A STUDY OF AERMOD TIERING APPROACH FOR NITROGEN DIOXIDE PREDICTION IN MAPTAPHUT INDUSTRIAL AREA

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ABSTRACT

The Maptaphut industrial area, Rayong Province is the largest industrial complex in Thailand. There has been concern about many air pollutants over this area. This study presents the methodologies and results of an application of the AERMOD model to predict the air quality impacts of NO_2 emitted by industrial emission sources in Maptaphut Industrial Estate. These emissions are typically composed of a mixture of nitric oxide (NO) and nitrogen dioxide (NO_2), an oxide of nitrogen (NOx). NO is subsequently oxidized to NO_2, which is an air pollutant found in the environment. Taking into consideration the chemistry of NOx and characteristics of the conversion of NO to NO_2, three different tiers, recommended by the USEPA are tested and evaluated for their ability in predicting NO_2 ambient concentration in the study area.

The performance evaluation of the AERMOD dispersion model in predicting 1-hour average concentrations in the vicinity of the Maptaphut industrial complex was conducted for the years 2012 and 2013 (1 January, 2012 to 31 December, 2013). Measured data from 10 ambient air monitoring stations were used to compare with those modeled results. The results from the model indicated that Tier 1 (100% conversion of NO_x to NO_2) provided less bias with those measured data as compared with other tiers. It also performed very well in predicting the extreme end of NO_2 concentrations.

Therefore, Tier 1 may be considered as appropriate for prediction of the annual average as well as in determining the maximum ground level concentration of NO_2 in the Maptaphut industrial area.

KEY WORDS: AERMOD/ NITROGEN DIOXIDE/ MAPTAPHUT/ OLM/ PVMRM

79 pages