

AT SOURCE ABATEMENT OF AMD USING WASTE PHOSPHATIC CLAY BARRIERS

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Acid mine drainage (AMD) from both active and abandoned surface mines continues to be a major problem. In an attempt to limit formation of AMD at its source, a low permeability phosphatic clay barrier has been under laboratory development. This clay is a waste product from the production of fertilizer in Florida. It has two properties that make it desirable for use in controlling AMD; a high percentage of smectite clay minerals, and a high percentage of phosphate ions. These properties give the clay an ability to limit AMD formation by both physical and chemical means. Laboratory permeability tests were conducted to determine the effectiveness of various methods of applying the clay to the acidic material. Results have shown that when the clay is mixed in with a cover soil or mixed in with the uppermost layer of acidic material, permeabilities can be reduced by four to five orders of magnitude. This represents a 10,000 to 100,000 times decrease in the quantity of AMD that would have to be treated. Furthermore, chemical analyses of effluent from all of the different methods have shown significant decreases in the concentration of heavy metals with the addition of a phosphatic clay barrier. However, the phosphatic clay does not appear to have the ability to buffer the pH of the effluent to any appreciable extent.

KEY WORDS: AMD, low permeability, phosphatic clay, waste product, barrier, smectite, phosphate ions

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