KHANTONG SOONTRAPA : AN INVESTIGATION OF SULFUR DIOXIDE DISPERSION WITH MATHEMATICAL MODELS "CRSTER" AND "VALLEY". THESIS ADVISOR : ASSO.PROF.WONGSEPUN LIMPASENI,98 pp.

This research is an investigation of sulfur dioxide dispersion with mathematical models "VALLEY" and "CRSTER" from an example oil refinery with 65,000 barrel/day at Laem Chabang, Amphoe Sriracha,Cholburi. The study centers on the sensitivity analysis of both models. The parameters concerned in "VALLEY" are terrain adjustment,wind speed and wind direction, stability class,stack height,stack exit temperature and stack diameter. But the parameters concerned in "CRSTER" are terrain adjustment, stack height,stack exit temperature and stack diameter."STAWIRO" is used in preparing meteorological data required in both models, such as hourly stability class,wind rose and stability-windrose.

It was found that percentage frequency of occurrence for wind speed range of 0.5-1,1-2 and 2-3 m./sec. are 31.9%,22.8% and 21.1%,respectively. The percentage frequency of occurrence for stability class F , B and D are 27.5%,19.5% and 18.9%, respectively.

From "VALLEY",it shows that by increasing wind speed from 0.5-2.5 m./sec.,plume rise is decreased , accordingly , maximum ground level concentration occured at shorter distance and at the receptor the concentration is higher. More stable the atmosphere is , the further the distance is found. The higher concentration is found at elevated receptor point than at the ground level. SSW downwind receptor is POBAI mountain , accordingly , the concentration is highest. The most impacted community is Ban Pak Tan Ao-Udom with the level of 80 ug/cu.m. The change in stack height causes the change in result of SO_2 concentration about 1% to 1% change in height. The change in stack exit temperature becomes more critical as the temperature becomes lower than 10% in which the maximum ground level concentration increases 1.2%.

From "CRSTER" , it shows that the most impacted community is Ban Ao-Udom with SO_2 concentration of 69 ug/cu.m. Similarly, the higher concentration is found at elevated receptor point than at the ground level. The change in stack height causes the change in SO_2 concentration about 1.2% to 1% change in height. The change in stack exit temperature becomes more critical as the temperature becomes lower than 10% in which the maximum ground level concentration increases 3.7% to 1% change in temperature.

Because of the valley-like of the study area , one can use "VALLEY" to estimate the annual as well as the short term mode of SO_2 concentration downwind from the plant with less input data and shorter computer time comparing with "CRSTER".