REPROCESSING OF GOLD FROM TAILINGS DAMS: A STRATEGY FOR TAILINGS DAMS REHABILITATION IN THE GIYANI GREENSTONE BELT, LIMPOPO PROVINCE, SOUTH AFRICA

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Abstract: In South Africa there are about 6,000 abandoned mines and the cost of their rehabilitation is about US$ 10 billion. The main concern here is the tailings dams, most of which are associated with gold mining. Consequently, there is need to identify new strategies for the rehabilitation of such tailings dams. One such strategy is to undertake feasibility study of reprocessing gold tailings dams and extract gold, while converting the residue to a construction material or during gold reprocessing, the tailings are to be relocated to a more suitable dumping site. Gold reprocessing from tailings dams is gaining momentum in South Africa especially in the Witwatersrand Basin where there are large volumes of tailings. Here the tailings dams are being explored, evaluated and reprocessed for gold recovery using hydraulic monitors that are cost-effective. The study focused on the evaluation of gold and heavy metals in tailings dams at Klein Letaba within the Giyani greenstone belt as a step for preparing the tailings dam for a clean-up during which gold can be recovered to offset the cost of rehabilitation. The work involved augering, profile logging and sampling up to a depth of 8 m along three profiles. A total of 95 samples were analyzed for heavy metals, using atomic absorption spectrometry and 24 samples for gold analysis by fire assaying. The tonnage for the heavy metals was rather low, for example, 2183 tons As, 667 tons Cr and 306 tons Mn. However, Au was 699 kg, which at the current gold price would be about US $ 30.7 million. The distribution of gold within the tailings dam was relatively uniform with mean concentration of 0.47 g/ton and a range from 0.21 g/ton to 0.74 g/ton. A slight increase in gold values was, however, observed with depth. Reprocessing of gold is therefore recommended, during which, the tailings could be used for the manufacture of bricks and tiles or be relocated to a more suitable site.

Keywords: Tailings dams, heavy metals, gold reprocessing, tailings dams rehabilitation