

## Mitigation Measures for the Acid Mine Drainage Emanating from the Sabie Goldfield: Case Study of the Nestor Mine

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**Abstract :** The Sabie Goldfield has a history of gold mining dating back more than a century. Acid mine drainage (AMD) from the Nestor mine tailings storage facility (MTSF) poses a serious threat to the nearby ecosystem, specifically the Sabie River system. This study aims at developing mitigation measures for the AMD emanating from the Nestor MTSF using materials from the Glynn's Lydenburg MTSF. The Nestor MTSF (NM) and the Glynn's Lydenburg MTSF (GM) each provided about 20 kg of bulk composite samples. Using samples from the Nestor MTSF and the Glynn's Lydenburg MTSF, two mixtures were created. MIX-A is a mixture that contains 25% weight percent (GM) and 75% weight percent (NM). MIX-B is the name given to the second mixture, which contains 50% AN and 50% AG. The same static test, i.e., acid-base accounting (ABA), net acid generation (NAG), and acid buffering characteristics curve (ABCC) was used to estimate the acid-generating probabilities of samples NM and GM for MIX-A and MIX-B. Furthermore, the mineralogy of the Nestor MTSF samples consists of the primary acid-producing mineral pyrite as well as the secondary minerals ferricopiapite and jarosite, which are common in acidic conditions. The Glynn's Lydenburg MTSF samples, on the other hand, contain primary acid-neutralizing minerals calcite and dolomite. Based on the assessment conducted, materials from the Glynn's Lydenburg are capable of neutralizing AMD from Nestor MTSF. Therefore, the alkaline tailings materials from the Glynn's Lydenburg MTSF can be used to rehabilitate the acidic Nestor MTSF.

**Keywords :** Nestor Mine, acid mine drainage, mitigation, Sabie River system

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