

## **1998 PERIODIC EMISSION INVENTORY UPDATE**

In 1997, a 1995 base year emission inventory was developed for the Sunland Park, La Union, Santa Teresa area. Every three years after the base year inventory is developed, states are required to develop a periodic inventory based on actual emissions. The purpose of the 1998 periodic emission inventory for the Sunland Park nonattainment area is to provide updated emissions for the year 1998.

Between the years of 1995 and 1998 there have been only two ozone exceedances in the Sunland Park nonattainment area. One exceedance occurred in 1996 and was included in the 1995 base inventory. The only other exceedance in the Sunland park nonattainment area occurred in November of 1998 at 0.126ppm.

This 1998 periodic inventory will summarize the emissions for all the source categories inventoried for the 1995 base year inventory. These categories include:

- 1) point (large) sources
- 2) area (small) sources
- 3) on-road mobile sources
- 4) non-road mobile sources
- 5) biogenic (natural) sources.

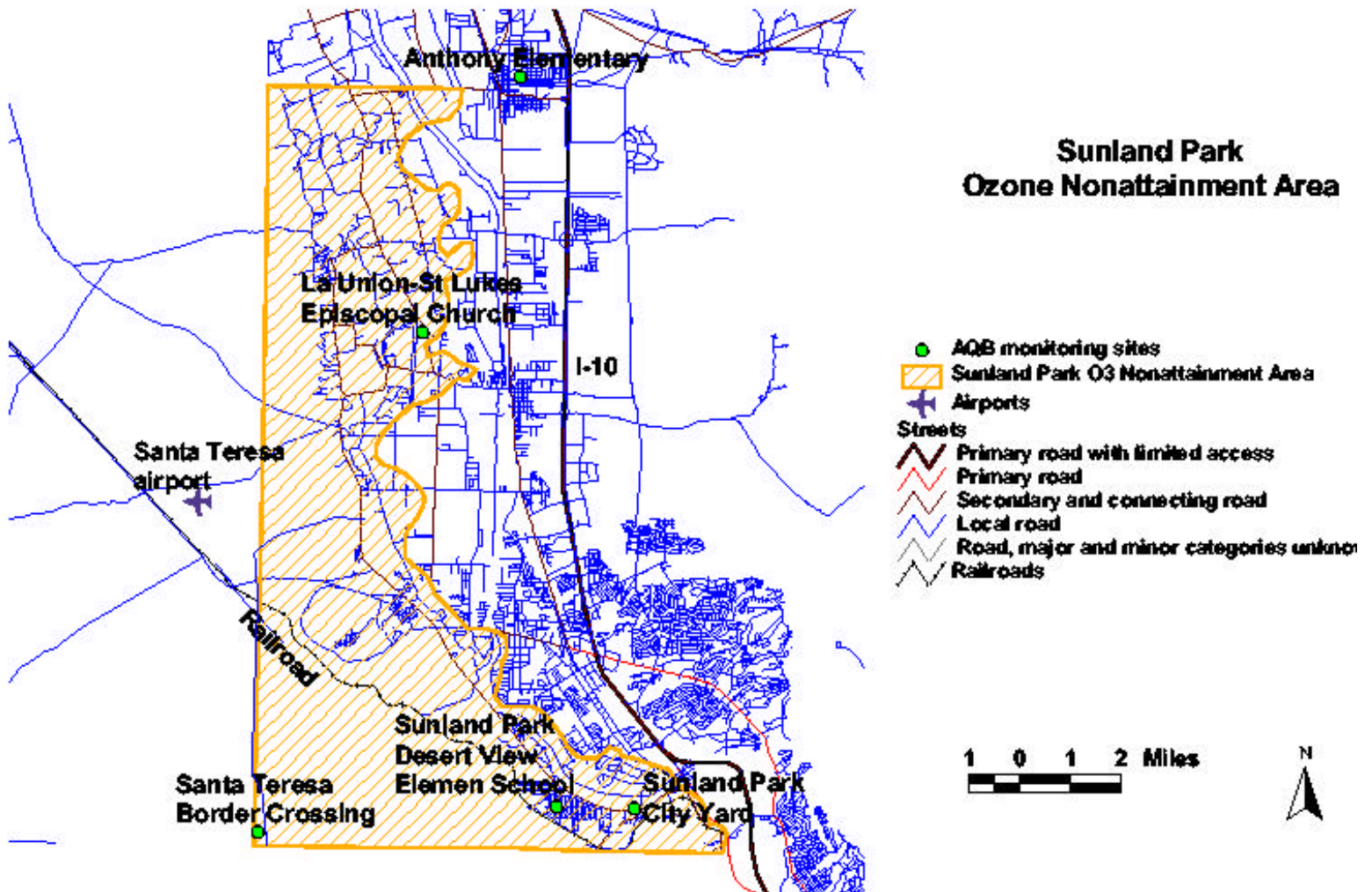
### **Introduction and Background**

The Sunland Park nonattainment area is approximately 42 square miles in area (see Figure 1). The northern portion extends from the north boundary at latitude 32° 00' south to about latitude 31° 49'. This area is roughly 3.5 miles wide by 6.25 miles high for a total of 21.9 square miles. The southern portion extends from 31° 49' south to the Mexico border and is about 8 miles wide by 2.5 miles high for a total of 20.0 square miles. This 42 square mile area represents only 1.10% of the countywide area (3804 square miles). The nonattainment area includes the communities, from south to north, of Sunland Park, Santa Teresa, and La Union. The area is largely rural with a small population and predominately agricultural land use along the Rio Grande, especially north of Santa Teresa.

The Sunland Park ozone nonattainment area lies within Doña Ana County, New Mexico. Doña Ana County has a total area of 3804 square miles and a population of 168,967 (1998). Much of this population is located within the city of Las Cruces, which is outside the nonattainment area.

Monitoring for several air pollutants, especially particulates and sulfur dioxide, has been conducted in the Sunland Park area since the mid 1970's. Some monitoring for ozone was conducted in La Union in the mid to late 1970's. Continuous monitoring for ozone has been conducted in La Union since 1984. Monitoring for ozone in Sunland Park did not begin until 1992. The first recorded exceedance of the current 1-hour ozone standard occurred on September 18, 1992 in Sunland Park.

Figure 1. Sunland Park Nonattainment Area.



Sunland Park was officially designated as nonattainment for ozone in a Federal Register announcement published June 12, 1995. Sunland Park was designated as a marginal nonattainment area, which is the lowest or least "serious" classification. When the base year inventory was conducted for Sunland Park a total of 12 exceedances of the federal ozone standard (0.12 ppm for a 1-hour exposure not to be exceeded more than once per year, averaged over 3 years) had been documented. Ten of the 12 exceedances (83%) occurred during the months of August, September, and October. The three highest values occurred in August and September.

### **Population**

The Sunland Park nonattainment area is included within the El Paso Metropolitan Planning Organization (MPO). For population and employment determinations the MPO divided the area into four segments: 1) Sunland Park, 2) Santa Teresa, 3) La Union, and 4) Gadsden (the area north of La Union). Combined population figures for all 4 segments for the 1990 (census year) and 1998 (estimated) were 10,705 and 14,171, respectively. This small area represents only 8.3% of the total county population (168,967).

Las Cruces, the largest city in the county, is located approximately 35 miles away from the Sunland Park nonattainment area and has never recorded an exceedance of the ozone standard. The close proximity (less than 10 miles) of the Sunland Park nonattainment area to the much larger cities of El Paso, Texas (1998 estimated population of 690,855 people, and classified as a "serious" ozone nonattainment area) and Juarez, Mexico (estimated at over 1 million people in 1993), is suspected to be the primary cause for Sunland Park's violations of the federal ozone standard.

### **Point Source**

This section presents data on point sources: 1) within the Sunland Park ozone nonattainment area, and 2) in New Mexico within a 25-mile radius of the nonattainment area. According to U.S. EPA guidance on ozone nonattainment area SIP inventories, sources located within the nonattainment area and emitting 100 or more tons of carbon monoxide (CO), 100 or more tons of nitrogen oxides (NO<sub>x</sub>), or 25 or more tons of volatile organic compounds (VOC) should be inventoried individually as point sources. In addition, the 1990 Clean Air Act Amendments specify that NO<sub>x</sub> sources greater than 25 tons must submit emission statements within three years of designation as a nonattainment area. Such sources must submit reports annually thereafter. Hence, this SIP inventory will include 25-ton NO<sub>x</sub> sources as point sources as well. Within a 25-mile radius of the nonattainment area, the inventory includes sources emitting 100 tons or more of carbon monoxide, nitrogen oxides or volatile organic compounds. The 25-mile radius was measured from the periphery of the nonattainment area and includes much of Las Cruces, New Mexico. This radius would also encompass much of Juarez, Mexico and El Paso, Texas; however, only sources in New Mexico are included in this discussion.

***Sources Within the Nonattainment Area***

Under the above definitions, there are two sources considered as point sources within the nonattainment area: El Paso Electric Co. and Foamex International Inc. El Paso Electric is a power generation facility and a point source for CO and NOx. Foamex manufactures foam products such as automobile seats and is a point source for VOC. These two sources were also the only two point sources within the nonattainment area for the 1995 base year inventory.

El Paso Electric emissions data from the EPA AIRS database for 1995 and 1998 are summarized below :

Table 1. Emissions from El Paso Electric Co. TPY = tons/year; TPD = tons/day

POLLUTANT	1995 ACTUALS (TPY)	1998 ACTUALS (TPY)	1998 ACTUALS WITH RULE EFFECTIVENESS	1998 DAILY EMISSIONS (TPD)
CO	3610.83	3610.83	4333.00	11.871
NOx	935.00	934.99	1122.00	3.074
VOC	9.30	9.29	11.16	0.0306

El Paso Electric had been a grand fathered (unpermitted) source for many years, but just recently underwent the permitting process in 1997. The 1995 and the 1998 actuals emission data were calculated from continuous emission monitors (CEM) data for the facility. CEM were only just installed in 1995. EPA's rule effectiveness procedure was applied to the actual emissions data. Rule effectiveness procedures adjust emissions to account for times of rule non-compliance. El Paso Electric, being a major point source, has a few rules that apply to it. EPA's default rule effectiveness of 80% compliance was applied to the actual emissions data. For the ozone season daily emissions calculation, 365 days per year operation and 25% of annual activity within the ozone season were used.

Foamex International Inc. was a minor source prior to 1996. Because they were minor they had never been thoroughly inventoried. They went through a permit modification in 1996 by increasing the number of laminating units from one to three. They were much more thoroughly inventoried at that time. The Foamex International Inc. emissions data from the EPA AIRS database for 1995 and 1998 are summarized below:

Table 2. Emissions from Foamex International Inc. TPY = tons/year; TPD = tons/day.

POLLUTANT	1995 ACTUALS (TPY)	1998 ACTUALS (TPY)	1998 ACTUALS WITH RULE EFFECTIVENESS	1998 DAILY EMISSIONS (TPD)
CO	20.34	65.56	78.67	0.303
NOx	7.54	24.31	29.17	0.112
VOC	29.02	93.52	112.22	0.432

Again, EPA's default rule effectiveness of 80% was used. The ozone season day determination was based on 25% of annual activity within the 3-month ozone season and 5-days/week operation. Copies of computer printouts from AIRS for both sources can be found in Appendix A.

***Sources Within a 25 Mile Radius of the Nonattainment Area in New Mexico***

Based on actual emissions data in AIRS, three sources within a 25-mile radius of the nonattainment area in New Mexico are over 100 tons per year for any of the three inventoried pollutants. These three sources include the City of Las Cruces Waste Water Treatment Plant, El Paso Natural Gas - Afton Compressor Station and the New Mexico State University (NMSU) Physical Plant Boilers. Emissions data from AIRS are in Table 3. Default rule effectiveness procedures of 80% were applied to these sources. Ozone season day determinations were based on 365-days/year operation and 25% of annual activity in the 3 month ozone season.

Table 3. Emissions within a 25-Mile Radius of the Nonattainment Area. TPY = tons/year.

SOURCE	POLLUTANT	1995 ACTUALS (TPY)	1998 ACTUALS (TPY)	1998 ACTUALS WITH RULE EFFECTIVENESS
Afton Compressor Station	CO	0.00	97.20	116.64
	NOx	0.00	612	734.4
	VOC	0.00	7.58	9.09
NMSU Physical Plant Boilers	CO	2.30	59	70.8
	NOx	16.40	271.9	315.48
	VOC	0.00	50.91	61.09
Las Cruces Waste Water Treatment Plant	CO	73.70	61.50	73.8
	NOx	105.50	123.3	147.96
	VOC	14.90	12.80	15.36

The reason for zero emissions for the Afton Compressor Station in 1995 was that it was not in operation at that time. The 1995 base year inventory included the NMSU Physical Plant Boilers and the Las Cruces Waster Water Treatment Plant even though the reported emissions for the facilities were well below the 100-ton thresholds. Both were include in the 1995 base year inventory because the permitted allowables for each of the facilities was well above the threshold

and they could potentially emit more in the future. Copies of computer printouts from AIRS for the three sources can be found in Appendix A.

### **Area Sources**

Area source emissions can be broadly divided into two groups: 1) combustion sources and 2) evaporative sources. To determine the area source emission data for the 1998 update, the area source emission data for the 1995 base year inventory was increased by 11.13%. The 11.13% increase was derived from the calculated 3.71% annual population increase for the Sunland Park area over a three year time period ( $3.71\% \text{ per year} \times 3 \text{ years} = 11.13\%$ ).

#### ***Combustion Sources***

Combustion emission sources include industrial, commercial and residential combustion of fuels such as natural gas, oil, LPG, and coal. Agricultural burning, trash burning and forest fires are also included in this category. For the 1995 base year inventory a list of source types were surveyed for both their presence and emissions within the Sunland Park ozone nonattainment area. This list was recommended by the US EPA and is the same list used by the TNRCC in conducting the El Paso, TX 1990 base year inventory. The same list of sources was used for the 1998 inventory. Please refer to the Sunland Park 1995 base year inventory.

Some of these source types, by definition, overlap and not all of these were identified as occurring within the Sunland Park nonattainment area. In any case, this list was used as a guide. In broad terms, these source types could easily be grouped and summarized into four source categories: 1) industrial combustion sources, 2) commercial combustion sources, 3) residential combustion sources, and 4) open burning.

#### ***Evaporative Emission Sources***

Evaporative emission sources include a wide variety of source types that emit VOC. Such sources may include aircraft refueling, bioprocess (i.e. bakeries), surface coating and painting operations, dry cleaning, pesticide application, solvent use, and wastewater treatment, to name a few. For the 1995 base year inventory a list of source types were surveyed for both their presence and level of emissions within the Sunland Park ozone nonattainment area. This list was recommended by the US EPA and is the same list used by the TNRCC in conducting the El Paso, TX 1990 base year inventory. The same list of sources was used for the 1998 inventory. Please refer to the 1995 base year inventory. The area source emissions data for 1995 and 1998 are summarized on the following page in Table 4.

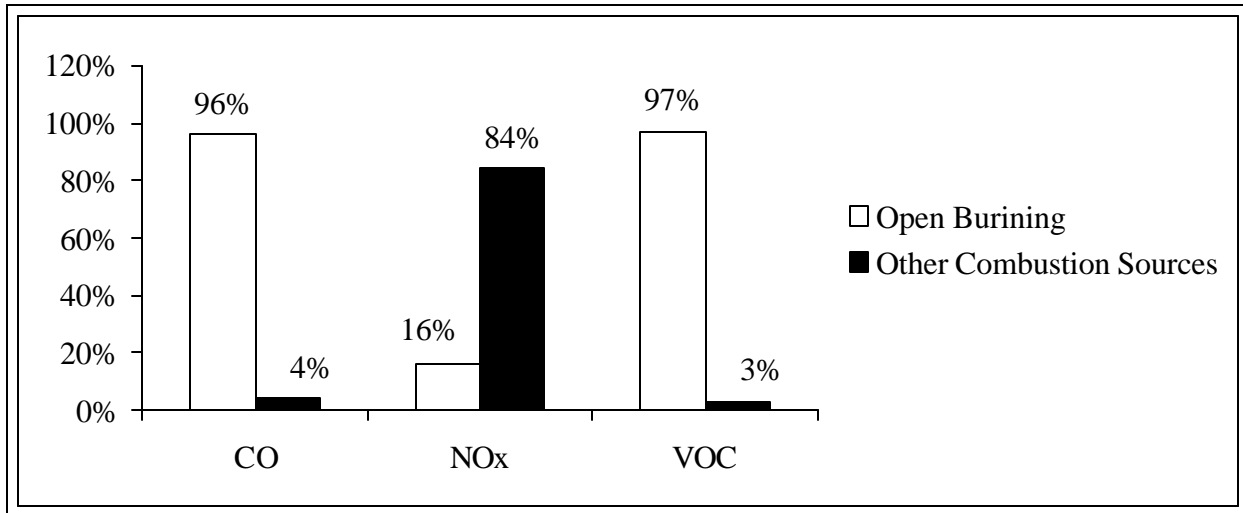
Table 4. Area Source Emissions for 1995 and 1998. TPY = tons/year

CATEGORY	1995 AREA SOURCES (TPY)			1998 AREA SOURCES (TPY)		
	CO	NO <sub>x</sub>	VOC	CO	NO <sub>x</sub>	VOC
<b>Combustion Sources</b>						
Brick Manufacture	0.843	3.37	0.067	2.24	2.68	0.141
Food Preparation Company	1.308	5.778	0.227	4.77	5.68	0.310
Supplier of Sterilized Medical Equipment	0.344	1.636	0.086	1.52	1.81	0.099
Commercial Natural Gas	0.63	3.02	0.16	2.81	3.35	0.185
Commercial LPG	0.013	0.093	0.004	0.014	0.104	0.004
Commercial Distillate	0.053	0.213	0.004	0.059	0.236	0.004
Commercial Coal	0.112	0.212	0.008	0.124	0.235	0.009
Residential LPG	0.107	0.775	0.029	0.118	0.862	0.032
Residential Natural Gas	3.46	8.131	0.628	3.84	9.024	0.696
Residential Coal	0.154	0.304	0.018	0.171	0.336	0.020
Open Burn Trash	66.79	4.72	23.58	74.21	5.23	26.19
Structure Fires	0.0156	0.0003	0.00286	0.0173	0.0004	0.0032
Grass Fires	4.60	N/A	0.684	5.05	N/A	0.755
Agricultural Burning	79.52	N/A	11.76	84.48	N/A	12.63
Total	157.9	28.25	37.25	179.4	29.54	41.07
<b>Evaporative Emission Sources</b>						
Aircraft Refueling	N/A	N/A	0.00136	N/A	N/A	0.0013
Asphalt Paving	N/A	N/A	2.36	N/A	N/A	2.62
Bioprocess	N/A	N/A	1.1	N/A	N/A	1.2
Appliance Coating	N/A	N/A	5.25	N/A	N/A	5.82
Architectural Coatings	N/A	N/A	33.48	N/A	N/A	37.08
Auto Refinishing	N/A	N/A	0.57	N/A	N/A	0.68
Graphic Arts	N/A	N/A	5.4	N/A	N/A	6.24
Pesticide Application	N/A	N/A	19.63	N/A	N/A	21.56
Solvent Use	N/A	N/A	25.38	N/A	N/A	28.21
Tank Breathing Losses	N/A	N/A	0.053	N/A	N/A	0.058
Municipal Wastewater	N/A	N/A	1.60	N/A	N/A	1.77
Landfills	N/A	N/A	45.3 (best case; 508.6 worst case)	N/A	N/A	50.4 (best case; 565.7 worst case)
Total	N/A	N/A	140 (best case; 603.4 worst case)	N/A	N/A	155 (best case; 670.9 worst case)
<b>Overall Total</b>	157.9	28.25	177.4 (best case; 640.7 worst case)	179.4	29.54	196.7 (best case; 712.0 worst case)

### Summary of Area Sources

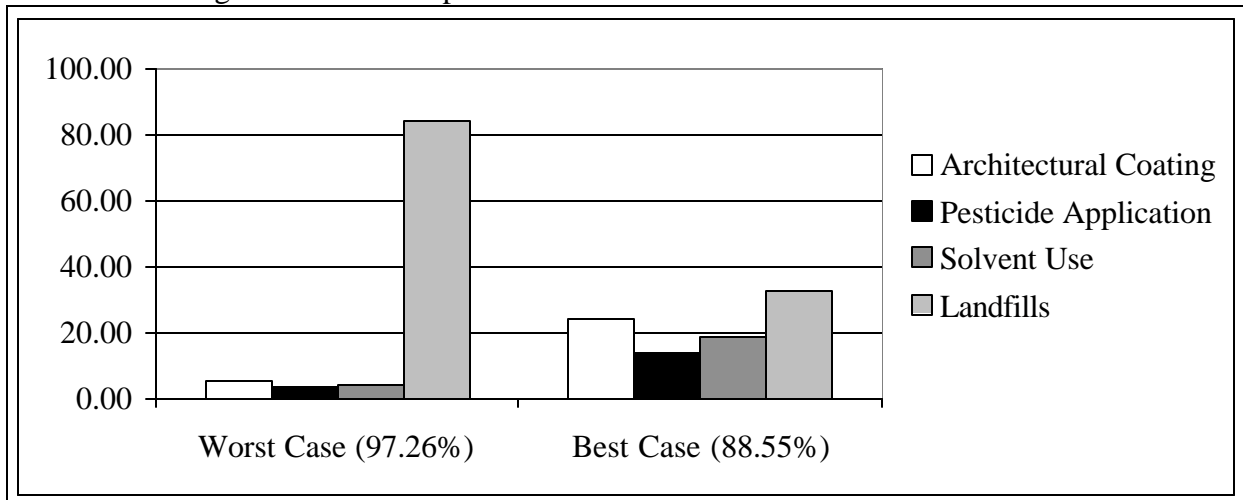
For all area combustion sources open burning accounts for 96% of CO, 16% of NO<sub>x</sub>, and 97% of VOC emissions. Agricultural burning and trash burning account for most of the open burning sources within the nonattainment area. Chart 1 below contains a summary of all area combustion sources.

Chart 1. Area Combustion Sources for 1998



The most significant area evaporative sources of VOC are: 1) the landfill, 2) architectural coatings, 3) solvent use, and 4) pesticide use. These four sources combined account for 97.26% of all emissions under the worst case situation and 88.55% under the best case situation. Worst and best case situations were based on different methods for estimating emissions from the landfill. Under the worst case the landfill accounts for 84% of all evaporative emissions. Under the best case the landfill accounts for only 33% of emissions. Chart 2 contains a summary of the most significant area evaporative sources.

Chart 2. Most Significant Area Evaporative Sources for 1998





## On-Road Mobile Sources

These sources include automobiles, trucks, and all vehicles that travel on established roads. Emissions from these sources can be estimated using a computer model recommended by the U.S. EPA called Mobile 5. There are a complex set of input data and variables that must go into this model in order to arrive at a reasonable determination of pollutant emissions. Some of this input information includes: fraction of vehicles within eight different vehicle classes, vehicle miles traveled (VMT), VMT mix (which distributes VMT by the eight vehicle classes), air temperature, vehicle speeds, types of roads within the area, directional splits (variations in the direction of traffic movement), Highway Performance Monitoring System (HPMS) traffic data factors, time of day, season of year, etc. Since the TNRCC and TXDOT (Texas Department of Transportation) have been conducting this type of modeling for several years for their several nonattainment areas, including El Paso, the NMED has taken advantage of this experience in obtaining emission data for Sunland Park.

In 1998, the El Paso MPO conducted the *El Paso Urban Transportation Study-Southern Doña Ana County Nonattainment Area (Ozone)*. The study was part of the 1998-2002 Transportation Improvement Program for El Paso County. The study by the El Paso MPO looked at the VMT and on-road mobile emissions for the Sunland Park nonattainment area. The 1998 Transportation Study's findings for on-road mobile emissions in the nonattainment are as follows (the table also includes the 1995 inventory's findings for comparison):

Table 5. Summary of Emissions from On-Road Mobile Sources in the Sunland Park Nonattainment Area for 1995 and 1998. See table footnote for vehicle class abbreviations.

VEHICLE CLASS*	DAILY SUMMER-TIME EMISSIONS IN TONS PER DAY (TPD)					
	1995			1998		
	CO	NO <sub>x</sub>	VOC	CO	NO <sub>x</sub>	VOC
LDGV	3698.1	643.2	366.3	5456.73	879.31	582.89
LDGT1	1267.8	212.7	127.0	2017.27	285.22	206.41
LDGT2	480.2	72.9	49.0	785.95	108.29	76.85
HDGV	467.6	64.1	27.1	418.35	76.94	31.30
LDDV	1.2	2.3	0.5	1.09	1.87	0.49
LDDT	0.5	0.8	0.3	0.79	1.28	0.39
HDDV	107.2	276.2	23.8	174.27	312.32	34.56
MC	18.8	2.2	5.3	37.73	3.16	10.59
TOTALS	3.021	0.637	0.300	4.44	0.8348	0.4717

\* Vehicle class abbreviations are as follows: LDGV = light duty gasoline powered vehicles; LDGT1 = light duty gasoline powered trucks, up to 6000 lbs gross vehicle weight; LDGT2 = light duty gasoline powered trucks, from 6001-8500 lbs gross vehicle weight; HDGV = heavy duty gasoline powered vehicles; LDDV = light duty diesel powered vehicles, up to 6000 lbs gross vehicle weight; LDDT = light duty diesel powered trucks; HDDV = heavy duty diesel powered vehicles; and MC = motorcycles.

**Gross Annual Estimates for 1998:**

CO: ≥ 1622 tons/year  
 NOx: ≤ 304 tons/year  
 VOC: ≥ 172 tons/year

Please refer to the *El Paso Urban Transportation Study*.

**Non-Road Mobile Source Emissions**

Non-road mobile sources include railroads, aircraft, ships and watercraft, and many other miscellaneous sources such as agricultural vehicles, construction vehicles, light commercial use vehicles, and lawn and garden equipment. These types of sources can be hard to inventory and quantify. For the 1995 base year inventory, data was obtained or derived for three categories: 1) railroads, 2) aircraft, and 3) miscellaneous. Ships and watercraft were not considered because the Rio Grande is essentially unnavigable and there are no large lakes or reservoirs in the nonattainment area. To determine the non-road mobile source emissions for the 1998 update, the non-road mobile source emission data for the 1995 base year inventory was increased by 11.13% (3.71% annual population increase over a 3 year time period).

Of the total non-road mobile sources, miscellaneous sources account for 88% of CO, and 81% VOC, while railroads account for 79% NOx emissions in the Sunland Park ozone nonattainment area (Table 6). Daily ozone season emissions are based on 7 days/week operation and 25% of annual activity in the ozone season.

Table 6. Summary of Non-road Mobile Source Emissions for 1998 and 1995. TPY = tons/year.

SOURCE CATEGORIES	1995			1998		
	CO	NOx	VOC	CO	NOx	VOC
Railroads	44.22	330.99	14.22	49.08	367.81	15.78
Santa Teresa Airport	43.85	0.24	1.44	48.72	0.264	1.599
Cielo Dorado Airport	13.16	0.071	0.43	14.6	0.079	0.48
All other sources	729.37	85.17	70.33	810.54	94.64	78.15
TOTALS	830.6	416.471	86.42	922.94	462.79	96.01

## **Biogenic Emissions**

Biogenic emissions are primarily VOC emissions from vegetation, but also include nitrogen oxides (mainly nitrous oxide, NO) from soil microbes. Emissions from these sources can be estimated by using U.S. EPA's biogenic emissions model called PCBEIS. There are four types of information needed to determine biogenic emissions according to U.S. EPA guidance in order to run the current version of PCBEIS:

1. The top ten hourly ozone days over a 3 year period.
2. Weather data for determining the maximum temperature for the top ten ozone days.
3. Hourly:
  - a. Air temperature
  - b. Cloud cover fraction
  - c. Photosynthetically active radiation (PAR)
4. Site information:
  - a. County federal information processing (FIP) codes
  - b. Latitude and longitude
  - c. Time zone
  - d. Month, day, and year of selected input

The biogenic emissions data from the 1995 base year inventory was also used for the 1998 update.

VOC:	138.72 tons/yr
NO:	26.40 tons/yr

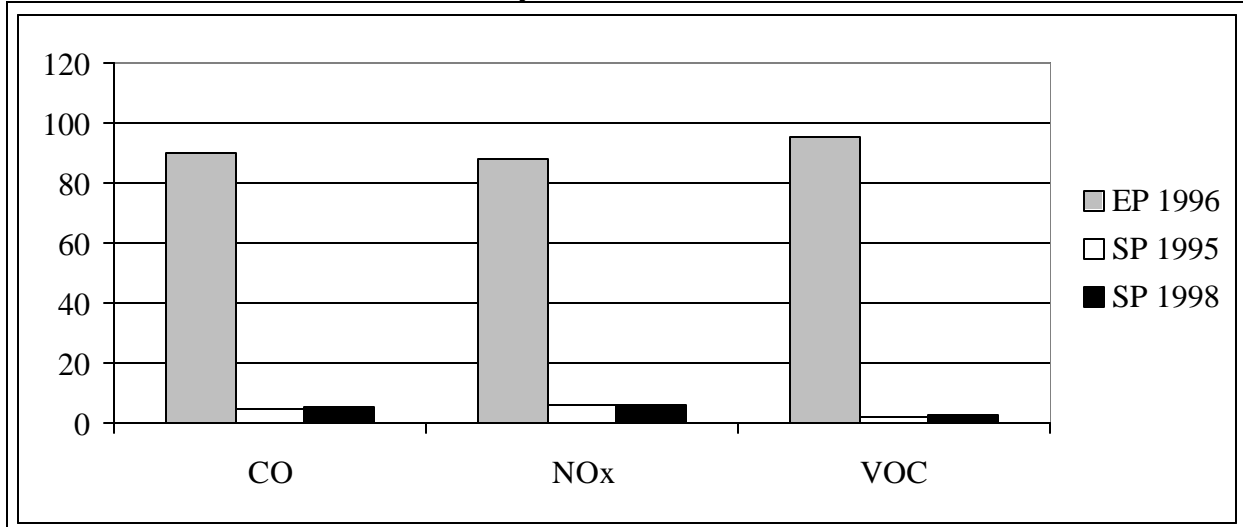
## **Sunland Park/El Paso Emissions Comparison**

In the 1995 base year inventory for Sunland Park a gross overall comparison of total emissions from the Sunland Park ozone nonattainment area to those from the El Paso, TX ozone nonattainment was conducted. The 1995 comparison showed that Sunland Park emits only 4.08% of the CO, 6.91% of the NO<sub>x</sub>, and only 1.69% or 3.09% of the VOC that El Paso emits. These differences are clearly understandable considering the population differences between the two nonattainment areas. For most source categories, Sunland Park emissions represent only about 1-10% of El Paso emissions. In 1995, the one significant source category in Sunland Park was point sources. Point source emissions of CO in Sunland Park in 1995 were 165-188% of those in El Paso and the NO<sub>x</sub> emissions were 16-24% of El Paso emissions. This was due to the very large point source of El Paso Electric Company located in Sunland Park. The 1998 update shows that conditions within the nonattainment area have not changed significantly between the years of 1995-1998. The most significant source within the nonattainment area, El Paso Electric, has maintained the same emission levels in 1998 as were originally reported in the 1995 base year inventory. Hence, with the exception of the El Paso Electric facility, emissions from Sunland Park were small compared to those of El Paso, Texas.

Chart 3, shown below, compares the total emissions from the Sunland Park ozone nonattainment area for 1995 and 1998 to those from the El Paso, Texas ozone nonattainment area for 1996 (the most recent emission data available for that area at this time). The emission data for El Paso, Texas for 1996 came from the National Emission Trends Inventory (NET 1996) conducted by

the Environmental Protection Agency (EPA). Copies of the NET 1996 inventory for El Paso, Texas can be found in Appendix B.

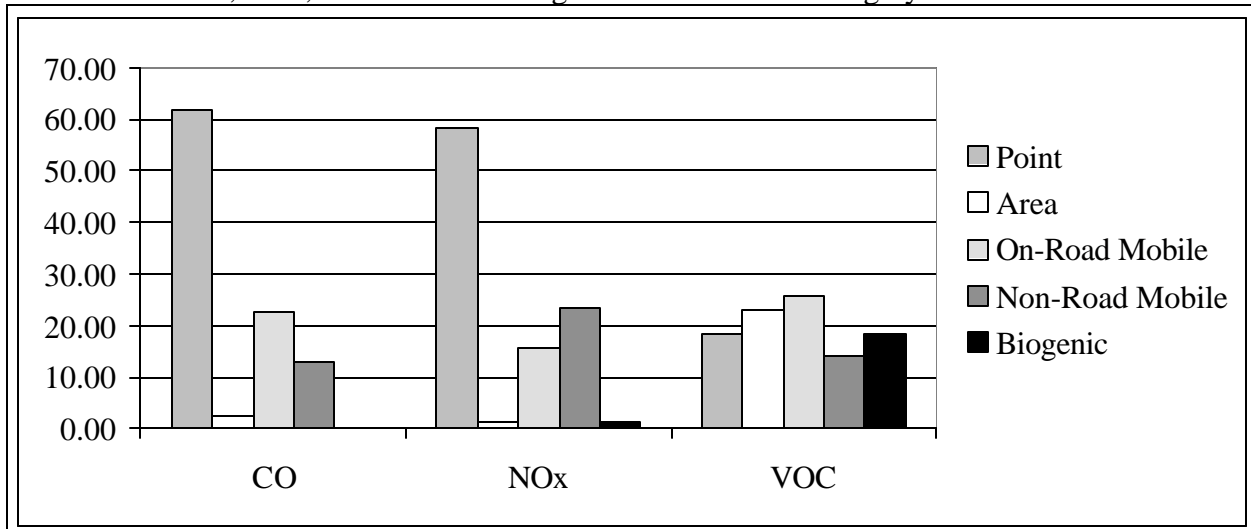
Chart 3. Comparison of the Annual Emissions of CO, NO<sub>x</sub>, and VOC from Sunland Park, New Mexico, and El Paso, Texas. Units in tons/year.



**Summary**

Chart 4, shown below, summarizes the total percentage of CO, NO<sub>x</sub>, and VOC being emitted by each source category in the Sunland Park nonattainment area for 1998. A large percentage of the CO being emitted within the nonattainment area is by point sources (61.83%) and on-road mobile sources (22.71%). Point sources (58.39%), along with non-road mobile sources (23.47%), also account for a large percentage of NO<sub>x</sub> emissions. Non-road sources (25.70 %) and area sources (23.14%) account for the highest percentage of VOC emissions within the nonattainment area.

Chart 4. Total CO, NO<sub>x</sub>, and VOC Percentages for Each Source Category



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