

Assessment of Marine Emissions on Corpus Christi Urban Airshed

Zuber M. Farooqui, leesuck Jung and Kuruvilla John

Brief Description:

The two largest and yet uncertain sub-categories of air emissions from non-road sources include marine vessels and pleasure crafts. Ocean going vessels (OGV) contribute a significant amount of emissions in the Corpus Christi urban airshed (CCUA). CCUA is classified as a near non-attainment area. To assess the effects of marine emissions on urban ozone levels, a comprehensive emissions inventory for NO_x, VOC, CO etc. was developed. The methodology developed by ENVIRON for US EPA was adopted for quantifying emissions from marine vessels. It was noted that marine emissions comprised approximately 3% of the total NO_x and 18% of the total VOC in the CCUA for the 1999 base year. For the year 2002, there was an increase of 21% in NO_x, 16% in CO and 25% in VOC in anthropogenic marine emissions. The NONROAD model was used to develop the emissions inventory for pleasure crafts using local activities and population, temperature and other activities data collected from surveys along with local meteorological parameters. There was little difference in the pleasure craft emissions between 1999 and 2002. Spatial allocation of the estimated emissions was performed using Geographical Information System (GIS). Comprehensive Air Model with extensions (CAMx) was used to evaluate the impact of these two sub-categories of precursor emissions on the urban ozone level within Corpus Christi and surrounding areas. A high ozone episode of September 13-20, 1999 was used as the base case for the modeling analysis. It was observed that the maximum contribution of both marine vessels and pleasure crafts on the urban ozone was approximately 18 ppb – 20 ppb. Ocean going vessels contributes approximately 5 ppb – 7 ppb for both base year computations.