used in the dispersion modeling in order to identify any large discrepancies between the magnitude of emissions of individual source categories and their corresponding contribution to measured PM$_{10}$ concentrations in the area of concern. To use this method of comparison for the El Paso area, complete, detailed emissions inventories for both El Paso and Juarez sources would have to be available, as well as comprehensive, detailed source fingerprints and laboratory analyses of filter samples. Since most of these data are not available at this time, the use of this type of receptor modeling in combination with dispersion modeling is not a viable option. Therefore, dispersion modeling alone was used to estimate PM_{10} impacts and to demonstrate attainment of the NAAQS.

Dispersion modeling was performed using five years of hourly meteorological data and two sets of emissions data. First, the 1990 El Paso County PM_{10} base case emissions inventory, which reflects current actual point, area, and mobile source emissions, was modeled to determine 24-hour and annual design concentrations based on U.S. sources alone. Design concentrations are those concentrations upon which control strategy development is based. A projected 1994 El Paso County PM_{10} emissions inventory was then modeled to demonstrate future attainment of the PM_{10} NAAQS based on allowable emissions for U.S. sources alone.

It is usual practice to corroborate the results from modeling actual emissions (e.g., the 1990 El Paso County PM_{10} emissions inventory) with actual monitored PM_{10} concentrations occurring in the nonattainment area. However, it was not feasible to do so in this case since both El Paso and Juarez sources contribute to the measured PM_{10} concentrations in the nonattainment area, but only El Paso County emission sources were modeled.

2) Models

The Gaussian-Plume Multiple Source Air Quality Algorithm (RAM) was used for predicting PM_{10} impacts based on the 1990 and 1994

El Paso County PM_{10} emissions and for determining PM_{10} design concentrations for both the 24-hour and annual averages. RAM, an Appendix A model recommended by EPA for performing PM_{10} analyses, was chosen due to its utility in estimating urban-wide impacts of multiple point and area sources distributed over a large area. The default option for regulatory applications was used in all model runs. Use of this option automatically sets certain parameters to preassigned values for consistency with recommendations in the Guideline on Air Quality Models (Revised), U.S. EPA, 1986. RAM was designed for flat terrain modeling. The TACB staff believes it is appropriate to use RAM for modeling area and mobile PM_{10} sources in the El Paso area, since these types of sources are low-level and are emitted in significant quantities only in the relatively flat portion of the basin. Furthermore, complex terrain modeling approaches are not designed for modeling mobile and area sources. Although point sources were included in the RAM modeling, the Valley Screening method was used for estimating impacts of significant elevated point sources on mountainous terrain such as the Franklin Mountains.

Building wake effects for point sources were not modeled for this SIP because of the lack of a model which can appropriately handle both area sources and downwashed point sources. As discussed previously, the RAM model was chosen for the urbanwide modeling because of its utility in modeling area sources, which comprise the majority of PM_{10} emissions in El Paso. However, building wake effect algorithms are not incorporated into RAM. The only refined, EPA-approved model which incorporates both area source and building wake effect algorithms is the Industrial Source Complex (ISC) model. However, EPA has recognized that the ISC model does not properly handle area sources. There is no practical way to combine outputs from the ISC and RAM models to determine concentrations over an array of receptors without developing a post processor. This would require a large amount of time and may require EPA approval.

3) Meteorological Data

The most recent, readily available hourly meteorological data were used for dispersion modeling. Data from the National Weather Service station at the El Paso International Airport for the years 1985 through 1989 were used for all RAM runs. Missing data were replaced in accordance with procedures documented in TACB's letter to EPA Region 6, dated October 5, 1988. Missing data replacements are shown in Appendix M. None of the predicted critical concentrations were associated with days on which there was missing data.

4) Emissions Inventories

Both the 1990 and 1994 emissions inventories include all inventoried point, area, and mobile sources of PM_{10} in El Paso County and a small portion of Otero County, New Mexico, which contains the northern extension of Fort Bliss. A total of 143 point sources and 99 area sources were input to the RAM Model. Point source locations were input using Universal Transverse Mercator coordinates. Area and mobile source emissions were combined into a set of square cells ranging in size from 2 km x 2 km to 28 km x 28 km, as illustrated in Figure 13. The size of each area source was based on population density, road network, urban versus rural land distribution, and distance from the PM_{10} nonattainment area. In general, they are relatively small within the urban core of El Paso, then gradually increase in size with distance from the urban core. A representative area source emission release height of 1.42 meters was chosen for input to RAM. This height represents an average for the area source categories weighted according to emission rate.

Area source emissions were seasonally adjusted, as applicable, for the periods of November through February and March through October. Separate dispersion modeling runs were conducted to predict 24-hour PM_{10} concentrations for these two seasons.

The 1990 emissions are estimates of actual emissions occurring in 1990. The 1994 emissions reflect the effects of future growth and the corresponding increase in area and mobile source emissions. Point source emissions for the 1994 inventory are based on allowable emissions for all permitted sources and 1990 actual

FIGURE 13

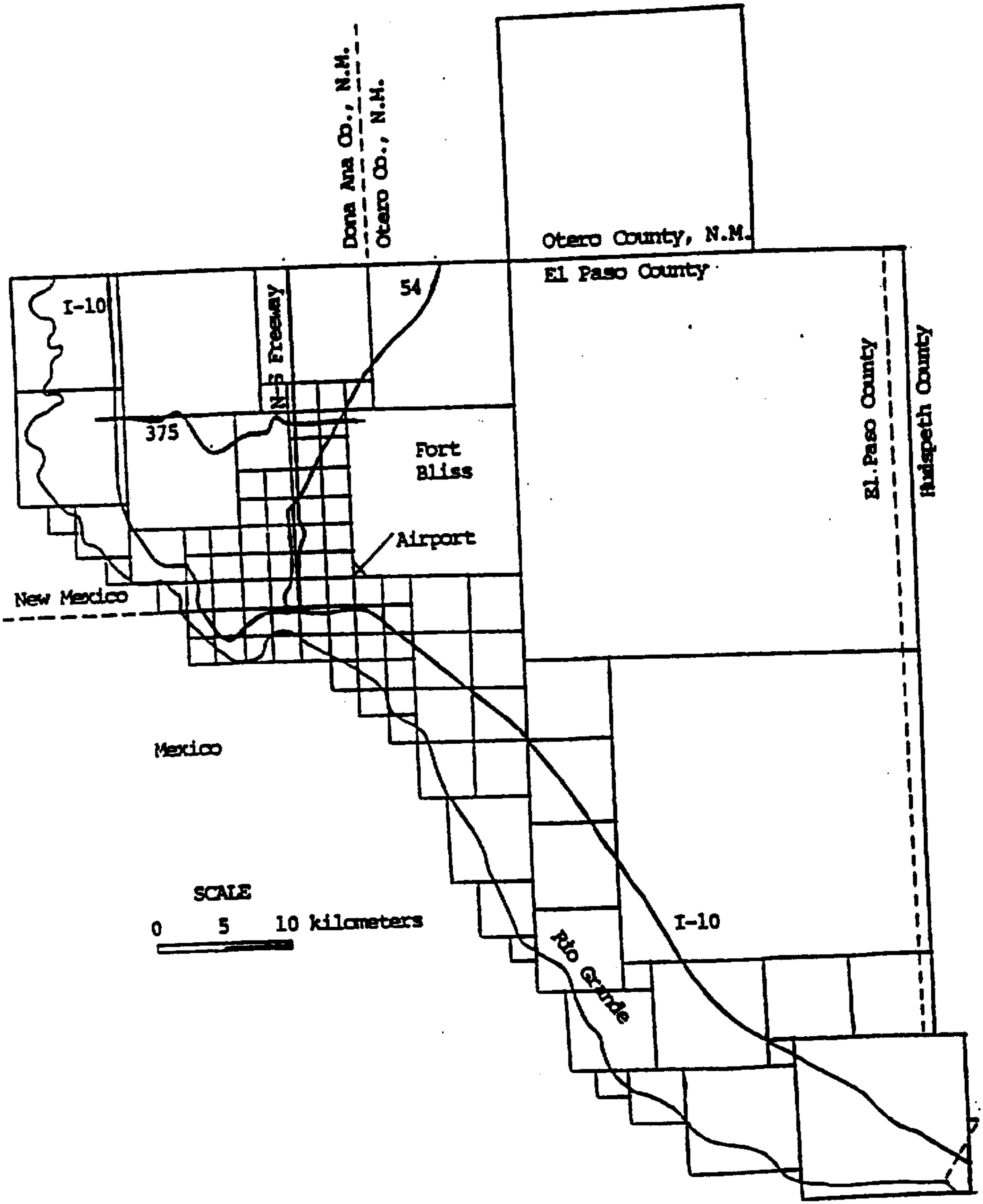


Diagram of PM_{10} Area Source Cells

emissions for grandfathered sources. As a conservative procedure, reductions due to adopted RACM were not included in the modeling of the 1994 emissions inventory. Section C.4.d. and Appendices K and L of this document discuss, in more detail, the inventory development and emissions calculations. Section C.4.f. and Appendices N, O, P, and Q discuss control plans.

5) Receptor Locations

Receptors were placed at all PM_{10} state and local monitoring sites in the El Paso area. Additional receptors were distributed within the nonattainment area, with a one-kilometer spacing in areas having relatively significant sources of PM_{10} and larger spacings in the outlying areas. In accordance with EPA guidelines, a 100-meter receptor spacing was used in areas of relatively high short-term and annual concentrations predicted with the initially allowed coarser spacings. Analysis of the results of the base case 1990 inventory modeling indicated that PM_{10} concentrations were consistently well below the NAAQS in the areas outside of the urban core of the City of El Paso. Therefore, receptors in the outlying areas were not included in the modeling of the 1994 inventory.

6) Background Concentrations

An estimated background concentration must be added to dispersion modeling results to account for all sources of PM_{10} that are not included in the model. EPA prefers that background values be taken from a nearby monitoring site. Such a site should not be influenced by any of the sources that are included in the dispersion modeling. For sites that are influenced by modeled sources only for specific wind directions, background values may be taken from the portion of monitored data which excludes days when the monitor is downwind of those sources. Although there are several PM_{10} monitoring sites in the El Paso area, all of them lie within the area source cells used in the dispersion modeling runs. Therefore, all of them are influenced by sources included in the model for all wind directions. In the absence of an adequate monitoring site in or near El Paso from which a background concentration could be extracted, 24-hour and annual average PM_{10} background values were estimated from the Big Bend National Park PM_{10} monitoring station. PM_{10} concentrations from June 1989 through May 1990 (79 monitoring days) were averaged to obtain the annual average background value of 12.39 $\mu g/m^3$. The maximum 24-hour observation of 38.43 $\mu g/m^3$ for the same time period was taken as the 24-hour background level.

7) Design Concentration Determination

PM_{10} design concentrations were determined through dispersion modeling for both 24-hour and annual averaging periods and for both the 1990 and 1994 emissions inventories.

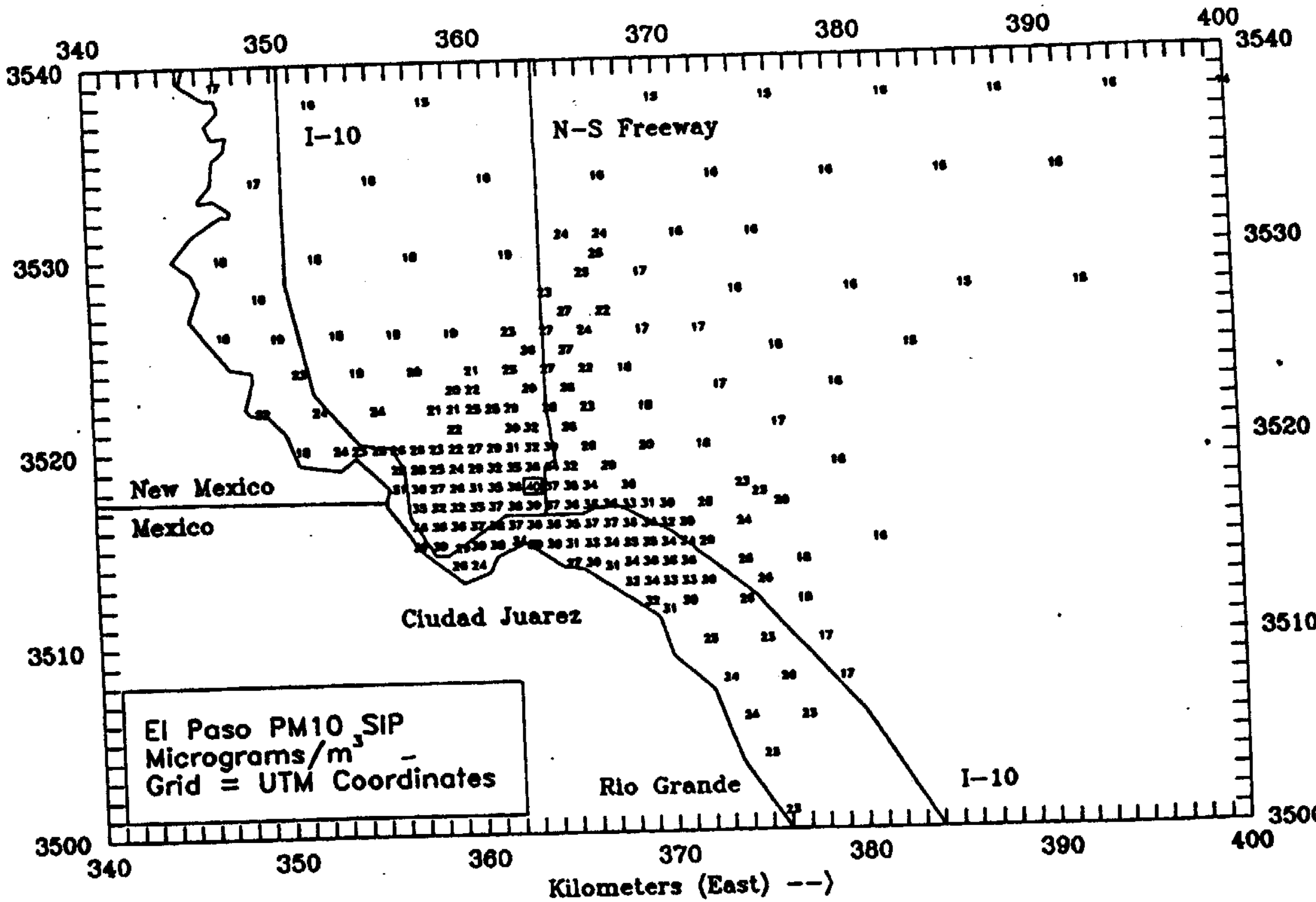
The procedure for determining the locations and magnitudes of all design concentrations involved two steps. First, a screening run was performed with an initial minimum receptor spacing of one kilometer using all five-years of meteorological data. For the 24-hour averaging period, the model was used to determine the sixth-highest concentration at each receptor over the five-year study period, based on the 24-hour NAAQS which limits the number of allowable exceedances of the NAAQS to an average of one per year for a given location (receptor). For the annual averaging period, the model was used to determine the average annual concentration at each receptor over the five-year study period. Results of the screening run were analyzed to locate "hot spot" areas where relatively high concentrations were predicted. Final model runs were then performed using a 100-meter spacing in the hot spot areas found from the screening run. For the 1990 emissions inventory runs, the area of maximum impact was identified and modeled with 100-meter receptor spacing for both the short-term and annual averaging periods. For the 1994 emissions inventory runs, three hot spots were identified and modeled with

100-meter receptor spacing for both the short term and annual averaging periods. Results of the 100-meter spacing runs were then analyzed to determine the location and magnitude of the design concentrations. The design concentrations include the background concentrations discussed previously.

8) 1990 Emissions Inventory Modeling Results

Results of the screening modeling of 1990 annual average emission rates are shown in Figure 14, where the average annual concentration plus background is plotted for each receptor. The maximum impact of 40.03 $\mu g/m^3$ is located at a receptor in the urban core of El Paso, approximately 1,500 meters north of Interstate 10 and 600 meters west of Highway 54. An additional model run was made with a 5 X 5 (5 columns, 5 rows) receptor grid centered on the critical receptor from the screening run. A receptor spacing of 100 meters was used for this grid. The modeling results for the tightly spaced receptor grid indicated a very weak concentration gradient. Modeled annual average impacts, including background, at the critical receptor from both the screening run and the final run are tabulated in Table 25. Based on these model runs, the 1990 annual average PM_{10} design concentration for the five-year study period is 40.10 $\mu g/m^3$, which is below the annual NAAQS for PM_{10} of 50 $\mu g/m^3$.

FIGURE 14



Annual Concentrations for One-Kilometer Minimum Receptor Spacing - 1990

NOTE: Boxed area indicates a hot spot which was modeled with 100-meter receptor spacing.

TABLE 25

Summary of Results of Dispersion Modeling of the 1990 Annual PM_{10} Emissions Inventory

One-Kilometer Minimum Spacing

YEAR	MAX (μg/m³)	UTM EAST (km)	UTM NORTH (km)	BACKGROUND (μg/m³)	RAM CONC.+ BACKGROUND (μg/m³)
1985	30.05	363.0	3518.0	12.39	42.44
1986	30.82	363.0	3518.0	12.39	43.21
1987	26.90	363.0	3518.0	12.39	39.29
1988	25.44	363.0	3518.0	12.39	37.83
1989	25.00	363.0	3518.0	12.39	37.39

AVG 27.64 (μg/m³)

AVG 40.03 (μg/m³)

100-Meter Spacing Around Receptor (361,3516)

YEAR	MAX (μg/m³)	UTM EAST (km)	UTM NORTH (km)	BACKGROUND (μg/m³)	RAM CONC.+ BACKGROUND (μg/m³)
1985	30.12	362.9	3517.8	12.39	42.51
1986	30.90	362.9	3517.8	12.39	43.29
1987	26.99	362.9	3517.8	12.39	39.38
1988	25.52	362.9	3517.8	12.39	37.91
1989	25.03	362.9	3517.8	12.39	37.42

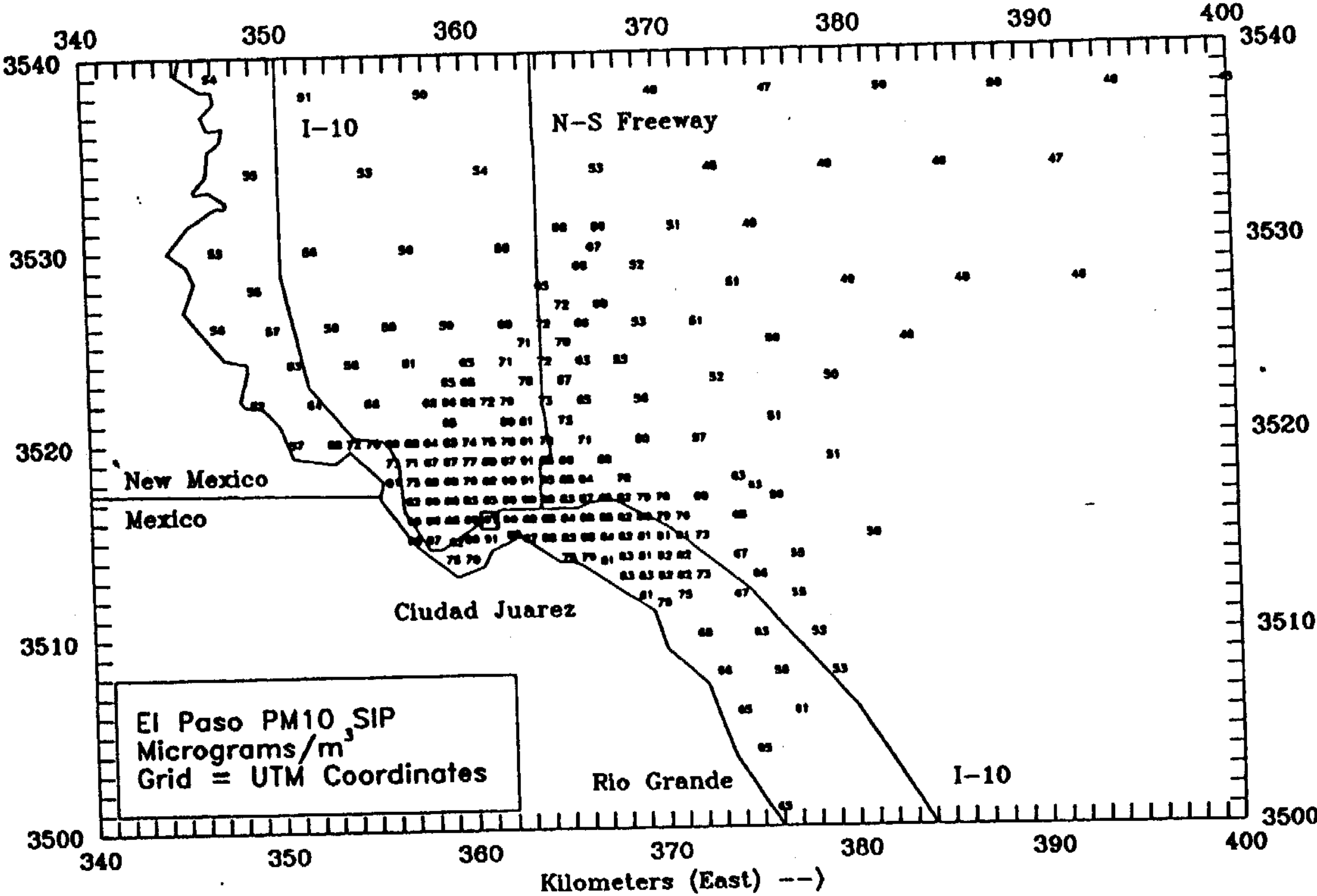
AVG 27.71 (μg/m³)

AVG 40.10 (μg/m³)

Results of the screening modeling for 1990 24-hour average emission rates are shown in Figure 15, where the sixth-highest 24-hour concentration plus background is plotted for each receptor. The maximum of 90.90 $\mu g/m^3$ is located at a receptor in downtown El Paso approximately 600 meters west of Piedras Street and 300 meters south of Interstate 10. An additional model run was made with a 5 X 5 (5 columns, 5 rows) 100-meter spaced receptor grid centered on the critical receptor from the screening run. As in the case of annual modeling, the results for the tightly spaced receptor grid indicated a very weak concentration gradient. Modeled 24-hour average impacts, including background, at the critical receptor for both the screening run and the final run are tabulated in Table 26. Based on these model runs, the 24-hour PM_{10} design concentration for the five-year study period is 91.45 $\mu g/m^3$, which is below the 24-hour NAAQS of 150 $\mu g/m^3$.

Normally, several hot spot areas found in the initial screening modeling (not just the area of the predicted maximum) are modeled with tighter receptor spacings. As discussed below, this procedure was followed for the 1994 future case modeling. For the 1990 case, however, modeling was not conducted in the vicinity of additional hot spot areas since area and point source emissions modeled for 1990 are less than or equal to those modeled for 1994, and since the 1994 design concentrations are predicted to be below the NAAQS.

FIGURE 15



24-Hour Concentrations for One-Kilometer Receptor Spacing - 1994.

NOTE: Boxed area indicates a hot spot which was modeled with 100-meter

TABLE 26

Summary of Results of Dispersion Modeling of The 1990 24-hour PM_{10} Emissions Inventory

One-Kilometer Minimum Spacing

RANK	CONC.* ($\mu g/m^3$)	UTM EAST (km)	UTM NORTH (km)	DATE	BACKGROUND ($\mu g/m^3$)	RAM CONC.+ BACKGROUND ($\mu g/m^3$)
HIGH	63.43	361.0	3516.0	10/01/85	38.43	101.86
2ND HIGH	54.67	361.0	3516.0	12/31/86	38.43	93.10
3RD HIGH	53.81	361.0	3516.0	12/04/86	38.43	92.24
4TH HIGH	53.15	361.0	3516.0	12/25/85	38.43	91.58
5TH HIGH	52.70	361.0	3516.0	12/04/85	38.43	91.13
6TH HIGH	52.47	361.0	3516.0	01/13/86	38.43	90.90

*The six highest values at the location of the highest, sixth-highest concentration.

100-Meter Spacing Around Receptor (361,3516)

RANK	CONC.* ($\mu g/m^3$)	UTM EAST (km)	UTM NORTH (km)	DATE	BACKGROUND ($\mu g/m^3$)	RAM CONC.+ BACKGROUND ($\mu g/m^3$)
HIGH	64.31	360.9	3515.8	10/01/85	38.43	102.74
2ND HIGH	55.03	360.9	3515.8	12/31/86	38.43	93.46
3RD HIGH	53.80	360.9	3515.8	12/25/85	38.43	92.23
4TH HIGH	53.60	360.9	3515.8	12/04/86	38.43	92.03
5TH HIGH	53.06	360.9	3515.8	01/13/86	38.43	91.49
6TH HIGH	53.02	360.9	3515.8	12/26/86	38.43	91.45

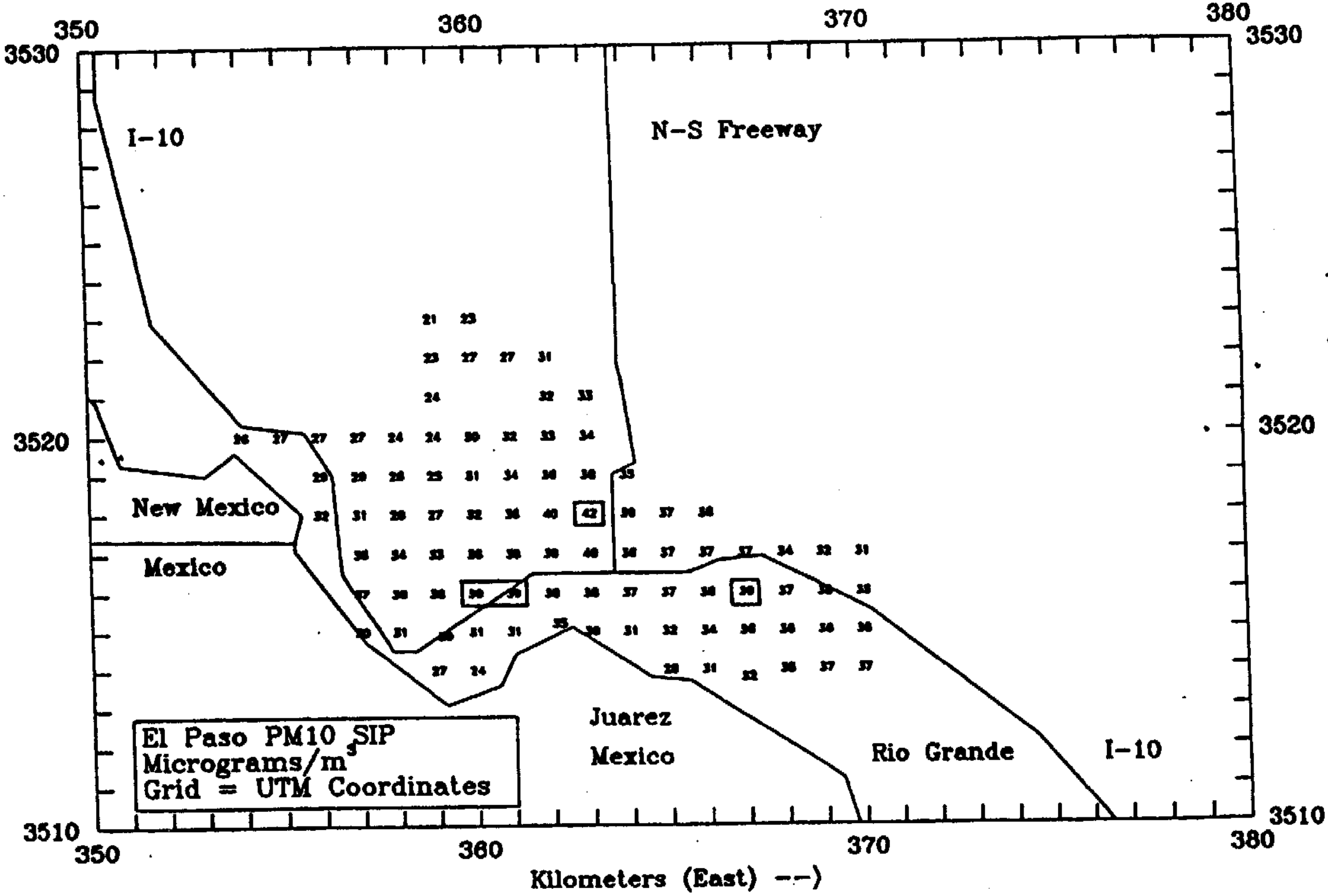
*The six highest values at the location of the highest, sixth-highest concentration.

9) 1994 Emissions Inventory Modeling Results

Results of the screening modeling of 1994 annual average emission rates are shown in Figure 16, where the average annual concentration plus background is plotted for each receptor. Three hot spots were identified and modeled with a 100-meter receptor spacing. The locations of the hot spots are indicated in Figure 16. These areas were modeled with 5 X 5, 100-meter spaced receptor grids centered on the critical receptors from the screening run. Modeled annual average impacts, including background, at the critical receptors for each hot spot are tabulated in Tables 27 through 29. Based on these model runs, the annual design concentrations in the hot spot areas for the five-year study period are 41.64 $\mu g/m^3$, 39.64 $\mu g/m^3$, and 38.79 $\mu g/m^3$, all of which are below the annual NAAQS of 50 $\mu g/m^3$.

Results of the screening modeling of 1994 24-hour average emission rates are shown in Figure 17, where the sixth-highest 24-hour concentration plus background is plotted for each receptor. The screening run predicted the maximum impact at a receptor located approximately 600 meters northwest of Jobe Concrete's McKelligon Canyon site. Since this critical receptor was found to be relatively close to several significant sources on Jobe Concrete's property, the emissions inventory for the McKelligon

FIGURE 16



Annual Concentrations for One-Kilometer Receptor Spacing - 1994

NOTE: Boxed area indicates a hot spot which was modeled wi[illegible] 100-meter

TABLE 27

Summary of Results of Dispersion Modeling of the 1994 PM_{10} Annual Emissions Inventory, Hot Spot No. 1

One-Kilometer Spacing

YEAR	MAX ($\mu g/m^3$)	UTM EAST (km)	UTM NORTH (km)	BACKGROUND ($\mu g/m^3$)	RAM CONC.+ BACKGROUND ($\mu g/m^3$)
1985	31.74	363.0	3518.0	12.39	44.13
1986	32.57	363.0	3518.0	12.39	44.96
1987	28.39	363.0	3518.0	12.39	40.78
1988	26.85	363.0	3518.0	12.39	39.24
1989	26.36	363.0	3518.0	12.39	38.75
	AVG 29.18 ($\mu g/m^3$)				AVG 41.57 ($\mu g/m^3$)

100-Meter Spacing Around Receptor (363,3518)

YEAR	MAX ($\mu g/m^3$)	UTM EAST (km)	UTM NORTH (km)	BACKGROUND ($\mu g/m^3$)	RAM CONC.+ BACKGROUND ($\mu g/m^3$)
1985	31.80	362.9	3517.8	12.39	44.19
1986	32.64	362.9	3517.8	12.39	45.03
1987	28.49	362.9	3517.8	12.39	40.88
1988	26.93	362.9	3517.8	12.39	39.32
1989	26.40	362.9	3517.8	12.39	38.79
	AVG 29.25 ($\mu g/m^3$)				AVG 41.64 ($\mu g/m^3$)

TABLE 28

Summary of Results of Dispersion Modeling of the 1994 PM_{10} Annual Emissions Inventory, Hot Spot No. 2

One-Kilometer Spacing

YEAR	MAX ($\mu g/m^3$)	UTM EAST (km)	UTM NORTH (km)	BACKGROUND ($\mu g/m^3$)	RAM CONC.+ BACKGROUND ($\mu g/m^3$)
1985	29.17	361.0	3516.0	12.39	41.56
1986	30.06	361.0	3516.0	12.39	42.45
1987	26.43	361.0	3516.0	12.39	38.82
1988	25.01	361.0	3516.0	12.39	37.40
1989	24.35	361.0	3516.0	12.39	36.74
	AVG 27.00 ($\mu g/m^3$)				AVG 39.39 ($\mu g/m^3$)

100-Meter Spacing Around Receptor (361,3516)

YEAR	MAX ($\mu g/m^3$)	UTM EAST (km)	UTM NORTH (km)	BACKGROUND ($\mu g/m^3$)	RAM CONC.+ BACKGROUND ($\mu g/m^3$)
1985	29.47	361.2	3516.2	12.39	41.86
1986	30.34	361.2	3516.2	12.39	42.73
1987	26.67	361.2	3516.2	12.39	39.06
1988	25.22	361.2	3516.2	12.39	37.61
1989	24.57	361.2	3516.2	12.39	36.96
	AVG 27.25 ($\mu g/m^3$)				AVG 39.64 ($\mu g/m^3$)

TABLE 29

Summary of Results of Dispersion Modeling of the 1994 PM_{10} Annual Emissions Inventory, Hot Spot No. 3

One-Kilometer Spacing

YEAR	MAX ($\mu g/m^3$)	UTM EAST (km)	UTM NORTH (km)	BACKGROUND ($\mu g/m^3$)	RAM CONC.+ BACKGROUND ($\mu g/m^3$)
1985	28.39	367.0	3516.0	12.39	40.78
1986	29.04	367.0	3516.0	12.39	41.43
1987	25.68	367.0	3516.0	12.39	38.07
1988	24.27	367.0	3516.0	12.39	36.66
1989	23.82	367.0	3516.0	12.39	36.21

AVG 26.24 ($\mu g/m^3$) AVG 38.63 ($\mu g/m^3$)

100-Meter Spacing Around Receptor (367,3516)

YEAR	MAX ($\mu g/m^3$)	UTM EAST (km)	UTM NORTH (km)	BACKGROUND ($\mu g/m^3$)	RAM CONC.+ BACKGROUND ($\mu g/m^3$)
1985	28.60	366.8	3516.2	12.39	40.99
1986	29.25	366.8	3516.2	12.39	41.64
1987	25.84	366.8	3516.2	12.39	38.23
1988	24.38	366.8	3516.2	12.39	36.77
1989	23.94	366.8	3516.2	12.39	36.33

AVG 26.40 ($\mu g/m^3$) AVG 38.79 ($\mu g/m^3$)

Canyon quarry, concrete, and asphalt operations was then carefully scrutinized, and a field trip to the site was conducted to collect more accurate data concerning locations of point sources, plant operations, and other parameters related to emissions calculations. As a result, the emissions at Jobe's McKelligon site were refined. A final run was then made with receptors spaced 100 meters apart along the plant's north property line where the maximum impacts from the facility would occur. Modeled 24-hour average impacts, including background, at the critical receptors for both the screening run and the final run are tabulated in Table 30. The resulting 24-hour PM_{10} design concentration for this area is 114.08 $\mu g/m^3$, which is below the 24-hour NAAQS for PM_{10} of 150 $\mu g/m^3$.

Modeling in the vicinity of Jobe Concrete was conducted without building downwash. The TACB staff believes that downwash is not an important consideration in the modeling of this facility. It is approximately 500 meters from the nearest downwashed sources to the property line where the maximum concentrations were predicted. Furthermore, over 90 percent of the PM_{10} emissions from Jobe Concrete are fugitives with low release heights. Applying building downwash to such fugitive emissions would only decrease concentrations predicted without downwash.

TABLE 30

Summary of Results of Dispersion Modeling of the 1994 PM_{10} 24-Hour Emissions Inventory, Hot Spot No. 1

One-Kilometer Spacing

RANK	CONC.* (μg/m³)	UTM EAST (km)	UTM NORTH (km)	DATE	BACKGROUND (μg/m³)	RAM CONC.+ BACKGROUND (μg/m³)
HIGH	106.75	360.0	3522.0	10/09/85	38.43	145.18
2ND HIGH	103.23	360.0	3522.0	12/23/86	38.43	141.66
3RD HIGH	78.13	360.0	3522.0	12/09/86	38.43	116.56
4TH HIGH	73.95	360.0	3522.0	11/23/85	38.43	112.38
5TH HIGH	69.87	360.0	3522.0	08/14/85	38.43	108.30
6TH HIGH	65.80	360.0	3522.0	11/13/85	38.43	104.23

*The six highest values at the location of the highest, sixth-highest concentration.

100-Meter Spacing along Jobe Concrete's North Property Line

RANK	CONC.* (μg/m³)	UTM EAST (km)	UTM NORTH (km)	DATE	BACKGROUND (μg/m³)	RAM CONC.+ BACKGROUND (μg/m³)
HIGH	91.86	360.65	3521.55	03/11/87	38.43	130.29
2ND HIGH	85.65	360.65	3521.55	01/08/86	38.43	124.08
3RD HIGH	83.71	360.65	3521.55	03/30/87	38.43	122.14
4TH HIGH	80.81	360.65	3521.55	10/09/85	38.43	119.24
5TH HIGH	78.09	360.65	3521.55	10/18/86	38.43	116.52
6TH HIGH	75.65	360.65	3521.55	10/24/88	38.43	114.08

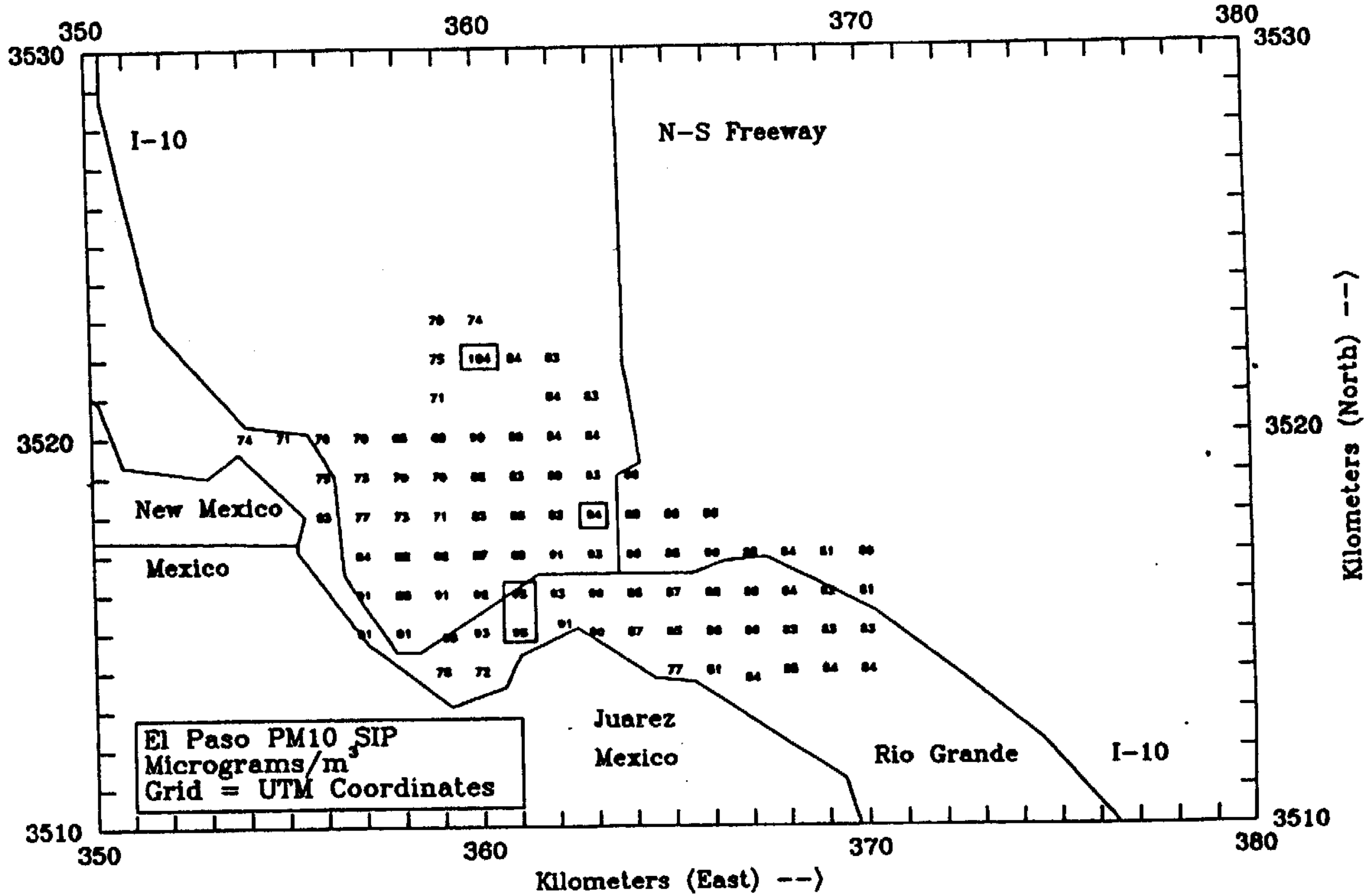
*The six highest values at the location of the highest, sixth-highest concentration.

Two additional hot spot areas for the 1994 24-hour average modeling were identified and modeled with a 100-meter receptor spacing. The locations of the hot spots are indicated on Figure 17. These areas were modeled with 5 X 5, 100-meter spaced receptor grids centered on the critical receptors from the screening run. The modeling with 100-meter spacing demonstrated very weak concentration gradients. Modeled 24-hour average impacts, including background, at the critical receptors for each hot spot are tabulated in Tables 31 and 32. Based on these model runs, the 24-hour design concentrations for the two additional hot spots are 95.47 $\mu g/m^3$ and 94.36 $\mu g/m^3$, which are below the 24-hour NAAQS of 150 $\mu g/m^3$.

10) Complex Terrain Screening

Complex terrain screening for the 1994 inventory was performed on all elevated point sources which had 24-hour average emissions of 0.5 gram per second or more. There are twelve point sources meeting this criteria: one Chevron USA, Incorporated (Chevron) source; one El Paso Refining, Incorporated (El Paso) source; three Border Steel Mills, Incorporated (Border Steel) sources, and seven ASARCO, Incorporated (ASARCO) sources. The Valley Screening method was used to determine PM_{10} impacts on elevated terrain at plume height for each of the significant point sources.

FIGURE 17



24-Hour Concentrations for One-Kilometer Minimum Receptor Spacing - 1990

NOTE: Boxed area indicates a hot spot which was modeled with 100-meter

TABLE 31

Summary of Results of Dispersion Modeling of the 1994 PM_{10} 24-Hour Emissions Inventory, Hot Spot No. 2

One-Kilometer Spacing

RANK	CONC.* (μg/m³)	UTM EAST (km)	UTM NORTH (km)	DATE	BACKGROUND (μg/m³)	RAM CONC.+ BACKGROUND (μg/m³)
HIGH	61.78	361.0	3515.0	10/01/85	38.43	100.21
2ND HIGH	60.45	361.0	3515.0	12/26/86	38.43	98.88
3RD HIGH	57.50	361.0	3515.0	01/13/86	38.43	95.93
4TH HIGH	56.92	361.0	3515.0	12/25/86	38.43	95.35
5TH HIGH	56.92	361.0	3515.0	12/25/85	38.43	94.63
6TH HIGH	56.14	361.0	3515.0	12/27/86	38.43	94.57

*The six highest values at the location of the highest, sixth-highest concentration.

100-Meter Spacing Around Receptor (361,3515)

RANK	CONC.* (μg/m³)	UTM EAST (km)	UTM NORTH (km)	DATE	BACKGROUND (μg/m³)	RAM CONC.+ BACKGROUND (μg/m³)
HIGH	68.04	360.8	3515.1	10/01/85	38.43	106.47
2ND HIGH	60.00	360.8	3515.1	12/26/86	38.43	98.43
3RD HIGH	59.62	360.8	3515.1	12/25/85	38.43	98.05
4TH HIGH	57.77	360.8	3515.1	01/13/86	38.43	96.20
5TH HIGH	57.48	360.8	3515.1	12/31/86	38.43	95.91
6TH HIGH	57.04	360.8	3515.1	12/25/86	38.43	95.47

*The six highest values at the location of the highest, sixth-highest concentration.

TABLE 32

Summary of Results of Dispersion Modeling of the 1994 PM_{10} 24-Hour Emissions Inventory, Hot Spot No. 3

One-Kilometer Spacing

RANK	CONC.* (μg/m³)	UTM EAST (km)	UTM NORTH (km)	DATE	BACKGROUND (μg/m³)	RAM CONC.+ BACKGROUND (μg/m³)
HIGH	68.25	363.0	3518.0	10/09/85	38.43	106.68
2ND HIGH	60.45	363.0	3518.0	01/15/87	38.43	98.88
3RD HIGH	57.88	363.0	3518.0	11/13/85	38.43	96.31
4TH HIGH	55.54	363.0	3518.0	10/01/85	38.43	93.97
5TH HIGH	55.46	363.0	3518.0	12/25/85	38.43	93.89
6TH HIGH	55.24	363.0	3518.0	11/07/85	38.43	93.67

*The six highest values at the location of the highest, sixth-highest concentration.

100-Meter Spacing Around Receptor (363,3518)

RANK	CONC.* (μg/m³)	UTM EAST (km)	UTM NORTH (km)	DATE	BACKGROUND (μg/m³)	RAM CONC.+ BACKGROUND (μg/m³)
HIGH	66.22	362.9	3517.8	10/09/85	38.43	104.65
2ND HIGH	60.48	362.9	3517.8	01/15/87	38.43	98.91
3RD HIGH	56.38	362.9	3517.8	10/01/85	38.43	94.81
4TH HIGH	56.14	362.9	3517.8	11/13/85	38.43	94.57
5TH HIGH	55.94	362.9	3517.8	12/25/85	38.43	94.37
6TH HIGH	55.93	362.9	3517.8	11/07/85	38.43	94.36

*The six highest values at the location of the highest, sixth-highest concentration.

The only off-property elevated terrain being impacted by the elevated point sources is the Franklin Mountains. High terrain in close proximity to ASARCO was initially modeled, but it was later learned that the elevated terrain is on ASARCO's property.

Significant elevated point sources with permits were modeled with the estimated allowable PM_{10} emission rate. Those that are not permitted were modeled with the actual 1990 emission rate. For each source, the point on the Franklin Mountains closest to the source and with the same elevation as the source's final stable plume height was located, and impacts at that point were predicted.

Results of the complex terrain screening are shown in Table 33. Predicted impacts on the Franklin Mountains at plume height for the indicated sources are negligible. Although subtotals are given for impacts from each facility, the impacts would not be expected to coincide at the same location on the same day.

11) Conclusions

Results of dispersion modeling of both the 1990 and 1994 El Paso County PM_{10} emissions inventories predict 24-hour and annual average design concentrations below the NAAQS and well below historically monitored PM_{10} concentrations. The modeling has demonstrated that the currently designated nonattainment area

TABLE 33

Summary of Results of Complex Terrain Screening Modeling of Point Sources Impacting on the Franklin Mountains

COMPANY	EMISSION POINT	EMISSION RATE (g/s)	STACK HEIGHT (m)	FINAL STABLE PLUME HEIGHT (m)	VALLEY 24-HOUR CONCENTRATION ($\mu g/m^3$)
CHEVRON	XFCCPPTR	3.870	41	132.3	0.57
EL PASO REF.	096	7.832	59	165.4	1.35
BORDER STEEL	A	0.681	30	133.1	0.28
BORDER STEEL	12A	0.516	17	79.1	0.43
BORDER STEEL	12B	0.516	17	79.1	0.43
			Border Steel Total		1.14
ASARCO	CU/STK	12.090	252	325.4	5.07
ASARCO	AP1/S	0.598	30	79.9	0.86
ASARCO	AP2/S	0.745	40	92.7	0.74
ASARCO	UNL/BD/N/S	0.934	20	37.5	1.75
ASARCO	UNL/BD/S/S	0.825	20	56.2	1.33
ASARCO	UNL/CUBH/S	0.783	20	46.8	1.16
ASARCO	UNL/PBBH/S	0.597	20	42.4	0.95
				ASARCO Total	11.86

would be in attainment now and at the 1994 deadline attainment date if it were not for emissions emanating from outside of the U.S.

f. Control Plans

The dispersion modeling performed with the El Paso County emissions inventory has indicated that the designated El Paso PM_{10} nonattainment area would be in attainment of the NAAQS by the attainment deadline based on U.S. emissions alone. Analyses of spatial trends in PM_{10} concentrations, along with trajectory analyses, have provided strong evidence that PM_{10} concentrations measured in El Paso are influenced by emissions from Juarez.

However, the TACB is adopting several new or enhanced control measures to help minimize PM_{10} impacts from El Paso sources. The control measures discussed in this document and required in TACB regulations reflect the requirements for RACM and RACT specified in the PM_{10} Moderate Area SIP Guidance: Final Staff Work Product, April 2, 1991.

1) Area Source Control

The 1990 emissions inventory established that area sources are clearly El Paso's most significant source of PM_{10}. In accordance with EPA guidance on RACMs, fugitive dust control measures, residential wood combustion control measures, and prescribed burning control measures have been reviewed. Many of the prescribed control measures were previously adopted in TACB Regulation I and are required to be effective as soon as possible, but no later than December 31, 1991. All control measures have been evaluated for their appropriateness in El Paso, and where control or additional control has been deemed reasonable, revisions to the TACB regulations are being proposed. Control requirements are being extended to include Fort Bliss Military Reservation, except for tactical training areas, by modification of §111.141, concerning Geographic Areas of Application and Date of Compliance.

a) Fugitive Dust Control Measures

All reasonable fugitive dust control measures for the City of El Paso, including items on EPA's List of Available Control Measures, have been reviewed (see Appendix N). Control of fugitive dust in the City of El Paso is clearly linked to the control of reentrained dust from vehicle traffic. Regulations requiring reasonable controls previously have been adopted. Some of the rules are being revised to expand applicability and to enhance effectiveness, as follows:

- Section 111.145, concerning Construction and Demolition, is expanded to add a requirement for El Paso for paving or otherwise stabilizing construction and/or demolition access roads and eliminates the existing exemption for small construction and demolition sites.

- Section 111.147, concerning Roads, Streets, and Alleys, is modified to require paving as the only acceptable method of dust control in El Paso for specified roads and adds a requirement that alleys be paved at the rate of 15 miles per year. This is an appropriate follow-up on the City of El Paso's previous commitments to paving as noted in the Interim PM_{10} SIP for El Paso (August, 1989). Section 111.147 is also expanded to require that all levee roads and access to such roads be paved or chemically stabilized, and to require removal of soil from all paved public streets at least four times per year within the El Paso city limits and up to six times per week in the central business district. The rule requires spot cleaning of visibly dirty road areas and removal of sand used for snow and ice control in the City of El Paso. Records must be maintained to document the sweeping activities. These requirements are needed to enhance the feasible dust control measures for paved roads in El Paso.

The Executive Director and EPA are being given the option of granting a waiver from paving requirements for industrial roadways, provided the roadway owner can demonstrate that the cost of paving is economically unreasonable compared to other forms of dust control specified in §111.147(1).

All other fugitive dust control measures have been determined to be sufficiently addressed by the current regulations or have been considered inappropriate for the El Paso area because of de minimis emissions or technological or economical infeasibility. Specific details of this analysis may be found in Appendix N.

A memorandum of understanding (MOU) between the City of El Paso and the TACB will serve as the basis for defining the division of responsibility and commitments to carry out the provisions of these rules. A copy of the MOU is provided in Appendix Q of this document.

b) Control Measures for Residential Wood Combustion Devices

All reasonable control measures for residential wood combustion devices (RWCD's) in the City of El Paso, including items on EPA's "List of Available Control Measures," have been reviewed (see Appendix O). The evaluation of these control measures considered the fact that emissions from RWCD's in El Paso are de minimis.

As discussed in the evaluation of EPA's "List of Available Control Measures," many of these control measures cannot be promulgated because the legislative authority to impose taxes or to require local agencies to impose taxes is lacking. Rules for an episodic curtailment program have been added to §111.111(c), concerning Solid Fuel Heating Devices. These rules will apply in both El Paso and Fort Bliss Military Reservation. The TACB rules will be similar to a recently adopted El Paso ordinance (Appendix O, Attachment 1) in that applicability extends to all residential solid fuel heating devices, rather than RWCD's only. These rules will exceed EPA requirements for such a program. The TACB will work with the City of El Paso to establish an effective public information program to facilitate compliance with the rules. All other evaluated control measures are considered inappropriate for the El Paso area because of de minimis emissions from these sources.

As in the case of fugitive dust control measures, a memorandum of understanding (MOU) between the City of El Paso and the TACB will serve as the basis for defining the division of responsibility and commitments to carry out the provisions of §111.111, concerning Solid Fuel Heating Devices. A copy of the MOU is provided in Appendix Q of this document.

c) Prescribed Burning Control Measures

The 1990 PM_{10} emissions inventory has established that there is no significant agricultural or silvicultural burning in El Paso County. In the future, if such burning occurs, TACB rules regarding outdoor burning (§§111.101, 111.103, 111.105, and 111.107) will sufficiently regulate these activities.

2) Point Source Control

The PM_{10} emissions inventory has been used to establish the quantity of emissions from point sources in El Paso County and the degree to which these sources are controlled. After a review of the controls currently placed on each of the point sources in the area, it has been determined that all sources meet the requirements for RACT or RACM or that the emissions from each source are de minimis.

Data and comments related to the review of point source control strategies are presented in Appendix P.

3) Reasonable Further Progress

EPA guidance contained in <u>PM_{10} Moderate Area SIP Guidance: Final Staff Work Product</u>, April 2, 1991, prescribes that SIPs for moderate PM_{10} nonattainment areas contain quantitative milestones to be achieved every three years and that the SIPs demonstrate RFP towards attainment.

For the current El Paso PM_{10} SIP revisions, the TACB staff does not believe that an RFP demonstration is strictly applicable. As noted in EPA's April 2, 1991 guidance, the purpose of the RFP milestone requirement is to "provide for emission reductions adequate to achieve the standards by the applicable attainment date." Based on the international impacts provision in Title VIII of the FCAA, the TACB has demonstrated in this SIP revision that the currently designated El Paso nonattainment area would attain the PM_{10} NAAQS both currently and in 1994, based on modeling of U.S. emissions alone. Thus, there should be no requirement for a demonstration of reductions to U.S. emissions. As discussed in Section C.4.d. of this SIP revision, emissions calculations for 1994 do account for reductions for source categories affected by the newly adopted rule changes, although total emissions for 1994 are projected to be greater than in 1990.

4) Contingency Measures

EPA guidance contained in <u>PM_{10} Moderate Area SIP Guidance: Final Staff Work Product</u>, April 2, 1991, prescribes that SIPs for moderate PM_{10} nonattainment areas include contingency control measures. According to the guidance, these measures become effective without further action by the state or EPA upon determination by EPA that the area has failed to make reasonable further progress or attain the PM_{10} NAAQS by the attainment deadline.

As discussed previously, this SIP revision is based on the provision in Title VIII of the 1990 FCAA which provides that an area does not have to meet the PM_{10} moderate area attainment deadline if the state demonstrates that the area would reach attainment by the deadline if it were not for emissions emanating from another country. The TACB has demonstrated through this SIP revision that the area would attain the PM_{10} standard by the deadline based on modeling of U.S. emissions alone.

A contingency plan is not being developed and submitted with the current SIP revision since 1) this SIP revision demonstrates that El Paso would attain the PM_{10} standard based on modeling of U.S. emissions alone, 2) the PM10 problem in the El Paso area is international in scope, and 3) there is a current lack of adequate information needed to determine the relative contribution of El Paso and Juarez to the PM_{10} problem in the air basin. However, provided that adequate information becomes available, a contingency plan will be developed in conjunction with future El Paso PM_{10} SIP revisions. It is anticipated that EPA, TACB, the City of El Paso, and SEDUE will continue a cooperative effort to study the PM_{10} air quality in the El Paso/Juarez air basin. Based on the availability of enhanced emissions and monitoring data, as well as more sophisticated modeling techniques (e.g., Urban Airshed Model), future studies will attempt to better define the relative contributions of El Paso and Juarez to the PM_{10} problem in the basin. At that time, a contingency plan can more appropriately be developed in a cooperative effort with Mexico.

5) Test Methods

In accordance with EPA guidance, states submitting a PM_{10} SIP need to adopt and have enforceable test methods in the SIP. However, the TACB staff does not believe that PM_{10} test methods should be included in the current SIP revision.

In this revision, the TACB did not propose new or modified rules or standards for El Paso which would require PM_{10} stack testing to establish compliance. A more appropriate approach would be to improve TACB Regulation I on a state-wide basis. The improvements would include development of rules requiring the use of specific test methods, and possibly a testing frequency, in all cases where an allowable emission rate has been established. It should be noted that there are currently no allowable emission rate standards in TACB Regulation I for PM_{10}. Statewide regulations to address this issue will be developed apart from the current El Paso SIP revision.

g. Revision of TACB Rules and Regulations

In accordance with 40 Code of Federal Regulations (CFR) Part 51, Requirements for Preparation, Adoption, and Submittal of Implementation Plans, the TACB is revising Regulation I, Control of Air Pollution from Visible Emissions and Particulate Matter, to incorporate rules to support the provisions of this PM_{10} SIP. Specifically, the TACB is adopting the following rule revisions:

- Section 111.111, concerning Visible Emissions, adds a subsection which prohibits the use of solid fuel heating devices during periods of atmospheric stagnation within the City of El Paso, including the Fort Bliss Military Reservation. The revision also contains exemptions for burn down periods, for buildings where the solid fuel heating device is the sole source of heat, and for periods of temporary power loss within the building.

- Section 111.141, concerning Geographic Areas of Application and Date of Compliance, adds the Fort Bliss Military Reservation, except for tactical training areas, to the El Paso geographic area being addressed in the rules and adds a separate compliance date of December 10, 1993 for the new controls being proposed in accordance with EPA's PM_{10} Moderate Area SIP Guidance: Final Staff Work Product, April 2, 1991.

- Section 111.145, concerning Construction and Demolition, adds a requirement for El Paso for paving or otherwise stabilizing construction and/or demolition access roads and eliminates the existing exemption for small construction and demolition sites.

- Section 111.147, concerning Roads, Streets, and Alleys, adds a notation that, within the City of El Paso, paving is the only acceptable dust control method for specified roads; adds a requirement that city alleys be paved at the rate of 15 miles per year; adds a requirement that all levee roads and access to such roads be paved or chemically stabilized; gives the Executive Director and EPA the option of granting a waiver from paving requirements for industrial roadways, provided the roadway owner can demonstrate that the cost of paving is economically unreasonable compared to other forms of dust control specified in §111.147(1); deletes the current exemption for removal of sand applied on public thoroughfares for snow or ice control; and adds specific street sweeping and recordkeeping requirements.

h. Legal Authority

The State of Texas has the legal authority necessary to implement the control strategies for PM_{10} under provisions of the Texas Clean Air Act, §382.017, TEXAS HEALTH AND SAFETY CODE ANN. (VERNON 1990).