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Thesis

Impacts of Hydraulic and Constituent Loading on a Combined Passive System for the Treatment of Acid Mine Drainage.

Abstract

Acid mine drainage (AMD) is a major environmental problem at mining sites around the world. This problem starts when sulphide-bearing minerals are exposed to oxygen and water, generating a highly acidic solution containing toxic metals. A combined passive system was developed to allow mitigation of a moderate strength AMD under Canadian climatic conditions. This system consisted of four components including oxidation/sedimentation, peat biofilter, sulphate reducing bacteria and anoxic limestone drain.

Physical/chemical characterizations and the ionic sorption capacity of the utilized peat were evaluated during this investigation. The impact of seasonal AMD fluctuations was evaluated on the performance of the system by a combination of high and low flows and constituent loadings. Dissolved oxygen, redox, pH, alkalinity, acidity, sulphate and metal concentrations were measured regularly. The system adequately treated the synthetic AMD during all the operational conditions. Breakthrough was noted in the peat biofilter and sulphate reduction stages due to their limited adsorption capacities.

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Supervisors

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