

Applied Research: Biogeochemical Response of PAG Mine Waste to Bactericides and Vegetation¹

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Abstract: A proposed expansion at a North American gold mine will involve the management of 350 million tonnes of potentially acid generating (PAG) mine waste that contains about 15% pyrite. Until the PAG is backfilled into existing open pits and submerged about 20 years in the future, it is projected to produce acid rock drainage (ARD). Research was conducted to minimize ARD production through the application of anti-bacterial suppressants. A suite of nine kinetic cell tests, each containing about 20 kg of PAG and varying amounts of anti-bacterial amendments (including a control), were monitored for six months. Liquid amendments included sodium lauryl sulfate, sodium thiocyanate, and dilute milk. Two of the KCTs received a layer of biotic soil media, agronomic amendments, and four site-specific species of fast-growing grass seed. As the tests were conducted indoors in the winter, the revegetated KCTs were exposed to grow lights to simulate a natural growing season situation. The biogeochemical response of the PAG-filled KCTs varied; the cells that received diluted milk behaved the best as indicated by a steadily rising pH trend and commensurate decreases in iron oxidizing bacteria, dissolved iron concentration, and sulfate concentrations. Additional observations regarding the KCT responses to vegetation will be provided in the presentation.

Additional Key Words: ARD suppression; pyrite; acid generation; biotic soil media

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