

BLUE RIDGE RESERVOIR PROJECT BLUE RIDGE, GEORGIA	YEAR COMPLETED	
	PROFESSIONAL SERVICES 2003 – 2012	CONSTRUCTION (IF APPLICABLE) 2010
PROJECT OWNER'S INFORMATION		
PROJECT OWNER Tennessee Valley Authority	POINT OF CONTACT NAME Mr. Jeff Brown	TELEPHONE NUMBER (706) 258-3671

RIZZO Associates (RIZZO) developed final designs for the seismic modifications of the upstream and downstream slope of the embankment dam, and developed remediation plans for the Penstock and Intake Tower at the Blue Ridge Reservoir.

This project consisted of the Blue Ridge Dam and an associated 22 MW hydroelectric facility. The Project was constructed in 1931 by the Tennessee Electric Power Company (TEPCO) and was acquired by TVA in 1939. The Dam was constructed on the Toccoa River and the facility is operated for hydroelectric power generation, flood control, and recreational uses. The Dam, approximately 1,050 feet (320 m) long at the crest and is 170 feet (52 m) high at the maximum section, was constructed using semi-hydraulic fill construction technology popular in the early 1900s.

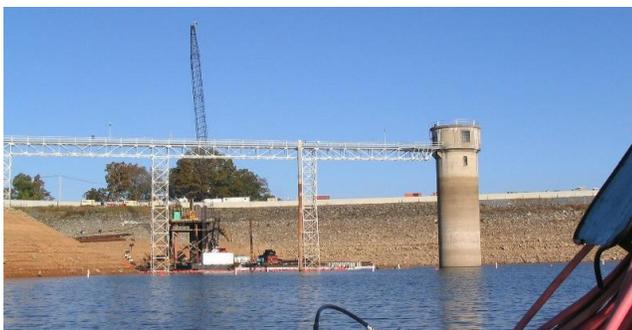
Tennessee Valley Authority (TVA) performed an evaluation of the embankment dam at Blue Ridge using a revised Maximum Design Earthquake (MDE). The evaluation included a comprehensive analysis of the seismic demand on the embankment as well as the liquefaction resistance based on current industry accepted practices. The results of this evaluation in terms of liquefaction susceptibility and permanent deformations indicated that remedial measures were required for both the upstream and downstream slopes of the embankment.

FINAL DESIGN AND SEISMIC MODIFICATIONS

The design called for the construction of a rockfill berm along the downstream slope of the embankment and either removing and replacing approximately 30-feet of material along the upstream slope of the embankment or using in-place ground improvement construction technologies. RIZZO performed a comprehensive engineering evaluation of the several issues associated with the existing condition of the dam related to potential dam safety and/or operation and maintenance considerations. RIZZO's scope of work included the preparation of final design documents for the seismic modifications including design calculations, construction drawings, and technical specifications.



PENSTOCK AND INTAKE TOWER REMEDIATION



TVA retained RIZZO to develop several remediation plans for both the Penstock and Intake Tower at Blue Ridge Reservoir. A detailed inspection and geotechnical investigation was performed during the 2003 Outage and Lake Drawdown to obtain all necessary information to support detailed designs of the remediation. The Intake is a massive reinforced concrete structure about 190 feet high. Engineering evaluations revealed that the tower may overturn during a Maximum Design Earthquake, potentially affecting the safety of the Dam.



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A 14 foot (4.27 m) diameter Penstock extends through the base of the Dam. Before the Penstock was put into service, settlement occurred near the centerline of the Dam. To prevent additional settlement, a 162 foot (49.37 m) plate girder was placed inside the Penstock bridging the settlement area. Additionally, a bulge in the Penstock liner occurred due to high-pressure differential when the Penstock was initially drained for inspection. To safely de-water the Penstock, the reservoir must be lowered more than 60 feet (18.28 m) below its normal pool elevation, which significantly impacted recreational use and project economics. RIZZO developed the remediation design that eliminated the need for deep reservoir drawdowns and provided a relatively watertight structure that will not compromise the safety of the dam.



The Blue Ridge project highlights RIZZO experience with the following deliverables:

- Structural and Dynamic Stability Analysis
- Equipment Qualification and Testing
- Earth Embankment Soil Stability Analysis
- Stress Analysis
- Design Plans and Specifications for Modifications
- Instrumentation
- Design Guides
- Drafting Services
- Construction Oversight and Support
- Seismic Modification Design
- Project Management

