Embankment Load Tests on an Active Ash Basin

Alan F. Rauch[1], Kenneth O. Hardin[1], Benjamin L. Phillips[1], Jeffrey B. Heun[2], and Larry C. VanGansbeke[2]

[1]Fuller, Mossbarger, Scott and May Engineers, 1409 North Forbes Road, Lexington, Kentucky 40511; [2]E.ON U.S., 820 West Broadway, Louisville, Kentucky 40232

KEYWORDS: ash pond, settlement, pore pressure, test fill, fly ash, bottom ash, embankment over fly ash, vibrocompaction

ABSTRACT

Two large-scale test fills were constructed on an active ash pond to gauge the response (settlement, lateral deformation, and pore pressure generation/dissipation) of the basin deposits to embankment loadings. The ash pond is located at a coal-fired generating station operated by E.ON U.S. in central Kentucky. The embankment tests were supplemented by borings, vane shear tests, cone penetration tests, and borehole geophysics. The field tests were undertaken to support the design of a vertical expansion to the ash basin, wherein the existing containment dam will be raised 60 feet. Site constraints will require constructing the embankment over fly ash and bottom ash deposits greater than 100 feet deep.

The field tests were constructed in an area of the basin underlain by about 35 feet of saturated fly ash. The footprint of one test fill was treated with vibrocompaction, wherein a pipe pile was vibrated to full depth and retracted on spacing of three diameters. The test embankments were constructed of transported bottom ash and reached average heights of 20 and 23 feet. Settlements on the order of 0.5 inches and lateral deformations up to 3 inches were measured. In situ vibrocompaction was effective in reducing the compressibility of the ash deposits.

Significantly, pore water pressures generated by the embankment loading dissipated rapidly (within a few days) due to the relatively high permeability of the ash. The embankment tests conclusively demonstrated the proposed construction will be feasible.

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