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Mitigating Acid Mine Drainage Pollution: A Case Study In the Witwatersrand Area of South Africa

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Abstract : In South Africa, mining has been a key economic sector since the discovery of gold in 1886 in the Witwatersrand region, where the city of Johannesburg is located. However, some mines have since been decommissioned, and the continuous pumping of acid mine drainage (AMD) also stopped causing the AMD to rise towards the ground surface. This posed a serious environmental risk to the groundwater resources and river systems in the region. This paper documents the development and extent of the environmental damage as well as the measures implemented by the government to alleviate such damage. The study will add to the body of knowledge on the subject of AMD treatment to prevent environmental degradation. The method used to gather and collate relevant data and information was the desktop study. The key findings include the social and environmental impact of the AMD, which include the pollution of water sources for domestic use leading to skin and other health problems and the loss of biodiversity in some areas. It was also found that the technical intervention of constructing a plant to pump and treat the AMD using the high-density sludge technology was the most effective short-term solution available while a long-term solution was being explored. Some successes and challenges experienced during the implementation of the project are also highlighted. The study will be a useful record of the current status of the AMD treatment interventions in the region.

Keywords : acid mine drainage, groundwater resources, pollution, river systems, technical intervention, high density sludge
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