

Two-Unit Steam Generator Replacement Project San Onofre Nuclear Generating Station

San Clemente, California



SCHWAGER DAVIS, INC. PROVIDES BECHTEL POWER CORPORATION WITH PROJECT-CRITICAL PT SOLUTIONS THAT MADE POSSIBLE A UNIQUE GENERATOR REPLACEMENT PLAN TO EXTEND THE POWERPLANT'S SERVICE LIFE. REMOVAL AND REPLACEMENT OF THE FIRST TWO OF FOUR 640-TON GENERATORS HAS BEEN ACHIEVED BY CUTTING A 28 FT. DIAMETER OCTAGONAL OPENING THROUGH THE HEAVILY POST-TENSIONED CONCRETE WALL OF THE UNIT 2 CONTAINMENT. THE SGR OUTAGE FOR UNIT 3 IS SCHEDULED TO COMMENCE IN SEPTEMBER 2010.



PROJECT PORTFOLIO - POST-TENSIONING SYSTEMS



IN DECEMBER 2006, BECHTEL POWER CORPORATION selected Schwager Davis, Inc. (SDI) as the post-tensioning subcontractor for the removal and replacement of two aging 640-ton steam generators at the San Onofre Nuclear Generating Station (SONGS). Because the containment structures' existing equipment airlocks were not designed to facilitate removal and replacement of the massive generators, Bechtel planned to cut a temporary 28 ft. diameter octagonal opening through each unit's 4-foot-thick, heavily reinforced concrete shell to allow the removal of the old generators and installation of the replacements. The project plan also incorporated an evaluation of impact on the containment structures' existing post-tensioning (PT) system. This was required because the PT tendons embedded in and near the temporary opening locations had to be detensioned and removed prior to removal of the containment concrete and liner plate.

This Project involved the first evolution removal of a PT strand system for a Bechtel SGR Outage, a factor that made detailed knowledge of and practical familiarity with the existing PT system a valuable asset. Due to their extensive involvement in the PT design & installation during the SONGS initial construction, SDI's core team members brought vital experience to bear from the early project planning and development stages. SDI's scope of work included: supply of replacement 55-strand 0.5" nuclear safety related hardware and materials, technical design and process development support for project implementation; performance of

an on-site tendon demonstration program; supply of specialty tendon removal and installation equipment; and providing 24/7 technical support for project execution over the 96+ day SGR Outage. After final structural analysis of the containment opening, the tendon quantity required for removal and replacement for each unit was determined as 82 tendons total, 46 horizontal and 36 vertical.

As part of the initial development phase of the Project, SDI established and implemented a QA Program in compliance with NRC Regulations Section 10CFR50 Appendix B. After audit reviews performed by Bechtel Power Corporation and supported by the Project Owner, Southern California Edison, SDI's Quality Assurance Program was formally approved in late 2008.

Prior to commencing critical path activities, SDI mobilized on-site to lead a demonstration program to validate and refine the equipment, procedures and processes proposed for removal and replacement of each tendon type. The hands-on experience gained by working with the large tendon sizes (up to 7.5 tons), complex tendon geometries, limited access conditions and confined workspaces clearly delineated the project challenges and allowed the team to optimize and finalize the equipments and methods ultimately employed. The program was carried out in the first half of 2009 during pre-Outage site preparation activities.

SDI's scope for the Unit 2 SGR Outage commenced in late September 2009 and was successfully completed in early January 2010 for containment restoration and early February 2010 for subsequent tendon re-greasing activities. Bechtel and the balance of the Project Team including SDI are currently preparing for the Unit 3 SGR Outage which is scheduled to begin in early October 2010. A current key focus for the Project Team is incorporating the lessons learned during the Unit 2 SGR Outage to ultimately improve the efficiency and overall performance on Unit 3.

