MARTIS CREEK DAM  
U.S. Army Corps of Engineers  
Truckee, California

*Martis Creek Dam, located on Truckee River three miles east of Truckee, California, is owned and operated by the U.S. Army Corps of Engineers (USACE) as a flood control and water storage facility. Completed in 1972, the 113-foot-high embankment dam has a capacity of 20,400 acre-feet.*

**THE CHALLENGE**  
During the dam’s first test fill, significant seepage was observed along the left abutment of the dam. Subsequently, remedial work was performed at the dam but seepage levels remained significant. A study completed in 2002 concluded the existing spillway could pass 47% of the probable maximum flood (PMF), and that a full PMF would overtop the dam by 1.1 feet.

**KLEINFELDER’S SOLUTION**  
Kleinfelder performed Phase II subsurface investigations and characterizations, dam safety analyses, identification of interim risk reduction measures, dam breach analysis and inundation mapping studies, and paleoseismic trenching. Subsurface investigations were conducted involving more than 5,000 feet of sonic and rotary drilling (up to 300 feet into bedrock), installation of piezometers, and in situ permeability testing. A previously unrecognized fault was discovered by analyzing recently acquired LiDAR data.

Per USACE’s request, Kleinfelder conducted fault investigations to characterize the fault’s activity in terms of recency, slip rate, sense of motion, and other characterizations as required. Potential failure modes related to seepage, liquefaction, and slope stability were evaluated for six subsurface domains and identified based on site geology and engineering characteristics of the dam. Kleinfelder performed seven dam failure scenarios and subsequent flood routing down the Truckee River. The project also included 17 different routing scenarios using one- and two-dimensional routing of the dam failure hydrographs for approximately 32 miles down the Truckee River.

**CLIENT BENEFIT**  
Working under a compressed schedule due to the high risk of dam failure, Kleinfelder provided diverse services, including development of a dam breach simulation model, inundation mapping, identification of interim risk reduction measures, and geotechnical characterization and analyses. Kleinfelder utilized a risk-informed approach that is the basis of the most forefront dam safety guidelines being developed by USACE. As a result, Kleinfelder has been able to help guide and shape the project as it moves towards remedial measures.

*Kleinfelder is an employee-owned science, design, and engineering consulting firm providing solutions to meet our world’s complex infrastructure and natural resource challenges. Working as a team, our bright people will deliver the right solutions.*