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TREATMENT AND REUSE OF MINE IMPACTED WATER

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The threat to the South African environment from acid mine drainage and mine-impacted waters is well documented. Effluents from the gold- and coal-mining industries can severely impact upon the quality of water supplies and affect all major industries across the value chain. Substantial volumes of water can, however, be made available through the reuse of treated acid mine water. The waste waters could be treated to levels that ensure that they meet "fitness-for-use" guidelines for alternative applications such as agriculture, sanitation or use in other industrial processes, reducing the treatment cost required for potable water production. The aim of this 'reuse philosophy' would ultimately be to reduce potable water consumption and subsequently have a positive effect on water conservation on both a local and international level. To this end Mintek has developed several technologies for the treatment of mine impacted waters, including: i. the SAVMINTM process developed for sulphate removal from mine impacted water. The four-stage chemical precipitation process, including heavy metal precipitation, ettringite precipitation, carbonation and recovery of aluminium hydroxide via ettringite decomposition, can reduce the sulphate content of the effluent to below drinking water standards, while simultaneously precipitating the heavy metals present in the water. ii. passive biological sulphate reduction, a low-cost, low-maintenance technology, aimed at treating relatively low volumes of mine waters and effluents emanating from existing processes, and especially after mine closure, to produce effluents containing sulphate concentrations within the limits specified by regulations for discharge or re-use. iii. nano-enabled membranes and resins for removal of pollutants and pathogens from water at low cost and high efficiencies. This paper will describe the technical development of the different technologies, including laboratory-scale and pilot plant design. Based on the water quality data for each treatment technology, various reuse options will be discussed

Biography

Makhapa Makhafola did his postdoctoral training in Analytical Chemistry at Indiana University, USA is currently the General Manager: Research & Development at Mintek. He is a highly accomplished and knowledgeable Executive-level Management Professional with a track record of success in driving bottom-line performance of products and services across the Mining and Research and Development industries. He has worked as Lecturer in Analytical Chemistry at Tshwane University of Technology and University of Venda, South Africa. In 2004 he was appointed Director Quality Assurance at Walter Sisulu University. He was the Director Quality Assurance at the University of Venda until he joined University of Kwa-Zulu Natal as the Director Quality Promotion & Assurance in July 2010, part of his responsibility was to lead the World University Rankings project. He served as Member of Umalusi Council and also as Chairperson of Lovedale FET College Audit Committee. He is currently the Chairperson of DST/MINTEK Nanotechnology Innovation Centre Steering Committee and Member of the HyPlat Board. He chaired and facilitated various workshops on quality assurance in higher education. He is also serving as an Academic Committee Member of QS World Ranking Universities. He has presented his research work in more than 25 international conferences and has published in credible journals.

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