

Passive Treatment of Acid Mine Drainage in Systems Containing Compost and Limestone: Laboratory and Field Results. G. R. Watzlaf and D. M. Pappas. Abstract: Passive, down-flow systems, consisting of compost and limestone layers, termed successive alkalinity producing systems (SAPS), may be well suited for treatment of mine drainage containing ferric iron and/or aluminum. A column, simulating a SAPS, has been operated in the laboratory for 52 weeks. The 0.16-m diameter column consisted of a 0.30-m thick layer of limestone, a 0.76-m thick layer of spent mushroom compost and 0.91 m of free standing water. Actual AMD (pH = 3.02, acidity = 218 mg/L (as CaCO₃), SO₄ = 600 mg/L, Fe = 16.0 mg/L, Mn = 12.1 mg/L, and Al = 17.1 mg/L) was applied to the column at a rate of 3.8 mL/min. Effluent pH has remained above 6.2 (6.2-7.9) in the column system. A SAPS located in Jefferson County, PA has been monitored for the past 4.5 years. The SAPS has an approximate area of 1000 m² and contains a 0.4-m thick layer of limestone, a 0.2-m thick layer of spent mushroom compost, and 1.5 m of free standing water. Mine water (acidity = 335 mg/L (as CaCO₃), SO₄ = 1270 mg/L, Fe = 246 mg/L, Mn = 38.4 mg/L, and Al = <0.2 mg/L) flowed into the SAPS at a rate of 140 L/min. Water samples from the field and laboratory systems have been collected at strategic locations on a regular basis and analyzed for pH, alkalinity, acidity, Fe²⁺, total Fe, Mn, Al, SO₄, Ca, Mg, Na, Co, Ni, and Zn. Alkalinity has been generated in both field and laboratory systems by a combination of limestone dissolution and sulfate reduction. The column generated an average of 378 mg/L of alkalinity; 74% due to limestone dissolution and 26% due to bacterial reduction of sulfate. The field SAPS generated an average of 231 mg/L of alkalinity and exhibited seasonal trends. Sulfate reduction was responsible for 70% of the alkalinity production in the summer and decreased to as little as 30% of the alkalinity production in the winter. Additional Key Words: compost wetlands, sulfate reduction.

EVALUATION OF SELECTED GRASSES FOR THE REVEGETATION OF A COAL SLURRY LAGOON IN WESTERN KENTUCKY BY DIRECT SEEDING.

by

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The research was conducted on the intermediate zone of a 23 ha slurry impoundment located on the Gibraltar Mine, near Central City, Kentucky. Two separate experiments were established. In the first, cultivation was carried out using a conventional disc and in the second, an 'Aer-way' attachment was used. The experimental plots, each measuring 4 m x 3 m, were prepared and seeded in June 1993. Percentage cover results were estimated by field observation in September 1995. In the experiment where cultivation was carried out using a conventional disc, the greatest mean percentage cover levels with sideoats grama 'El Reno' (55%) being the best entry. For the second experiment, the highest percentage cover was obtained for switchgrass 'Alamo' (38%). These values reflect do not include weeds which averaged in the 40-50% ranged and most plots had 90-95% vegetation cover. Results for the cool-season species were generally disappointing and may have been due to late seeding-date. This study revealed that warm-season grasses, especially the tall-grass prairie species, produced reasonable stands on coal slurry after just two years.

KEY WORDS: direct seeding, coal slurry lagoon, warm season grasses, grass seed stratification