

Utilization of Soda Ash for the Treatment of Acid Mine Drainage

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Abstract— This study focused on addressing the environmental challenge of Acid Mine Drainage (AMD) in the mining industry. The research aimed to utilize soda ash for the treatment of AMD, simultaneously valuable minerals. AMD samples, rich in magnesium, sodium, manganese, aluminum, copper, iron and sulfate were analyzed using ICP-MS. The AMD samples underwent batch neutralization with soda ash. Characterization of the AMD showed that it had a pH of 2.32. Optimal conditions for AMD neutralization were found to be 20 g of soda ash and 30 minutes of contact time. The results indicated successful neutralization to a pH of 7.66, with percentage recoveries for Cu, Mg, and Mn at 0.16%, 48.82%, and 0.67%, respectively. However, the recovered water failed to meet SANS 241 standards for potable water, suggesting that soda ash alone is insufficient for potable water recovery but for agricultural purposes.

Keywords— Acid Mine Drainage, Minerals, Neutralization, SANS 241, Soda ash.

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