

PROJECT PROFILE

REHABILITATION OF FOSSIL-FUEL POWER PLANT INFRASTRUCTURE

D'Appolonia conducted a geotechnical/structural evaluation, prepared remedial designs, and provided construction management to address problem operating conditions of components at the Decker Creek Power Station in Austin, Texas. Unit One of the 920-MW power plant had experienced structural problems due to movement of underlying expansive foundation soils. The most significant movements included: tilt of the mat foundation supporting the Turbine-Generator (T-G) pedestal; distortion of high-energy piping systems in the plant; cracking and offsets in the concrete spillway for the dam impounding plant cooling water; and cracking and heaving of the cooling water intake canal's concrete floor.

During the plant's service life, the 110-foot-long by 42-foot-wide turbine pedestal had tilted 6 inches due to differential movement of expansive soils supporting the pedestal foundation. To assess the magnitude of pedestal movements since plant construction, historical survey records were reviewed. Survey control was implemented and instrumentation was installed to monitor movements in the foundation soils and structure components. Survey control was provided by monuments that were

installed outside of the plant perimeter. The instrumentation included: standpipe and vibrating-wire piezometers, extensometer, plumb lines, and trams.

Instrumentation and testing data indicated that future foundation movements would be minimal. Structural analysis of the piping systems indicated that although the piping was locally overstressed, the systems could be repaired by realigning pipes to near their original configuration and installing new hangers/supports to accommodate system movements during plant operation. Therefore, rather than costly and time consuming pedestal foundation modifications, the repairs in the power plant were limited to realignment of the piping systems supplemented with long-term monitoring of structure and foundation movements.



Shallow utility realignment following reconstruction of the cooling water intake canal to address structural distress and Asian clam infestation.

Work on the intake canal included evaluation of vertical displacements that had reached 24 inches and assessment of problems associated with Asian clam infestation. The clams were plugging the plant's condensers and piping systems causing unplanned outages.

D'Appolonia developed a remedial design for the intake canal that included new 28-foot-high concrete transition structures and a pair of 11-foot-diameter intake pipes. The new design eliminated the use of all components of the existing canal that had been distressed by the expansion of the underlying soils. The modified hydraulics of the reconfigured structure increased cooling water flow velocities and eliminated the Asian clam problem.

D'Appolonia also assessed and developed remedial designs for rehabilitating the plant's cooling water reservoir. These repairs included an unstable dam embankment, malfunctioning internal drainage systems, and concrete deterioration in the spillway of the cooling water reservoir dam.



This 110-foot-long by 42-foot-wide turbine pedestal had tilted six inches due to differential movement from underlying expansive clay soil.