

Coal Fly Ash as Contaminant Barriers for AMD Generating Mine Tailings

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ABSTRACT

A study was carried out to investigate the feasibility of using coal fly ash, a by-product from coal-fired power generating plants, as the contaminant barrier for acid generating mine tailings. The scientific principles the study are founded on the fact that coal fly ash generates alkaline leachate upon in contact with water. It is, therefore, anticipated that with proper engineering design, the coal fly ash leachate can be utilized in mine tailings management to encourage precipitation of metals, which leads to three possible benefits, i.e. to immobilize regulated metals from migrating in groundwater, to reduce the pore size as well as the hydraulic conductivity of both coal fly ash and mine tailings and to prevent generation of acid mine drainage. A research project based on abovementioned considerations was carried out and the preliminary conclusions include:

1. When permeated with AMD (pH 4), the hydraulic conductivity of the coal fly ash from two OPG stations decreased more than two orders of magnitude due to formation of precipitates from chemical reactions between the ash solids and AMD.
2. The hydraulic gradient required for AMD to break through the compacted coal fly ash is up to 10 times higher than that for water.
3. Results of chemical analyses on effluents from coal fly ash samples from two Ontario generating stations permeated by water and acid mine drainage indicated that the concentrations of regulated trace elements are well below the leachate criteria set by the Ontario Government.

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