



Project Details



For over thirty years Longwood University has been utilizing bio-mass (sawdust & wood chips) as the main fuel source for their boilers that provide steam and hot water to most of the campus buildings. This is quite an achievement when many companies and facilities are just starting to tap into the benefits of using Bio-mass as a fuel component. Local sawmills and logging companies provide between 80-100 tons of sawdust per day. The economical and environmental efforts of the management team at Longwood have prevented these wood products from becoming just waste to be disposed of in landfills. This latest upgrade to the central utility plant will increase the capacity to over 80% of the university's energy requirements. Waco was awarded a contract in June of 2017 to upgrade numerous elements of the boiler plant. The installation included the following:

AFS No. 8 Boiler – This installation was the last of three (3) boilers that operate in this facility. Extremely tight conditions required a detailed rigging and execution plan. The AFS Water Tube boiler is rated for 25,000 lbs. per hour of steam at 80 psig and a feed water temperature of 212 F. The reciprocating stepped grate stoker evenly distributes the fuel across the surface. The combustion is accomplished very effectively leaving only ash, which is expelled thru the bottom side of the grate. Any hot gases coming off the grate are sent to the refractory lined furnace for further combustion. Structural steel frames and catwalks were added to this unit - so that operators can access critical components of the boiler system. All piping, fittings, valves, gauges and probes external to the boiler installed per ASME B31.1.

Webster Burner – this combination burner is set up for No. 2 oil and propane/natural gas. It is a low NOx burner assembly with a 50 HP blower, rated at 30 PPM flue gas recirculation. The Siemens LMV5 control package has all the components necessary for a fully automatic operation.

Draft Fans (over-fire and under-fire) – the cross flow draft air is fed to the air pre-heater assembly. Waco fabricated and installed ductwork and breeching attachments. The AirPro hi-temp draft fan assembly has a flanged inlet and outlet, TEFC motor and clean out door. Complete combustion is achieved with a multi-nozzle over-fire air system.

Enhanced Pollution Control Equipment – this vertical box feed-water economizer has a unique feature with a double wall insulated casing, removable panels and mechanically attached tubes which allow replacement without code welding. All breeching past the economizer was made with Corten® steel. The exhaust was a 40 inch diameter free standing A-36 carbon steel stack fabricated with 1" through 3/16" plate. All fasteners were A325 stainless steel. The platform and caged ladder were hot dipped galvanized. The whole system is rated for 120 mph exterior conditions.

Baghouse and Improved Ash Recovery System – A DustEx 20,000 ACFM modular high temperature pulse jet bag-house was installed. This unit has a compressed-air manifold with individual pulse valves. It incorporates Allen-Bradley solid state cleaning controls in a NEMA 4 enclosure. The fiberglass filter bags are designed for top removal, which allows easier access and creates less dust when replacing. Two hopper level probes connected to an alarm were attached to notify operators of a plugged condition. A carbon reinjection system was installed for ash discharge from both the fly ash collector and air pre-heater assembly. This system included blowers, motors, drives and pneumatic piping to each furnace. An AFS drag chain ash conveyor fabricated from 1/4 inch carbon steel was modified to enhance the existing ash conveyor and storage system.

Bucket Elevator – The existing silos carrying the woodchips and sawdust were not a reliable delivery system for the upgraded capacity requirements of the new boiler. To insure a continuous delivery of bio-mass material, a new bucket elevator system was constructed. The Model B136-530 system had a 14 inch wide PVC centrifugal belt and included motors, drives, guards and inlet and outlet transitions. A discharge chute was custom designed to connect to the # 7 Auger. This new elevator is rated at 1,320 cu ft per hour and could meet the increased demand. Two (2) pressure relief panels were installed to insure compliance with NFPA standards.

Obviously, this project had many more aspects than simply rigging and installing the No. 8 Boiler. The new controls system required extensive upgrades to the current electrical and mechanical elements so it would function as designed and interface with the existing system correctly.

This enhanced boiler not only provides heat during the winter months, but it also is the main source of steam for the Absorption Chillers which deliver air conditioning to several campus buildings during the summer months.

Many challenges were presented to Waco's management team on this project, but our years of experience allowed us to complete the tasks and insure that Longwood University remains one of the leaders in bio-mass usage for their campus energy needs.



Project Facts:

- Start Date: June 2017
- Completion Date: July 2018
- Contract Value: 5.0 MM
- Project Manager: Jon Coon
- Supt: Russ Ricketts



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