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

GROUP I AREA - EL PASO
(INTERIM SIP)

TEXAS AIR CONTROL BOARD
6330 HIGHWAY 290 EAST
AUSTIN, TEXAS 78723

MAY 1989

C. INHALABLE PARTICULATE MATTER (PM_{10})

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C. INHALABLE PARTICULATE MATTER (PM_{10})

1. - 2(a-f). (NO CHANGE)

3. PM_{10} GROUP I AREA

In the August 7, 1987 Federal Register, the Environmental Protection Agency (EPA) designated El Paso County as a Group I area for the PM_{10} National Ambient Air Quality Standards (NAAQS). The designation was based on calculations using Total Suspended Particulate (TSP) data for 1984 - 1986 and the determination that the area has a greater than 95 percent probability of exceeding the PM_{10} NAAQS. EPA requirements call for a revision to the State Implementation Plan (SIP) for each Group I area. The Texas Air Control Board (TACB) was initially to have submitted the revision to EPA by May 1, 1988. Because of the large amount of technical work required to develop this SIP revision, however, the TACB requested additional time to prepare and submit the El Paso Group I SIP. On October 9, 1987, EPA accepted the proposed schedule of submitting the SIP by December 30, 1988.

On April 7, 1988, in conjunction with SIP development, the TACB submitted a draft modeling protocol to EPA and pointed out some of the international issues in the El Paso area. The TACB staff met with EPA and El Paso City-County Health District (EPCCHD) staff in El Paso on April 12-13, 1988 to discuss the unique issues arising because of the international nature of the PM_{10} problem in El Paso. The TACB suggested that the problem warranted additional study and that a final SIP properly considering these issues could not be submitted in accordance with the previously agreed upon schedule. EPA acknowledged that uncertainties and special concerns existed in addressing the PM_{10} air quality problem in El Paso, but requested the submittal of an interim SIP until further studies and final SIP revisions could be completed. In correspondence of June 1, 1988, EPA outlined requirements to be contained in the interim SIP and

recommended that the TACB submit a draft interim SIP by September 30, 1988. This draft interim SIP is in response to that recommendation and includes the data analysis requirements and other long-term commitments specified in the letter.

a. Interim SIP Requirements

In the June 1, 1988 letter, EPA recommended that the TACB include the following ten points in the interim SIP:

1) Determination of "background" concentration as a function of wind direction.
2) Results and interpretation of PM_{10} filter analyses.
3) Commitment and plan to perform carbon analyses on available filters to complement optical analyses already completed (analyze any additional filters).
4) Updated PM_{10} emissions inventory (per comments at meeting of April 13, 1987 in El Paso).
5) Commitment and plan to improve emissions inventory in the U. S. emphasizing the following points:
   a. Major point and area sources at Fort Bliss.
   b. Residential wood burning emissions in U. S.
   c. Sources in the squatters' colonies east and west in El Paso.
6) Review of the control measures which are listed in the urban fugitive dust policy. Inclusion in the draft interim SIP of a program to implement any measures which are appropriate and a discussion of why other measures were not selected.
7) Inclusion of a plan to establish an automated camera system (including provisions for densitometer analysis, similar to that used in visibility studies) to determine the major visible emission points in Juarez and to track the formation and movement of the haze layer.

8) Commitment to continue coordination with Juarez officials, providing reasonable assistance when requested.

9) Commitment to work with EPA Region 6 to revise the modeling protocol to include consideration of five years of meteorological data.

10) Commitment to work with EPA Region 6 to conduct a future study to characterize the nature of the PM_{10} being transported into the U. S. This would include short-term sampling to represent different meteorological regimes, chemical analysis and receptor modeling, analysis of background concentrations, and dispersion modeling of the airshed, using emissions data furnished by Mexico (or alternately, of the U. S.' portion of the airshed using the background information gained from the short-term monitoring).

b. Definition of Group I Area Boundary and the Air Quality Status

The Federal Register notice listing PM_{10} area classifications (Vol. 52, No. 152, August 7, 1987) designated El Paso County as Group I. However, the state was given the option to more precisely define the boundaries of the area that is or may be violating the PM_{10} standards during the SIP development. According to recommendations provided by EPA in the PM_{10} SIP Development Guideline, Section 2.5, the TACB performed a qualitative analysis of the representativeness of air quality data together with consideration of terrain, meteorology, and sources of emissions. Analysis included compiling maps showing all TSP and PM_{10} monitoring stations with their calculated probability of exceeding the standard, and all PM_{10} point sources in the county.

There were 22 TSP monitoring sites in El Paso County in the period 1984 - 1986, 14 of which had three complete years of data. The probability calculations identified seven monitors with a greater

than 95 percent probability of exceeding the PM_{10} 24-hour NAAQS. The probability calculations are shown in Table 4 and the locations of monitors are shown in Figure 1. The TSP monitors that had shown greater than 95 percent probability of exceeding the PM_{10} NAAQS are also identified. As can be seen from the map, all the monitors that have shown high probability are located along the Rio Grande Valley. Six monitors with a calculated probability of greater than 20 percent and less than 95 percent are also located along the valley. All other monitors have shown less than 20 percent probability of exceeding the standard. In all but one case, the exceedance probabilities of these monitors are less than 10 percent.

In anticipation of the PM_{10} NAAQS promulgation, two PM_{10} monitors have been operating in El Paso since 1985, one at the EPCCHD site (SAROAD #1700002G01) and the other at the University of Texas in El Paso (UTEP) (SAROAD #1700037F01). There have been a total of 10 daily measurements above the PM_{10} 24-hour NAAQS of 150 ug/m^3 during the three-year period at the EPCCHD monitor and the annual average values were above the standard of 50 ug/m^3 each year. The highest 24-hour concentration recorded at this site was 324 ug/m^3 in 1986 and the highest annual arithmetic average was 68 ug/m^3 recorded in 1985. One measurement exceeded the 24-hour NAAQS at the UTEP site during the three-year period - a concentration of 185 ug/m^3 recorded in 1986. The annual NAAQS was attained at this site in each of the three years.

A PM_{10} emission inventory was developed for El Paso in 1987. Fifteen point sources of PM_{10} emissions were identified, of which only four are major sources (greater than 100 tons/year emissions). A list of all PM_{10} sources is shown in Table 5 and their locations are plotted on the map in Figure 2. Although the largest source of PM_{10} emissions is located in Fort Bliss, none of the monitors close to Fort Bliss has shown a high probability of violating the PM_{10} standard. As stated earlier, all high probability monitors are located along the U. S./Mexico border in

TABLE 4

Probabilities of Exceeding PM_{10} NAAQS Based on 1984-1986 TSP Data

EL PASO COUNTY

SITE NO.	24-HOUR NAAQS %	ANNUAL NAAQS %	NUMBER OF SAMPLES	YEARS WITH COMPLETE QTRS.*	YEARS OF MONITORING
31G	100	87	178	3	3
41F	100	86	295	3	3
02G	100	74	193	3	3
30G	99	69	182	2	2
18G	99	64	193	3	3
27F	98	67	305	3	3
40F	96	23	297	3	3
15G	91	73	172	2	2
39F	91	5	318	3	3
38G	67	8	187	2	2
42F	64	2	312	3	3
37F	58	10	297	3	3
25G	25	4	186	3	3
29G	20	1	185	2	2
19G	10	4	166	2	2
07G	6	0	192	3	3
33G	6	4	194	3	3
03G	5	4	178	3	3
11G	4	2	180	3	3
16F	3	4	167	1	3
24G	0	1	187	2	2
10G	0	1	154	2	2

* = Probability calculations require at least 12 samples in each quarter for a year to be considered valid.

FIGURE 1

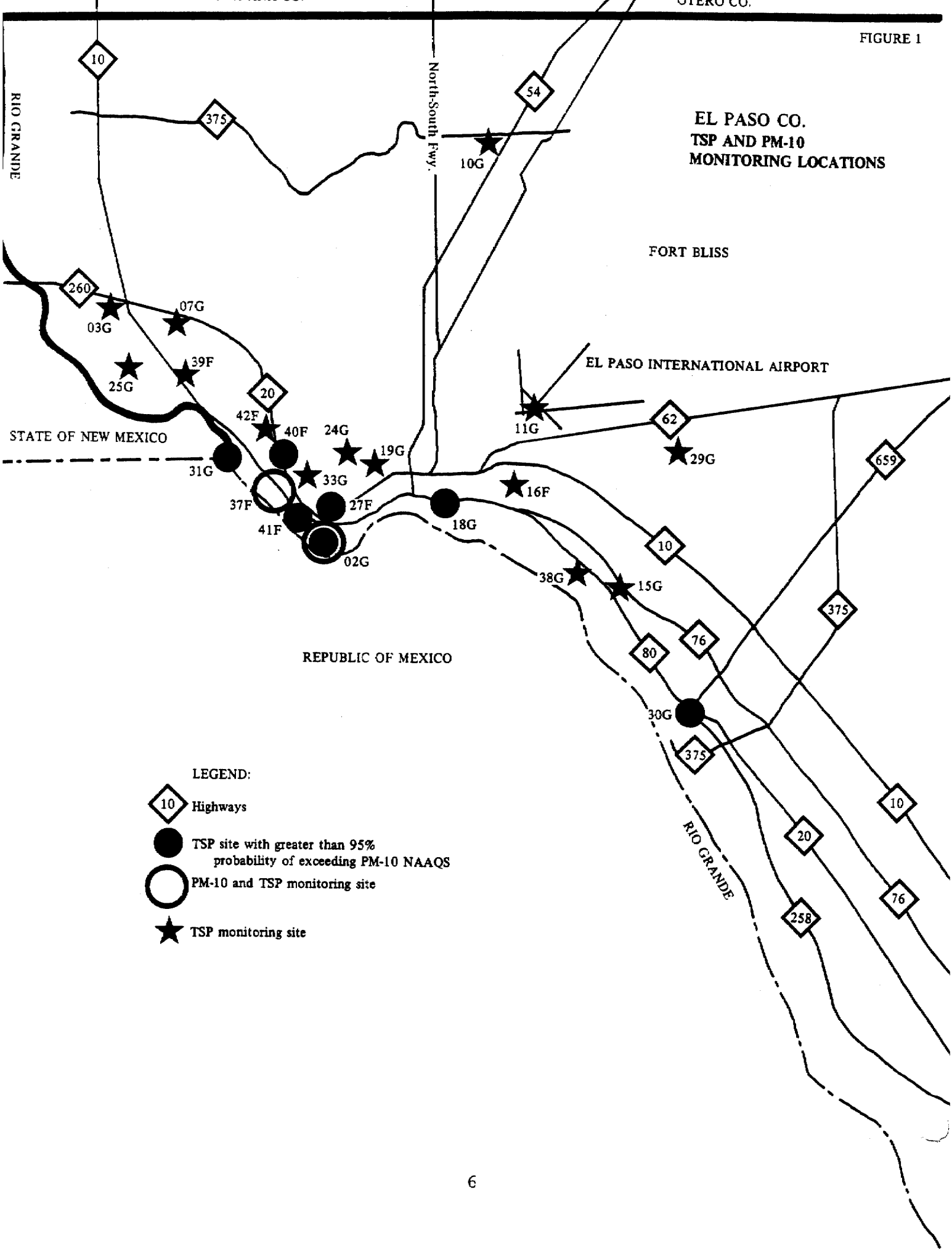
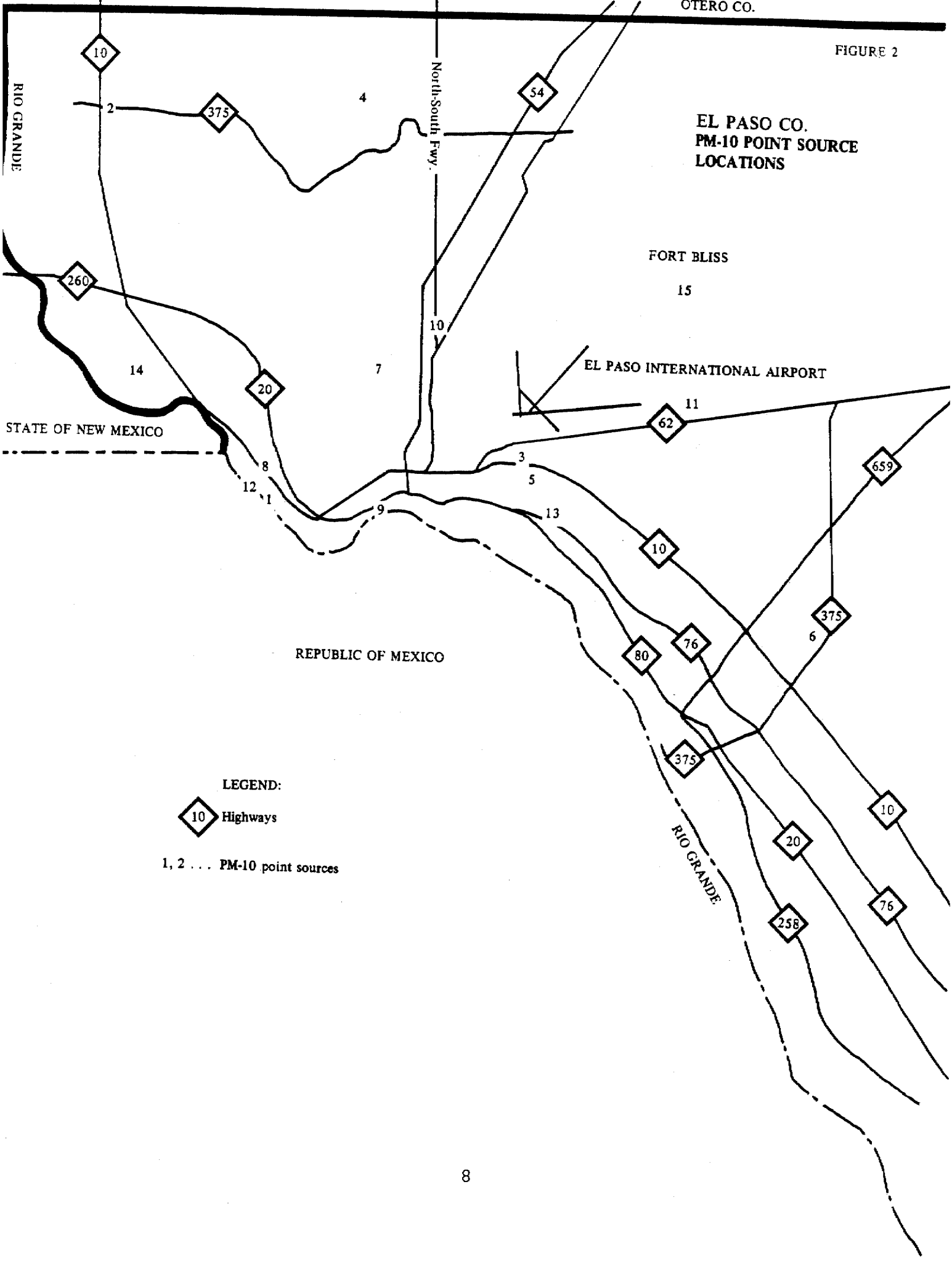

EL PASO CO.
TSP AND PM-10
MONITORING LOCATIONS
RIO GRANDE
North-South Fwy.
FORT BLISS
EL PASO INTERNATIONAL AIRPORT
STATE OF NEW MEXICO
REPUBLIC OF MEXICO
RIO GRANDE
10G
03G
07G
25G
39F
42F
40F
24G
19G
31G
33G
37F
27F
41F
02G
18G
16F
11G
29G
38G
15G
30G
LEGEND:
Highways
TSP site with greater than 95% probability of exceeding PM-10 NAAQS
PM-10 and TSP monitoring site
TSP monitoring site

TABLE 5

PM_{10} Point Sources in El Paso County
(Based on 1986 PM_{10} Emissions)

#	ACCT.#	COMPANY	LOCATION	PM_{10} EMISSIONS (TONS/YEAR)
1	EE0007G	ASARCO INCORPORATED	2301 WEST PAISANO	116
2	EE0011P	BORDER STEEL MILLS INCORP.	IH-10 & VINTON ROAD	24
3	EE0015H	CHEVRON USA INC.	6501 TROWBRIDGE DRIVE	14
4	EE0029T	EL PASO ELECTRIC COMPANY	FARM RD. 2529 @ WAR HWY	28
5	EE0082P	EL PASO REFINING CO.	6500 TROWBRIDGE	213
6	EE0034D	EL PASO SAND PRODUCTS	1.5 MI NE OF I10 @ LP 375	113
7	EE0035B	EL PASO SAND PRODUCTS	#1 MCKELLIGON CANYON ROAD	56
8	EE0036W	EL PASO SAND PRODUCTS	762 EXECUTIVE CENTER BLVD	6
9	EE0147M	JOBE CONCRETE PRODUCTS, INC.	2275 AVE. OF AMERICAS	17
10	EE0149I	JOBE CONCRETE PRODUCTS, INC.	MARSHALL ROAD	8
11	EE0061A	PAISANO CONCRETE CO.	11577 PELLICANO	15
12	EE0062V	PARKER BROTHERS & COMPANY	WEST PAISANO	15
13	EE0067L	PHELPS DODGE REFINING CORP.	NORTH LOOP ROAD	10
14	EE0068J	PROLER INTERNATIONAL CORP.	8230 DONIPHAN DRIVE	31
15	EE0024G	U. S. ARMY AIR DEFENSE	FORT BLISS	1360
			TOTAL EMISSIONS	2026

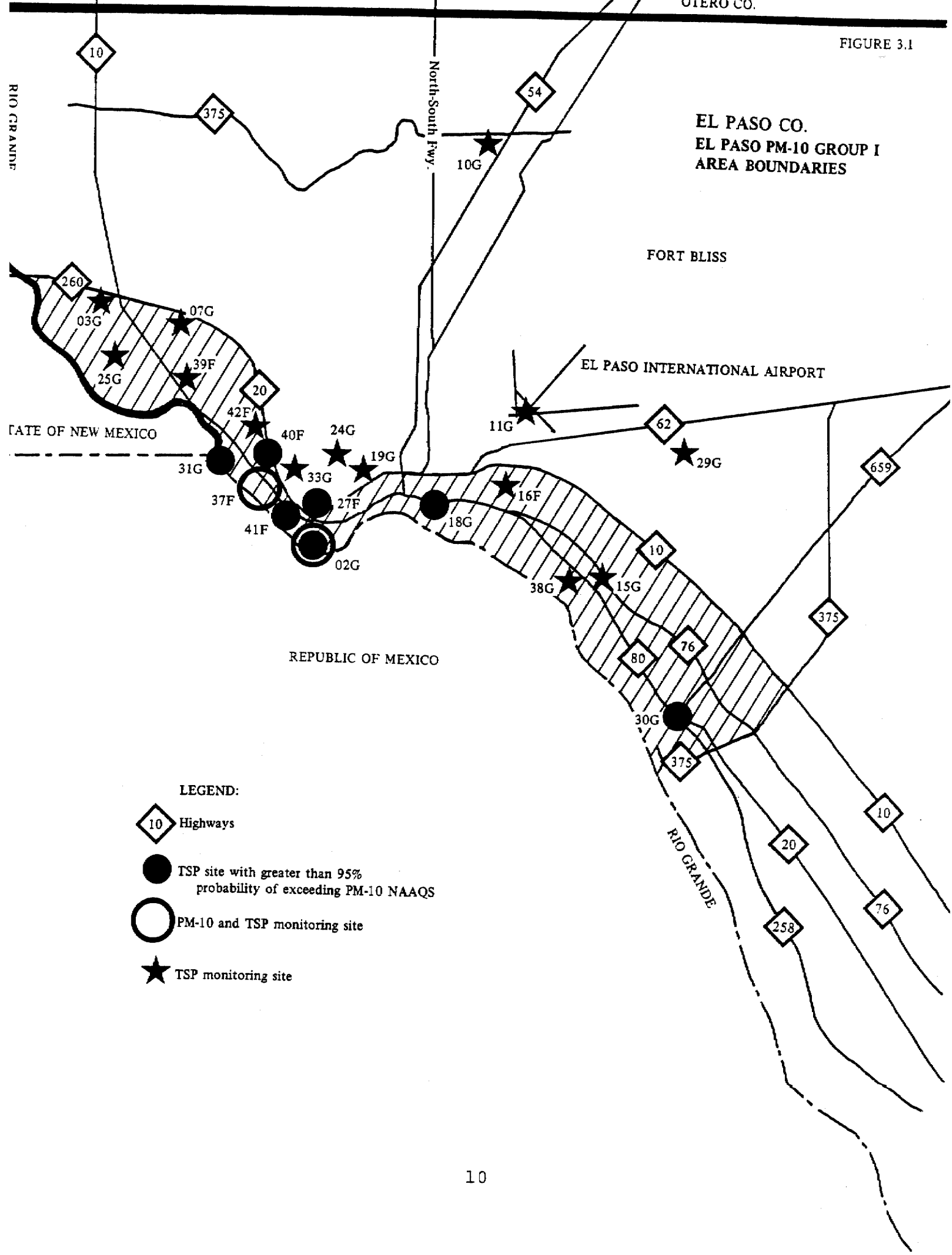

OTERO CO.
FIGURE 2
EL PASO CO.
PM-10 POINT SOURCE
LOCATIONS
RIO GRANDE
North-South Fwy.
FORT BLISS
15
EL PASO INTERNATIONAL AIRPORT
STATE OF NEW MEXICO
REPUBLIC OF MEXICO
RIO GRANDE
LEGEND:
10 Highways
1, 2 . . . PM-10 point sources

the Rio Grande Valley. Air quality analysis of TSP data for 1986 in El Paso supports the conclusion that particulate matter levels tend to become worse closer to the border.

Based on the above analysis, the TACB is limiting the PM_{10} Group I area in El Paso to a portion of the City of El Paso in the Rio Grande Valley as described below:

> That portion of the City of El Paso bounded on the northwest by Farm Road 260 from the Texas/New Mexico border to the intersection of Interstate Highway 10 and State Highway 20; thence, southeastward along State Highway 20 to the intersection of Interstate Highway 10 and State Highway 20; continuing southeastward along Interstate Highway 10 to Loop 375; thence, southwestward along Loop 375 to the Rio Grande River; thence, northwestward and continuing along the Rio Grande River to the Texas/Mexico/New Mexico border; along the Texas/New Mexico border to the point of intersection with Farm Road 260. Figures 3.1 and 3.2 illustrate the specific boundaries.

In accordance with 40 CFR Part 58.13 requirements, ambient PM_{10} data will be collected in the El Paso Group I area daily at the EPCCHD monitor (SAROAD #1700002G01). Based on Table 4 in 40 CFR Part 58, three to four National Ambient Monitoring Station (NAMS) sites are recommended for El Paso. The TACB proposes three additional NAMS sites and two State and Local Air Monitoring Station (SLAMS) sites in El Paso. The monitor at the maximum concentration site has been operational since 1985. All other monitors are also operational at this time. The proposed PM_{10} monitoring locations and the scheduled frequency of operation of each are shown in Table 6. The locations are also shown in Figure 4. The network was designed after close coordination between the TACB, EPA, and the EPCCHD staff in order to provide a better area coverage while not overlooking the problem areas.


OTERO CO.
FIGURE 3.1
EL PASO CO.
EL PASO PM-10 GROUP I
AREA BOUNDARIES
North-South Fwy.
RIO GRANDE
FORT BLISS
EL PASO INTERNATIONAL AIRPORT
TATE OF NEW MEXICO
REPUBLIC OF MEXICO
10G
03G
07G
25G
39F
42F
40F
24G
19G
31G
33G
37F
27F
41F
02G
11G
29G
16F
18G
38G
15G
30G
LEGEND:
Highways
TSP site with greater than 95% probability of exceeding PM-10 NAAQS
PM-10 and TSP monitoring site
TSP monitoring site

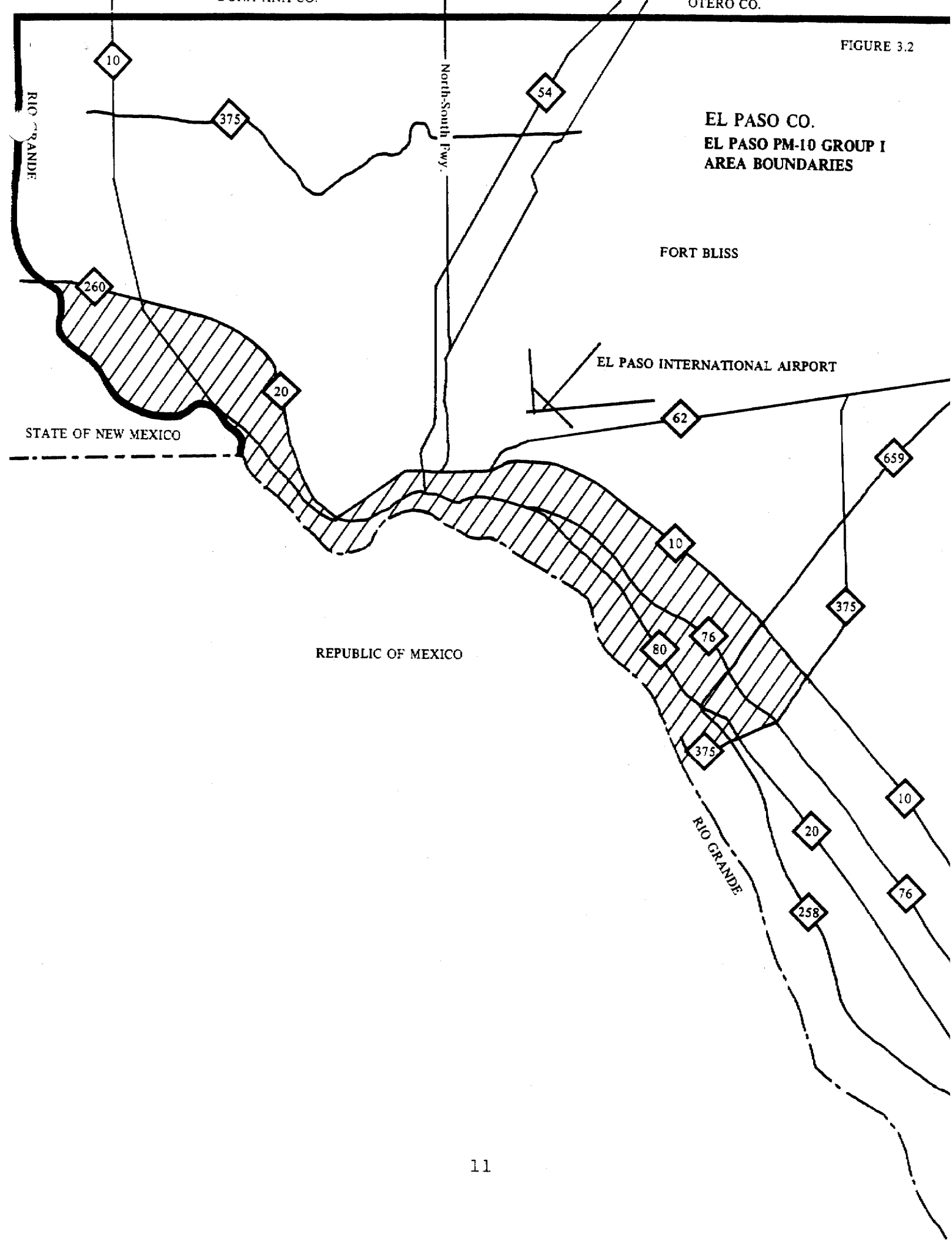
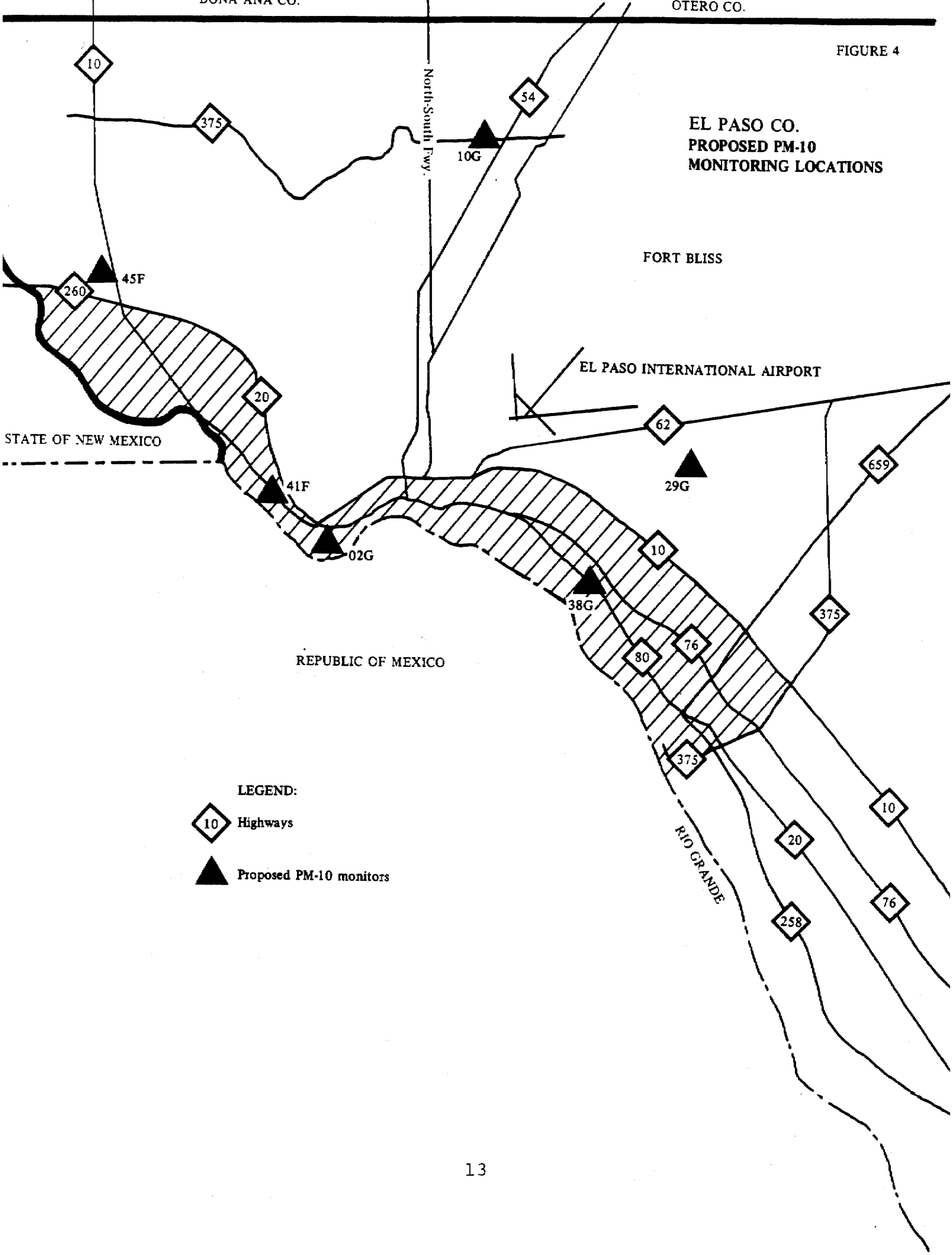

OTERO CO.
FIGURE 3.2
EL PASO CO.
EL PASO PM-10 GROUP I
AREA BOUNDARIES
RIO GRANDE
North-South Fwy.
10
375
54
FORT BLISS
260
20
EL PASO INTERNATIONAL AIRPORT
62
STATE OF NEW MEXICO
659
10
375
REPUBLIC OF MEXICO
80
76
375
RIO GRANDE
10
20
76
258

TABLE 6

Proposed PM_{10} Monitors in El Paso

SAROAD	LOCATION	FREQUENCY	MONITOR CLASSIFICATION	STATUS
1700002G01	El Paso City-County Health District	Daily	NAMS	Operating
1700010G01	Northeast Clinic	Sixth day	SLAMS	Operating
1700029G01	Ivanhoe Street	Sixth day	NAMS	Operating
1700041F01	Vilas Elementary School	Every other day	NAMS	Operating
1700045F01	Lindberg Avenue	Sixth day	NAMS	Operating
1700038G01	Riverside High	Sixth Day	SLAMS	Operating


DONA ANA CO.
OTERO CO.
FIGURE 4
EL PASO CO.
PROPOSED PM-10
MONITORING LOCATIONS
North-South Fwy.
10
375
54
10G
45F
260
FORT BLISS
EL PASO INTERNATIONAL AIRPORT
20
STATE OF NEW MEXICO
41F
62
29G
659
02G
10
38G
375
80
76
REPUBLIC OF MEXICO
375
RIO GRANDE
10
20
76
258
LEGEND:
10 Highways
Proposed PM-10 monitors

c. Results and Interpretation of PM_{10} Filter Analysis

In preparation for the SIP development, a special analysis of 21 selected filters from the PM_{10} monitor at the EPCCHD site (SAROAD #1700002G01) was conducted. The filters were selected from a total of 291 samples collected in 1986 and included all high concentrations and a representative sample from all seasons. The highest PM_{10} concentration in 1986 was 324 ug/m^3 recorded on January 30, 1986. The filters were analyzed at the TACB laboratory using optical and scanning electron microscopy. In addition, x-ray micro analysis to identify major chemical elements and compounds of the particle loading and ion chromatographic analysis for sulfates and nitrates were also performed. The methodology and the results of the analyses are included as Appendix D.

Analysis of results indicates that approximately 70 to 90 percent of the filter loading by volume is calcium carbonate and mixed clay. Clay soil contained aluminum, silicon, potassium, calcium, titanium, iron, and quartz sand. A major portion of the remainder of the particulate matter is carbonaceous material. Only a small portion of the particulate loading was determined to be sulfates (on the average, about 5 percent) and nitrates (on the average, about 1 percent). The other constituents were rubber dust, fungal spores, pollens, iron oxides, and lead bromochloride compounds. This information is summarized in Figure 5. Complete results of the laboratory analyses are included as Appendix D. The conclusions drawn from TACB staff review of the laboratory analyses are that the PM_{10} particulate loading on the filters from the EPCCHD monitor is substantially a result of soil reentrainment. Industrial processes and automobile emissions in the El Paso area contribute only a small fraction of the fine particulate matter.

Analysis also shows that most of the high levels of PM_{10} were recorded in the winter months when low level inversion and low visibility conditions are most prevalent in the El Paso area. This is illustrated in Figure 5.1. Eight filters out of the 21 that

FIGURE 5

COMPOSITION OF PM10 FILTERS

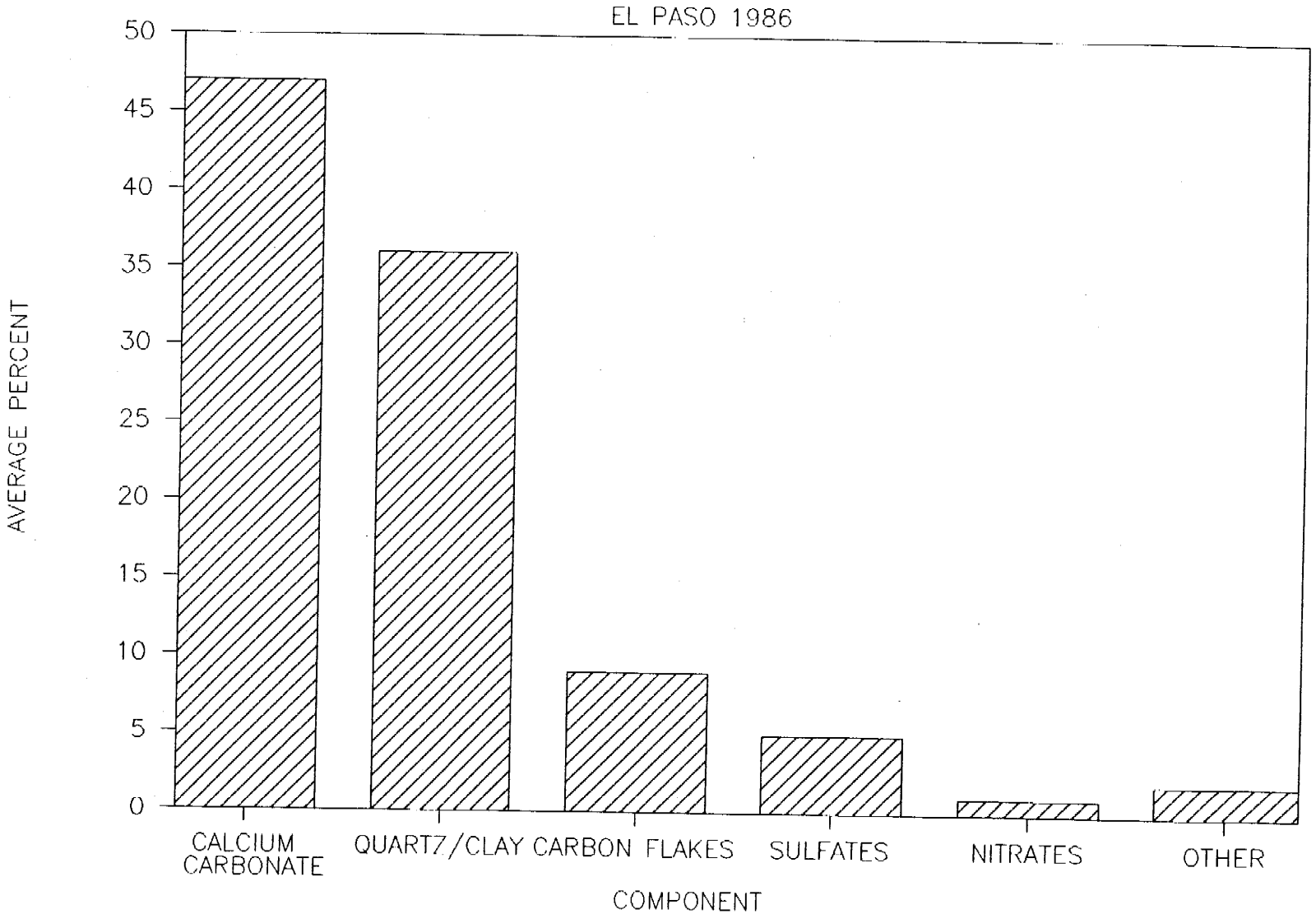
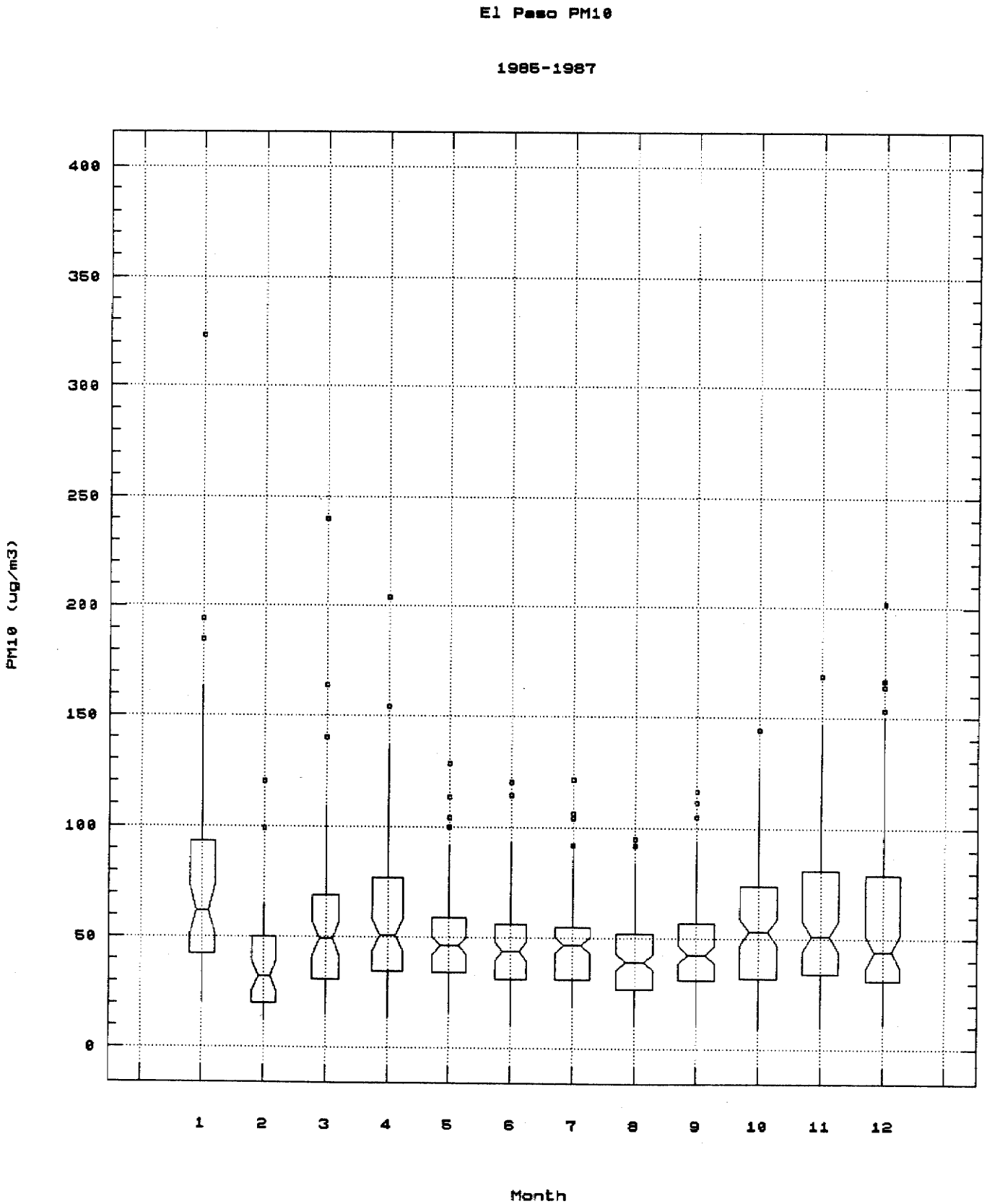


FIGURE 5.1


El Paso PM10
1985-1987
PM10 (ug/m3)
400
350
300
250
200
150
100
50
0
1
2
3
4
5
6
7
8
9
10
11
12
Month

were subjected to special analysis measured concentrations greater than the 150 ug/m^3 24-hour standard. A special study conducted by the TACB in 1986 to establish visual air quality in El Paso showed that the mean standard visual range (SVR) for six of the eight high PM_{10} days was less than 50 kilometers. In comparison, the mean SVR for winter months was 80 kilometers. This is illustrated in Table 7 and Figure 6. Standard visual range is interpreted as the greatest distance that an observer could see a large black horizon feature against the sky. This quantitative measurement is related directly to the sight path between the observer and the target. The observer in this study was an automatic 35mm camera established on the roof of the library at El Paso Community College. The two targets used in the study were the MBank building in downtown El Paso (11.1 kilometers from the camera) and background mountains in Juarez, Mexico (16.2 kilometers from the camera). A map of the camera site and target locations is presented as Figure 7.

Slides were taken at 9:00 a.m., 12:00 p.m., and 3:00 p.m. daily. The study period was December 1985 through December 1986. The contrast between the sky and selected visibility targets was measured from the slides using slide densitometry techniques. Contrast measurement values were then reduced to yield SVR estimates in kilometers. The full report is available from the TACB as a separate document. Only information pertaining to days for which PM_{10} filters were selected for special study is included here in summary form. Table 7 shows the date, PM_{10} concentrations, the SVR for targets 1 and 2 at the three time periods monitored, and the mean SVR for the day. When zero SVRs are reported, either the targets were not visible because of haze or because weather was obstructing the targets and/or the sky in the detector area. Therefore, the SVR for those times could be some distance between the camera and the targets. However, for calculating the mean SVR for the day, we have averaged zeros with SVR readings.

The results of these analyses are supported by a 1983 study conducted by the Radian Corporation under contract with the TACB.

TABLE 7

Results of Slide Densitometry Analysis for El Paso on Days PM_{10} Filters Were Analyzed for Special Study

DATE	PM_{10} CONCENTRATION (UG/M^3)	TIME (HOUR)	TARGET 1 SVR (KM)	TARGET 2 SVR (KM)	MEAN SVR FOR THE DAY (KM)
01/10/86	161	900	0	0	
		1200	0	0	
		1500	22	24	7
01/11/86	164	900	42	0	
		1200	39	31	
		1500	41	51	34
01/14/86	195	900	24	0	
		1200	27	24	
		1500	37	36	25
01/20/86	140	900	20	0	
		1200	30	46	
		1500	107	125	55
01/23/86	135	900	22	0	
		1200	24	22	
		1500	78	93	40
01/30/86	324	900	22	0	
		1200	31	31	
		1500	28	28	22
02/01/86	48	900	23	31	
		1200	22	0	
		1500	39	39	26
03/06/86	165	900	18	0	
		1200	20	0	
		1500	121	125	48
03/09/86	240	900	249	391	
		1200	0	0	
		1500	0	0	107
04/02/86	204	900	25	31	
		1200	35	51	
		1500	28	29	33
04/05/86	154	900	29	0	
		1200	116	177	
		1500	99	103	88

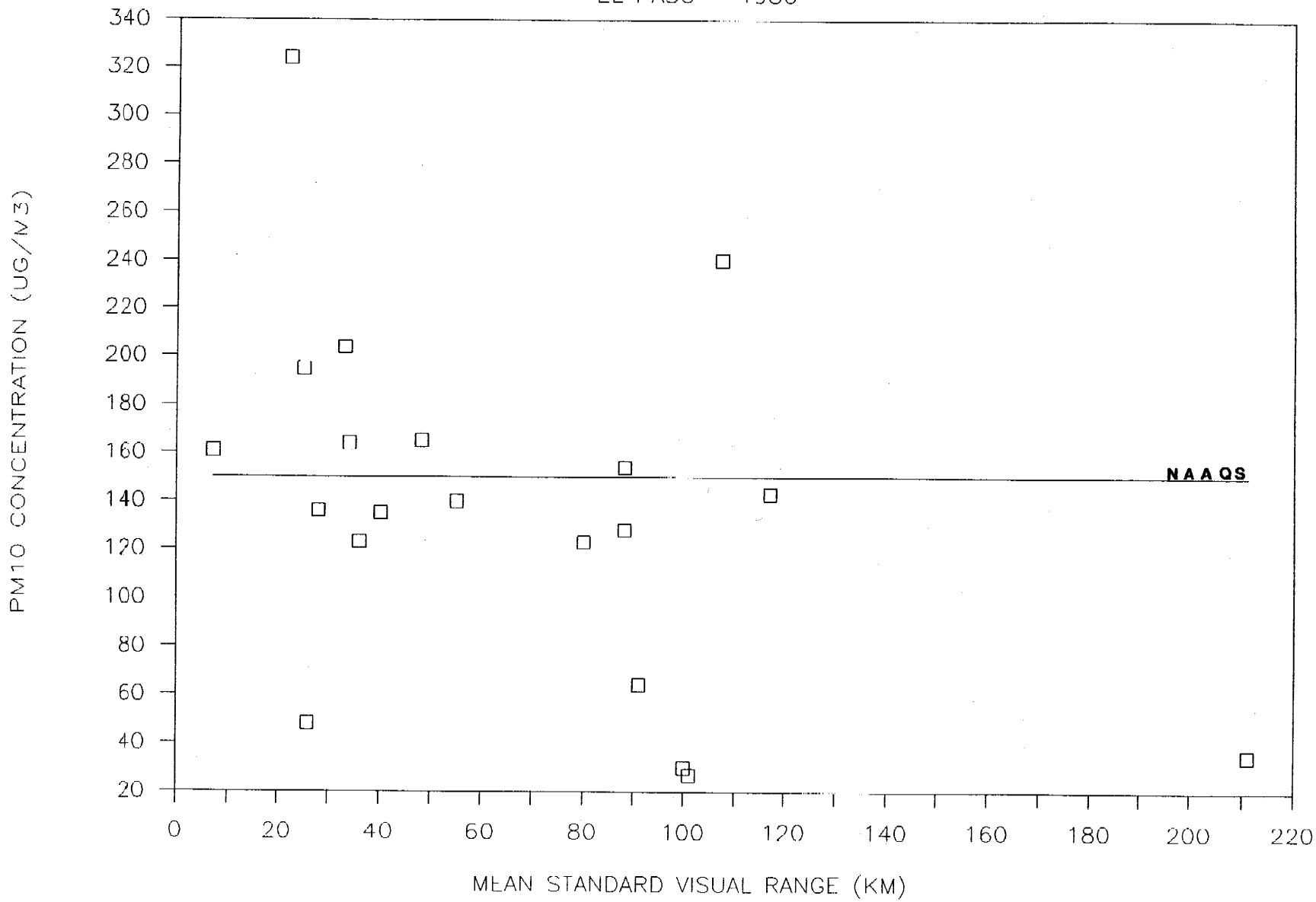
TABLE 7
(CONTINUED)

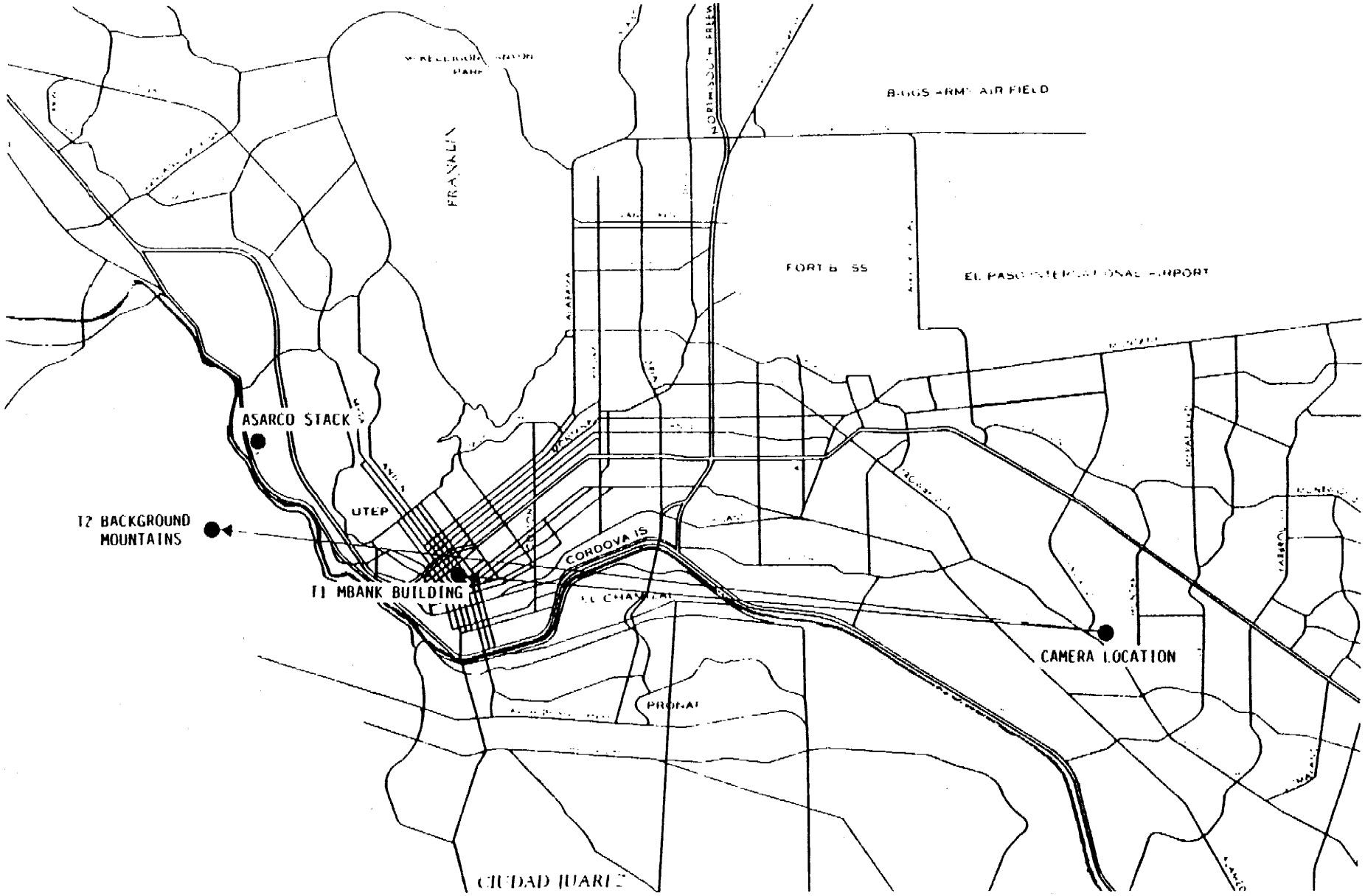
Results of Slide Densitometry Analysis for El Paso on Days PM_{10} Filters Were Analyzed for Special Study

DATE	PM_{10} CONCENTRATION (UG/M^3)	TIME (HOUR)	TARGET 1 SVR (KM)	TARGET 2 SVR (KM)	MEAN SVR FOR THE DAY (KM)
04/13/86	123	900	81	50	
		1200	0	0	
		1500	40	48	36
04/17/86	136	900	35	0	
		1200	34	44	
		1500	NO DATA	NO DATA	28
05/24/86	128	900	54	42	
		1200	136	155	
		1500	75	69	88
06/14/86	64	900	73	61	
		1200	129	102	
		1500	91	89	91
07/22/86	27	900	NO DATA	NO DATA	
		1200	NO DATA	NO DATA	
		1500	99	103	101
10/28/86	143	900	0	0	
		1200	144	173	
		1500	184	200	117
10/30/86	123	900	57	43	
		1200	87	83	
		1500	88	125	80
11/04/86	30	900	80	61	
		1200	50	45	
		1500	184	180	100
11/22/86	35	900	257	171	
		1200	202	215	
		1500	NO DATA	NO DATA	211
12/03/86	137	900	NO DATA	NO DATA	
		1200	NO DATA	NO DATA	
		1500	NO DATA	NO DATA	NO DATA

PM10 CONCENTRATION VS. MEAN SVR

EL PASO – 1986





Map of Site and Target Locations.

The Radian study identified main components of TSP filters from El Paso to be soil and urban dust. The reentrainment of particulate matter by urban traffic and high winds were identified as major sources of TSP. The study also found that a significant portion of the high concentrations of TSP occurred during the first and fourth calendar quarters when atmospheric ventilation rates are the poorest and stagnation conditions result from evening and nighttime inversions. Temperature inversions are common in El Paso, especially in the winter time; up to 91 percent of the time, according to a study done by ESSA National Record Center, Ashville, North Carolina.

In light of these findings, the TACB staff visited the monitoring locations in El Paso to investigate potential sources impacting the monitors. All the sites that had shown greater than 50 percent probability of exceeding the PM_{10} NAAQS were visited. These monitors, with their site characteristics, are listed in Table 8 and their locations are shown in Figure 1. A common element with all of these sites is that they are within 2 miles from the Mexican border. A statistical analysis of 1986 TSP data from all El Paso sites shows that the mean concentration of TSP is highest at the monitors closest to the border and that it decreases as the distance from the border increases. The results are illustrated in Figures 8.1 through 8.3. Figure 8.4 illustrates that when TSP data from all monitors are considered, there seems to be consistency in the concentrations recorded at various monitoring sites. When the mean concentration is high or low, most monitors seem to follow the pattern. Except on certain exceptional event days, there is not a wide range of values measured at these sites. This is indicative of an areawide problem rather than a site-specific problem.

Additionally, analysis of meteorological data for the year 1986 from the continuous air monitoring station (CAMS 6) in downtown El Paso indicates that there are prevailing winds from the south/southeast or south/southwest and low wind speeds on days when

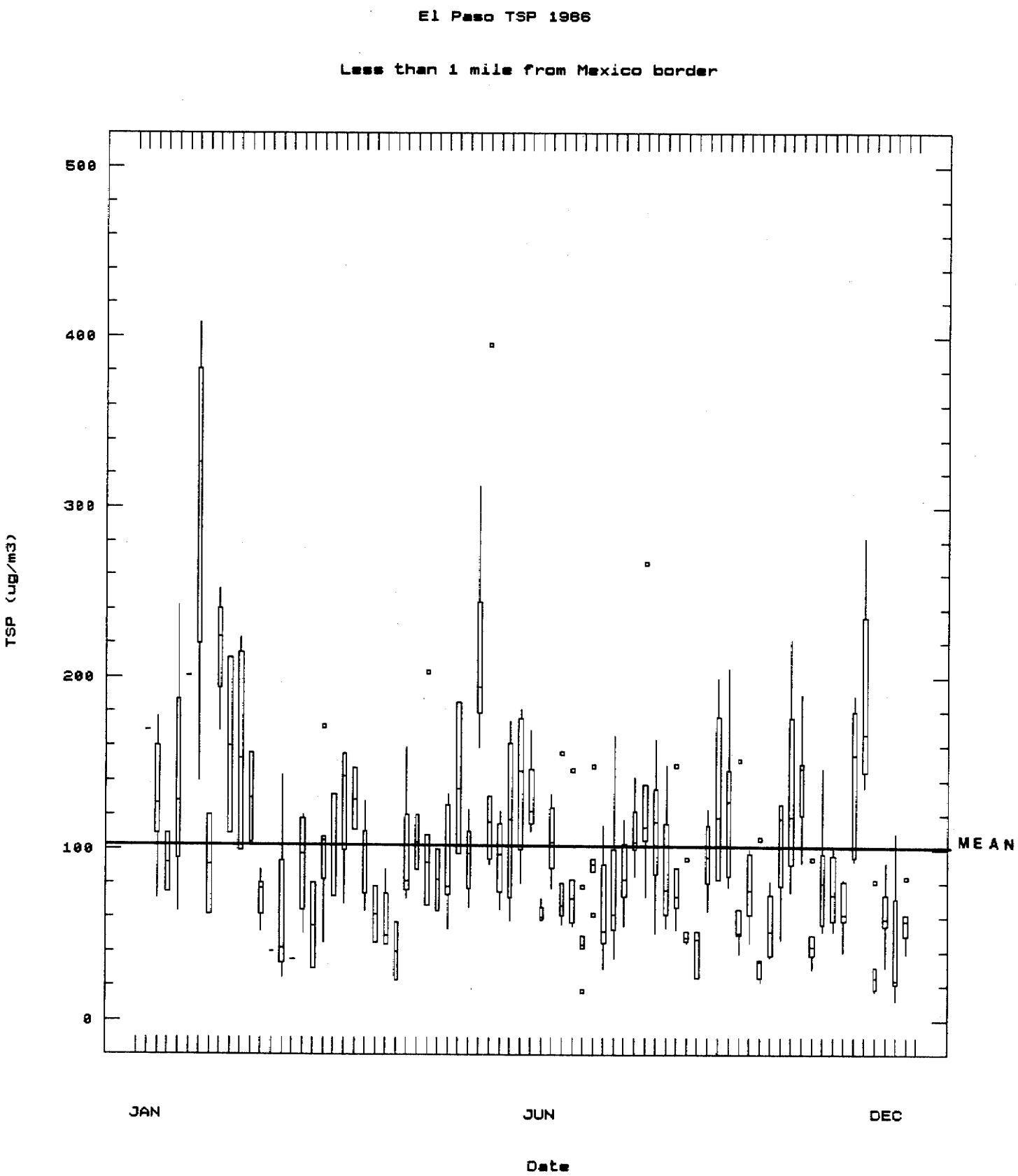
TABLE 8

Characteristics of TSP Sites in El Paso with High and Medium Probability of Exceeding PM_{10} NAAQS

SITE #	PROBABILITY OF EXCEEDING PM_{10} NAAQS	DISTANCE FROM MAJ.TSP POINT SOURCE (MILES)	DISTANCE FROM JUAREZ BORDER (MILES)	COMMERCIAL AREA	RESIDENTIAL AREA	HIGH DENSITY POPULATION
31G	1.00	0.50	0.10	Y	N	N
41G	1.00	2.50	0.50	N	Y	Y
02G	1.00	3.00	0.50	Y	N	Y
30G	0.99	13.00	1.00	N	Y	N
18G	0.99	2.00	1.00	Y	Y	N
27F	0.98	3.00	1.00	Y	N	Y
40F	0.96	1.00	1.50	N	Y	Y
15G	0.91	4.00	1.50	Y	Y	N
39F	0.91	2.00	2.00	N	Y	Y
38G	0.67	6.00	0.75	N	Y	N
42F	0.64	1.00	1.50	Y	Y	Y
37F	0.58	1.50	0.75	Y	Y	Y

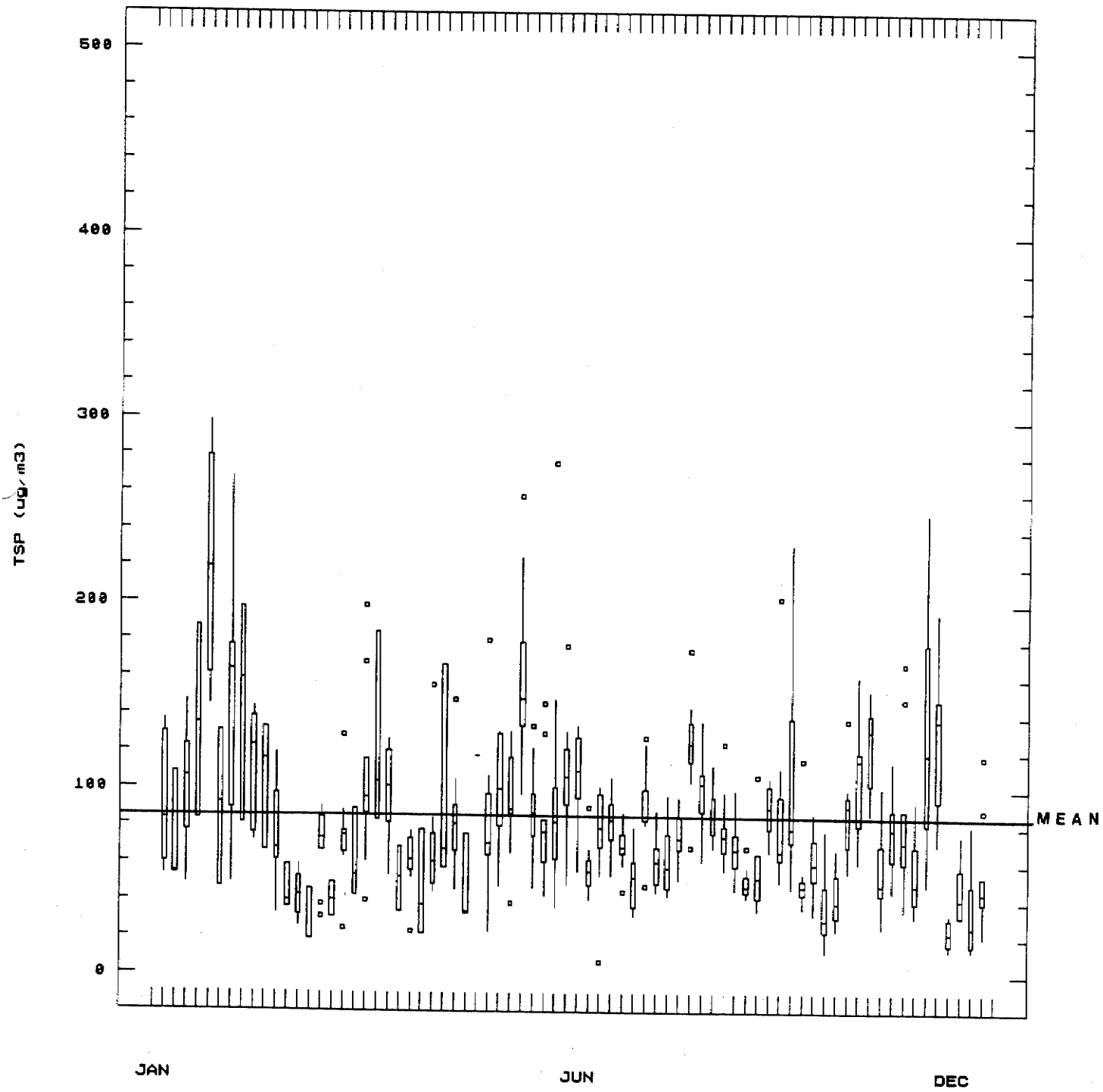
SITE #	DISTANCE FROM MAJOR ROADWAYS (FEET)	UNPAVED STREETS WITHIN ONE MILE	VEHICULAR TRAFFIC ON UNPAVED STREETS	OPEN DIRT AREAS WITHIN ONE MILE	ACTIVITY LEVEL IN OPEN DIRT AREAS	SCHOOL NEARBY
31G	1000	Y	MEDIUM	Y	MEDIUM	N
41G	1500	N	N/A	Y	MEDIUM	Y
02G	1500	N	N/A	N	N/A	N
30G	1500	N	N/A	Y	LOW	N
18G	100	N	N/A	Y	LOW	N
27F	50	N	N/A	N	N/A	N
40F	1500	Y	LOW	Y	MEDIUM	Y
25G	5000	N	N/A	Y	LOW	N
39F	500	N	N/A	Y	LOW	N
38G	100	N	N/A	N	N/A	Y
42F	1500	Y	LOW	Y	LOW	N
37F	3000	N	N/A	Y	LOW	N

FIGURE 8.1


El Paso TSP 1986
Less than 1 mile from Mexico border
500
400
300
200
100
0
TSP (ug/m3)
MEAN
JAN
JUN
DEC
Date

El Paso TSP 1986

1 - 2 miles from Mexico border



El Paso TSP 1986

Greater than 2 miles from Mexico border

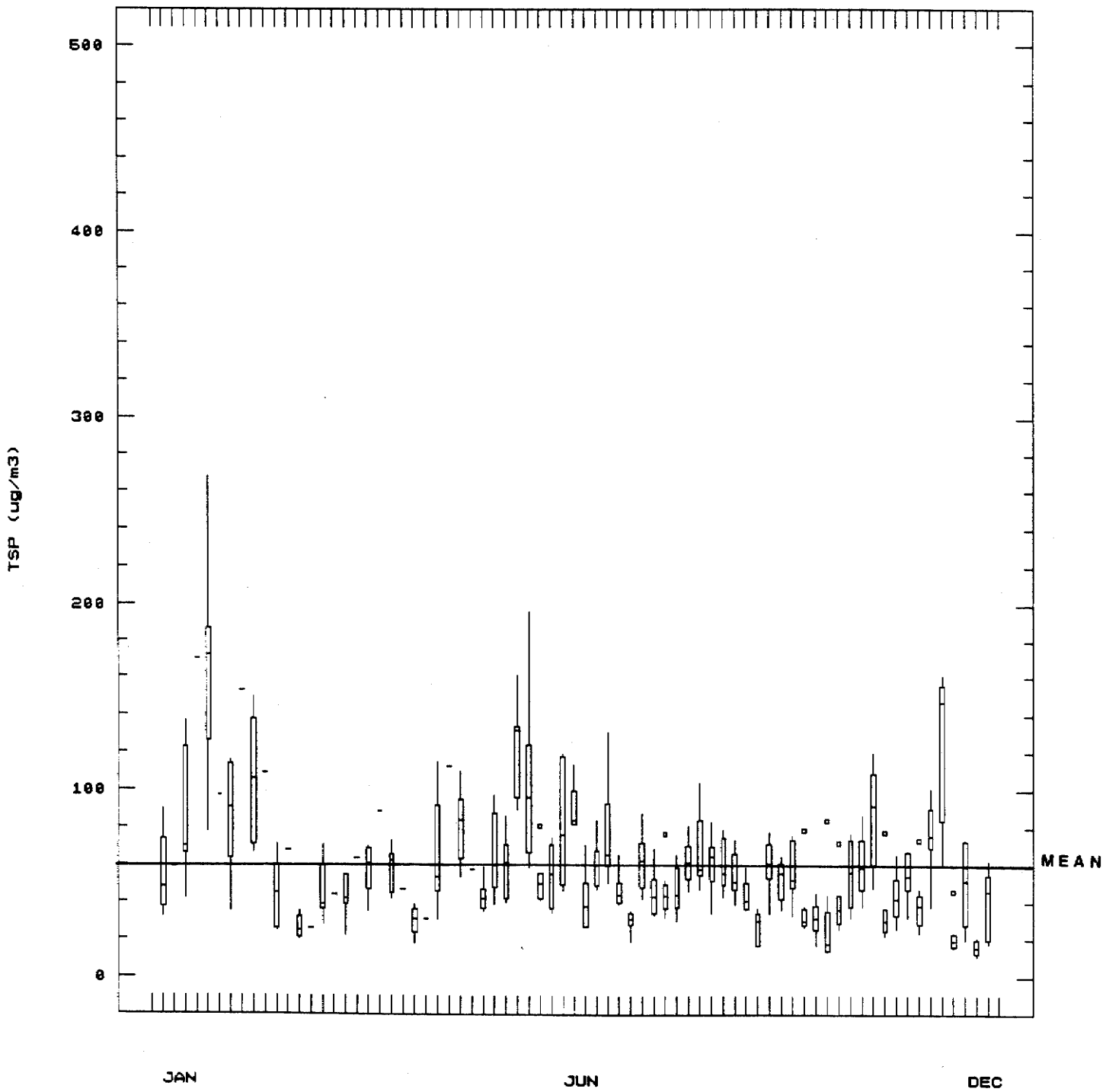
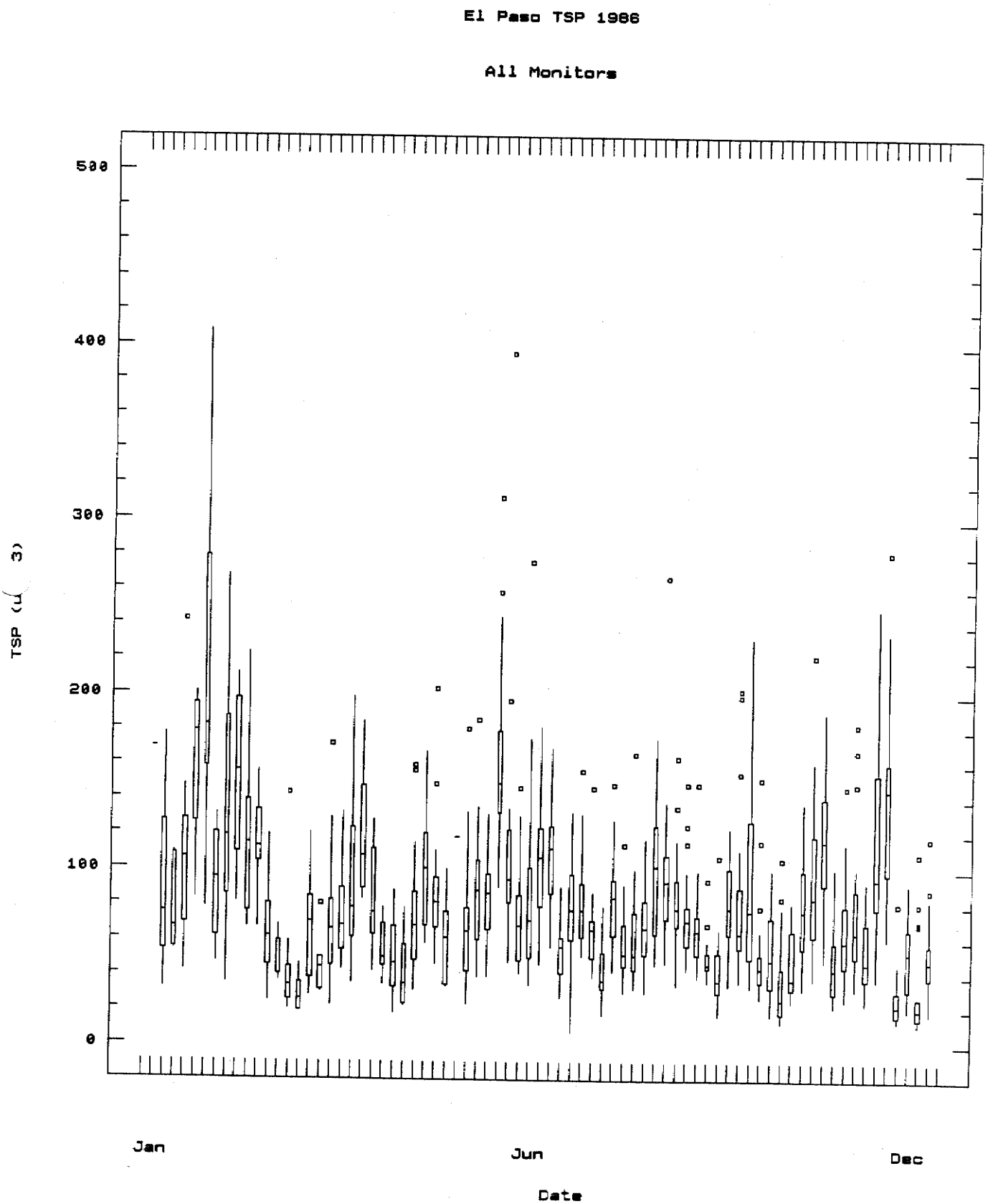


FIGURE 8.4


El Paso TSP 1986
All Monitors
500
400
300
200
100
0
TSP (u 3)
Jan
Jun
Dec
Date

high PM_{10} levels were recorded. Wind rose analysis confirms this conclusion. A summary of wind direction analysis is shown in Table 9. The complete results of the analysis are in Appendix E.

Essentially, all of the metropolitan area of Juarez and the southern portion of the El Paso metropolitan area between Highway I-10 and the Rio Grande River are situated in a basin formed by the river valley between mountain ranges in El Paso County and Juarez. El Paso and Juarez, therefore, share a common airshed. This is illustrated in the elevation graphs B1-B7. In areas like this, air, carrying elements which constitute air pollution, tends to move back and forth between the two cities. This has been verified for El Paso by earlier trajectory analysis done at the TACB. The El Paso basin area meteorological and topographical factors combine to limit the dispersion of air pollutants and result in the buildup of ambient pollutant concentrations.

These findings indicate that appropriate studies should be conducted to determine the impact of particulate sources in Juarez on El Paso before extensive control measures are implemented. This should include gathering emissions and air quality information from Juarez and additional studies using an automatic camera system to determine the major visible emission points in Juarez and to track the formation and movement of the haze layer.

d. PM_{10} Emissions Inventory

The 1986 PM_{10} Emissions Inventory is a compilation of stationary and mobile source emissions for El Paso County. The EPA document **PM_{10} SIP Development Guideline** (EPA-450-2-86-001) specifies the methods for states to use in preparation of PM_{10} emissions inventories for 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} inventory. The TACB developed a new PM_{10} inventory using PM_{10} emission factors.

TABLE 9

Summary of Wind Direction Analysis
El Paso - 1986

PREVAILING WIND DIRECTION*	WIND SPEED	NUMBER OF DAYS	AVERAGE PM_{10} CONCENTRATION AT EPCCHD MONITOR (ug/m^3)
0° - 90°	all	9	54
90° - 120°	all	3	70
120° - 270°	all	45	76
120° - 270°	low winds	9	100
270° - 360°	all	9	42

* Prevailing wind is defined as when the wind is blowing from that direction for 12 hours or more.

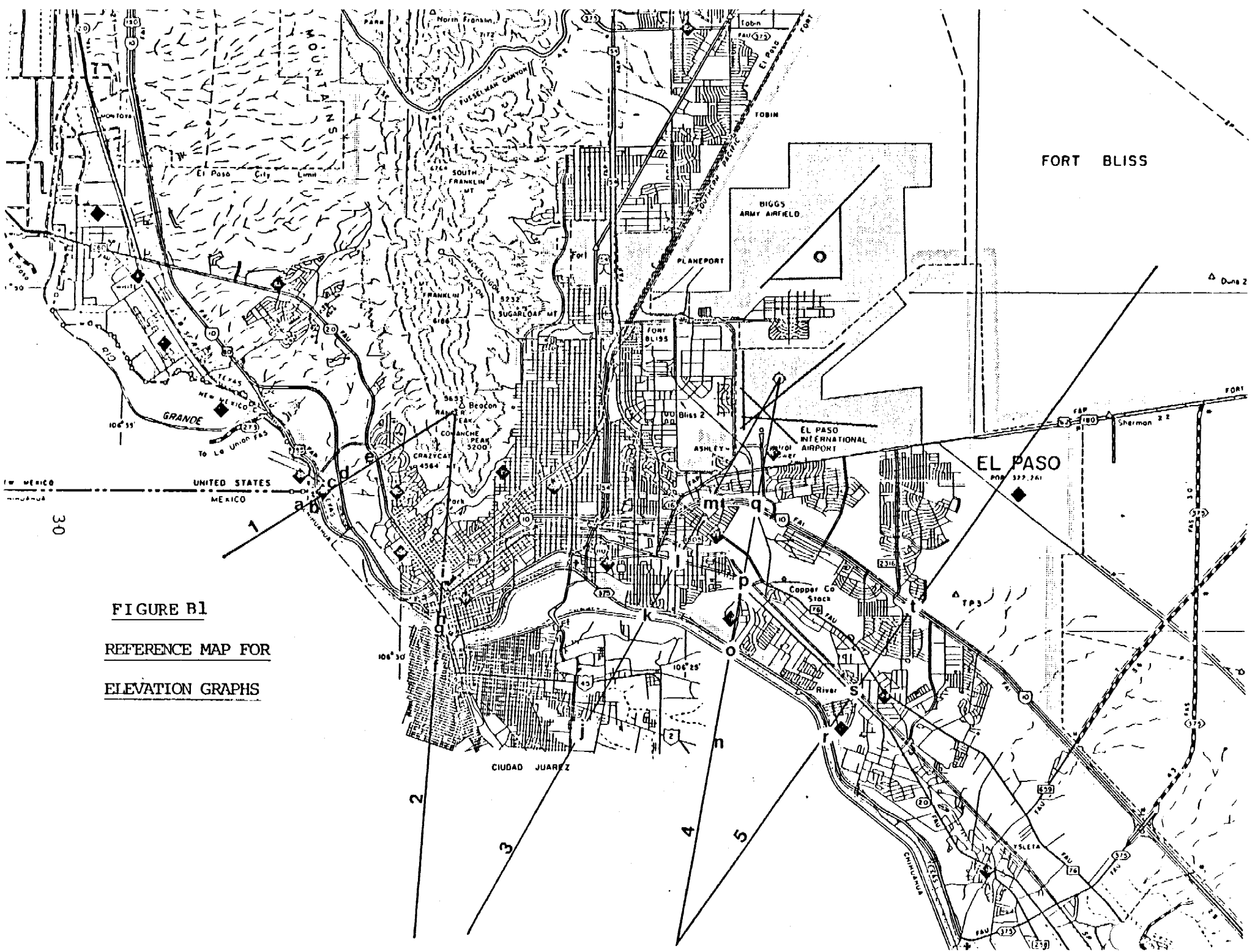


FIGURE B1

REFERENCE MAP FOR

ELEVATION GRAPHS

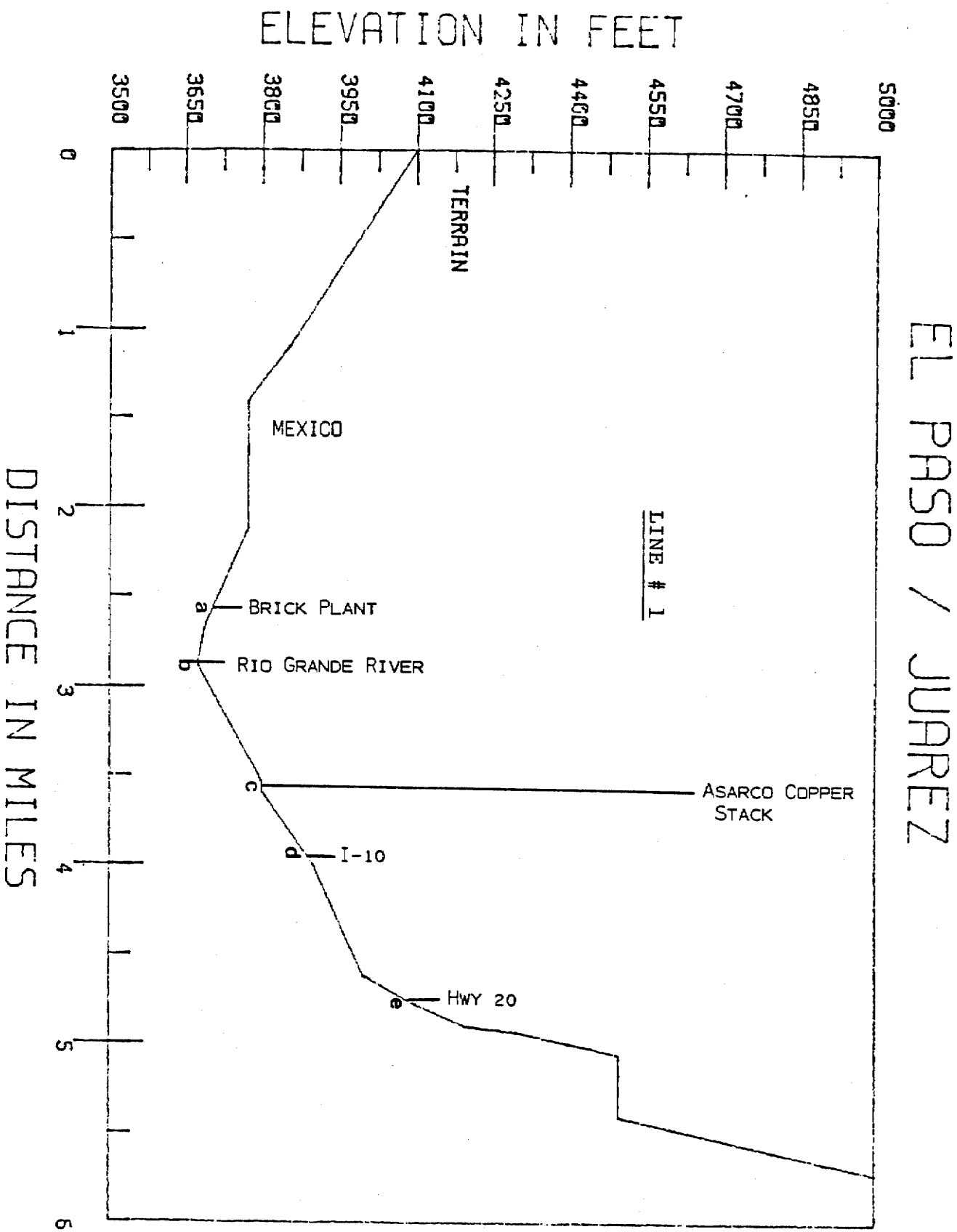

ELEVATION IN FEET
3500
3650
3800
3950
4100
4250
4400
4550
4700
4850
5000
0
1
2
3
4
5
6
DISTANCE IN MILES
TERRAIN
MEXICO
LINE # 1
a
BRICK PLANT
b
RIO GRANDE RIVER
c
ASARCO COPPER STACK
d
I-10
e
HWY 20
EL PASO / JUAREZ

FIGURE B2

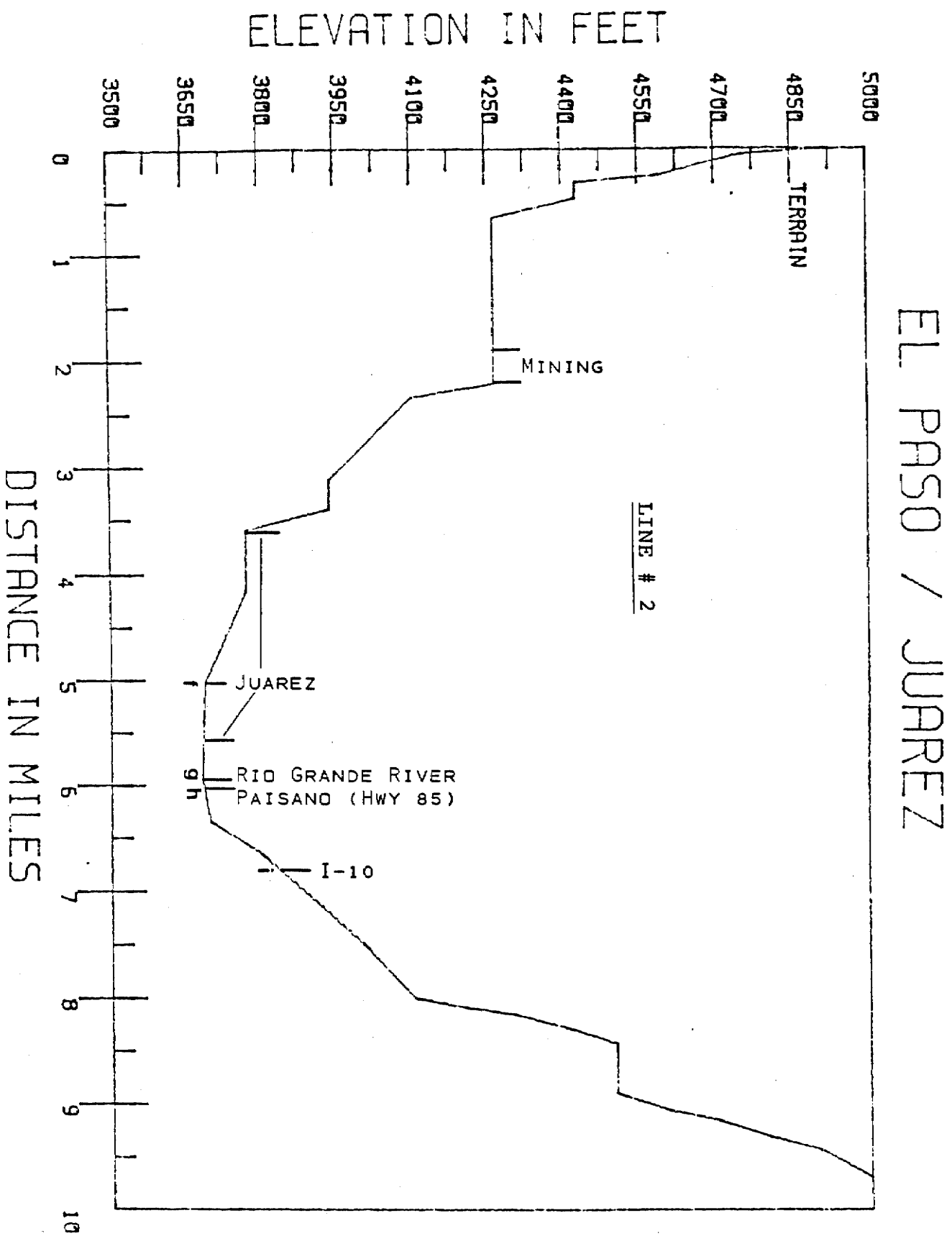

ELEVATION IN FEET
3500
3650
3800
3950
4100
4250
4400
4550
4700
4850
5000
TERRAIN
MINING
LINE # 2
JUAREZ
RIO GRANDE RIVER
PAISANO (HWY 85)
I-10
DISTANCE IN MILES
0
1
2
3
4
5
6
7
8
9
10
EL PASO / JUAREZ

FIGURE B3

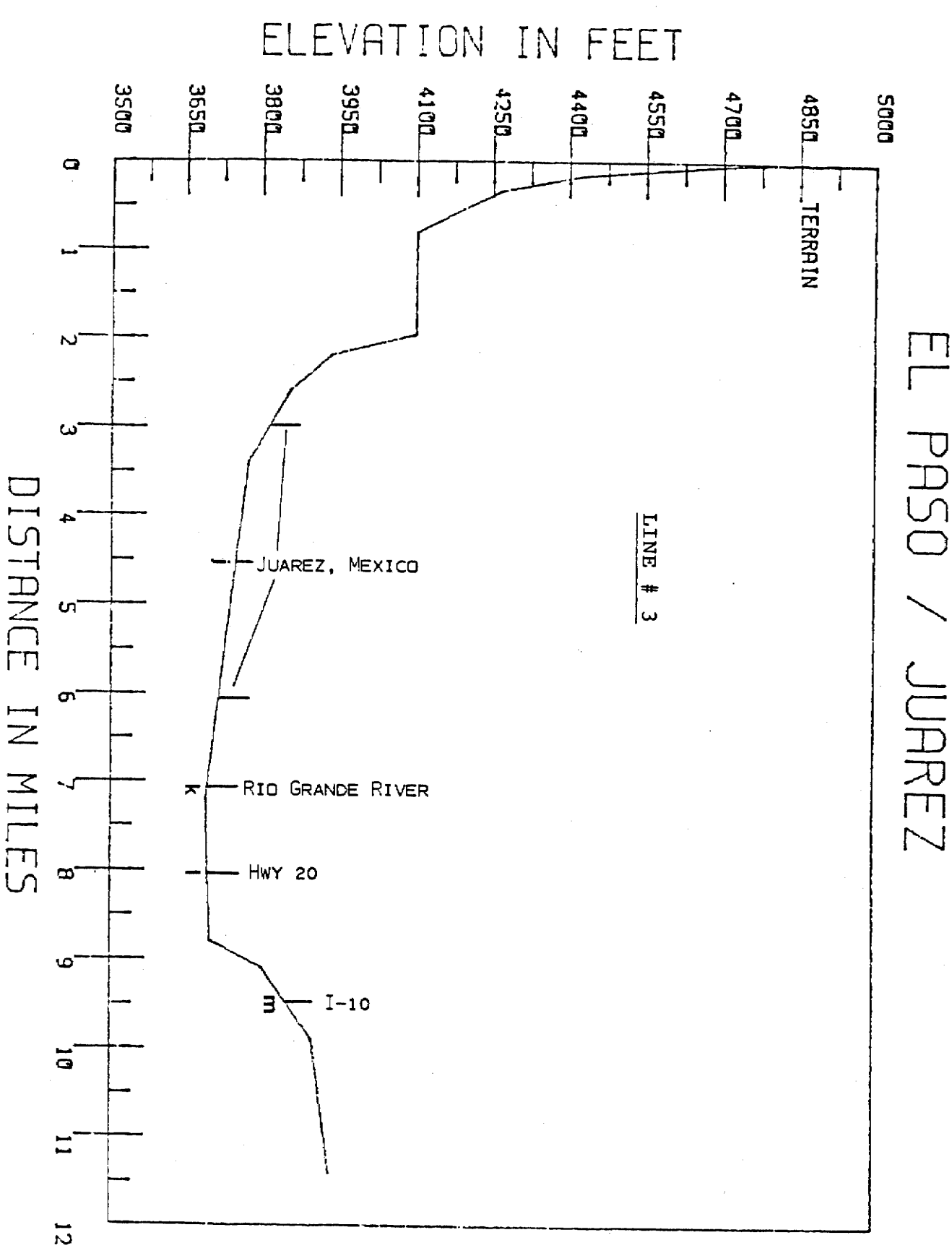

ELEVATION IN FEET
3500
3650
3800
3950
4100
4250
4400
4550
4700
4850
5000
TERRAIN
EL PASO / JUAREZ
LINE # 3
DISTANCE IN MILES
0
1
2
3
4
5
6
7
8
9
10
11
12
j
JUAREZ, MEXICO
k
RIO GRANDE RIVER
l
HWY 20
m
I-10

FIGURE B4

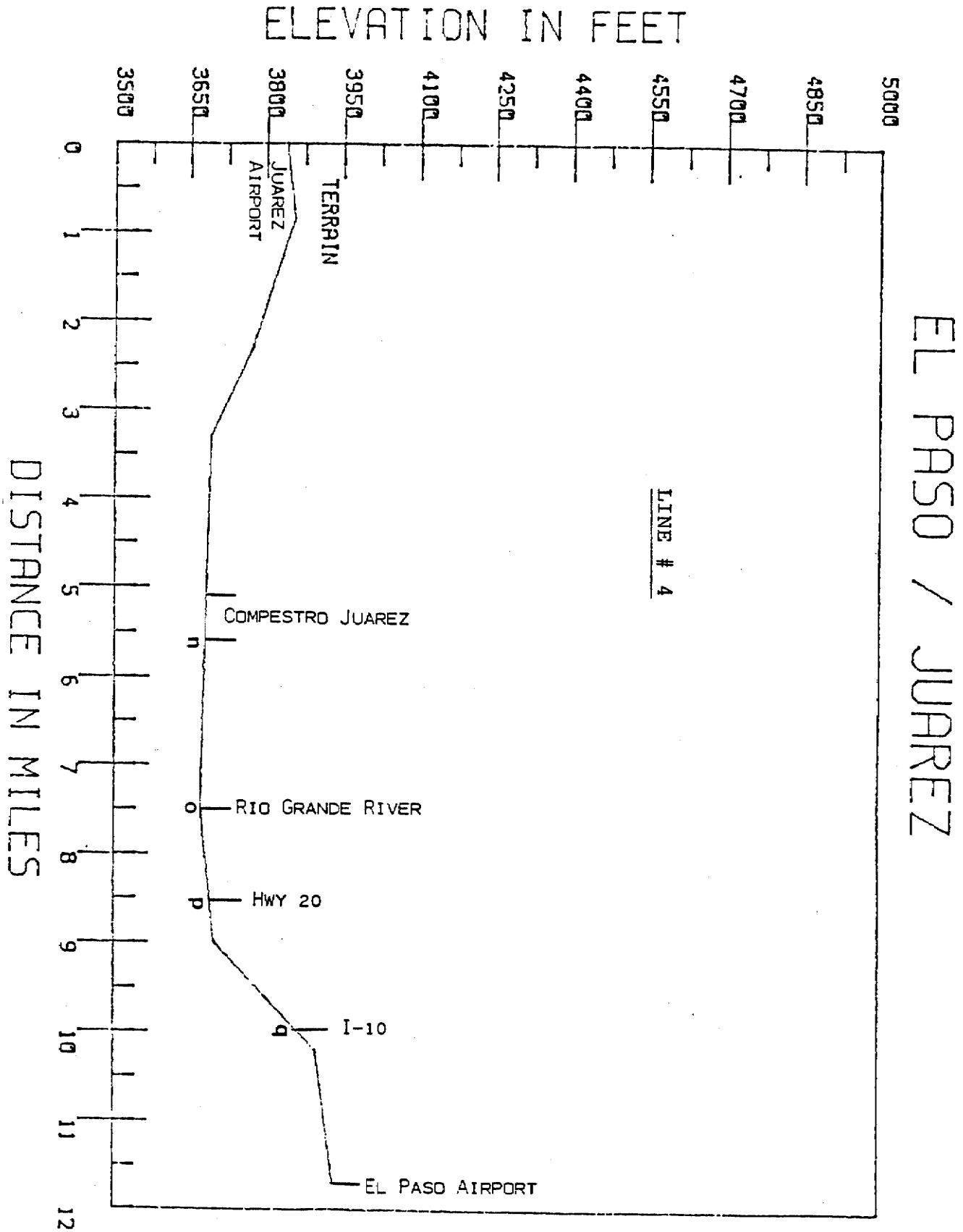

ELEVATION IN FEET
3500
3650
3800
3950
4100
4250
4400
4550
4700
4850
5000
JUAREZ AIRPORT
TERRAIN
EL PASO / JUAREZ
LINE # 4
DISTANCE IN MILES
0
1
2
3
4
5
6
7
8
9
10
11
12
n
COMPESTRO JUAREZ
o
RIO GRANDE RIVER
p
HWY 20
q
I-10
EL PASO AIRPORT

FIGURE B5

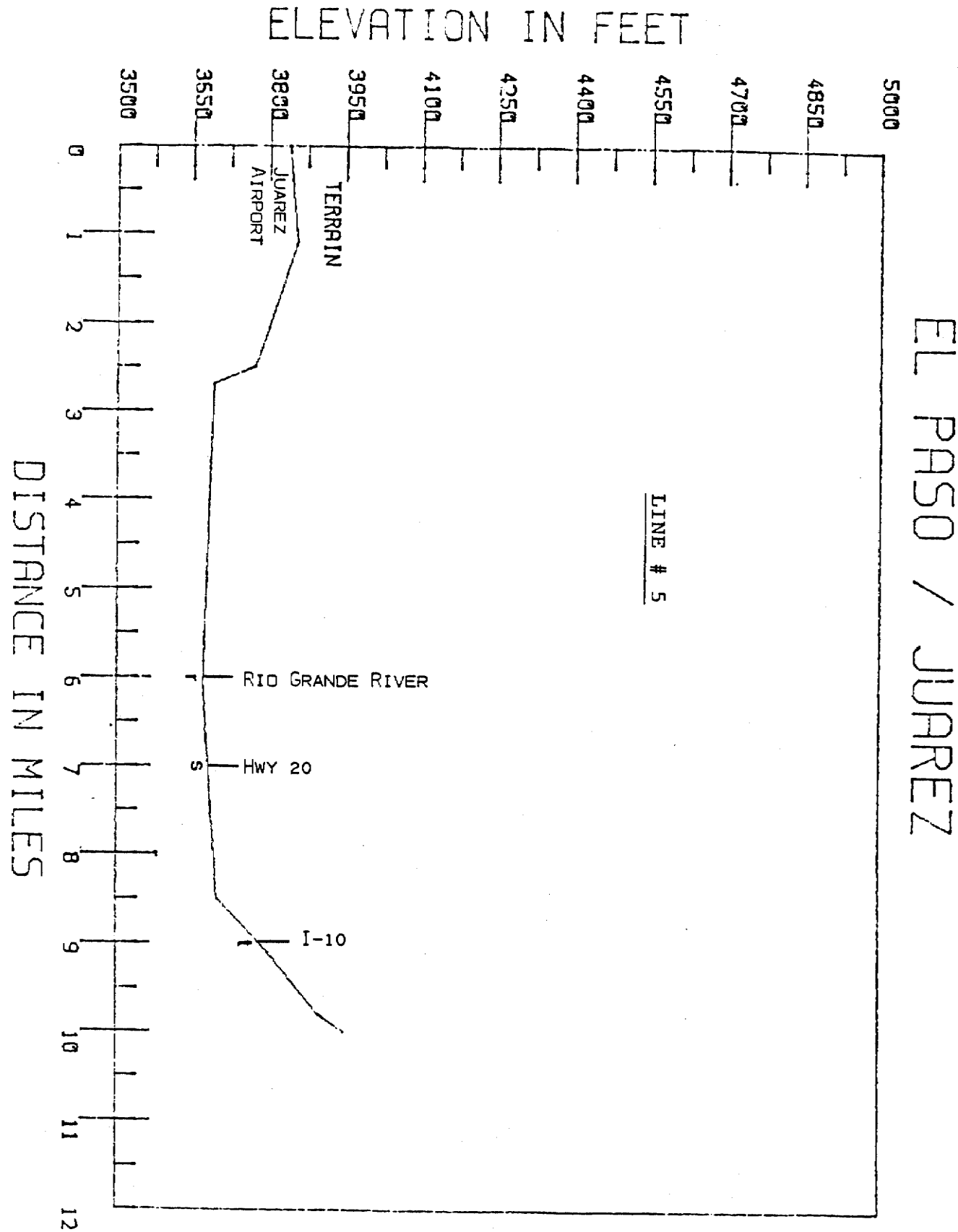

ELEVATION IN FEET
3500
3550
3800
3950
4100
4250
4400
4550
4700
4850
5000
0
1
2
3
4
5
6
7
8
9
10
11
12
DISTANCE IN MILES
JUAREZ AIRPORT
TERRAIN
RIO GRANDE RIVER
HWY 20
I-10
LINE # 5
EL PASO / JUAREZ

FIGURE B6

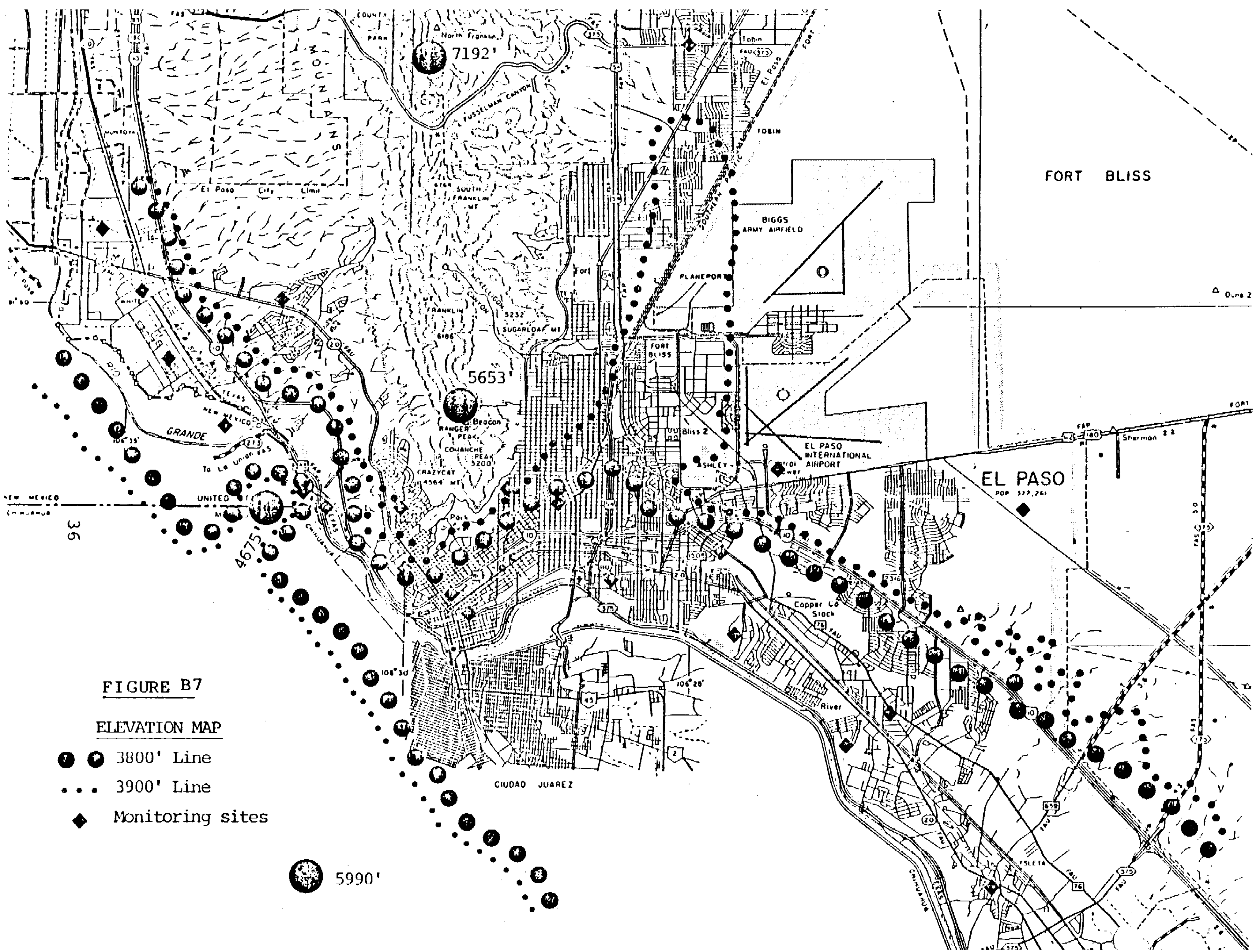


FIGURE B7

ELEVATION MAP

3800' Line

3900' Line

Monitoring sites

1. Point Sources

Point sources for the 1986 El Paso PM_{10} emissions inventory 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. Additionally, consultations with TACB's Region 11 office and EPCCHD provided additional information regarding sources not currently in the PSDB. Those selected were sent an emissions inventory questionnaire. Information describing the purpose of the inventory and for obtaining current PM_{10} factors was also provided. A total of 15 questionnaires was completed by sources in El Paso County.

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.

Fugitive Emissions

The two EPA documents: **AP-42, Compilation of Air Pollutant Emission Factors** and **Supplement A to AP-42, Compilation of Air Pollutant Emission Factors** were each used as a guide in estimating fugitive PM_{10} emissions from industrial processes. In those circumstances in which there were no factors available, the company was requested to estimate these emissions or provide information sufficient for the TACB staff to estimate them. Total emissions from this category of sources were estimated to be 1,596 tons per year in 1986, or 79 percent of the total PM_{10} point source emissions.

Table 10 lists a summary of each company's PM_{10} emissions in tons per year (TPY). Table 11 is a summary of PM_{10} emissions grouped by Standard Industrial Classification Major Group.

TABLE 10

Point Sources
El Paso County, 1986

TACB ACCOUNT NO.	COMPANY	PM_{10} EMISSIONS
EE-0007-G	ASARCO, Inc.	116
EE-0011-P	Border Steel, Inc.	24
EE-0015-H	Chevron U.S.A., Inc.	14
EE-0029-T	El Paso Electric	28
EE-0082-P	El Paso Refining	213
EE-0034-D	El Paso Sand Products	113
EE-0035-B	El Paso Sand Products	56
EE-0036-W	El Paso Sand Products	6
EE-0147-M	Jobe Concrete Products, Inc.	17
EE-0149-I	Jobe Concrete Products, Inc.	8
EE-0061-A	Paisano Concrete Co.	15
EE-0062-V	Parker Brothers, Inc.	15
EE-0067-L	Phelps Dodge Refining	10
EE-0068-J	Proler International	31
EE-0024-G	U. S. Army, Ft. Bliss	1360*
	TOTAL	2026

*99.9% of these emissions are fugitive dust generated by tank activities.

TABLE 11

Point Sources by Category
El Paso County, 1986

SIC GROUP	CATEGORY	PM_{10} EMISSIONS
29	Petroleum Refining	227
32	Concrete Products	230
33	Primary Metal Industries	150
49	Electric Services	28
50	Wholesale Trade	31
97	National Security	1360
	TOTAL	2026

2. Area Sources

Area sources are combinations of many individual sources too numerous and too small to be individually recorded. The TACB staff estimated area source PM_{10} emissions by employing emission factors from the EPA publication, **Procedures for Emissions Inventory Preparation, Volume III: Area Sources**. The 1986 population estimate of 551,700 for El Paso County was obtained from the Texas Department of Water Resources 208 Planning Section. Other activity measures and distribution of source categories are discussed below.

Dust Reentrainment From Roads

To estimate the contribution of PM_{10} emissions from paved roads, the Texas State Department of Highways and Public Transportation (TSDHPT) District 10 office was contacted to provide information concerning traffic distribution along expressways, highways, and collector and local streets. EPCCHD estimated there are 22 miles of unpaved roads within the city limits of El Paso. In order to calculate the PM_{10} emissions from unpaved roads, one-tenth of one percent of the urban vehicle miles travelled (VMT) in the City of El Paso was apportioned to the unpaved roads in the city. The document **Supplement A to AP-42, Compilation of Air Pollutant Emission Factors** was used as a guide to estimate these emissions.

Area source categories in El Paso County are listed in Table 12. The PM_{10} emissions from each category and the associated activity factor are also listed.

3. Mobile Sources

Highway Vehicles

This category includes emissions from the operation of internal combustion engines on roadways in El Paso County. The document

TABLE 12

Area Sources
El Paso County, 1986

CATEGORY	ACTIVITY FACTOR	PM_{10} EMISSIONS (TPY)
Residential Fuel - Gas	Population	97
Residential Fuel - Dist. Oil	Population	7
Residential Fuel - Wood	Population	496
Commercial/Indust. Fuel - Gas	Population	59
Commercial/Indust. Fuel - Oil	Population	39
Solid Waste Disposal	Population	32
Structural Fires	Population	206
Agricultural Tilling	Acres	14
Unpaved Roads	VMT	15
Paved Roads	VMT	10,608
	TOTAL	11,573

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 highway vehicle PM_{10} emissions. Inputs for this program, such as vehicle speeds and VMT by vehicle category, were obtained from the TSDHPT. The TSDHPT District 10 staff also provided the VMT. All other inputs into the mobile particulate model were EPA default values already coded into the program.

An alternate approach to estimating diesel emissions with the particulate model was to contact the major oil refineries and marketers in El Paso to gather information regarding total diesel sales. Information obtained indicated that approximately 50 percent of the diesel sold (48,000,000 gallons) was combusted in El Paso. It was estimated that 10 percent was consumed by locomotives and the remainder by highway and off-highway small bore diesel engines. The emission factors contained in AP-42, 4th edition, for small bore diesel engines were used to estimate emissions. Total highway diesel vehicle PM_{10} emissions using the mobile model are 153 tons per year; the alternate method based on diesel fuel sales and allocation of 75 percent of small bore diesel use to highway vehicles results in an estimate of 543 tons per year.

Locomotives

PM_{10} emissions from diesel combustion in locomotives were estimated using the TACB's area source program containing emission factors derived from AP-42. These emissions are listed in Table 13. PM_{10} emissions estimated by the alternate method based on diesel fuel sales are 120 tons per year. This assumed that 10 percent of the diesel consumed in the county was used by locomotives. Emissions estimated by applying the AP-42 emission factor for large bore diesel engines, those greater than 560 cubic inch displacement per cylinder, are listed in Table 14.

TABLE 13

El Paso County
1986 PM_{10} Emissions from Mobile Sources
(EPA Computer Program Method)

EMISSION CATEGORY	TONS PER YEAR
Highway Vehicles	
Diesel	
Urban	140
Rural	13
All Other	
Urban	150
Rural	16
Total Brake and Tire Wear	53
Off-Highway Vehicles	
Diesel	162
Gasoline	17
Locomotives	60
Aviation	129
TOTAL	740

TABLE 14

El Paso County
1986 PM_{10} Emissions from Mobile Sources
(Diesel Sales Apportionment Method)

EMISSION CATEGORY	TONS PER YEAR
Highway Vehicles	
Gasoline	
Urban	150
Rural	16
Diesel	543
Total Brake and Tire Wear	53
Off-Highway Vehicles	
Diesel	181
Gasoline	17
Locomotives	120
Aviation	129
TOTAL	1,209

Off-Highway Vehicles

This category includes miscellaneous gasoline- or diesel-fueled equipment such as lawn mowers, generators, pumps, tractors, dozers, and road graders. PM_{10} emissions from both gasoline and diesel combustion were estimated using the TACB's area source program containing emission factors derived from AP-42. Emissions estimated from this program are shown in Table 13. Using the alternate method based on diesel fuel sales, PM_{10} emissions from diesel combustion are 181 tons per year and are listed in Table 14.

Aviation

This category includes all aircraft landings and take-offs from El Paso County airports. Emissions were estimated using the TACB's area source program containing emission factors derived from AP-42.

Summary

Summaries of PM_{10} emissions in El Paso County are shown below. One shows PM_{10} mobile source emissions using EPA's size specific particulate emissions model; the other incorporating diesel sales apportionment.

EL PASO COUNTY
1986 PM_{10} EMISSIONS

(Mobile Source Emissions Based on EPA's Mobile Program)

Total Point Source Emissions	2,026 Tons per year
Total Area Source Emissions	11,573 Tons per year
Total Mobile Source Emissions	740 Tons per year
TOTAL	14,339 Tons per year

EL PASO COUNTY
1986 PM_{10} EMISSIONS

(Mobile Sources Emissions Based on Diesel Sales Apportionment)

Total Point Source Emissions	2,026 Tons per year
Total Area Source Emissions	11,573 Tons per year
Total Mobile Source Emissions	1,209 Tons per year
TOTAL	14,808 Tons per year

Methodology for estimating PM_{10} emissions from point, area, and mobile sources in El Paso County is described in more detail in Appendix F.

e. Control Plans

The laboratory analysis of the ambient PM_{10} air quality samples from El Paso revealed that 70 to 90 percent of the particulate loading on the filters consisted of calcium carbonate, quartz, and mixed clay. This evidence indicates that the high probability of exceeding the PM_{10} NAAQS in El Paso is caused mainly by reentrained dust rather than point sources. However, point sources like cement plants, brick plants, and construction activities cannot be ruled out as potential sources. Analysis of soil samples will be required to establish a better source profile. The PM_{10} emissions inventory also shows that the point source portion is small compared to area sources consisting mainly of dust reentrainment from paved roads. Point sources of particulate matter in El Paso are already subject to stringent control requirements as a result of control strategies previously implemented to address lead and TSP nonattainment problems.

The 1979 revisions to the Texas SIP for TSP nonattainment areas in El Paso identified fugitive dust from agricultural activities, wind erosion from arid lands, dirty paved streets and parking lots, unpaved streets and parking lots, unpaved alleys, construction activities, and industrial processes as major sources contributing

to the TSP nonattainment situation. The adopted control strategy provided for increased enforceability and stringency of TACB Regulation I, Control of Air Pollution from Visible Emissions and Particulate Matter, control of fugitive dust emissions from materials handling, construction activities, and the use and maintenance of roads, streets, alleys, and parking lots. Compliance with Regulation I was anticipated to yield substantial reductions in visible emissions from commercial and industrial properties and from construction activities.

The Texas SIP for the control of lead air pollution submitted by the TACB on March 21, 1980 identified the ASARCO smelter and vehicle exhaust emissions as major sources of lead in El Paso. The federal program to phase out the use of lead as a gasoline additive was anticipated to result in vehicle lead emission reductions. In order to control the smelter emissions, TACB Board Order 75-5 and the Agreed Order of Injunction, May 14, 1975, required installation of agreed-upon abatement equipment at the ASARCO smelter. This equipment has been installed and is operational. Additionally, TACB Regulation III, Control of Air Pollution from Toxic Materials, was revised on February 17, 1984 to include provisions limiting both point and fugitive sources of lead emissions from the ASARCO operations. Paragraphs 113.43 through 113.53 require controls for fugitive dust from roads, open unpaved areas, materials handling and transfer, and smelting of lead, copper, and zinc. In 1987, stack emission limits were modified to reflect the results of studies conducted to determine the lowest emission limits that could be achieved through good engineering practice with respect to operation and maintenance of certain baghouses at the site. Maintenance of the lead standard, now attained, is to be accomplished by the application of stringent controls on new sources through the provisions of Rule 116.3(a) of TACB Regulation VI, Control of Air Pollution by Permits for New Construction or Modification.

Regulation I is being revised to incorporate additional controls designed to reduce PM_{10} emissions. Particulate matter controls for materials handling, construction, roads, streets, alleys, and parking lots will be enhanced in the El Paso Group I area. Opacity limits of 30 percent for any five-minute period will be required from any building, structure, or other source of fugitive dust. Recommended controls for nonindustrial dust sources included in the EPA draft document, Appropriate Approaches to the Control of Nonindustrial Fugitive Dust in Urban Areas, have been reviewed. Appendix G provides a tabular description of these source categories and the TACB's intended action on each of them. Some of the recommended controls, such as the covering of trucks hauling material, paving streets with heavy traffic, and stabilizing ground at construction sites have already been implemented in El Paso through existing Regulation I. A new control measure proposed for El Paso will require paving or uniformly covering with gravel any parking lot which has more than five parking spaces [§111.49(b)].

The EPCCHD has identified approximately 22 miles of unpaved roads within the city limits. The EPCCHD has committed to pave sixty percent of the unpaved roads in FY-88 and the remaining forty percent in FY-89, depending on the availability of community development funds.

Recommended controls for erosion from storm water washing onto streets are not applicable to El Paso because of the small amount of rainfall El Paso receives every year. Other recommended controls for wind erosion from adjacent areas, such as wind breaks and vegetative stabilization or chemical sealing of the ground, are not feasible because of high winds, low humidity, and the desert climate prevalent in El Paso.

f. Long-term Study Commitments

In the June 1, 1988 letter, EPA recommended that the interim SIP include certain commitments for a future study of PM_{10}. The purpose of the future study is to: (1) characterize the "Juarez plume," its sources, and its impact on high PM_{10} concentrations in El Paso; and (2) provide the basis for an attempt to get funding/commitment to control selected source categories in Juarez which are deemed most responsible for air pollution problems in El Paso. These required commitments and the TACB response are as follows:

1) Plan for performing carbon analysis and additional component analysis of PM_{10} filters.

The quartz filters currently used for PM_{10} monitoring are not suitable for complete component analyses. The high background values in the filter make aluminum and silicon analyses biased. Therefore, new samples would have to be collected on teflon filters using a dichotomous sampler. Teflon filters, however, cannot be used for carbon analysis, which requires pre-heated quartz filters. Therefore, separate samples would have to be collected using pre-heated quartz filters and a dichotomous sampler for carbon analysis. The TACB is committed to initiate a scoping study in cooperation with EPA Region 6 to identify primary components of PM_{10} being transported into El Paso and general characteristics of the transport phenomena. Study results will be used to focus research efforts in a comprehensive study to be initiated as described in commitment 6 and to be coordinated with special monitoring efforts in Juarez.

2) Plan for improving the emissions inventory by emphasizing major point and area sources at Fort Bliss; residential wood burning emissions in El Paso; and sources in the squatters' colonies east and west in El Paso.

Fort Bliss has already completed and submitted a comprehensive PM_{10} emissions inventory for point and area sources within its jurisdiction. The updated emissions inventory included in this interim SIP (section 3.d.) reflects the Fort Bliss data. According to EPCCHD, it would be extremely difficult to determine wood burning emissions in El Paso. Furthermore, natural gas is the primary source of heating in the El Paso area. The use of wood for heating purposes in El Paso is not a viable alternative because of the cost and unavailability of wood. The EPCCHD staff has stated that the primary sources of PM_{10} in the squatters' colonies are probably dust from unpaved surfaces and smoke from open burning of trash. Bottled butane gas is the primary fuel source used for heating and cooking. The TACB is committed to working with county officials to estimate unpaved road emissions in the squatters' colonies and to investigate alternate methods of burning residential trash.

3) Plan for establishing an automated camera system (including provisions for densitometer analysis) to determine the major visible emission points in Juarez and to track the formation and movement of the haze layer.

The results of an earlier study in El Paso using an automatic camera system to track visibility degradation are summarized in this interim SIP in section 3. c. (Results and Interpretation of Air Quality Analysis). However, the TACB is committed to a future study using an automatic camera system, if financial assistance is provided by the EPA. This future study will be designed to determine major visible emission points in Juarez and to track the formation and movement of the haze layer.

4) Commitment to continue coordination with Juarez officials.

The TACB and EPCCHD staffs have been actively working with Mexican environmental officials to develop cooperative programs. This

cooperative effort is established under the auspices of the El Paso/Juarez Air Quality Work Group. The EPCCHD staff has stated that they are willing to continue their support of and cooperation with Juarez officials. The TACB will also continue its support of these cooperative efforts.

5) Commitment to work with EPA Region 6 to revise the modeling protocol to include consideration of five years of meteorological data; and

6) Commitment to work with EPA Region 6 to conduct a future study to characterize the nature of the PM_{10} being transported into the U. S.

These two required commitments must be considered together. The TACB commits to revising the modeling protocol based on data collected during the future study. The TACB and EPCCHD are committed to participate in any study to characterize the nature of PM_{10} being transported into El Paso, provided funding and equipment are made available by the EPA. Specific milestones for the completion of these commitments are shown in Table 15.

g. Revision of TACB Rules and Regulations

In accordance with 40 CFR Part 51, Requirements for Preparation, Adoption, and Submittal of Implementation Plans, the TACB is revising various regulations to incorporate PM_{10} provisions. TACB General Rules will be revised to include PM_{10} - related definitions. Regulation I is being revised to incorporate certain PM_{10} control requirements. Regulation VI was previously revised to adopt PM_{10} changes to the Prevention of Significant Deterioration (PSD) requirements. Finally, Regulation VIII will be revised to incorporate new emergency episode levels for PM_{10}. These regulations are anticipated to provide for attainment and maintenance of the PM_{10} NAAQS in the State of Texas, except for the Group I area in El Paso. Attainment and maintenance of the PM_{10}

TABLE 15

Plan for Long-term Study in Support of the PM_{10} State Implementation Plan for El Paso

DATE		OBJECTIVE
January, 1989	1.	Initiate scoping study in cooperation with EPA Region 6 to identify primary components of PM_{10} being transported into El Paso and general characteristics of the transport phenomena. Study results will be used to focus research efforts in comprehensive study to be initiated during the following PM_{10} season and to be coordinated with special monitoring efforts in Juarez.
June, 1989	2.	Complete planning for comprehensive study incorporating results of the scoping study including preliminary analysis of filters and photographs.
	3.	Complete update of emissions inventory accounting for emissions from Juarez and area sources in El Paso.
September, 1989	4.	Initiate comprehensive study to characterize the "Juarez plume," its sources, and its impact on high PM_{10} concentrations in El Paso.
September, 1990	5.	Complete comprehensive study and produce reports.
October, 1990	6.	Determine if additional controls are required to demonstrate attainment of the PM_{10} NAAQS. If needed, develop new regulations.
March, 1991	7.	Complete draft SIP for review by the TACB Regulation Development Committee.
April, 1991	8.	Review by the Regulation Development Committee.
June, 1991	9.	Hold public hearing.
September, 1991	10.	Complete analysis of public hearing testimony.

TABLE 15
(CONTINUED)

Plan for Long-term Study in Support of the PM_{10}
State Implementation Plan for El Paso

DATE		OBJECTIVE
October, 1991	11.	Review of staff recommendation by the Regulation Development Committee and the Board.
November, 1991	12.	Submit SIP revision adopted by the Board to the Governor's office.
December, 1991	13.	Submit SIP revision to EPA.

NAAQS in the El Paso Group I area will require international cooperation and effort because of the transboundary transport of air pollution from Mexico.

h. Legal Authority

The State of Texas has the legal authority necessary to implement the control strategy for PM_{10} under provisions of the Texas Clean Air Act (Article 4477-5, Vernon's Texas Civil Statutes, as amended). Further details of this legal authority are described in the section on "Legal Authority" in the SIP.