Integrating a Large Data Set to Properly Scope the Phase II Repairs at the Lake Manatee Dam

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In 2014, a deep seepage cutoff wall was installed at the Lake Manatee Dam in an emergency action to prevent an uncontrolled release of the reservoir. This constituted the Phase I repair. Extensive internal erosion and piping adjacent to and underneath the Service Spillway since the dam’s commissioning in 1967 resulted in a complex network of voids adjacent to and underneath this spillway and has resulted in multiple sinkholes forming adjacent to the downstream training walls after high tailwater releases. In 2015, non-emergency Phase II repairs were planned to fill these voids and prevent additional internal erosion and piping. A significant program was implemented between 2015 and 2018 to collect additional information to properly scope the Phase II repairs. These additional efforts included: SPT borings; CPT soundings; pump drawdown testing; dye studies; coring through the stilling basin and downstream apron to map the voids; ongoing monitoring of pore pressures in the dam; and, engineering stability and seepage evaluations. The result of this program was an enormous set of data that was somewhat unwieldy and needed to be integrated to scope the Phase II repairs. This paper reviews the analytical/integration techniques used to evaluate that very large data set, presents the conclusions and recommendations derived from those analyses, and presents the conceptual scope of work for the Phase II Repairs. The Phase II scope of work involves: filling the voids with a high permeability sand; completely encapsulating the Service Spillway with a seepage cutoff wall consisting of driven sheetpiling, contiguous soil-mixed columns, and grouted connections to the existing deep seepage cutoff wall; placing impermeable concrete slabs between the sheetpiling and the approach and training walls; placing an impermeable tremie slab in the approach channel; and, installing either a stop-log gate structure or using a combi-wall that can be removed and reinstalled across the intake channel.