Lake Murray, a man-made lake in Columbia, South Carolina, began as a source of energy for residents. Confined by the Saluda Dam, a hydroelectric plant that has a capability of 206 megawatts, Lake Murray contains 2,200,000 acre-feet of water. The dam was built on an earthen embankment in 1930 with no filter or drain protection. Because it was constructed in this way, the dam could be susceptible to liquefaction during a large earthquake, due to the loose density of the sluiced fill materials used to form the core of the dam.

In 2002, the Federal Energy Regulatory Commission (FERC) directed the owner of the dam, South Carolina Electric & Gas (SCE&G) to strengthen the structure of the dam in the event of an earthquake. The Saluda Dam Remediation Project became the largest active dam project in the United States and involved seismic upgrade requirements including the construction of a new back-up dam in the event that the original dam ever failed. Any failure of the dam without a back-up dam would cause major flooding for many miles downstream, including the city of Columbia.
In June 2003, general contractor Barnard Construction Company, Inc. contacted CSDA member Bluegrass Bit Company, Inc. to assist with the Remediation Project. The $275 million upgrade involved the construction of a combined roller-compacted concrete (RCC) mid-section and rockfill berms acting as a back-up dam located immediately downstream of the existing dam. It also included the excavation and back filling in the toe of the dam to depths of 60 feet. During the period of excavation and back filling, the water level in the reservoir was lowered to relieve some of the pressure on dam in order to maintain adequate stability.

Bluegrass Bit was hired to remove a concrete retaining wall in order to create access to the tower water supply to the turbines that produce hydroelectric power, commonly called the Penstock Five towers. These round landmarks are intakes rising 223 feet high. Project Manager Tony Niehaus made a special visit to the Columbia site to meet with the prospective client SCE&G, owner of the Saluda Dam. Bluegrass cut the concrete piers surrounding the discharge pipes for the dam. They used diamond saws to cut 40-foot hexagons from the 1,000-square yard riser blocks and utilized 20 cases of expansive grout per hexagon. Diamond saws were chosen to use because of the minimal vibrations they caused during operation.
Any heavy vibrations could have caused hazardous materials to enter the draft tubes, which would lead to excessive debris and tunnel deterioration. Workers placed two I-beams to support the 2,000-ton sections as they made the cuts in the hexagons, cutting in an X-pattern from one corner of the hexagon to the other. This was done so that the diamond wires used to saw would not be crushed by the weight of the concrete. Months in advance of cutting and excavating around the piers, workers drilled more than 600 holes that were 2 inches in diameter into each pier on a two foot center pattern approximately 18 to 20 feet in depth for the utilization of expansive grout. When the piers were ¾ cut the expansive grout was loaded to prevent any cracks from forming.

After the wire cuts were completed, cracks in the foundation had already begun to develop and then the hammers went to work. While slurry accumulated in depths of eight inches up to one foot in some areas and expansive grout broke concrete into ½ yard cubes half the size of the robotic hammers, workers ensured their safety by wearing the appropriate Personal Protective Equipment (PPE). Breaking the concrete into these cubes enabled cleaning and removal efforts to progress more efficiently. Bluegrass Bit Company, Inc. completed their portion of the project on time and under budget.

“We were extremely satisfied with the project because of the challenges we overcame and the relationships made on the project that continue to grow to this day,” said Tony Niehaus project manager for Bluegrass Bit Company, Inc.