



WeldTech Services Corp. – Showcase Project Report
A Midwest Nuclear Power Station
Turbine Condenser Piping Replacement – March 2010

Project Description

WeldTech was contracted by the OEM to replace piping in three (3) LP turbine condensers at a Midwest nuclear power plant during a twenty-one (21) day project schedule. WeldTech project managed and planned the mechanical workscope associated with removal and replacement of condenser bellows, and implemented all of the cutting, rigging, welding and ancillary services (including scaffolding and machining services). WeldTech assembled a team including the scaffolding contractor, providing all supervision, union labor, equipment and tooling in an integrated full service approach. After diligent planning and vigilant execution, the project was completed in twenty (20) days.



Restricted access in the condensers required expert craftsmen working to a detailed project plan and schedule.

Project Initiative

The OEM provides an innovative turbine design which improves turbine efficiency and extends turbine component life. Additional benefits associated with new turbine design and material will help to increase megawatt output.

The new LP turbine replacement results in changes to pressure, temperature and flow conditions for the extraction piping. The new conditions change the loading on the existing extraction steam piping, condenser shell penetrations, and turbine and feedwater heater nozzles, including the existing bellows. The new loading conditions require installation of new bellows of improved design and materials.

Project Challenges

- An aggressive schedule of twenty-one (21) days for the bellows replacements which includes scaffolding and all mechanical scopes in the condenser.
- Safety concerns due to excessive equipment moving, cutting, rigging, fit-up, preheating and welding in a tightly confined area inside the condensers.
- An aggressive work environment including heat and welding/grinding smoke requiring confined space monitoring and controlled ventilation.
- Restricted access to the components requiring replacement.
- Tight access constraints for all mechanical activities.
- Contending with intermittent overhead workscope activities and component lifts.



The condenser piping and scaffolding were mocked up and new condenser bellows were rigged to the new LP turbine lower casing, to be lowered into place in one integral lift.

WeldTech Alternative Repair Approach

WeldTech offered a strategic (full-services) replacement approach including WeldTech management, supervisory and a field specialty union workforce who have extensive component repair and replacement experience. This approach would assure successful delivery of the projects schedule, quality, human performance and safety goals.

WeldTech installed (90) condenser piping welds on the A335 (P11) chrome-moly piping and bellows using manual gas tungsten arc welding (GTAW) on the root and hot passes and manual (shielded metal arc welding) SMAW to complete the welds.

Scope Description

WeldTech provided the following services and workscope completion including:

- Project planning, including preparation and submittal of weld packages, qualified weld procedures, travelers, and welder qualification certifications.
- Subcontracting of Safety Services for project safety management.
- All welding utilizing manual GTAW and SMAW processes for P1, P4, P5A, P5B, and P8 materials with and without post weld heat treatment.
- Subcontracting and managing the scaffolding contractor to install a creative modular design in (21) hours. Laser mapping of the condensers provided detailed information to shorten the duration of scaffold erection and disassembly.
- Monitoring of condenser air and ventilation using 6000 CFM HEPA air ventilators.
- Full-scale mock-up of the engineered scaffolding at the local labor hall.
- All bellows piping machining and end preparation by machining partner Hydratight.
- Removal and welded replacement of (27) bellows total in (3) condensers ranging in sizes from 24” to 12”.



The WeldTech integrated team managed restricted access and a tightly confined workspace and conditions with a creative scaffold design and specialty craft labor.

The entire crew consisted of a total of two hundred and four (204) WeldTech supplied personnel consisting of a Project Director, day and night Site Managers and Supervisors, scaffolding supervision and personnel including carpenters and laborers, QC inspectors, heat treating technicians, machinists, and more than one hundred and fifty (150) welders, boilermakers and pipefitters. The project schedule worked two (2) - twelve (12) hour shifts per day, seven (7) days per week. The up-front project planning and pre-outage preparation was conducted by a site manager, and supervision for three (3) months in advance of the project start date.



Project Challenges Resolved

WeldTech hand selected the crew and subcontractors to assure that the appropriate level of experience and ingenuity was available to implement this project according to the plan. Working closely with the OEM and the chosen subcontractors, WeldTech was able to assure QA program compliance through vigilant site management and monitoring of work activities and resources, including detailed and informative safety and pre-job briefings each and every shift change.



WeldTech expert welders execute first-time quality welds.

Why WeldTech (Project Value Recognized)

An innovative approach to scaffolding construction minimized installation and removal, increasing the time required for mechanical piping installation. Welding and machining of 1 ¼% chrome materials is not typically common for condenser piping, and WeldTech expert welders were able to deliver first-time quality on piping being preheated in a restricted and confined work environment.

The OEM selected WeldTech for this project because of a planned strategic approach to an aggressive schedule to complete this project. WeldTech provided an integral team of supervision, welding, machining, scaffolding, and safety management personnel which streamlined management interface for all disciplines. WeldTech also agreed to a bonus-penalty program motivated to deliver a high quality project safely, on-schedule, and with no human performance issues.

The schedule was delivered in twenty (20) days from condenser breach to closure. Based on WeldTech's project professionalism and delivery, the OEM will conduct planning with WeldTech for the balance of five (5) remaining LP turbine retrofit projects in the utilities nuclear fleet.