

# **Soil-Cement Mixing in Coal Ash for Seismic Stability of the Kingston CCR Facility**

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Following the December 2008 Kingston dredge cell failure, TVA initiated emergency recovery efforts and concurrent planning, design, and permitting for final closure of this coal ash facility. The recovery effort initially focused on off-site shipping of ash, but the balance of the recovered material will be stacked within the former dredge cell footprint followed by capping and closure.

Similar to many CCR facilities around the world, the Kingston dredge cell is sited on the floodplain deposits of a major river, and is underlain by liquefiable native soil and ash foundation materials. The dredge cell closure design addresses the challenges of seismic stability, with extensive liquefaction predicted during the design earthquake. The project includes the construction of an innovative, soil-cement structural containment system that buttresses the dredge cell embankment to maintain stability under dynamic loading conditions. The design will require construction of a soil-cement, cellular wall that extends to bedrock around the two-mile periphery of the site.

To model the dynamic, soil-structure interaction resulting from seismic loading, the geotechnical design effort has included a sophisticated numerical analysis carried out in FLAC. A fast-track project approach supports the compressed schedule, as dictated by the recovery effort, requiring multiple and parallel ash handling, design, and closure permitting elements. The design program includes proactive interaction with a peer review team and regulatory briefings.

This paper outlines the challenges encountered and solutions developed by the TVA/Stantec engineering team, while providing a potential view into future CCR seismic structural integrity solutions for similar facilities and project settings.

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