Charles R. Lowman Power Plant Riverbank Stabilization

Leroy, Alabama

DBA Client: Geotechnical Engineering and Testing, Inc

Owner:
Alabama Electric Cooperative

Project Manager:
Black and Veatch—Energy

Contractor:
Joint Venture of Jordan Pile Driving and A. H. Beck Foundation Co., Inc.

Geotechnical Engineer:
Geotechnical Engineering and Testing, Inc.

Instrumentation:
Applied Foundation Testing, Inc.

DBA Services:

- Review of historical records of slope movements and evaluation of existing stability of riverbank
- Recommendations for expanded site investigation, field instrumentation, and laboratory testing to improve understanding of stability issue
- Evaluation of alternative stabilization measures including active drawdown wells, passive drains, stabilizing berms, tieback anchors, and soil dowels (drilled shafts), among others
- Developed final design consisting of one hundred 54-inch diameter drilled shafts socketed approximately 20-ft into underlying limestone
- Recommendations and review for construction drawings and instrumentation plan
- Review and analysis of construction procedures to evaluate stability under construction loads.
- Review of construction progress and interpretation of instrumentation measurements during and following construction

Project Highlights: Alabama Electric Cooperative (AEC) is constructing new air quality control improvements (AQC) at the Charles R. Lowman Power Plant in Leroy Alabama along the banks of the Tombigbee River. The selected location for the AQC additions is nearby a coal unloader facility, which has experienced lateral movements of approximately 4 feet over a period of over a decade as a result of river bank instability. Geotechnical investigations performed for this project revealed that the deep seated movements are produced by a combination of conditions including high artesian water pressures within an aquifer confined by a layer of stiff clay, low shearing resistance within the stiff clay, low overburden pressures as a result of dredging adjacent to the coal unloader facility, and low river levels which further reduces the overburden stress. After extensive investigation and analysis, including probabilistic assessments, a scheme of one hundred 54-inch diameter soil dowels (drilled shafts) extending greater than 100 feet down through the stiff clay and socketed 20 feet into the underlying limestone was selected to arrest lateral movements and protect the planned AQC additions. Construction of the drilled shafts within the river required construction of a series of seven work trestles to prevent overloading of the riverbank during construction and casing through overburden soils. Construction commenced in June 2006 and was completed in December 2006. The shafts and surrounding ground were extensively instrumented with standpipe and fiber-optic piezometers to monitor pore water pressures within the relevant strata, slope inclinometers within several of the installed drilled shafts and the surrounding ground to monitor lateral movements of the shafts and surrounding soil, and fiber-optic strain gages placed within selected shafts to monitor load transfer into the drilled shafts from the moving soil. Results of instrumentation readings taken prior to and during construction indicate that the system is performing as intended with limited soil movement occurring in order to mobilize resistance in the drilled shafts, but with the shafts maintaining sufficient excess capacity to maintain an acceptable margin of safety against future movements. Instrument observations at this site will continue for at least one year following completion of construction.

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