Emission Inventory for Sapugaskanda Industrial Area.

By

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Dedication

Those who love to see the greeneries tomorrow.

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ABBREVIATIONS AND ACRONYMS

AAQS	Ambient Air Quality Standards
AC	Activated Carbon Process
AMW	Average Molecular Weight
APPL	Asia Power Private Ltd.
ATF	Aviation Turbine Fuel
$C_{(x)}$	Concentration of x
C_1	Methane derivatives
C_2	Ethane derivatives
C_3	Propane derivatives
CEA	Central Environment Authority
CEB	Ceylon Electricity Board
CMR	Colombo Metropolitan Region
CPC	Ceylon Petroleum Cooperation
DF	Diesel Fuel
DSI	Dry Sorbent Injection
EIA	Environmental Impact Assessment
HF	Heavy Fuel
iC_4	Iso Butane derivatives
IEE	Initial Environmental Examination
LDV	Lakdanavi Power Station
LPG	Liquid Petroleum Gas
LTO	Landing and Take Off
NBRO	National Building Research Organisation
nC_4	Normal Butane derivatives
NE	North East
ppm	Parts per million
R. No.	Route Number
SDA	Spray Dryer Absorption
SPM	Suspended Particulate Matter
SPS	Sapugaskanda Power Station
SPSEX	Sapugaskanda Power Station Extension
SW	South West
UDA	Urban Development Authority
USEPA	United State Environmental Protection Agency
VOC	Volatile Organic Carbon
WAP	Walther Process
WHO	World Health Organization
WS	Wet Scrubbing

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Summary

In this thesis an emission inventory for an industrial area is developed, and mathematical modeling on emissions and comparisons with air quality criteria are presented. With emission data recorded in a scientific manner, an emission inventory is a powerful tool used for sound environmental management all over the world. It provides the foundation for all air quality management programs providing information on assessments of the air emissions, interactions among air pollution sources in a region, as input data for air quality models, implementation and tracking of control strategies in air pollution emissions. It has several branches, which depends on the methodology adopted in the preparation stages. One of the main branches is that area emission inventory.

Area Emission Inventory collectively represents individual sources that are small and numerous and that have not been inventoried as specific point, mobile, or line sources. Generally, air emissions are calculated by using emission factors. These emission factors are available in the world and they are developed based on the experienced gathered by the developed countries. However, the use of those emission factors in the preparation of inventories is questionable in the developing countries. A set of emission factors for the particular systems studied have been developed in arriving at the final inventory.

Spugaskanda area had been selected to develop an area emission inventory. This area is the most vulnerable for air quality degradation in Sri Lanka at present. There are 03 thermal power plants having capacity of 260 MWe at the Sapugaskanda area. Apart from that, the Ceylon Petroleum Corporation (CPC) is doing its refinery activities in the vicinity of the site, which is the only petroleum refinery in the island. Further a well developed industrial estate borders this site.

The calculated emissions from the Sapugaskanda are 13,331 metric tons of Sulphur Dioxide, 1,070,608 metric tons of Carbon Dioxide, 17,166 metric tons of Nitrogen Dioxide and 323 metric tons Particulate per annum.

Further study was carried out to run a dispersion model using the calculated emission load from the selected area to check whether the predicted pollution concentrations exceed the present ambient air quality standards. Meteorological inputs for this model was prepared using the real time data collected in the selected area.

The model prediction was done for 04 monsoon periods. The predicted pollution concentration at North East (NE) monsoon is comparatively high when compared to that of South West (SW) monsoon. But the occurrence of stability classes during these monsoon periods is almost same. Therefore, the relatively low wind velocities experienced during the North East monsoon could be the reason for high pollution levels during this period. The monitored pollution concentration at the downwind direction in the Sapugaskanda area during the periods of NE & SW supports this observation.

Finally further developments necessary are forwarded for consideration.