REVISIONS TO THE STATE IMPLEMENTATION PLAN (SIP) FOR THE CONTROL OF OZONE AIR POLLUTION

SECTION 818 DEMONSTRATION FOR THE EL PASO NONATTAINMENT AREA

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Background

The Federal Clean Air Act (FCAA) Amendments of 1990 designated El Paso nonattainment for ozone for failing to meet the National Ambient Air Quality Standard (NAAQS) for ozone. An area is classified as moderate, serious, severe, or extreme depending on the area's ozone design value and the percentage by which the design value exceeds the NAAQS of 120 parts per billion (ppb). El Paso, having a design value of 170 ppb, is classified as a serious area with an FCAA mandated schedule for attainment of the ozone NAAQS by November 15, 1999.

The FCAA requires states containing ozone nonattainment areas with a classification of moderate or greater to amend their State Implementation Plans (SIP) to achieve a reduction of emissions of volatile organic compounds (VOC) in the nonattainment areas to a level 15% below 1990 levels as a first step. The Texas Natural Resource Conservation Commission (TNRCC) submitted the SIP amendment for the 15% reduction for El Paso in two parts, with the first in November 1993, and the second part in May 1994. These reductions must be accomplished by November 1996. The

TNRCC must also determine if any additional reductions will be needed to achieve attainment in El Paso by November 15, 1999. A demonstration that El Paso can achieve the ozone NAAQS as a result of the 15% emissions reduction plan plus any additional reductions is to be submitted by November 15, 1994. This demonstration will be accomplished using the Urban Airshed Model (UAM).

Basis for attainment

El Paso's adjacent proximity to Ciudad Juarez, Mexico uniquely affects planning for ozone attainment. Section 818 of the 1990 FCAA Amendments incorporates a new §179B into the FCAA which contains special provisions for nonattainment areas that are affected by emissions emanating from outside the U.S., i.e., international border areas such as El Paso. (Note: The §179B provisions are hereinafter referred to as "§818.") This situation is pertinent to El Paso, since the airshed encompasses Ciudad Juarez.

Under §818, the U.S. Environmental Protection Agency (EPA) is required to approve a SIP for El Paso if the TNRCC establishes that implementation of the plan would achieve timely attainment of the NAAQS, but for emissions emanating from Ciudad Juarez. This provision prevents El Paso from being reclassified to a higher level of nonattainment should monitors continue to record

ozone concentrations in excess of the NAAQS. To establish that implementation of a control plan would achieve timely attainment of the NAAQS, but for emissions emanating from Ciudad Juarez, TNRCC has conducted UAM modeling with U.S. sources only. Basin-wide modeling was not feasible due to the lack of emissions data from Ciudad Juarez. However, modeling with U.S. sources alone does establish the "... but for emissions emanating from Ciudad Juarez" condition. The modeling results show that, with the controls providing the 15% reduction, emissions from U.S. sources alone are insufficient to generate ozone concentrations in excess of the NAAQS. In addition, the results demonstrate that, with these controls, El Paso could easily attain the NAAQS in 1996, again based on U.S. emissions alone.

Request for 1996

For ozone nonattainment areas classified serious and above, the 1990 FCAA requires, in addition to the 15% rate of progress reductions for 1996, an additional three percent per year of reductions until the attainment date. In the case of El Paso, a serious area, this would mean another 9% reduction in VOC between 1996 and 1999. The EPA's "Guidance on the Post-1996 Rate- of-Progress Plan and the Attainment Demonstration," indicates that if attainment can be demonstrated for an earlier date than mandated by the FCAA, additional reductions past the earlier date

are not required. Since no ozone exceedances of the NAAQS were modeled in the base cases, there was no reason to believe that, with even less emissions in the future years, there would be any predicted ozone exceedances. Thus, modeling has been conducted based upon the 1996 projected emissions inventory which demonstrates attainment at this earlier date, based on U.S. emissions alone. The TNRCC believes that any further unilateral reduction of VOC in El Paso would be excessive and unnecessary, and would likely be very expensive. Given these conditions, the TNRCC is requesting that EPA change the attainment date for El Paso to 1996 from the FCAA standard date of 1999 as generally required for serious areas.

Modeling Procedures and Results

The TNRCC used version IV of the UAM, an EPA-approved photochemical grid model, to perform the modeling. All modeling activities were performed as outlined in the UAM modeling protocols, and in accordance with EPA's "Guideline for Regulatory Application of the Urban Airshed Model." The UAM modeling protocol for the El Paso area has been approved by EPA. The accompanying appendix describes in detail the modeling procedures and results.

Four historical ozone exceedance episodes were selected for the modeling demonstration. Meteorological models were employed

to simulate the weather patterns characteristic of each episode. Concurrently, models of emissions of nitrogen oxide (NO_x), VOC, and carbon monoxide (CO) were developed to characterize the chemical speciation, and the spatial and temporal distributions of these ozone precursors. These modeling emission distributions were based upon data collected for the 1990 Base Year Emissions Inventory. Once acceptable characterizations of emissions and meteorology were developed for each ozone episode, the UAM was executed.

A consequence of not having an emissions inventory from Juarez is that it may not be possible to achieve modeling results which meet established criteria for acceptability. In anticipation of this situation, the TNRCC and EPA, via the modeling protocol, agreed to gauge the performance of the model based upon the results of a series of sensitivity and diagnostic analyses. This series of sensitivity and diagnostic analyses was used to determine whether the model behaved as it should when its inputs were varied according to set patterns. If the model behaves as it should, then the performance is judged acceptable and the model is considered suitable for determining the level of control that would be required from U.S. sources to achieve attainment, but for contributions from Juarez.

The TNRCC ran the series of sensitivity and diagnostic analyses for each episode to determine whether the model behaved

appropriately. Assessment of the sensitivity and diagnostic model results indicated that two episodes, both in the summer of 1987, produced simulation results consistent with expectations, although the modeled ozone levels at the three monitoring sites were well below measured values. The two remaining episodes, in February 1987 and October 1989, produced results clearly at variance with standard models of ozone photochemistry. As a result, these two episodes were not used in this §818 demonstration. Detailed information regarding the assessment of the sensitivity and diagnostic results are included in the appendix.

Table 1 compares measured and base case modeled ozone concentrations in parts per billion (ppb), at each of the three local air monitors, for the two acceptable episodes. As expected, the model predicted ozone concentrations were notably less than monitored data, primarily due to the omission of Juarez emission sources from the inventory.

Table 1 COMPARISON OF MEASURED AND MODELED OZONE

		Measured		Modeled	
Date	Site	O_3	Time	O_3	Time
06/24/87	C06	190	11:00	62	15:00
	C12	200	11:00	63	15:00
	C30	170	10:00	74	15:00
07/02/87	C30	130	11:00	85	14:00
07/03/87	C30	180	09:00	60	12:00

Notes: 1. ozone (O_3) concentrations are in ppb

2. time is in Central Standard Time (CST)

3. O_3 NAAQS equals 120 ppb

The highest domain-wide modeled maximum ozone concentration for the June and July 1987 episodes was 114 ppb. This domain-wide maximum value was predicted in the June 1987 base case simulation. However, this concentration occurred at 16:00 CST more than ten kilometers east-northeast of the city. As Table 1 shows, modeled ozone at the monitoring sites never exceeded 74 ppb during the episode and the higher measured ozone values occurred at 10:00 and 11:00 CST. In summary, while U.S. sources alone might account for some elevated ozone in the region, they were not primarily responsible for the ozone exceedances recorded during these two episodes.

To demonstrate attainment of the ozone NAAQS under the requirements of §818, modeling was conducted with a 1996 projected emissions inventory. Demographic and economic forecasting methods were used to project the growth in various activities to the summer of 1996. These activities include industrial and small business employment and automotive traffic. This projected growth was coupled with the emission reductions expected under the 15% rate of progress plan (shown in Table 2) to develop the projected 1996 modeling emissions inventory. Table 3 summarizes the 1996 projected modeling inventory by general source category. Biogenic VOC emissions were not included in the modeling, due to their negligible contribution.

Table 2 1993 ROP SIP VOC REDUCTIONS

Mandated rules	1996 Projected Emissions	Reductions Tons/Day
Catch-ups	2.00	0.71
Vehicle refueling	2.30	2.03
Aircraft Stage 3	0.29	0.02
FMVCP Tier 1	31.18	0.25
Enhanced I/M	31.18	6.32
Phase 1 rules		
Auto refinishing	2.84	1.13
Offset printing	0.85	0.56
Vessel loading	0.40	0.32
Fugitives	1.79	1.13
Rule effectiveness improvement	12.07	0.61
Gasoline utility engines	7.57	0.84
Transportation control measures	31.18	0.30
Phase 2 rules		
Architectural coatings	5.25	1.42
Consumer products	5.69	0.61
Municipal landfills	0.38	0.21
Industrial wastewater	0.37	0.27
Gasoline terminals	0.86	0.82
Outdoor burning	0.81	0.40
Other coatings	1.48	0.30
Wood furniture	0.29	0.04
Reid vapor pressure (on-road)	31.18	2.61
Reid vapor pressure (off-road)	12.58	0.09
I/M improvements	31.18	0.40
Total 1996 reductions		21.39

Table 3. UAM Emissions Inventory Development for 1996

El Paso Attainment Demonstration

	Emission Source Category (Tons/Day)			
	Point	Area	Off-Road Mobile	On-Road Mobile
Base 1990 Inventory	9.02	27.60	11.90	67.33
RACT Fixups	-0.00	-1.52	-0.00	–
Adjusted 1990 Inventory	9.02	26.07	11.90	–
Projected Growth	+0.24	+2.03	+1.36	–
Projected 1996 Inventory	9.26	28.10	13.26	–
ROP Reductions	-3.73	-6.86	-0.94	–
1996 Modeling Inventory	5.53	21.25	12.33	38.04

A summary of the results of the modeling with the 1996 projected inventory are displayed in Table 4. In each case the predicted domain-wide maximum ozone concentration was well below the NAAQS of 120 ppb. This establishes that implementation of the 1993 ROP SIP would achieve timely attainment of the NAAQS, but for emissions emanating from Ciudad Juarez.

Table 4

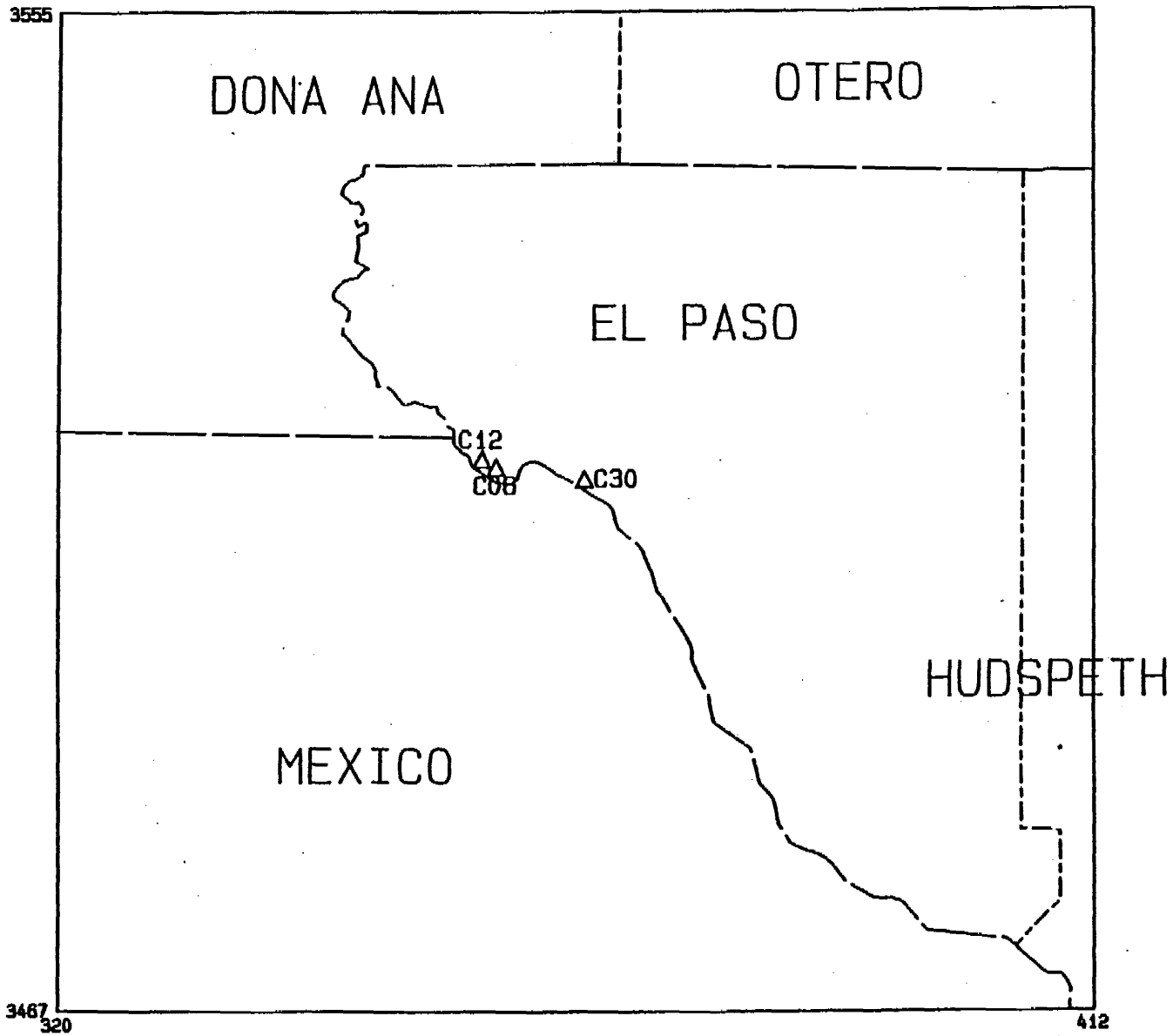
Maximum Predicted Ozone Concentration

Episode Date	Base Year Emissions	Attainment year Emissions
6/24/87	114 ppb	87 ppb
7/02/87	98 ppb	80 ppb
7/03/87	78 ppb	68 ppb

International cooperation in the El Paso-Juarez basin

Because violations of the ozone NAAQS are likely to continue, the TNRCC is committed to conducting additional modeling for the area as new data becomes available. This modeling effort will be conducted under the auspice of the 1983 La Paz Agreement between the U.S. and Mexico. Annex V to this agreement includes a provision for conducting basin-wide modeling for the El Paso-Juarez airshed. This modeling is expected to be conducted for ozone by November 15, 1999, depending on the timely development of a modeling emissions inventory for Juarez. An inventory is currently being developed in cooperation with the EPA using special EPA funding. The intent of this effort is to develop a basin-wide and international strategy to improve and maintain air quality in both cities.

El Paso UAM Domain



Coordinates are UTM Zone 13