Gauging Success of Coal-Combustion Byproducts Utilization in Indiana Abandoned Mine Land Reclamation

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KEY WORDS: reclamation, coal-combustion byproducts, water quality

ABSTRACT

The Indiana Geological Survey conducted two projects that assessed the performance of coal-combustion byproducts as amendments for reclaiming abandoned mine lands in Indiana. These assessments were accomplished by monitoring hydrologic and water-quality changes at the amended sites.

At an abandoned mine site in Pike County, a blend of pulverized coal-combustion fly and bottom ash was used as fill material in final-cut lakes, and fixated flue-gas desulphurization scrubber sludge was used as an impermeable capping material over the ash fill and acid-generating coal-processing waste. Both surface and ground water were monitored on a quarterly basis from one year before reclamation (1995) to five years after reclamation (2001).

At a site in Clay County, a blend of fluidized-bed combustion ash and microbiological fermentation byproduct was applied as a synthetic soil cap for a large coal-washing waste pile. Soil moisture and pore-water chemistry changes in the vadose zone below this amendment were monitored beginning the first month after application in 2001 and continuing through 2003.

The major indicator of success at both sites is that diverse vegetation thrives on once barren areas. Water quality varied from some improvement in acidic conditions to no improvement during monitoring, depending on the hydrologic changes caused by the amendments. Leached components from coal combustion byproducts were either not detected outside the boundaries of the amendment, or they occurred in concentrations only slightly elevated from baseline values. If success is measured by thriving vegetation and negligible contamination from the amendments, then both sites were successfully reclaimed.

Submitted for consideration in the 2005 World of Coal Ash, April 11-15, 2005, Lexington, Kentucky, USA.