CONTAMINATION OF WATER RESOURCES BY THE BAUXITE/ALUMINA OPERATIONS IN JAMAICA.

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Abstract

Jamaica’s bauxite/alumina industry produces a waste product known locally as “red mud”. This waste has been disposed of, for over 30 years since the plants were constructed, in unsealed mined out pits within the karstic limestone. The karstic limestone is the principal aquifer in the island and supplies 80% of the islands water supply. The waste is more than 85% water, is highly caustic and rapidly infiltrates to the ground water table. Ground water contaminated by red mud shows increased sodium, pH and alkalinity concentrations. Monitoring of ground water around the four (4) processing plants in the island has indicated contamination of water resources.

Approximately 200 million cubic metres (MCM) of groundwater have been contaminated and another 200 MCM is at risk of contamination. The red mud ponds are in the direct path of ground water flow and pose a serious threat to ground water reservoirs and consequently the ground water reserves of the island. Relocation of the ponds would not remove the threat therefore other methods of disposal that would not contaminate water resources had to be found. The Government of Jamaica through its agencies, The Water Resources Authority (WRA) and the Jamaica Bauxite Institute (JBI), established with each plant monitoring committees that had as their objective the identification of new waste disposal systems and the reduction of contamination of water resources. The new techniques now employed include sealing with liners and clay, thickening of the mud and solar drying (stacking and drying method), sloping of thickened mud to create beaches against the face of the limestone outcrop and reuse of liquid fraction. Since these techniques were introduced, some 10 years ago, there has been significant improvement in water quality with sodium concentration declining at some water sources by over 500%. Continued collaboration between the Government agencies and the privately owned plants are continuing and further improvements in water and environmental quality are expected.