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Design and Construction of Seismic Remediation for Duke Energy's Catawba Dam

Catawba Dam is a part of the Bridgewater Hydroelectric Development owned and operated by Duke Energy Carolinas, LLC (Duke). The dam is located in Burke and McDowell Counties in North Carolina and is one of three earthen dams which impound Lake James. At approximately 150 feet in height, original construction of the dam and ogee spillway was completed in 1921 with an addition to the spillway training wall in 1923. The dam was built using the semi-hydraulic fill method, rendering it susceptible to liquefaction concerns in the event of a strong earthquake. The dam was also built on alluvial foundation materials which are susceptible to liquefaction. The ogee spillway and training structures were constructed with cyclopean concrete and have weathered significantly since construction. The project to mitigate the dam for liquefaction concerns included construction of two stability berms, an extension of the ogee spillway, construction of two roller compacted concrete training walls, a cosmetic resurfacing of the ogee spillway, and the installation of a minimum flow bypass system through a penetration in the ogee spillway.

This paper will provide an overview of the project through design, permitting, and construction and provide discussions of challenges encountered during the project as well as lessons learned. Design issues included limited site space, limited site access, and difficulties with access to the primary borrow area. Permitting challenges included protection of endangered species and the proximity of the site to a protected waterway. Several challenges were also encountered during construction which provided opportunities for valuable lessons for future endeavors.