



Burner Replacement at University of Richmond

Transformation of coal fired boiler efficiently brings more heat and hot water to entire campus



Project Description

The University of Richmond’s power facility has 4 boilers, two of which were inactive at the time of this project. Due to increases in student population and greater requirements for steam and hot water, the University had to find ways to support the increased demand. The solution was to reactivate one of the previously coal fired boilers. The University is committed to using cleaner burning fuels and selected Waco to add a natural gas burner to the boiler.

Originally the power plant on campus had four stoker fired coal boilers collectively capable of producing 62,250 lbs. of steam per hour. Utilizing new technology in burner design, Waco installed a St. Johnson brand burner and was able to increase the capacity of a single boiler to 25,000 lbs of steam per hour – an increase of 60%. In addition to the improved efficiency, the new burner provides a dual fuel option which allows the University flexibility to choose between running off of bio-diesel or natural gas.

The project included the following:

- Piping to connect both fuel sources to the new equipment
- Upgrading the automated control systems
- Installing a FGR fan and new breeching
- Replacing the instrumentation controls that interfaced with the boiler/burner assembly
- Disassembling the coal equipment of the boiler, which included removing the coal stoker, hopper, over-fire fan, ash shutes and coal grates which were internal to the boiler
- Installing and designing a steel structure to accommodate the new refractory brick insulation in the floor of the boiler
- Installing a new water-column assembly

Unique Project Challenges

- 1 One of the biggest challenges of this project was working safely inside the boiler. This is defined as a confined space and requires additional safety precautions including air monitoring, proper air flow and trained personnel to meet OSHA requirements.
- 2 Transforming older equipment to a more modern system included upgrading the automated control systems in order to fully capitalize on energy efficiency. Waco’s personnel have extensive experience in transforming older systems to newer technology and were able to successfully manage this element in a cost effective manner.
- 3 The large burner element required building a temporary steel support for final burner installation. This was similar to building a custom scaffold, which required a high level of job-site ingenuity and creativity in order to complete the project safely and on-time.

Project Scale

- New burner capacity is 31 MMBTU/Hr
- Entire project spanned a 3-month period

Why Waco was chosen – credibility, certifications and past experience

As a result of previous work with the supplier of the new burner, Waco was referred to the University as the quality contractor of choice, and was subsequently invited to bid on the project. Waco’s past experience on similar projects and their ASME-R certification for work on pressure vessels and boilers provided the additional verification the engineering personnel needed to award the entire package.

Summary of Results

Jon Coon was the Project Manager. Only one change order was required, due to an unknown requirement of having to bring in a new power source from a different location on the project. Otherwise, the project was completed as per the original bid price. Even with all the challenging working conditions, the boiler was operational ahead of schedule with no workplace injuries.

In the end, the University was able to achieve a significant increase in steam production which produced the desired amount of heat and hot water capacity to support the growth the campus will need for future activities.

Installation Process



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