

APPENDIX V

December 1, 2000 Updates to the ROP and Attainment Demonstration SIP for the HGA Ozone  
Nonattainment Area: Non-road Mobile Source Inventories

Houston/Galveston Attainment Demonstration and  
Post-1999 Rate-of-Progress SIP

December 2000

Emission estimates for all sources in the non-road category except aircraft, locomotives, commercial marine vessels, diesel construction equipment, and airport support equipment were originally developed by a contractor to EPA's Office of Transportation Air Quality as a 1990 emissions inventory. Emissions were then projected to later years based on EPA's Economic Growth Analysis System (EGAS) model. Aircraft emissions were estimated from landings and takeoff data for airports used in conjunction with a suitable aircraft emissions model (FAAED or EDMS). Locomotive emissions were developed from fuel use and track mileage data obtained from individual railroads.

Emissions from airport GSE, HDD construction equipment, and commercial marine vessels were estimated with new methods involving the use of local survey data. These methods included use of the EPA's new NONROAD model for calculating emissions from construction equipment and airport GSE. The methodologies for preparing these inventories for airport GSE, HDD construction equipment, and commercial marine vessels are addressed in other Appendices.

The forecasting years emissions inventories were compiled by using the EPA NONROAD model for each nonroad mobile source category except aircraft, locomotives, and commercial vessels. Emissions from commercial vessels were also calculated separately and are discussed in a separate appendix. The 1990 base year emissions inventory used the NEVES data which corresponds to those categories covered in the NONROAD model. The forecasted years were adjusted to accommodate this change in methodology (see Table 1 below). Locomotive emissions for the forecasting years were derived from data obtained from the major railroad lines. In recognition of locomotive emission standards, EPA estimated average emission rates for locomotives expressed in grams per brake horsepower-hour (g/bhp-hr) for uncontrolled emissions. This methodology was followed to calculate the emissions in Texas for locomotives using fuel data received from the two largest operating rail lines, Union Pacific and Burlington-Northern. Diesel fuel consumption in each county was provided by the railroads to calculate emissions. The emission factors were converted to grams per gallon to utilize the fuel activity data received. Projected emissions were based on current estimated emission rates. Total emission rates were calculated by multiplying the emission factors in g/gal by the fuel consumption rates (millions of gal/yr). Emission factors were taken from the emission rate tables found at the EPA web site for locomotives.

Aircraft forecasting years emissions inventories were compiled using the EPA Economic Growth Analysis System (EGAS) growth factors. The EGAS factors cover every source type for every year.

The modeling input and output files and the post processing spreadsheets used to develop the inventories are available upon request in electronic format, but are not included in this appendix. Please contact the TNRCC Technical Analysis Division if a copy of the electronic information is needed.

**Table 1**

| Summary of Non-road Mobile Source<br>Houston-Galveston Ozone Nonattainment Area<br>(Emissions are in tons per ozone season day) |                  |                     |                           |                           |                                 |                                       |
|---|------------------|---------------------|---------------------------|---------------------------|---------------------------------|---------------------------------------|
| Base Year and<br>Forecast Years   | VOC<br>Emissions | VOC<br>Adjustments* | Adjusted VOC<br>Emissions | NO <sub>x</sub> Emissions | NO <sub>x</sub><br>Adjustments* | Adjusted NO <sub>x</sub><br>Emissions |
| 1990 Base Year  | 129.98           |                     |                           | 198.08                    |                                 |                                       |
| 2002 Forecast Year  | 154.87           | 4.65                | 159.52                    | 173.07                    | 72.69                           | 245.76                                |
| 2005 Forecast Year  | 164.78           | 4.94                | 169.72                    | 185.69                    | 77.99                           | 263.68                                |
| 2007 Forecast Year  | 171.89           | 5.16                | 177.05                    | 194.08                    | 81.51                           | 275.59                                |

\*Non-road emission inventories are calculated using a baseline inventory calculated with the NONROAD model adjusted using a methodology ratio. The methodology ratio corrects the nonroad values for differences between the NEVES and NONROAD methodologies using 1999 grown NEVES and 1999 NONROAD inventories to determine the ratio. This correction is done in order to maintain consistency with the 1990 base year, 1996 ROP, and 1999 ROP inventories.