Challenges of Closing Large Fly Ash Ponds

Steve Macrowski¹, John Esser¹, John Seymour¹, Pedro J Amaya²

¹Geosyntec Consultants, 134 N LaSalle Street – Suite 300, Chicago, IL 60602; ²Civil Engineering and Geotechnical Services, American Electric Power, 1 Riverside Plaza – 22nd Floor, Columbus, OH 43215.

KEYWORDS: Pond Closure, Fly Ash, Acid Mine Drainage, High Hazard Dam, NPDES Permit Compliance.

ABSTRACT

Closure of a 120 hectare (300 acre) fly ash disposal pond contained by a high hazard dam in a former coal mining area presents significant challenges. The fly ash pond was created by construction of a 40-m high earthen dam in an existing stream valley and then sluicing of fly ash into the pond. Approximately 40 hectares (100 acres) of the fly ash was covered with a 3 m layer of sandstone and shale “blastrock”. The remaining area is open water up to 10 m deep. A coal seam was mined for many decades prior to pond construction and acid mine drainage (AMD) lowers the pH of the pond such that buffering is required. Pond closure will involve lowering the surface water; exposing the surface of the fly ash; re-grading the fly ash and adding contouring fill; constructing an engineered final cover; lowering the dam; installing permanent stormwater management controls; constructing a new overflow spillway and discharge channel. Significant engineering challenges include managing settlements due to consolidation of the fly ash and contouring fill; interim and post-closure stability; management of fly ash consolidation water, cover infiltration water, and groundwater; management of stormwater throughout construction; coordination of AMD mitigation with closure construction; identifying economical borrow sources to meet the considerable construction volume requirements; and sequencing of the dam lowering. Throughout the closure construction, NPDES permit limit requirements must be met.

This paper contains a summary of the engineering, regulatory and constructability challenges of the closure and how they were managed.