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Impacts of gold mine waste on the water quality in the West Rand region & the associated risk to Anglogold Ashanti

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ABSTRACT

This study was conducted at the West Rand Region, part of South African-based AngloGold operations. The study assesses the impacts of gold mining on the water quality and the change in landuse resulting from the mining activities on the West Rand Region. This was achieved by collecting historical data relating to the tailings dams and both surface and groundwater qualities between 1998 and 2003. The landuse information was gathered from the topographic map of Carltonville and remotely sensed data in the form of aerial photographs, landsat data and ASTER images. The data was analysed in a GIS ILWIS.

The sizes of the tailings dams have not changed significantly during the study period. The size of the plantation also shows a decreasing trend due to pollution from the tailings dams. The area surrounding the Anglo Gold mining operations is sparsely-vegetated due to both poor soils and the impacts of mining activities.

The surface water quality is poor and this water has negative impacts on the environment following accidental discharges and has potential negative impacts from seepage through the unlined dams. The quality of the groundwater is generally good with the exceptions of BH 18, MBH 8, MBH 5 and MBH 3 whose pollution arises from North mine tailings dams and North boundary dam. MBH 5 shows an improvement in water quality over time. The potential generation of AMD from the tailings dams is inhibited by the neutral pH of the tailings.

In order to improve the environment in the West Rand Region and to prevent further pollution, planting of indigenous trees to make up for shrinking plantation and lining of the dams be undertaken. Stricter maintenance and monitoring of both the sewage plants and the dams be implemented to avoid accidental discharges of poor quality water into the environment. A study to accurately quantify the groundwater pollution arising from both the tailings dams and other surface water bodies should be undertaken.