EVALUATING TECHNIQUES FOR ESTABLISHING A VEGETATIVE COVER ON AN ACIDIC REJECT COAL BASIN[1]

by

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Abstract: The 488-D Ash Basin is an unlined, earthen basin that contains approximately one million tons of dry ash and coal reject material at the U.S. Department of Energy's Savannah River Site. The pyritic nature of the coal rejects has resulted in the formation of acidic drainage (AD), which has contributed to groundwater deterioration and threatens biota in down gradient wetlands. Establishment of a vegetative cover is being examined as a remedial alternative for reducing AD generation within this system by enhancing the utilization of rainwater through evapotranspiration. Greenhouse studies were initiated to evaluate potential amendments and/or treatments required for plant growth in this acidic (1:1 pH $\approx$ 2.0) material. Treatments included the use of microencapulators to inhibit pyrite oxidation, and vesicular arbuscular mycorrhizae (VAM) to promote mycorrizal symbiosis. Forty-eight gravity lysimeters were packed with 4 Kg of air-dried coal reject material and amended with 4 Kg of either coal reject material (control); 1:1 coal reject/ fly ash mixture; or 2:1:1 coal reject/topsoil/compost mixture. Eight lysimeters from each group were leached with one pore volume of either a dilute H_2O_2/KH_2PO_4/NaOAc solution or distilled water. Thereafter, all lysimeters were leached weekly with 0.25 pore volumes of distilled water. After leaching was initiated, one-half of the lysimeters were inoculated with VAM (four per treatment/amendment pair). Subsequently, all lysimeters were planted with sprigs of bahiagrass (*Paspalum notátum)*. Within two weeks, all vegetation died in the non-amended (control) lysimeters. Grasses in the fly ash and topsoil/compost amended lysimeters, leached with only distilled water, exhibited 100% survival and showed good growth characteristics. The use of H_2O_2/KH_2PO_4/NaOAc as a pyrite microencapsulator proved to be beneficial from the standpoint of water quality, but was deleterious to plant growth and survival. The use of VAM inoculant did not significantly enhance plant growth or survival. Given these results, a field deployment utilizing fly ash, topsoil and compost amendments was established.

Additional Key Words: pyrite microencapsulation, fly ash, vesicular arbuscular mycorrhizae.

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