

The Use of Bottom Ash in the Design and Construction of Dams

Pedro J Amaya¹, Andrew J Amaya²

¹ American Electric Power, One Riverside Plaza, 22nd Floor, Columbus OH 43215

² Thomas Worthington High School, 300 Dublin-Granville Rd. Worthington OH 43085

Keywords: Bottom Ash, Dams, Shear Strength, Unit Weight, Compressibility, Permeability, Grain-size

Abstract: The design of dams requires selecting materials that possess engineering properties that allow a structure to perform in a reliable and safe fashion while allowing their construction to be carried out within the economic and time constraints of a project. The selected materials need to exhibit: high shear strength, unit weights that limit the loading on the foundation soils, and compressibility characteristics that minimize total and differential settlement. Permeability and grain-size characteristics of the selected materials determine their location within the cross-section of a dam. Bottom ash, a by-product of burning coal at a power plant, is a material that exhibits high shear strength, low compressibility, and relatively low unit weight. These engineering properties make bottom ash an ideal material in the design and construction of dams. Bottom ash also exhibits a relatively high permeability and a grain-size distribution that allows the design engineer to use it in direct contact with impervious materials and/or toe drains and to meet well established filter and piping criteria. The work presented herein describes the engineering properties of the bottom ashes that led to their selection in the design of the dams that form Horse Ford Creek Fly Ash Reservoir in Kentucky, Muskingum River Plant Upper Reservoir in Ohio, and Tanners Creek Fly Ash Pond in Indiana. These facilities are currently under construction. The bottom ash has proved to be an economical material because it has demonstrated to have not only good engineering properties but also to have constructability benefits.

Submitted for consideration in the World of Coal Ash 2007 Conference, held May 7-10, 2007.