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Ambient air quality impacts of a coal-fired power station in Lephalale area

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Abstract

Lephalale Municipality is a predominantly rural Municipality with 38 villages, two townships (Marapong and Onverwacht) and one town, Lephalale. Lephalale, formerly known as Ellisras, is a town situated in the "heart of the Bushveld" in Limpopo province. The town is growing rapidly and more industries are becoming concentrated within this small town. The construction of Medupi power station which is underway and other projects such as the expansion of Grootegeluk mine (coal 3 and 4 projects), and road developments in the area; have led to concern about the ambient air quality of the area. Other possible future projects are the Coal to Liquid project by Sasol and the Coal Bed Methane project by Anglo American Thermal Coal. The purpose of this study is to determine the ambient air quality impact of the Matimba power station in the Lephalale area. The AERMOD model and ambient air quality data obtained from Eskom's Grootstryd and Marapong monitoring stations were used to assess the ambient air quality of Lephalale. Sulphur dioxide and Nitrogen oxides were investigated. Both the model's results and the ambient air quality monitoring data indicated that the power station contributes to high -ground level concentrations of Sulphur dioxide. AERMOD simulated the nitrogen oxides results as nitrogen dioxide. From the study it is concluded that the power station is not the only source of nitrogen oxides. Nitrogen oxides concentrations were associated with low-level sources. The relationship between the criteria pollutants in this study was assessed. The study found that there is no relationship between sulphur dioxide and nitrogen oxides. This finding was used to support the idea that sulphur dioxide and nitrogen oxides are from different sources. It was also established that seasonality has an influence on the ground level concentrations of pollutants in the area.