The management of aerial particulate pollution: the case of Platinum Industry Smelters in the Rustenburg region of North West Province, South Africa.

by

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Abstract

South Africa predominates in global Platinum production; supplying 74% of the world's mined production in 1997. The most important use of Platinum is in the automotive industry where autocatalysts reduce vehicle exhaust emissions. Other uses of Platinum Group Metals (PGMs) include jewellery and decoration for coins, medallions and bars for investment. The electrical, chemical, petroleum refining, medical and dental industries as well as glass and fibre manufacturing further make use of PGMs. In South Africa, Platinum is mined almost exclusively from the Bushveld Igneous Complex. The area surrounding Rustenburg in the North West Province of South Africa, forms part of the western lobe of the Bushveld Igneous Complex and has especially rich reserves. These Platinum reserves are mined by three mining companies, namely Anglo Platnum, Impala Platinum and Lonmin Platinum.

Sustainable development in the mining industry requires commitment to continuous environmental and socio-economic improvement through effective environmental management. Environmental sustainability may be compromised in the mining industry by air pollution, which is a complex problem with benefits, risks, and costs being all-important parameters.

The Platinum mining industry has experienced considerable growth during the 1990's and 2000's (because of a rapidly increasing Platinum price reaching levels of ± $600/oz combined with a favourable exchange rate). This growth has lead to all three Platinum mines expanding their activities and increasing production. The amount of ore delivered to the Smelters of all three Platinum mines increased, but little attention was given to improvement (upgrading) of the air pollution control technology used in the Smelters to combat the amount of particulate pollution emitted. The situation was worsened by the specific atmospheric conditions present in the Rustenburg area. Air quality management plans were incomplete and did not support the preventative measures in place.

The goal of air quality management is to maintain a quality of air that protects human health and welfare, animals, plants (crops, forests and natural vegetation), ecosystems, materials and aesthetics. The foundation for achieving this goal is the development of policies and strategies; without a suitable policy framework (which include policies in several areas) and adequate legislation it is difficult to maintain an active or successful air quality management programme. When goals and policies have been developed, the next stage is the development of a strategy or plan in which it is necessary to consider both the role and control ability of the various air quality managing agencies.

Given the poor management of particulate air pollution that apparently extends into other forms of emissions from the mining companies, a management plan for the control of air quality in the Rustenburg region was developed. The plan, called the Rustenburg Regional Air Quality Management Plan (RAQMP) was developed to manage particulate emissions from the three Platinum smelters. The RAQMP contains crucial elements of international management plans (theoretical knowledge), but was further expanded to take into account the unique situation of the Rustenburg region.

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Soli deo Gloria

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