

Supporting an Engineering Services Contractor

Completing a Fast-track Program Involves Team Relationship with Engineering Services Contractor

Steam is essential in processing crude oil. The facility boiler that provides process steam at a large Bay Area refinery required refurbishment. The refinery owner retained a major engineering firm to manage all aspects of engineering, procurement, installation and operation of a temporary steam supply while the facility boiler refurbishment program was underway. In addition to a large, high-pressure, high-temperature boiler, the requirements included providing a boiler feedwater system and meeting stringent Bay Area Air Quality Management District (BAAQMD) emission limits of 30 ppm NOx.

Tosco Refining Company's Avon Refinery in Martinez, California (currently owned by Tesoro), required a 120,000 lb/hr, 600 psig, 750 degree Fahrenheit boiler and a companion feedwater system for a period of two months. Boiler emissions had to meet local air quality standards. The feedwater system required a 10-minute storage capacity of deaerated and chemically treated feedwater and a minimum pumping capacity of 300 gpm at 700 psig. Bechtel Corporation was retained by the owner to manage the project, including all aspects related to the boiler and feedwater system. The entire complement of equipment needed to be delivered to the job site within 30 days of contract award.

Engineers from Bechtel and Tosco visited Nationwide Boiler facilities in Fremont, California, to evaluate the company's engineering, fabrication and test capabilities. Following a plant tour and meetings with Nationwide Boiler engineers, a contract was awarded for design and production of a feedwater deaerating and pumping system and the rental of a skid-mounted 120,000 lb/hr, 600 psig 750 degree package boiler. Nationwide Boiler engineers designed and built the feedwater system to specifications developed by Bechtel engineers. It took slightly over three weeks to design, build and test the system. Once assembled, the structure was 22 ft high and weighed 35,000 lbs. It was partially disassembled for transit to Tosco Petroleum. Major components included a 120,000 lb/hr spray-type ASME deaerator with 2,700 gal treated-water storage and two high-pressure feed pumps, each powered by a 250 hp motor.

For temporary use, a 120,000 lb/hr superheat package boiler in Nationwide Boiler's inventory was outfitted with a low NOx burner and a PLC-based burner management system. A flue-gas recirculation (FGR) system was installed to assure that the stringent NOx and CO emission levels would be met.



Just over one month following authorization to proceed, the temporary feedwater deaerating and pumping system and low NOx, superheat boiler were installed and placed in operation. All equipment designs were approved by Bechtel engineers. Boiler stack emissions were below the established limits due to the use of FGR. The system operated successfully at full-load conditions for two months and was removed.



Customer Profile

- Tesoro Refining (formerly Tosco Refining's Avon Refinery)
- Martinez, CA
- Capacity of 166,000 bpd
- Plant produces motor fuels, conventional gasoline and diesel fuel

Supplied Equipment

- 120,000 lb/hr, 600 psi / 750F superheat skid-mounted package rental boiler
- New 120,000 lb/hr spray-type deaerator with water storage, two (2) high pressure feed pumps, and two (2) 250 hp motors