Field Testing of Geomorphic Landform Design Features in Central Appalachia[1]

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Abstract. Restoration of abandoned mine lands from bond forfeited mining permits and pre-law sites is on-going in Appalachia and across the United States. One potential reclamation technique to reclaim these areas is geomorphic landforming that attempts to approximate the long-term, steady state landform condition. The objectives of the research described herein were to design, implement, and monitor a pilot test design of the geomorphic landform with a cap and cover system at a coal refuse site in Greenbrier County, West Virginia. Both constructability and performance were considered. First, a 1133-m^2 field site was designed to demonstrate and test geomorphic reclamation features. The field site was composed of three test plots (60% refuse with 40% paper fiber, 80% refuse with 20% paper fiber, 100% refuse) that centrally drained into a geomorphic channel. A hydraulic barrier composed of compacted refuse and slopes up to 2H:1V were included. Ground cover, infiltration of vegetation layer and hydraulic barrier, compaction, water quality, and surface temperature were monitored. Infiltration rates of the hydraulic barrier were 9.7%-20.6% less than the refuse before disturbance despite being lower than the required compaction density. Vegetation was reseeded to meet ground cover greater than 30%. Surface temperature varied 11°C across the plots, affecting grass germination. Mixing the paper fiber with the refuse prior to placement resulted in the most reliably mixed growth layer. Lessons learned from this pilot study will be used to inform geomorphic reclamation at a larger scale.[3]

Additional Key Words: Cap and cover system, water balance cover, abandoned mine land, short paper fiber

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3. Work reported here was done near 38°00'50.4"N 80°36'05.2"W.