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Pollution Scenarios through Atmospheric Dispersion Modelling Based on Real Measurements of Selected Urban Areas in Abu Dhabi, UAE

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ABSTRACT

Power requirements in the city of Al Mirfa in western Abu Dhabi are covered by the Al Mirfa Power and Distillation Plant. Comprehensive emission inventories for 2007-2008 were used to execute an ENVIMAN (OPSIS AB Company, Sweden) Gaussian dispersion model to predict ambient ground level concentrations of nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter (PM₁₀) and sulfur dioxide (SO₂) at selected receptors considering all emission sources located in the area. Two years of meteorological data was used in conjunction with the dispersion model to compute NO_x and SO₂ levels in and around the power plant. To validate the model, computed results were compared with the average values measured at a fixed Air Quality Station in Al Mirfa city. The highest hourly, daily and annual ground level concentrations under exiting meteorological conditions were then analyzed. The computed results for the study area revealed that daily, hourly and annual concentration values did not exceed the Federal Environment Agency (FEA) standard, and the contribution of plant emissions to the ground levels pollutants in the surrounded area range from 3.1 to 109 µg/m³ for NO₂, and 1.1 to 41.4 µg/m³ for CO. This study can be considered a baseline study for any future expansion in the plant. Based on these results, mitigation strategies are not required.

KEYWORDS

Power Plant; Sulfur Dioxide; Nitrogen Oxides; Emissions

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References

- [1] J. I. Levy and J. D. Spengler, "Modelling the Benefits of Power Plant Emission Controls in Massachusetts," *Journal of Air and Waste Management Association*, Vol. 52, No. 1, 2002, pp. 5-18. doi:10.1080/10473289.2002.10470753
- [2] J. I. Levy, J. D. Spengler, D. Hlinka, D. Sullivan and D. Moon, "Using CALPUFF to Evaluate the Impacts of Power Plant Emissions in Illinois: Model Sensitivity and Implications," *Atmospheric Environment*, Vol. 36, 2002, pp. 1063-1075.
- [3] M. T. Lopez, M. Zuk, V. Garibay, G. Tzintzun, R. Iniestra and A. Fernandez, "Health Impacts from Power Plant Emissions in Mexico," *Atmospheric Environment*, Vol. 39, No. 7, 2005, pp. 1199-1209. doi:10.1016/j.atmosenv.2004.10.035
- [4] A. M. Kazim, "Assessments of Primary Energy Consumption and Its Environmental Consequences in the United Arab Emirates," *Renewable and Sustainable Energy Reviews*, Vol. 11, No. 3, 2007, pp. 426-446. doi:10.1016/j.rser.2005.01.008
- [5] M. P. Ireland, J. Gomez, B. Cornet, T. Ellis, A. Clark and M. Grundy, "Quality Management in the Emirates-Case Study: Abu Dhabi, International Conference Integrated Sustainable Energy and

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- [6] Abu Dhabi Water and Electricity Company (ADWEC), " Annual Statistical Report," United Arab Emirates, 2008.
- [7] Al-Azmi, N. Bader, Nassehi, V. Khan and R. Abdul, " SO₂ and NO_x Emissions from Kuwait Power Station in Years 2001 and 2004 and Evaluation of the Impact of These Emissions on Air Quality Using Industrial Sources Complex Short-Term ISCST Model," Water Air and Soil Pollution, Vol. 203, No. 1-4, 2009, pp. 106-178.
- [8] M. Shahgedanova, T. P. Burt and T. D. Davies, " Carbon Monoxide and Nitrogen Oxides Pollution in Moscow," Water, Air, and Soil Pollution, Vol. 112, No. 1-2, 1999, pp. 107-131. doi:10.1023/A:1005043916123
- [9] H. T. Nguyen and K. Ki-Hyun, " Comparison of Spatiotemporal Distribution Pattern of NO₂ between Different Types of Air Quality Monitoring Stations," Chemosphere, Vol. 65, No. 2, 2006, pp. 201-212. doi:10.1016/j.chemosphere.2006.02.061
- [10] L. Dovile, " Nitrogen Dioxide Concentrations and Their Relation with Meteorological Conditions and Some Environmental Factors in Kaunas," Environmental Research Engineering and Management, Vol. 43, No. 1, 2008, pp. 21-27.